

BUKU PEDOMAN AKADEMIK UNIVERSITAS NEGERI PADANG 2018/2019



FAKULTAS MATEMATIKA DAN ILMU PENGETAHUAN ALAM

FOREWORD

This book is an Academic Manual of Universitas Negeri Padang which contains, among other things, a brief history of the early establishment of UNP, an overview of supporting units, and the curriculum of all study programs at UNP, both educational and non-educational programs as well as professions that refer to the Law of the Republic of Indonesia Number 12 of 2012 concerning Higher Education, especially regarding the Curriculum, Presidential Regulation of the Republic of Indonesia Number 8 of 2012 concerning the Indonesian National Qualifications Framework (KKNI), Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 73 of 2013 concerning Application of the National Qualifications Framework for Higher Education, as well as Regulation of the Minister of Research, Technology, and Higher Education of the Republic of Indonesia Number 44 of 2015 concerning National Standards for Higher Education.

We express our gratitude and high appreciation to the leaders of faculties, departments, study programs and their staff, drafting team, BAK and UPT PTIK who have worked hard to prepare this 2018 manual.

Hopefully this book can be used as a guide and used properly.



Padang, 24 July 2018
Chancellor,

Prof. Ganefri, Ph.D.
NIP. 196312171989031003

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DECREE OF THE CHANCELLOR OF THE STATE UNIVERSITY OF PADANG

Number : 817/UN35/EP/2018

About

Universitas Negeri Padang Academic Guidelines 2018

CHANCELLOR OF UNIVERSITAS NEGERI PADANG

- Considering : a. that in order to improve education services for students and the academic community of Universitas Negeri Padang (UNP) it is necessary to issue Academic Guidelines;
- b. that the Academic Guidelines contain general information, organization and curriculum within the Universitas Negeri Padang;
- c. that with respect to points "a and b" above, it is necessary to issue a Chancellor's Decree concerning the application of Academic Guidelines as a guide in educational services at Universitas Negeri Padang.

- Remembering : 1. Law Number 20 of 2003 concerning the System National Education
2. Law Number 14 of 2005 concerning Teachers and Lecturers
3. Law Number 12 of 2012 concerning Higher Education
4. Government Regulation Number 4 of 2014 concerning the Implementation of Higher Education and Management of Higher Education
5. Decree of the President of the Republic of Indonesia Number 93 of 1999 concerning the Change of IKIP Padang to Universitas Negeri Padang
6. Presidential Regulation Number 8 of 2012 concerning Indonesia's National Qualifications Framework
7. Regulation of the Minister of Education and Culture Number 73 of 2013 concerning the Implementation of the National Qualifications Framework for Higher Education
8. Regulation of the Minister of Research, Technology and Higher Education Number 10 of 2015 concerning OTK UNP
9. Regulation of the Minister of Research, Technology and Higher Education No. 44 of 2015 concerning National Higher Education Standards
10. Regulation of the Minister of Research, Technology and Higher Education No. 67 of 2016 concerning the Statute of Universitas Negeri Padang

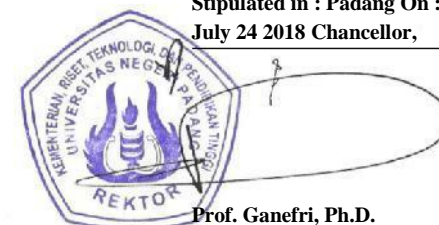
11. Regulation of the Minister of Research, Technology and Higher Education No. 90 of 2017 concerning New Student Admissions for Undergraduate Programs at State Universities

Pay attention to : UNP Chancellor's Decree Number 137/UN35/AK/2018 dated 12 April 2018 regarding the 2018/2019 UNP Academic Calendar.

DECIDING

- Setting :
First : Universitas Negeri Padang Academic Guidelines for the 2018/2019 Academic Year are used as Academic Guidelines by students and the entire academic community of Universitas Negeri Padang.
- Second : This Universitas Negeri Padang Academic Guidelines can be used by students for the 2018/2019 academic year until they finish attending education at Universitas Negeri Padang.
- Third : This decision shall come into force as from the date of stipulation, provided that if in the future it turns out that there is an error in this stipulation, it will be amended and corrected accordingly.

Stipulated in : Padang On :
July 24 2018 Chancellor,



Prof. Ganefri, Ph.D.
NIP. 196312171989031003

Copy:

1. Minister of Research, Technology and Higher Education of the Republic of Indonesia in Jakarta
2. DiChancellor General Belmawa Kemristekdikti in Jakarta
3. Inspector General of the Ministry of Research, Technology and Higher Education in Jakarta
4. All UNP Vice Chancellors
5. All Faculty Deans at UNP
6. All Heads of Institutions/Heads of Bureaus of UNP
7. All Heads of UNP Study Programs

SYMBOL



**SYMBOL MEANING
UNIVERSITAS NEGERI PADANG**

With the issuance of the Decree of the President of the Republic of Indonesia No. 93 of 1999 dated August 4, 1999, IKIP Padang changed its status to Universitas Negeri Padang. With the change in status, Universitas Negeri Padang (UNP) has the following tasks:

1. Organizing academic education programs and/or professional education in a number of disciplines of science, technology and/or certain arts.
2. Develop education, teacher training, and educate academic and professional staff in education.

UNP has a symbol in the form of a white circle with a black border in which there is the inscription UNIVERSITAS NEGERI PADANG at the top and UNP writing at the bottom flanked by black dots on the right and left, a blue circle with a yellow border inside there is a pair of yellow wings and the inside is white, three yellow and white books arranged in tiers, and above it is a white container where a red fire burns.

I. Shape Philosophy

The UNP symbol consists of two elements, namely absolute and relative forms:

- a) The absolute form is a circle, which means that UNP always stands firmly on scientific truth and strives and develops based on that truth.
- b) The relative shape is wings, three books, and a burning fire, meaning that UNP always accepts the truth from anywhere and develops to carry out the mission according to the task it carries out.

II. Meaning of the Image on the Emblem

- a. Circle has the meaning that UNP produces human resources who believe and fear God Almighty, capable of quality Academic Education, Professional Education, and Vocational Education based on Pancasila and the 1945 Constitution;
- b. Wings have the meaning of dynamic, creative, and innovative;
- c. Three books arranged in tiers have the meaning of the tridharma of higher education; and
- d. The burning fire has the meaning of intelligence, enlightenment, the foundation of life, and the development of society, nation and state.

III. The Meaning of the Colors on the Coat of Arms

- a. Black has the meaning of firmness in carrying out tasks;
- b. Blue has the meaning of depth and coolness;
- c. Yellow has the meaning of greatness and majesty of mind;
- d. Red has the meaning of dynamic, creative, innovative, and always open to renewal; and
- e. White has the meaning of purity and sincerity.

IV. Colors and Color Code

No	Symbol	Color	Color Code/RGB (Red-Green-Blue)
1.	Circle	Black Chrome Yellow Cobalt Blue	R: 0 G: 0 B: 0 R: 255 G: 167 B: 0 R: 0 G: 71 B: 171
2.	Wings	Chrome Yellow White	R: 255 G: 167 B: 0 R: 255 G: 255 B: 255
3.	Three Books	Chrome Yellow White	R: 255 G: 167 B: 0 R: 255 G: 255 B: 255
4.	Fire	Carmin Red White	R: 255 G: 0 B: 56 R: 255 G: 255 B: 255
5.	Container	White	R: 255 G: 255 B: 255

UNIVERSITAS NEGERI PADANG FLAG



UNP has a rectangular flag, with a length to width of 3:2 (three to two) in yellow color with the color code R:255, G:255, B:0 in the middle there is the UNP symbol.

UNIVERSITAS NEGERI PADANG HYMNE

Cipt. Erfan Lubis

♩ = 70 Do = Es

U ni versi ta Negri Pa dang ci ta mu ku bang ga kan eng

6 kau lah pi lar nan a gungpe nyangga h ci ta ci ta na ma mu ter u kir in dah

9 *Do = F*
da lam re lungji wa Dengani man dantaq wa tu naikan tu gas mu lia

14 *Do = Es*
men ca ri il mu me lak sa na kan tri dar ma Berge ma lah pu ji

20 pu ja ma sya ra kat il mi ah berko bar lah cip ta kar sa tu

25 na ba kal sar ja na Dan ja ya lah se la ma nya U ni

29 ver si ta Neg ri Pa dang Dan ja ya lah se la ma nya U ni

33 ver si ta Neg ri Pa dang

MARS OF UNIVERSITAS NEGERI PADANG

Cipt. Erfan Lubis

♩ = 120

U ni versi ta Neg ri Pa dang wa dah pem bi na dan pen di dik tu
 nas bangsa me nu ju ma sa de pang e mi lang men ja di ha ra pan di masa da
 lang U ni versi tas Neg ri Pa dang na ma mu ku jun jung dang gi dan ku
 a gung kan mem ba ha na lah di nu san tu ra per ka sa dan bang ga me na ap du
 ni a De rap dan lang kah se i ra ma un tuk meng ga pai ci ta ci
 ta Ber da se kan pa da ri dar ma wu ju d nya ta pe ng ab di
 an U N P U ni versi ta Neg ri Pa dang ja ya sla ma
 nya se la ma nya

HEAD OF UNIVERSITAS NEGERI PADANG
(UNP)



Prof. Ganefri, Ph.D

CHANCELLOR



Prof. Dr. Yunia Wardi, Drs, M.Si
VICE CHANCELLOR I



Drs. Syahril, ST, M.Sc, Ph.D
VICE CHANCELLOR II



Prof. Dr. Ardipal, M.Pd
VICE CHANCELLOR IV



Prof. Dr. Syahril B., M.Pd
VICE CHANCELLOR III

HEAD OF INSTITUTION AND HEAD OF BUREAU



Prof. Dr. Rusdinal, M.Pd
Chairman
Research and Service
To the Community Institute
(LP2M)



Dr. Edwin Musdi, M.Pd
Chairman
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and Quality Assurance Institute
(LP3M)



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Dra. Asmar Yulastri, M.Pd, Ph.D
Head of UPT. Career Development and Entrepreneurship



Dra. An Fauzia Rozani Syafei, MA
Head of UPT. Language



Drs. Aswardi, MT
Head of UPT. PTIK



Dr. Ardoni, M. Si
Head of UPT. Library



Dr. Yarmis, M.Pd., Kons
Head of UPT. Services and BK

**LEADERS OF FACULTY OF MATHEMATICS AND NATURAL SCIENCES
(FMIPA)**



**Prof. Dr. H. Lufri, M. S
DEAN**



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VICE DEAN I**



**Drs. Hendra Syarifundin, M.Si, Ph.D
VICE DEAN II**



**Dr. Hardeli, M.Si
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**Muhammad Subhan, S. Si, M. Si
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**Dr. H. Azwir Anhar, M.Si
Biology**



**Dr. Ratnawulan, M.Si
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**Dr. Mawardi, M. Si
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**Dra. Yurnetti, M. Pd
Science Education**

SECRETARY OF DEPARTMENT
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
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Dra. Pure Goddess,
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Chemistry

CHAPTER I
GENERAL INFORMATION

A. Brief History of Universitas Negeri Padang

Universitas Negeri Padang (UNP) is the result of the conversion of IKIP Padang into a university, which was originally called the Teacher Education College (PTPG). Since it was founded on September 1st

1954, UNP has undergone many changes. In the history of its development, the changes that have occurred include not only its name and position, but also the status and educational programs it has developed, in accordance with policies to meet the demands of educational development in the country. This change can be classified into six periods, namely the PTPG Batusangkar period, the FKIP period at Andalas University Bukittinggi in Batusangkar, the FKIP period at Andalas University Padang, the IKIP Jakarta Branch Padang period, the IKIP Padang period and the UNP period.

1. PTPG Batusangkar Period (1954-1956)

The period PTPG Batusangkar began to be established with six departments, namely the Department of Indonesian Language, the Department of History, the Department of English, the Department of Economics, the Department of Exact Science, and the Department of Biology. However, many first-generation students moved to PTPG Bandung and to PTPG Malang because lectures had not been running properly. As a result, very few students survive. Because of that, the department that originally numbered six was reduced to four departments that still have students, namely the Department of Indonesian Language, the Department of History, and the Department of Economics. and the Department of Mathematics. However, in 1955 a new department was opened, namely the Law Department, which was later listed as the first major to produce a bachelor's degree in education in 1964.

2. The period of FKIP Andalas University (Unand) Bukittinggi in Batusangkar (1956-1958)

In 1956 PTPG throughout Indonesia was integrated into local universities. Although the integration was a change of status, for PTPG Batusangkar which was integrated into Andalas University, Bukittinggi, the policy hardly affected previous programs. The regional upheaval that occurred at that time caused a slight bottleneck in the implementation of the lecture program for one year, from 1957 to early 1958.

3. FKIP Unand Padang Period (1958-1964)

After experiencing congestion until early 1958, FKIP Unand was reactivated on June 10, 1958 and on September 1 in the same year its position was transferred from Batusangkar to Padang. It was only after 1958 that FKIP Unand developed more steadily. In 1961, all B1 courses throughout West Sumatra were integrated into FKIP, namely B1 English courses and B1 History courses in Bukittinggi and B1 courses in Indonesian, Exact Science, Commerce, and Physical Education in Padang. Subsequent developments occurred with the opening of several new departments, namely the Department of Education Advisors, the Department of Life Sciences, the Department of Social Education, and the Department of Fine Arts. Almost all new majors develop the Baccalaureate program.

4. Period of IKIP Jakarta Padang Branch (1964-1965)

In 1964, FKIP Unand Padang was separated from Andalas University and became IKIP Jakarta Padang Branch. By organizing the existing departments, four faculties emerged, namely the Faculty of Education (FIP), the Teaching Faculty for Exact Sciences (FKIE), the Teaching Faculty for Social Sciences (FKPS), and the Teaching Faculty for Arts (FKSS). During this period, the Physical Education Department of FKIP, which was originally a B1 Physical Education Padang, changed its status to the Padang Branch of the Jakarta Sports College (STO), under the Department of Sports.

This period was a transitional period before IKIP Padang was independent. At the end of 1964 a new faculty was formed, namely the Faculty of Engineering Teacher Training (FKT), from a private institution which was fostered by the Development and Welfare Foundation of IKIP Padang. Thus, the Padang Branch of IKIP Jakarta has five faculties so that it is eligible for status as an independent IKIP.

5. The period of IKIP Padang as an independent institution (1965-1999)

As of August 7, 1965, with the Decree of the Minister of Higher Education and Science (PTIP) No. 351/1965, IKIP Padang has the status of an independent IKIP. The institute consists of five faculties with 14 departments, namely (a) FIP with the Department of Educational Sciences and the Department of Social Education, (b) FKPS with the Department of History/Anthropology, the Department of Economics/Cooperatives, and the Department of Civics/Law, (c) FKIE with Department of Exact Sciences, Department of Life Sciences,

Department of Natural Sciences, and Department of Chemistry (d) FKSS with Department of Indonesian Language and Literature, Department of English Language and Literature, and Department of Fine Arts, and (e) FKT with Department of Machinery, Department of Civil, and Department of Architecture.

In May 1966, all IKIP Padang activities were moved to Air Tawar. Since then the institute has gradually begun to build its campus, and develop wider programs so that in 1969 there were 21 departments in five faculties.

Since the first year of Five-Year Development I, IKIP Padang has grown rapidly. In 1970, IKIP Padang had a Laboratory School consisting of SMA and STM Laboratory. Two years later, January 1, 1972 the Laboratory School was completed with Kindergarten, Elementary School, and Junior High School. In the same year, IKIP Padang was assigned the responsibility to implement the Pioneer School Development Project.

Starting from the 1975 academic year, reforms in the field of program development were initiated with the use of the semester credit system (sks) which in 1979 was implemented in all universities throughout Indonesia in accordance with the decree of the Minister of Education and Culture.

The following years, 1976 and 1977, non-degree programs were opened in response to the increasing demand for secondary school teachers. This program without a degree or certificate program is known as the First Advanced School Teacher Education (PGSLP), with majors in Natural Sciences (IPA), Mathematics, Indonesian, and English. In 1977 this certificate program was expanded by opening new fields of study, namely Guidance and Counseling, Service Skills, and Craft Skills. Meanwhile, in the same year, another certificate program was opened called Senior High School Teacher Education (PGSLA) with the study areas of Biology, Physics, Chemistry, Mathematics, Indonesian and English. Both types of certificate programs last until the year 1978.

With the integration of the Sports College (STO) in 1977, IKIP Padang added a new faculty, namely the Teacher Training Faculty of Sports Science (FKIK) with the departments of Sports Coaching, Problematics and Recreation, and Sports and Health. Thus, IKIP Padang has six faculties.

In 1979 IKIP Padang opened the S0, S1 and Teaching Deeds I, II, III and IV programs. The S0 program consists of the D1, DII and DIII programs which specifically produce junior and senior high school teachers.

With the Decree of the Minister of Education and Culture dated March 14, 1983, the names of faculties in IKIP were determined nationally, namely the Faculty of Education (FIP), Faculty of Language and Arts Education (FPBS), Faculty of Mathematics and Natural Sciences Education (FPMIPA), Faculty of Science Education Social Affairs (FPIPS), the Faculty of Health and Sports Education (FPOK), and the Faculty of Technology and Vocational Education (FPTK).

In 1990, according to the policy of the Minister of Education and Culture of the Republic of Indonesia that the implementation of the LPTK program under one roof, the Teacher Education Schools (SPG) and Sports Teacher Schools (SGO) in West Sumatra (Bukittinggi and Padang) were integrated into IKIP Padang to become

Department of Elementary School Teacher Education (PGSD) Class Teacher and Department of PGSD Physical Education (Penjas). This is done in order to improve the quality of elementary school teachers. Likewise, in

1994, School of Special Education Teachers (SGPLB) Bandar Create Padang was also integrated into IKIP Padang to become the Department of Special Education (PLB) at FIP IKIP Padang.

The Postgraduate Program (PPs) of UNP has been initiated since 1981 under the name Credit Collection Activities (KPK) under the guidance of the Postgraduate Faculty of IKIP Jakarta with the Education Administration study program. The status of the KPK was upgraded to an independent study program with the Decree of the DiChancellor General of Higher Education No. 517/Dikti/Kep/1992 dated December 31, 1992. In the academic year 1994/1995 the Education Administration Study Program was grouped into several concentrations, namely Education Management, Guidance and Counseling, Social Science Education, and Language Education. In 1996/1997, two concentrations were opened again, namely Educational Technology and Environmental Management. In 1997/1998 several concentrations had the status of Study Programs.

6. Universitas Negeri Padang (UNP) Period (1999 – now)

The change of IKIP Padang to Universitas Negeri Padang (UNP) was stipulated by Presidential Decree No. 93 of 1999 on 24 August 1999. Previously, based on the Decree of the DiChancellor General of Higher Education of the Ministry of Education and Culture Number 1499/D/1996 dated June 20, 1996, The DiChancellor General of Higher Education approved the assignment IKIP of broader tasks to Padang to organize programs studies non-educational, in addition to continuing to organize and develop education for education personnel. Since the academic year.

1997/1998, IKIP Padang has started to organize various non-educational study programs as an extension of the mandate given by the government, through the Decree of the DiChancellor General of Higher Education, Ministry of Education and Culture No. 1884/D/I/1997 dated August 1, 1997, by opening study programs: 1) Indonesian Language and Literature, 2) English Language and Literature, 3) Mathematics, 4) Biology, 5) Physics, and 6) Chemistry for the program level S1. While the study programs 1) Electrical Engineering, 2) Civil Engineering Buildings, 3) Mechanical Engineering, 4) Electronic Engineering, 5) Automotive Engineering, 6) Catering, and 7) Clothing are opened for the D3 Program Level. Thus, UNP not only prepares students to become educational staff but also prepares academic and professional staff in certain non-educational fields.

In the 1999/2000 academic year, UNP received approval again to open a new non-educational study program, namely S1 Management and S1 Sports Science. Then, in 2001, UNP reopened four non-educational study programs, namely: Mining Engineering (D3), Information Science, Libraries and Archives (D3), Accounting (S1) and Development Economics (S1) and the fields of education namely: Sociology and Anthropology Education. (S1). So, until the 2001/2002 academic year, UNP has opened 19 non-educational study programs and will follow for other study programs.

With the change of IKIP Padang to UNP, there was a change in the names of the faculties to become the Faculty of Education (FIP), Faculty of Social Sciences (FIS), Faculty of Languages and Arts (FBS), Faculty of Mathematics and Natural Sciences (FMIPA), Faculty of Engineering (FT), Faculty of Sports Science (FIK), and through the approval of DIKTI No. 2816/D/T/2004 dated July 22, 2004 and the Decree of the Chancellor of UNP No. 05/J.41/KP/2005 dated January 2, 2005, one faculty was added, namely the Faculty of Economics (FE), then in 2015 through the approval of the Minister of Research, Technology and Higher Education and the Chancellor's Decree No. 175/UN35/KP/2015 On 15 July 2015, one more faculty was added, namely the Faculty of Tourism and Hospitality.

For the Postgraduate Program (S2) in 2001, a permit was issued to open the Guidance and Counseling Study Program. Thus, in 2001 PPs UNP had 6 study programs, namely Education Administration, Social Studies Education, Language Education, Educational Technology, and Basic Education. In addition, PPs UNP also has 10 concentrations, namely (1) Education Management, (2) Environmental Education Management, (3) Sports Education Management, (4) Indonesian Language Education, (5) English Education, (6) Education Economics/Geography, (7) History Education/PPKN, (8) Education

Sociology/Anthropology, (9) Educational Technology and (10) Vocational Education.

Starting from the academic year 2002/2003 until now several concentrations have changed status into study programs, namely: Biology Education, Physics Education, Chemistry Education, Mathematics Education, Indonesian Language and Literature Education, English Education, Geography Education, State Administration Science, Vocational Engineering Education, Sports Education, Management, Economics, Economics Education, Environmental Science, and Guidance and Counseling.

For the academic year 2003/2004 PPs implemented a Doctoral Program (S3) with a study program in Educational Sciences based on the Decree of the DiChancellor General of Higher Education No. 940/D/T/2003, dated May 7, 2003. The Education Science Study Program has several orientations, namely (1) Educational Resource Development (PSDP), (2) Mathematics and Natural Sciences Education, (3) Social Studies Education, (4) Language Education and Indonesian Literature, (5) English Language Education, (6) Environmental Education, (7) Education Management, (8) Guidance and Counseling, and (9) Educational Technology.

In addition to the Postgraduate Program above, in 2000 UNP opened the Master of Management (MM) Masters Program which was initially held in collaboration with UNP and the University of Jember. However, since the issuance of the Decree of the DiChancellor General of Higher Education No.

2596/D/T/2001 dated August 6, 2001, UNP has the authority to organize the Master of Management Program independently. In 2003, the MM Program was accredited to BAN PT based on the Decree of BAN PT No. 068/BANPT/Ak-II/S2/VII/2003. UNP's MM program currently has three concentrations, namely Public Management, Marketing Management, and Human Resource Management.

Then on February 17, 2015, UNP again underwent a change from an ordinary Work Unit Government Agency, to a Government Agency with the status of fully implementing PK BLU. This change is based on the Decree of the Minister of Finance of the Republic of Indonesia No 335/KMK.05/2015 On February 17, 2015, the status of Universitas Negeri Padang was legalized as a Public Service Agency (BLU) so that it could apply flexibility in financial management and develop its assets and services in accordance with Government Regulation Number 23 of 2005 concerning Financial Management of Public Service Agencies as amended by Government Regulation Number 74 of 2012 and at the same time as the first agency to become a Public Service Agency in 2015.

For the 2018/2019 Academic Year, Universitas Negeri Padang has 8 faculties, 1 Postgraduate Program, and 101 study programs.

B. Fundamentals, Vision, Mission, Goals and Motto

1. Basic

As one of the higher education institutions in Indonesia, Universitas Negeri Padang bases its education program on Pancasila and the 1945 Constitution and the Outlines of State Policy. In particular, now UNP bases its activities on Government Regulation no. 4 of 2014, Presidential Decree No. 93 of 1999, and its implementing regulations, and the Statute of the State University of Padang in 2016.

2. Vision

To become one of the leading universities in the fields of education, science, technology, sports, and the arts based on moral values, religion and piety to God Almighty.

3. Mission

- a. organize quality education in the fields of education, science, technology, art, and sports based on moral values, religion, and piety to God Almighty.
- b. conducting research activities and disseminating knowledge, research results, and innovative learning models at the national and international levels.
- c. Organizing community service activities so that the application of education, science, technology, arts and sports for the progress of the nation.
- d. improve UNP governance.
- e. enhance local, national and international cooperation.

4. Purpose

- a. produce superior, moral, and religious graduates who are highly competitive and able to adapt to developments.
- b. the implementation of student activities that form prospective leaders and entrepreneurs with character.
- c. produce research to develop education, science, technology, sports, and arts and disseminate them.
- d. the implementation of community service activities in order to help solve various community problems.
- e. the creation of a credible university governance.
- f. the establishment of synergistic cooperation with various institutions, both the central government and the private sector at home and abroad.

5. Motto

The motto of Universitas Negeri Padang is "Alam Takambang Jadi Guru (Open Nature Becomes the Teacher)".

CHAPTER II ORGANIZATION

The UNP organization is based on the Regulation of the Minister of Research, Technology and Higher Education of the Republic of Indonesia No. 10 of 2015 and the 2016 UNP statutes, which consist of the Senate, Chancellor, Internal Audit Unit, Advisory Council, and Management Organ Leaders.

A. Senate

The Senate is an organ that carries out the functions of determining, considering, and supervising the implementation of academic policies. The Senate has the following duties and powers:

- a. Determination of academic policies, norms, and codes of ethics;
- b. Supervision of:
 1. application of academic norms and code of ethics for the Academic Civitas;
 2. the application of academic provisions;
 3. implementation of higher education quality assurance refers to at least the national higher education standard;
 4. implementation of academic freedom, freedom of academic pulpit, and scientific autonomy;
 5. implementation of academic rules;
 6. implementation of the Lecturer's performance appraisal policy; and
 7. implementation of the learning process, research, and community service.
- c. Implementation of the learning process, research, and service to community. giving consideration and process improvement proposal learning, research, and service of higher to the community to education leaders;
- d. Giving consideration to higher education leaders in the opening and closing of study programs;
- e. Giving consideration to the granting or revocation of academic degrees and awards;
- f. Giving consideration to higher education leaders in proposing professors; and
- g. Providing recommendations for imposing sanctions on violations of academic norms, ethics, and regulations by the Academic Civitas to higher education leaders.

B. Chancellor

The Chancellor is a UNP organ that carries out the function of determining non-academic policies and managing higher education for and on behalf of the Minister.

The Chancellor of the University consists of the Chancellor and Vice Chancellor, Bureau, Faculty and Postgraduate, Institutions and Technical Service Units. The Chancellor as the main person in charge, has the task of leading the implementation of education, research, and community service, as well as fostering educators, education staff, students, and their relationship with the environment. The Vice Chancellor consists of four people and a maximum of two people can be added to handle certain tasks according to development demands. Currently, UNP has four Vice Chancellors. Vice Chancellor for Academic Affairs, Vice Chancellor for Planning, General Affairs and Finance, Vice Chancellor for Student Affairs and Alumni, and Vice Chancellor for Cooperation and Information Systems.

C. Internal Supervisory Unit

It is a UNP organ that carries out non-academic supervisory functions for and on behalf of the Chancellor. The Internal Control Unit has the following duties and authorities:

- a. Determination of internal control policies in the non-academic field of UNP;
- b. Internal control over the management of non-academic education;
- c. Preparation of reports on the results of internal control; and
- d. Giving advice and/or consideration regarding repair management of non-academic activities at the Chancellor based on the results of internal supervision.

D. Advisory Council

It is a UNP organ that has the function of providing non-academic considerations. The Advisory Council has the following duties and authorities:

- a. Conduct a review of the Chancellor's policies in the non-academic field;
- b. Formulate suggestions and opinions on the Chancellor's policies in the non-academic field;
- c. Provide non-academic considerations to the leadership of UNP in managing UNP; and
- d. Assist the development of UNP.

E. Supervisory Board

The supervisory board has the task of supervising the development of PTN PK-BLU carried out by the Managing Officer of PTN PK-BLU regarding the implementation of the Business Strategic Plan and Business Plan and Budget as well as compliance with laws and regulations.

F. Lecturer

Lecturers consist of permanent and non-permanent lecturers. Lecturers are permanent lecturers who work full time with the status of permanent educators at UNP. Non-permanent lecturers are lecturers who work part-time with the status of non-permanent educators at UNP. Non-permanent lecturers as appointed by the Chancellor at the suggestion of the Dean of the faculty concerned in accordance with the needs and provisions of the legislation.

G. Education Personnel

The education staff at UNP consist of academic support staff and academic administrative staff. Academic support staff consists of librarians, computer administrators, public relations institutions, laboratory assistants, and technicians. Requirements, procedures for appointment, and authority for academic support staff are regulated by the university by referring to the applicable laws and regulations. Academic support staff are tasked with assisting the learning process, practicum, and providing library services and maintenance of media equipment used in the learning process. Academic administrative staff is the implementing element of academic administration which has the main task of administering all academic activities.

H. Academic Executive

Academic implementers in the fields of education and teaching, research, and community service are the Faculties, Research and Community Service Institutes, and Learning Development and Quality Assurance Institutes.

1. Faculties, Departments, Study Programs, and Postgraduate Programs

Universitas Negeri Padang currently has eight faculties, one Postgraduate Program, 102 S3, S2, S1, D3, D2 study programs and 1 counselor professional education program.

The names of the faculties, departments, and study programs are:

A. Levels Three, Two, One, Diploma, and Professional Programs

FACULTY & DEPARTMENT	STUDY PROGRAM	
	EDUCATIONAL	NON-EDUCATIONAL
1. Faculty of Educational Sciences (FIP)		
Educational Administration	- Educational Administration (S1) - Educational Administration (S2) - Educational Administration (S3)	
Special Needs Education	- Special Needs Education (S1)	
Educational Technology	- Educational Technology (S1)	
Out of School Education	- Out of School Education (S1)	
Guidance and Counseling	- Guidance and Counseling (S1) - Guidance and Counseling (S2) - Guidance and Counseling (S3)	- Counselor Profession Education (PPK)
Elementary School Teacher Education	- Elementary School Teacher Education (S1) - Elementary Education (S2)	
Preschool Teacher Education	- Preschool Teacher Education (S1) - Early Age Children Education (S2)	
Psychology	- Psychology (S1)	
2. Faculty of Language and Art (FBS)		
Indonesian Language and Literature	- Indonesian Language and Literature Education (S1) - Indonesian Language Education (S2)	- Indonesian Literature (S1) - Information, Library, and Archive Science (D3) - Library and Information Science (S1)
English Language and Literature	- English Language Education (S1) - Japanese Language Education (S1) - English Language Education (S2) - Language Educational Science (S1)	- English Language and Literature (S1)
Art	- Art Education (S1)	- Visual Communication Design (S1)
Drama, Dance, and Music Arts	- Drama, Dance, and Music Arts Education (S1) - Music Education (S1) - Dance Education (S1)	

FACULTY & DEPARTMENT	STUDY PROGRAM	
	EDUCATIONAL	NON-EDUCATIONAL
3. Faculty of Mathematics and Natural Sciences (FMIPA)		
Mathematics	- Mathematics Education (S1) - Mathematics Education (S2)	- Mathematics (S1) - Statistics (S1) - Statistics (D3)
Biology	- Biology Education (S1) - Biology Education (S2)	- Biology (S1)
Physics	- Physics Education (S1) - Physics Education (S2)	- Physics (S1) - Physics (S1)
Chemistry	- Chemistry Education (S1) - Chemistry Education (S2)	- Chemistry (S1)
Science Education	- Science Education (S1)	
4. Faculty of Social Sciences (FIS)		
Social and Political Science	- Pancasila and Civil Education (S1) - Pancasila and Civil Education (S2)	
Geography	- Geography Education (S1) - Geography Education (S2)	- Geography (S1) - Long Range Sensor Technology (D3)
History	- History Education (S1) - Islamic Religion Education (S1)	
Sociology	- Sociology Anthropology Education (S1)	
Country Administration Science		- Country Administration Science (S1) - Country Administration Science (S2)
5. Faculty of Engineering (FT)		
Civil Engineering	- Architectural Engineering Education (S1)	- Civil Engineering (D3) - Civil Engineering (S1)
Electrical Engineering	- Electrical Engineering Education (S1)	- Electricity Engineering (D3) - Industrial Electrical Engineering (D4)

FACULTY & DEPARTMENT	STUDY PROGRAM	
	EDUCATIONAL	NON-EDUCATIONAL
Electronics Engineering	- Electronics Engineering Education (S1) - Informatics and Computer Engineering Education (S1)	- Electronics Engineering (D3)
Mechanical Engineering	- Mechanical Engineering Education (S1)	- Mechanical Engineering (D3) - Mechanical Engineering (S1)
Automotive Engineering	- Automotive Engineering Education (S1)	- Automotive Engineering (D3)
Mining Engineering		- Mining Engineering (D3) - Mining Engineering (S1)
Post-Graduate Programs	- Technology and Vocational Education (S2) Skills : - Informatics Engineering Education - Architectural Engineering Education - Electrical Engineering Education - Automotive Engineering Education - Mechanical Engineering Education - Electronics Engineering Education - Family Welfare Education - Technology and Vocational Education (S3) Skills : - Informatics Engineering Education - Architectural Engineering Education - Electrical Engineering Education - Automotive Engineering Education - Mechanical Engineering Education - Electronics Engineering Education - Family Welfare Education	- Technology and Vocational Education (S2) Concentration : - Chief Information Officer (CIO)

FACULTY & DEPARTMENT	STUDY PROGRAM	
	EDUCATIONAL	NON-EDUCATIONAL
6. Faculty of Sport Sciences (FIK)		
Physical Education	- Physical Education, Health, and Recreation (S1) - Physical Education (S2)	
Coaching	- Sport Coaching Education (S1)	
Health and Recreation		- Sport Sciences (S1) - Nursery (D3)
7. Faculty of Economy (FE)		
Accountancy		- Accountancy (S1) - Accountancy (D3)
Economy Education	- Economy Education (S1) - Economy Education (S2)	
Management		- Management (S1) - Trade Management (D3) - Tax Management (D3) - Management (S2)
Development Economy		- Development Economy (S1) - Economy Science (S2) - Development and Environmental Study (S3)
8. Faculty of Tourism and Hospitality (FPP)		
Family Welfare Science	- Family Welfare Education (S1)	- Culinary Education (D3) - Fashion Education (S1)
Electrical Engineering	- Make Up and Beauty Education (D4)	
Tourism		- Hospitality Management (D4)

B. Post-Graduate Programs (PPs)

NO	STUDY PROGRAM	CONCENTRATION	DET
a. S2 Program (Magister)			
1.	Social Sciences Education	- Anthropology/Sociology Education - History Education - Civil Education - Art and Cultural Education - Integrated Social Sciences Education	
2.	Educational Technology		
3.	Environmental Science		
b. S3 Program (Doctor)			
1.	Educational Science	Orientation : - Educational Resource Development (PSDP) - Mathematics and Natural Science Education - Social Science Education - Indonesian Language and Literature Education - English Language Education - Environmental Education - Education Management - Educational Technology - Guidance and Counseling	
2.	Environmental Science		

2. Institute for Research and Community Service (LP2M)

The Institute for Research and Community Service (LP2M) is an academic implementing element, which has the task of coordinating, implementing, monitoring, and evaluating research and community service activities who are directly responsible to the Chancellor. The Institute for Research and Community Service carries out the following functions:

- a. Preparation of plans, programs, and budget of the Institution;
- b. Implementation of pure and applied scientific research;
- c. Implementation of community service;
- d. Coordinating the implementation of research activities and community service;

- e. Implementation of publication of research results and community service;
- f. implementation of cooperation in the field of research and community service with universities and/or other institutions both domestically and abroad;
- g. monitoring and evaluating the implementation of research activities and community service; and
- h. implementation of the Institution's administrative affairs.

LP2M oversees several research and community service centers which are formed according to needs through the Chancellor's Decree. Research Centers have a duty to carry out and coordinate the implementation of relevant research, monitor and evaluate research activities, especially for inter-field or multi-disciplinary research.

a. Center for Population and Environmental Research (PKLH)

The PKLH study center has the following scope of work:

- Research and assessment in the field of Population and the Environment
- Training and Consulting services in the field of Community related to the environment
- Seminars and workshops in the field of Population and Environment
- Promotion and expansion of attention to the environment

b. Gender Research Center (PPG)

The PPG study center has the following scope of work:

- Increase the capacity of human resources and institutions in managing gender-oriented education
- Carry out gender-oriented research by absorbing local religious and cultural values
- Develop research with a gender perspective in synergy with industry, research institutions, local governments, central and foreign governments
- Carrying out research based on gender perspective disaster mitigation mitigasi
- Providing services to empower the poor, especially female heads of household.

c. Research Center for Religious Studies (PPPA)

The PPPA study center has the following scope of work:

- Religious Counseling / Da'wah
- Training on research methodology/writing scientific articles in the field of religion for PAI lecturers
- Training on the Development of Religious Learning Models for MDA teachers
- Training on rush writing methodology for PAI lecturers
- PBM training for MDA teachers
- Student Da'i Training (Peldama)
- Seminars and discussions on the dangers of drugs and promiscuity
- Conducting religious research in collaboration with religious institutions/organizations

d. Regional Development Research Center and Regional Autonomy

The PPPWOD study center has the following scope of work:

- Meta-evaluation research (special research) with regard to local government, especially in the field of services, development, policy, and community empowerment
- Training and consulting services in the field of capacity building, with regard to regional financial management, good governance, and regional potential development
- Organizing scientific activities such as seminars, panel discussions, book reviews etc.
- Assisting faculty in organizing proposal seminars, drafts of research results for teaching staff

e. Disaster Research Center (PPB)

The PPB study center has a scope of work offered, namely:

- Research in the field of reducing the risk of natural disasters such as earthquakes, tsunamis, volcanic eruptions, floods, droughts, hurricanes, and landslides
- Research in the field of non-natural disaster risk reduction such as failed technology, failed modernization, epidemics, and disease outbreaks
- Research in the field of reducing the risk of social disasters such as social conflicts between groups or between communities, and terror
- Services for the inventory and identification of areas prone to and risks of natural disasters, information systems for natural disaster mitigation and natural disaster mitigation technology mitigasi
- Services for mapping disaster-prone areas and risks
- Services for disaster mitigation and management

- Services for professional services in the field of disaster risk reduction
- Seminars and workshops

f. Center for Legal and Human Rights Research

The PPH-HAM study center has the following scope of work:

- Assessment and research regarding; development policies, constitutional law, legislation, regional regulations, regional autonomy, geography, demographics, and natural resources
- Advocacy against human rights violations
- Mediation on non-litigation violations
- Seminars and discussions on various fields in development
- Conducting education and training on studies and research in the civil, political, economic and social fields
- Disseminate the conditions of national and regional development
- Establish cooperation with government and private institutions at the local, national and international levels in the context of developing community development
- Conducting development and communication with institutions institutions and intellectual communities that have an interest in development development, both at national and international levels
- Recommend study and research findings to relevant agencies.

g. Center for Public Management and Strategy Research

The PPMSP study center has the following scope of work:

- Assessment and development of SMEs
- Entrepreneurship assessment and development
- Public policy review
- Preparation of the public sector strategic plan
- MSME Consultation
- Small entrepreneur training

In addition to the above research center which is managed by LP2M, it also has the task of planning, implementing and coordinating the practice of science, technology and art carried out by UNP directly to the community to accelerate the development process.

LP2M has the aim of (a) developing human resources towards the creation of human development and development towards the establishment of a learning community, (b) practicing knowledge and

skills through continuous education in the community, (c) carry out services to the community in accordance with available capabilities and resources, and (d) carry out integrated activities of education, research and community service.

3. Institute for Learning Development and Quality Assurance (LP3M)

The Institute for Learning Development and Quality Assurance (LP3M) has the task of coordinating, implementing, monitoring, and evaluating activities for improving and developing learning and quality assurance of education. The Institute for Learning Development and Quality Assurance carries out the following functions:

- preparation of plans, programs, and budget of the Institution;
- implementation of improvement and development of learning;
- implementation of the development of education quality assurance system;
- coordination of the implementation of learning improvement activities, learning development, and education quality assurance;
- monitoring and evaluation of learning improvement, learning development, and education quality assurance; and
- implementation of the Institution's administrative affairs.

I. Administrative Executor

Implementation of university administration which includes the Bureau of Academic and Student Affairs (BAK), Bureau of Planning, Administration of Cooperation and Public Relations (BPAKHM). Meanwhile, General Administration and Finance is held by the General and Finance Bureau (BUK). The Head of the Bureau is appointed by and reports directly to the Chancellor.

J. Supporting Element

The supporting elements at UNP in the form of the Technical Implementing Unit (UPT) are equipment in the fields of education and teaching, research, and community service outside the faculties, departments and study programs, laboratories, workshops, and studios.

1. UPT Library

According to PP No. 24 th 2014 library is an institution that manages the collection of written works, printed works, and/or recorded works in a professional manner with a standard system to meet the educational, research, preservation, information, and recreational needs of the users. College Library is a library which is an integral part of education, research and service activities

to the community and serves as a learning resource center to support the achievement of educational goals domiciled in tertiary institutions. The library has the task of providing library material services for the purposes of education, research and community service.

The library has the function of (a) providing and processing library materials, (b) providing services and utilization of library materials (c) maintaining library materials (d) performing reference services, and (e) carrying out library administration matters.

The UPT Library of UNP consists of the central library, faculty reading room, departmental reading room and reading room at each PGSD UPP (Lubuk Buaya, Bandar Create, and Bukittinggi). Since 1994 this UPT Library has been occupying a new five-story building with an area of about 5000 m².

In this building there are several rooms which include: AVA, Librarian's Work, film projection, binding, lecturer/postgraduate reading, internet room, main collection and student reading room.

The library has been managed using a library information system, which provides digital library services (Digital Library) that can be accessed 24 hours a day through the website.

<http://digilib.unp.ac.id>

a. Reading Room Faculty/Department/UPP

This reading room in addition to serving students is also widely used by teaching staff in faculties/departments/study programs concerned.

b. Service Schedule

Day	hit	Information
1). Library		
Monday, Thursday	07.30 to 12.00 WIB 12.00 to 13.30 WIB 13.30 to 16.00 WIB	(Pray Break)
Friday	07.30 to 11.45 WIB 11.45 to 14.00 WIB 14.00 to 15.30 WIB	(Pray Break)
Saturday	07.30 to 12.00 WIB	
Sunday	09.00 to 13.00 WIB	
2). Faculty/UPP Reading Room		
Monday, Thursday	07.30 to 16.00 WIB	
Friday	07.30 to 11.30 WIB	

2. Information and Communication Technology Development Unit

The development of Information and Communication Technology supports data automation in developing management information systems in academics and other fields. The use of networks based on Local Area Network (LAN)/Intranet and Wide Area Network (WAN)/ Internet equipped with fiber optic cable is expected to make the computerization process more integrated, simultaneous and can be accessed more widely by the UNP academic community.

Starting in 2006 the payment system has been developed *host to host* between UNP and Bank Nagari (*on line*) which provides convenience to students in the process of paying tuition fees. This system has been further developed to include the payment of the Mandiri Regular New Student Admission, the payment of the graduation fee, the payment for the acceptance of new students for Diploma III and Postgraduate Faculty of Engineering, UNP.

The same year also launched the official website of the State University of Padang (<http://www.unp.ac.id>) and Universitas Negeri Padang Webmail (<http://webmail.unp.ac.id>).

In 2008, all new student registration processes, academic administration management of study programs, academic portals, library information systems and digital libraries also began to be implemented routinely *on line*.

Student registration (<http://prasireg.unp.ac.id>) is an application for new student registration so that the registration process is more effective with more accurate data because it is carried out by the person concerned.

Academic Information System is an application for the management of department/study program management, especially regarding class schedules. With this application, each study program can determine its own course schedule along with the rules for taking the courses offered each semester. This application can only be accessed from the UNP internal network (intranet).

Access for students and lecturers can be done through the Academic Portal (<http://portal.unp.ac.id>). Lecturer *byon line* can find out what courses are taught in the current semester, class participants and enter student grades at the end of the semester, while online students can fill out study plan cards (KRS), view study results (LHS), interact with students and lecturers throughout the university through discussion forums. The academic portal is being upgraded to function as an interactive learning facility between course lecturers and the students they care for.

At the end of 2012, an online Electronic Learning System has been developed (<http://elearning.unp.ac.id>) which can be used for distance learning and electronic journaling (<http://ejournal.unp.ac.id>) to upload journals electronically for lecturers and students. The use of this information system is in line with the provision of infrastructure that is always improved, such as:

1. New rooms and equipment for the data center (starting at the end of the year 2013)
 2. Blade Server with 3 units of dual xeon quad core servers with 32 GB of memory each with a capacity that can be increased to 14 server units with the latest technology, tower type servers with intel xeon technology and sufficient memory with a total of more than 10 units .
 3. Backup storage with a capacity of up to 10 TB as the main and backup data container.
 4. 3 OMR machines with a speed of 3,500 sheets per hour as a means of data input and examination examination using computer exam answer sheets (LJK).
 5. Network with 10 gigabit fiber optic technology and type N wireless hotspot that can be accessed from inside and outside the fresh water UNP campus with a radius of 10 KM (continuing to be improved so that it can be accessed from all corners of the city of Padang by students, lecturers and administrative staff).
 6. Teleconference room used for distance learning services, meetings with other departments and universities in Indonesia that are connected to INHERENT (Indonesian Higher Education Network) through the national education network (Jardiknas).
3. Language Technical Implementation Unit

UPT Language is a support unit that organizes academic service activities for the entire academic community and the community in the form of training or foreign language courses such as English, Japanese, Arabic, German, and Mandarin.

The course is provided for all levels from children, youth, and adults. This unit also provides linguistic-related services such as translation and interpreter, escort for foreign guests, foreign language proficiency test (TOEFL, TOEIC, IELTS, Japanese test), thesis/thesis/dissertation and book editing and training for language instructors.

4. UPT Services and Counseling Guidance (UPBK)

UPBK has the task of providing consulting services to lecturers, students, employees, and the community. The services provided by UPBK are generally focused on UNP students. The services provided are academic and non-academic services in order to help UNP students achieve academic success, career planning success, and social success (trisukses).

In dealing with academic and social demands, students are faced with various problems whose solutions often require the help of a counselor. These problems include, among others, personal, social, learning, economic problems, young people's relationships, marriage and other problems that interfere with the smooth and successful learning. These services are provided by counselors who are experts in their fields, according to the type and nature of the problems experienced. Students can directly or through PA meet with a counselor, but it is better to make an appointment beforehand.

5. International Service UPT

UPT International Services has the task of facilitating international cooperation, services for students, educators, and foreign education personnel, as well as international promotion of UNP.

In carrying out the tasks as referred to in Article 118, UPT International Services carries out the following functions: (a) implementation of the preparation of plans, programs and budgets for UPT; (b) the development of UNP international cooperation; (c) facilitation of international cooperation; (d) implementation of services for students, educators, and foreign education personnel; (e) implementation of the university's international promotion; (f) coordination of UNP's international cooperation program implementation; (g) monitoring and evaluation of UNP's international cooperation program; and (h) implementation of UPT administrative affairs.

6. UPT Career Development and Entrepreneurship

UPT Career Development and Entrepreneurship has the task of carrying out career development and entrepreneurship within UNP. In carrying out the tasks referred to, the UPT for Career Development and Entrepreneurship carries out the following functions:

(a) implementation of the preparation of plans, programs, and budgets, (b) implementation of career development and entrepreneurship, (c) implementation of the administration of career development and entrepreneurship activities, and (d)

implementation of administrative affairs of UPT Career Development and Entrepreneurship.

7. Laboratory/Workshop

The laboratory/workshop is a supporting facility in order to provide services and train students' skills in strengthening theory and practice. These types of laboratories/workshops are available in each faculty according to their respective departments and study programs. Detailed information regarding labor/workshop/studio can be seen in each faculty.

8. Campus Health Unit (UKK)

a. UKK's duties are:

- 1) Providing health services to the academic community
- 2) Provide medication/care for maternal and child health, nutrition, hygiene, immunization and family planning.

b. Service Schedule

Treatment and care for the sick is held every working day except fridayat. Examination of pregnant women, control of healthy children, nutrition instructions for children's food are held every Thursday. Family planning services/consultation are held every working day starting at 11.00 WIB except fridayat.

9. Student Activity Center (PKM)

Student activity center (student center) is a place of activity in an effort to foster and develop student activities related to reasoning, talents/interests, welfare and is also a communication and information forum for all co-curricular activities including student organizations. All student activities in the form of discussions, seminars, workshops, leadership training and others can be accommodated in PKM.

10. Employment Service Center (PJK)

The Employment Service Center provides information and assistance to students in the field of employment. This information and assistance includes:

- a. provide information about available job opportunities
- b. identify graduate qualifications required by the job market
- c. help student career development
- d. seek additional skill training

e. establish cooperative relationships with relevant departments and agencies in terms of employment

11. Publishing (UNP Press)

UNP Publishers endeavor to publish the works of lecturers in the form of textbooks, lecture requirements, research reports, as well as articles from the UNP Education Forum and Bulletin, Ganto, and Learning.

12. Sports Facilities

The available sports facilities and infrastructure can accommodate the sports activities of students, lecturers and employees outside of class hours. Currently there are 3 sports buildings consisting of basketball courts, volleyball, badminton, handball, sepak takraw, table tennis and gymnastics. Three football fields, athletic track and four tennis courts as well as fitness training facilities and an indoor swimming pool.

13. Civil Servant Cooperative

Padang State University Cooperative has a legal entity Number 1027/BH-XVII dated October 28, 1992. Padang State University Cooperative aims to improve services to members in the form of goods and services.

Padang State University Cooperatives organize savings and loan business activities, shops, photocopying, suppliers of office stationery, and consultants.

14. Student Cooperative (KOPMA)

KOPMA is an academic support facility for UNP students. KOPMA is not only intended as a place for developing skills to carry out practical organizational activities in a business manner, but also as a forum for fostering the younger generation to realize the ideals of cooperatives.

15. Student Dormitory

Students who are allowed to occupy dormitories are students who have met the criteria set by the Chancellor. The student dormitories are scattered in various places, namely; 1) AirTawar Padang central campus, 2) UPP II PGSD in Lubuk Buaya, 3) UPP III PGSD in Bandar Create, 4) UPP IV PGSD in Bukittinggi. How to get the opportunity to occupy a dormitory can be asked to the Student Affairs Section of BAK.

16. Development and Welfare Foundation (YPK)

This agency aims to help improve the progress of the institution and well-being civitas academic with strive sources beyond the budgeted funds.

17. Mosque

Inside the campus there is the Al-Azhar Mosque which in addition to praying and religious activities is also used for Islamic religious lectures as well as the Moral and Moral Laboratory.

18. Campus Security

Campus security is handled by the campus security unit (SATPAM), which is on duty 24 hours. This Security Unit is equipped with a 2 meter radio communication with a frequency of 143,400 MHz. If there are emergency matters or/and important issues/important information regarding the campus and the academic community, they can immediately contact the SATPAM through that frequency. Security guard posts are scattered in several places on campus.

K. Students and Student Organizations

Students are students who are registered and studying at UNP in accordance with the provisions of the applicable laws and regulations. To carry out the improvement and development of talents, interests, reasoning, knowledge and welfare, community service and activities

college student other, formed organization student that organized from, by, and for students.

1. Student Organization at University Level

a. Student Representative Council (MPM)

The Student Representative Council is a normative part of the University level whose duties are:

- 1) draw up an outline of the student activity program (GBPK) at the University level
- 2) lifting and dismissing BEM
- 3) supervise and direct BEM in implementing (GBPK)

b. Student Executive Board (BEM)

The Student Executive Board is a forum for student development at the university level, for the development of reasoning, interests and talents as well as student welfare.

2. Student Organization at the Faculty level

a. Faculty Student Representative Body (BPMF)

The Faculty Student Representative Body is a normative body at the faculty level as a forum that supports student activities in terms of welfare, interests/talents and reasoning development. BPMF members are representatives who are directly elected by students from candidates who are supported by at least 10 students and approved by the Dean. The requirements to become a member of BPMF are (a) having integrity, personality and noble character and (b) having high learning achievement while following the previous education level.

b. Faculty Student Executive Board (BEMF)

The Student Executive Board is a forum for student development at the faculty level for the development of students' individual reasoning strengths (*ideas and reasoning*) as well as a place to channel students' talents and interests.

c. Student Activity Unit Semi-Autonomous Body (BSO-UKM)

This Agency is under BEMF which is in charge of developing and increasing creativity in carrying out scientific activities, interests and talents, as well as planning, implementing, and evaluating activities in accordance with their respective fields.

3. Student Organization at the Department level

At the department level, the Department of Student Association (HMJ) is formed which is tasked with assisting coaching, reasoning, talent and welfare department student.

L. List of Leaders, Expert Staff and University Senate

1. University Leader

Rector	: Prof. Ganefri, Ph.D.
Vice Chancellor I (Academic Field)	: Prof. Dr. Yunia Wardi, Drs, M.Si
Vice Chancellor II (General Planning and Finance)	: Drs. Syahril, ST, M.Sc, Ph.D
Vice Chancellor III	: Prof. Dr. Ardipal, M. Pd
(Student and Alumni Sector)	Vice Chancellor IV : Prof. Dr. Syahril BM Pd
(Cooperation and Information Systems Sector)	

2. Expert Staff

Chancellor's Expert Staff	: 1) Aldri Frinaldi, SH, M. Hum, Ph.D 2) Dr. Muhammad Anwar, S.Pd, MT :
Expert Staff of the Vice Chancellor I	1) Alizar, S.Pd, M.Sc, Ph.D 2) Abror, SE, ME, Ph.D
Expert Staff of the Vice Chancellor II	: 1) Drs. Revian Body, M.SA 2) Risma Apdeni, ST, MT :
Expert Staff of the Vice Chancellor III	1) Drs. Yulifri, M.Pd 2) Drs. Hasan Maksum, MT :
Expert Staff of the Vice Chancellor IV	1) Drs. Jonni, M.Pd 2) Mohammad Isa Gautama, S. Pd, M. Si

3. Faculty Leader

Dean of the Faculty of Education	: Dr. Alwen Bentri, M.Pd. :
Dean of the Faculty of Languages and Arts	Prof. Dr. M. Zaim, M. Hum :
Dean of the Faculty of Mathematics and Natural Sciences	Prof. Dr. Lufri, MS
Dean of the Faculty of Social Sciences	: Prof. Dr. Syafri Anwar, M.Pd :
Dean of the Faculty of Engineering	Dr. Fahmi Rizal, M. Pd : Dr.
Dean of the Faculty of Sports Science	Zalfendi, M.Pd
Dean of the Faculty of Economics	: Dr. Idris., M. Si
Dean of the Faculty of Tourism and Hospitality	: Dra. Ernawati, M.Pd., Ph.D.
Postgraduate Program Director	: Prof. Yenni Rozimela, M.Ed, Ph.D

4. Institutional Leader

a. Research institutions and community service

Chairman : Prof. Dr. Rusdinal, M.Pd

b. Institute for Learning Development and Quality Assurance

Chairman : Dr. Edwin Musdi, M.Pd

5. Bureau Chief

Head of BAK	: Drs. Yushamdi
Head of BUK	: Afdalisma, SH., M.Pd.
Head of BPAKHM	: Drs. Ahmad Hamdani, MM.

6. Central and Unit Leaders

a. BLU Business Unit Management Agency

Head : Prof. Dr. Yasri, MS

b. LP2M Research Center

Head : Drs. Syamsir, M. Si, Ph.D

c. LP2M Service Center

Head : Dr. Elfi Tasrif, MT

d. LP3M Learning Development Center

Head : Dr. Zul Amri, M. Ed

e. LP3M . Quality Assurance Center

Head : Dr. M. Giatman, M. SIE

f. Field Experience Program Center

Head : Dr. Waskito, MT

g. UPT. Career Development and Entrepreneurship

Head : Dra. Asmar Yulastri, M.Pd, Ph.D

h. UPT Language

Head : Dra. An Fauzia Rozani Syafei, MA

i. Library UPT

Head : Dr. Ardoni, M. Si

j. UPT PTIK

Head : Drs. Aswardi, MT

k. Counseling Guidance Service Unit

Head : Dr. Yarmis, M.Pd., Kons

7. University Senate

Chairman	: Prof. Dr. Z. Mawardi Effendi, M.Pd. :
Secretary	Prof. Dr. Sufyarma Marsidin, M.Pd :
Member	

Prof. Ganefri, Ph.D
Prof. Dr. Yunia Wardi, M.Si
Ir. Syahril, ST, M.Sc, Ph.D
Prof. Dr. Ardipal, M.Pd
Prof. Dr. Syahril Bakhtiar, M.Pd
Prof. Dr. Rusdinal M.Pd
Dr. Edwin Musdi, M.Pd
Prof. Yenni Rozimela, M.Ed, Ph.D
Prof. Dr. Lufri, MS
Prof. Dr. Ahmad Fauzan, M. Pd, M.Sc
Prof. Dr. Festiyed, MS
Prof. Dr. Elizar, M.Pd
Prof. Dr. Minda Azhar, M.Si
Drs. Hendra Syarifuddin, M.Si, Ph.D
Dr. Irwan, M. Si
Dra. Hj. Heffi Alberida, M.Si
Dr. Yuni Ahda, S.Si, M.Si Dr.
Yulkifli, S.Pd, M.Si Dr. Indang
Dewata, M. Si Dr. Fahmi Rizal,
M.Pd., MT

Prof. Dr. Nizwardi Jalinus, M.Ed
Drs. Bahrul Amin, ST, M.Pd Dr.
M. Giatman, M. SIE
Dr. Nurhasan Syah, M. Pd
Oriza Candra, ST, MT Dr.
Usmeldi, M. Pd
Drs. Putra Jaya, MT
Dr. Muhammad Anwar, S.Pd, MT
Dr. Hasan Maksum, MT
Drs. Raimon Kopa, MT
Dr. Zalfendi, M.Kes
Prof. Dr. Phil. Yanuar Kiram
Prof. Dr. Eddy Marheni, M.Pd
Prof. Dr. Syafruddin, M.Pd
Prof. Dr. Eri Barlian, MS
Dr. Khairuddin, M. Kes, AIFO
Drs. Jonni, M.Pd
Dr. Alnedral, M. Pd
Dr. Bafirman HB, M. Kes, AIFO
Dr. Didin Tohidin, M.Kes, AIFO
Dr. Wilda Welis, SP, M.Kes Dr.
Alwen Bentri, M.Pd
Prof. Dr. Jamaris Jamna, M.Pd
Prof. Dr. Firman, MS. Cons of
Prof. Dr. Mega Iswari, M.Pd Prof.
Dr. Rakimahwati, M.Pd
Prof. Drs. Yalvema Miaz, MA, Ph.D Dr.
Alizamar, M. Pd, Kons
Dr. Fetri Yeni J, M.Pd
Dr. Hadiyanto, M.Ed
Drs. Muhammadi, S.Pd, M.Si
Prof. Dr. M. Zaim, M. Hum
Prof. Dr. Mukhaiyar, M.Pd
Prof. Dr. Hasanuddin WS, M. Hum
Prof. Dr. Atmazaki, M.Pd
Dr. Zul Amri, M.Ed
Prof. Dr. Hermawati Syarif, M. Hum
Prof. Dr. Yasnur Asri, M.Pd
Dr. Yahya, M.Pd
Drs. Yusron Wikarya, M.Pd
Indrayuda, S.Pd, M.Pd, Ph.D

Drs. Wimbrayardi, M.Sn
Prof. Dr. Syafri Anwar, M.Pd
Prof. Dr. Azwar Ananda, MA
Prof. Drs. Dasman Lanin, M. Pd, Ph.D
Drs. Suryanef, M. Si
Drs. Ikhwan, M. Si
Dr. Siti Fatimah, M.Pd., M.Hum
Drs. Zafri, M.Pd
Dra. Yurni Suasti, M.Si
Junaidi, S.Pd., M.Si
Drs. Syamsir, M.Sc., Ph.D
Dr. Dedi Hermon, MP Dr.
Idris, Drs., M.Si
Prof. Dr. Agus Irianto
Prof. Dr. Syamsul Amar, MS
Prof. Dr. Bustari Muchtar
Prof. Dr. Yasri, MS
Dr. Susi Evanita, MS
Dr. Efrizal Syofyan, SE., M.Sc., Ak
Drs. Ali Anis, MS
Erni Masdupi, SE., M.Sc., Ph.D
Sany Dwita, SE., M.Sc., Ak., Ph.D
Dr. Ernawati, M.Pd, Ph.D
Prof. Dr. Agusti Efi, MA
Dra. Asmar Yulastri, M.Pd., Ph.D
Dra. Rahmiati, M.Pd, Ph.D Dra.
Adriani, M.Pd
Dra. Wirnelis Syarif, M.Pd
Dra. Hayatunnufus, M.Pd
Murni Astuti, S.Pd, M.Pd.T
Dra. Ira Meirina Chair, M.Pd
Dr. Yuliana, SP., M.Si
Waryono, S.Pd., MM. Par

CHAPTER III
CURRICULUM

The Higher Education Curriculum is a set of plans and arrangements regarding the content, study/lesson materials as well as the delivery and assessment methods which are used as guidelines for the implementation of teaching and learning activities in higher education. Starting from the 2003/2004 academic year, Padang State University implemented a new curriculum in accordance with the Decree of the Minister of National Education No. 232/U/2000 and Decree of the Minister of National Education No.045/U/2002 concerning Guidelines for the Preparation of Higher Education Curriculum and Assessment of Student Learning Outcomes. These two Ministerial Decrees indicate the application of a Competency-Based Curriculum in Higher Education.

Competency-Based Curriculum (KBK) is a curriculum designed based on studies **competencies that must be possessed by students** after completing his studies in a program. So competence is a set of intelligent actions, full of responsibility, that a person has as a condition to be considered capable by the community in carrying out tasks in certain fields of work. Competence includes knowledge, skills, and abilities that can be learned and developed by a person including behavior in developing satisfying cognitive, affective and motor aspects.

In the 2014/2015 academic year, Padang State University implemented a new curriculum in accordance with the Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 73 of 2013 concerning the Implementation of the National Qualifications Framework for Higher Education. Framework Indonesian National Qualifications, hereinafter abbreviated as KKNi, is a competency qualification framework that can juxtapose, equalize, and integrate between the education sector and the field of job training and work experience in order to provide recognition of work competencies in accordance with the work structure in various sectors. KKNi is the embodiment of the quality and identity of the Indonesian nation in relation to system national education and training owned by Indonesia.

A. Mauniversity course

1. EyeUniversity Compulsory Tuition

No.	MK code	Compulsory Courses University	credits
1.	<u>UNP1.60.1401</u>	Religious education	3
2.	<u>UNP1.60.1402</u>	Pancasila Education	2
3.	<u>UNP1.60.1403</u>	Civic education	2

No.	MK code	Compulsory Courses University	credits
4.	<u>UNP1.60.1404</u>	Indonesian	2
5.	<u>UNP1.60.3101</u>	Entrepreneurship	3
6.	<u>UNP1.60.1405</u>	English	2
7.	<u>UNP1.60.7401</u>	Real Work Lecture (KKN)	2
amount			16

2. EyeUniversity Preferred Course

No.	MK code	Elective courses University	credits	Note.
1.	<u>UNP2.50.2102</u>	Multicultural Education	2	Selected 1 eye college (2 credits)
2.	<u>UNP2.60.2101</u>	Fitness Education Physical	2	
3.	<u>UNP2.60/2402</u>	Disaster Management	2	
4.	<u>UNP2.60.3401</u>	Natural Culture Minangkabau	2	
5.	<u>UNP2.60.3402</u>	Information Technology and Communication	2	
6.	<u>UNP2.60/2102</u>	Japanese	2	
7.	<u>UNP2.50.2401</u>	History of the Struggle Indonesian nation	2	
8.	<u>UNP2.50.1401</u>	Social and Cultural Sciences Basic	2	
9.	<u>UNP2.50.1402</u>	Basic Natural Science	2	
amount			18	2

3. EyeUniversity Compulsory Education Course

No.	MK code	Compulsory Courses Education University	credits	Description an
1.	<u>UNP1.61.1201</u>	Fundamentals of Science Education	2	Semester 1 or 2
2.	<u>UNP1.61.2102</u>	Administration and Education Supervision	2	Semester 2 or 3
3.	<u>UNP1.61.2101</u>	Educational Psychology	2	Semester 3 or 4
4.	<u>UNP1.61.4201</u>	Counseling Guidance	2	Semester 4 or 5
5.	<u>UNP1.61.5101</u>	Field Practice	1	<u>Semester</u>

No.	MK code	Compulsory Courses Education University	credits	Description an
		School 1 (PLP1)		5
6.	UNP1.61.6401	Field Practice School 2 (PLP2)	1	Semester 6
7.	UNP1.61.7401	Field Practice School 3 (PLP3)	3	Semester 7
8.	UNP1.61.2103	Philosophy of Education	2	Semester 2
amount			13	

Note: PLP1, PLP2, and PLP3 are managed by the Head of the Study Program and in collaboration with PPPL, LP3M UNP.

B. Credit Load by Education Level

Educational level	Credit load
Diploma II	72 to 90
Diploma III	108 to 120
Bachelor and Diploma IV	144 to 158
Profession	minimum 36
Master's Program	minimum 46
Doctoral Program	minimum 52

C. Course Codes and Meaning of Course Codes

1. Course Code

- The course code consists of 10 digits divided into three segments separated by a period (.).
- The first segment of the course code consists of four digits, the first three digits are capital letters according to the abbreviation of the University, Faculty, or Study Program (Prodi) that owns the course. for example UNP means university courses, FBS means Faculty of Languages and Literature courses and IND means Indonesian Language Department/Programme courses.
- The second segment consists of two digits
 - The first digit indicates the IQF level, namely D3 = 5, S1=6, S2=8, and S3=9.
 - The second digit uses the number 0, 1, or 2 which indicates the study program group. For Study Program

Education uses code 1, Non-Educational Study Programs use code 2, and if the courses are the same for both Study Programs use code 0.

- The third segment consists of four digits
 - The first digit uses numbers 1-8, indicating the semester in which the course is taken.
 - The second digit is the code for the educational competency group
 - The third and fourth digits are the serial numbers of the courses, according to the group of subjects (01 to 99).
- The code for the faculty abbreviation is as follows. FIP = Faculty of Education
FBS = Faculty of Languages and Arts
FMA = Faculty of Mathematics and Natural Sciences FIS = Faculty of Social Sciences
FTE = Faculty of Engineering
FIK = Faculty of Sports Science FEK = Faculty of Economics
FPP = Faculty of Tourism and Hospitality
- The abbreviation code for the study program is as follows.

Faculty	Majors courses	Code
FIP	Education administration	AIP
	Special education	PLB
	Education technology	ID card
	Out-of-school Education	PIs
	Guidance and Counseling	BDK
	PGSD	GSD
	PGPAUD	AUD
	basic education	PDA
	Psychological Counselor Professional	KDP
	Education	PSI
FBS	Indonesian Language and Literature Education	ENG
	Indonesian Literature	ENG
	English Education English	ING
	Language and Literature	ING
	Fine Arts Education	SRP

Faculty	Majors courses	Code
	Drama, Dance and Music	SEN
	Information Science Library and Archives for	GPA
	Japanese Language Education	JPG
	Music Education Visual	DKV
	Communication Design	MSK
	Dance Education	TAR
	Library and Information Science	PII
	Language Teacher Training	IKB
FMIPA	Mathematics	MAT
	Biology	BIO
	Physics	FIS
	Chemistry	KIM
	D3 Statistics	STK
	Statistics S1	STA
	Science Education	IPA
FIS	Pancasila Citizenship Education S1	civics
	Citizenship Pancasila Education Masters	PKN
	Degree in State Administration	IAN
	Geography	GEO
	History	SEJ
	Sociology Education Anthropology	SOA
	Islamic Religious Education Remote	PIE
	Sensing Technology Civil	TPJ
FT	Engineering	OK
	Electrical Engineering	ELO
	Electrical engineering	ELL
	Informatics and Computer Engineering	ICT
	Mechanical Engineering	MES
	Automotive Engineering	auto
	Mining Engineering	TMB
	Industrial Electrical Engineering	TEI

Faculty	Majors courses	Code
FIK	Sports Education	por
	Coaching Education	LED
	Health Education and Recreation	KOR
FE	Economic Education	PDE
	Management	MNJ
	Accounting	ACT
	Economic development	EKO
	Tax Management	CHD
	Environmental Studies and Family	EKO
FPP	Welfare Development	KKE
	Hotel management	FOLDER
	Education Cosmetology and Beauty	TRK
	Catering	BOG
	Fashion	bus

CHAPTER VI
FACULTY OF MATHEMATICS AND IPA

A. Vision, Mission and Objectives of the Faculty.

1. Vision

Making the Faculty of Mathematics and Natural Sciences in 2020 an institution that produces MIPA educators and scientists who are superior, professional, have high academic culture and have character based on faith and piety

2. Mission

- a. Provide excellent service in the implementation of MIPA education and MIPA development to produce MIPA educators and scientists who are superior, professional, have high academic culture and have character based on faith and piety
- b. Increase the quantity and quality of research in the MIPA and MIPA education fields and fields relevant to MIPA
- c. Increase the quantity and quality of community service in the MIPA and MIPA education fields and fields relevant to MIPA
- d. Increase the quantity and quality of cooperation with various government and private institutions both at home and abroad for the advancement of FMIPA and MIPA education both locally, nationally and internationally
- e. Improving the governance of FMIPA institutions

3. Purpose

Produce Bachelors who:

- a. Having the characteristics of being a citizen as reflected in the National Education Goals
- b. Have a foundation of thinking and broad insight about Mathematics and Natural Sciences as a group of fields of study so that they are able to communicate in the field of Mathematics and Natural Sciences between each other and are able to connect the material in the field of study they teach with material in other Mathematics and Natural Sciences.

- c. Mastering MIPA knowledge comprehensively, which is steady and deep enough so that graduates can develop and adapt to various situations and advances in science and technology,
- d. Have broad knowledge about Mathematics and Natural Sciences and education and have adequate abilities and skills in designing, implementing, and managing teaching and learning activities in their field of study, and
- e. Have additional authority/ability both horizontally and vertically.

B. Faculty Academic Information

FMIPA UNP has four majors, each of which consists of two study programs with education levels of D3, S1 and S2 programs, which are as follows:

1. Department of Mathematics, consisting of:
 - a. Mathematics Education Study Program
 - b. Mathematics Study Program
 - c. Statistics Study Program
2. Department of Biology, consisting of:
 - a. Biology Education Study Program
 - b. Biology Study Program
3. Department of Physics, consisting of:
 - a. Department of Physics Education
 - b. Physics Study Program
4. Department of Chemistry, consisting of:
 - a. Chemistry Education Study Program
 - b. Chemistry Study Program
5. Natural Science Education Study Program

In addition to managing regular programs, FMIPA also manages regular independent programs, including:

1. Educational study program whose students come from high school.
2. Qualification improvement program for junior and senior high school teachers to obtain a bachelor's degree in education

- Other special programs in the form of Upgrading/Short-term training for Mathematics and Science teachers at SMP/Madrasah Tsanawiah, SMU/ Madrasah Aliah, both public and private

Detailed explanations of these programs can be found in the respective program's manuals.

C. TPB Course

In accordance with curriculum developments based on the needs of each department, all new FMIPA students are required to take courses that are part of the TPB course group, according to their respective majors as listed in the following table

this.

TPB COURSES

No.	Code	Courses	Credits	Semester
1	FMA1.60.1302	Calculus	4	1
2	FMA1.60.1303	General Physics	4	1
3	FMA1.60.2102	General biology	4	2
4	FMA1.60.2103	General Chemistry	4	2

The implementation of the TPB course group lectures is arranged under the coordination of the TPB Course Service Unit with each department in the Faculty of Mathematics and Natural Sciences, Padang State University.

D. Academic Information at Department Level

1. Mathematics Department

a. Vision

Making the Mathematics Department of FMIPA UNP a center for mathematics education, research, and development in order to produce professional, faithful, devoted and reputable academic staff and scientists at the national and international levels.

b. Mission

The mission of the Mathematics Department of FMIPA UNP is to improve:

- 1) faith and devotion to God Almighty
- 2) noble character, discipline, and a sense of responsibility
- 3) conducive academic climate
- 4) the quality of graduates of education staff and scientists
- 5) role as facilitator of lifelong learning
- 6) graduates who are able to communicate effectively with community members
- 7) cooperation with other parties in the field of research, and community service
- 8) mathematics research and teaching activities to support the process of learning, developing, and applying mathematics
- 9) supporting activities *grounding* mathematics, so that the impression of people who think that the difficulty of mathematics can be minimized.

c. Destination

The objective of the Mathematics Department of FMIPA UNP is to produce graduates who have competitive and comparative advantages according to national and international quality standards.

d. Study Load

To complete undergraduate education in Mathematics, students are required to have passed courses of at least 144 credits which include compulsory courses (127 credits for the Mathematics Education study program, 117 credits for the Mathematics study program) and elective courses and specifically for the Statistics study program the study load only includes compulsory courses consisting of 115 credits.

1) Compulsory Courses

Compulsory courses consist of courses – courses that every student must take. To take a course certain conditions are required (*pre-request*, or other conditions). This should be the attention of students.

2) Elective Courses

Students are free to choose elective courses that are available each semester. However, so that students have an adequate unit of ability, in choosing elective courses, students are expected to consult and pay attention to the suggestions of academic supervisors.

e. Study program

The Mathematics Department of FMIPA UNP has four study programs, namely the Mathematics Education study program, the Mathematics study program, the Statistics program (S1) and the Statistics study program (D3).

Study Program : Mathematics Education (S1)

1) Vision

Making one of the superior study programs at the national level in producing mathematics educators in 2020 based on faith and piety.

2) Mission

The missions of the Mathematics education study program at FMIPA UNP are:

a) Develop innovative learning activities based on faith and piety

b) Carrying out research oriented to mathematics learning innovation

c) Organizing community service activities

d) Develop cooperation with various *stakeholders*

3) Purpose

The objectives of the Mathematics education study program at FMIPA UNP are:

Produce a Bachelor of Mathematics Education who has professional, pedagogic, personality and social competencies based on faith and piety

a) Produce graduates who are able to compete at the national level

b) Produce scientific papers with national reputation in develop mathematics learning

c) Providing services to the community in the field of mathematics education in accordance with the progress of science and technology

4) Graduate Competencies

Competencies of graduates of the Mathematics Education Study Program of FMIPA UNP can be formulated as follows:

1. Competence in the Field of Work

a. Mastering learning theory, principles of learning mathematics, and student characteristics

b. Skilled in developing mathematical abilities, high-level mathematical thinking, and positive attitudes of students towards mathematics.

c. Have the ability to use information and communication technology for self-interest and for learning Mathematics

d. Skilled in evaluating the process and results of learning mathematics and using it for the benefit of learning mathematics

e. Have a work ethic, empathy, responsibility, self-confidence, and a sense of pride as a math teacher

f. Able to communicate effectively and politely with fellow educators, education staff, parents and the community

2. Knowledge Mastery Competence

Able to think deductively, inductively, logically, analytically and structured in understanding Learning and Learning methods and theories so that they can apply them correctly.

3. Managerial Ability:

a. Able to communicate and cooperate with community members.

b. Able to negotiate with applied field practitioners.

4. Attitudes and Values:

a. Understanding the values of character, science, and life nation and state.

b. Able to carry out work honestly, disciplined, and responsible.

c. Able to act ethically and morally.

5) Course Structure

Major : Math

Study program : Mathematics Education(S1)

No	Code	Courses	SKS			Sem	
			Quantity	T	P		L
1). Basic Education Course (MKDK)							
A.Required							
1	FMA1.60.1303	General Physics	4	3	1	0	1
Number of Credits			4	3	1	0	
2). Expertise Course (MKBK)							
A.Required							
1	FMA1.60.1302	Calculus	4	3	1	0	1
2	MAT1.61.2101	English for Mathematics	2	2	0	0	2
Number of Credits			6	5	1	0	
3). University Compulsory Courses							
A.Required							
1	UNP1.60.1401	Religious education	3	3	0	0	1
2	UNP1.60.1402	Pancasila Education	2	2	0	0	2
3	UNP1.60.1403	Indonesian Citizenship	2	2	0	0	1
4	UNP1.60.1404	Education	2	2	0	0	2
5	UNP1.60.1405	English	2	2	0	0	1

No	Code	Courses	SKS				Sem
			Quantity	T	PL		
6	UNP1.60.3101	Entrepreneurship	3	3	0	0	6
7	UNP1.61.1201	Fundamentals of Educational	2	2	0	0	3
8	UNP1.61.2101	Psychology Education	2	2	0	0	3
9	UNP1.61.2102	Education Administration And Supervision	2	2	0	0	2
10	UNP1.61.4201	Guidance and counseling	2	2	0	0	4
Number of Credits			22	22	0	0	
4). University Elective Courses							
A.Choose 2 of 18 Credits							
1	UNP2.60.1401	Basic Natural Science	2	2	0	0	1
2	UNP2.60.1402	Basic Socio-Cultural Sciences	2	2	0	0	1
3	UNP2.60.2101	Physical Fitness Education	2	2	0	0	2
4	UNP2.60/2102	Japanese	2	2	0	0	2
5	UNP2.60.2103	Multicultural Education	2	2	0	0	2
6	UNP2.60/2401	History of the Indonesian Nation's Struggle	2	2	0	0	2
Number of Credits			12	12	0	0	
5). Faculty Compulsory Courses							
A.Required							
1	FMA1.60.2102	General biology	4	3	1	0	2
2	FMA1.60.2103	General Chemistry	4	3	1	0	2
Number of Credits			8	6	2	0	
6). Study Program Compulsory Courses							
A.Required							
1	MAT1.61.1101	Computer application	2	1	1	0	1
2	MAT1.61.1301	Introduction to Basic Mathematics	3	3	0	0	1
3	MAT1.61.1302	Basic Algebra and Trigonometry	3	2	1	0	1
4	MAT1.61.2301	Advanced Calculus	4	3	1	0	2
5	MAT1.61.2302	Field and Space Geometry	3	2	1	0	2
6	MAT1.61.3301	Analytical Geometry of Planes and Room	4	4	0	0	3
7	MAT1.61.3302	Elementary Statistics	4	3	1	0	3
8	MAT1.61.3303	Learning Psychology Mathematics	2	2	0	0	3

No	Code	Courses	SKS			Sem	
			Quantity	T	P		L
9	<u>MAT1.61.3304</u>	Elementary Linear Algebra	4	3	1	0	3
10	<u>MAT1.61.3305</u>	Number Theory	3	2	1	0	3
11	<u>MAT1.61.4301</u>	Learning strategies Mathematics	3	2	1	0	4
12	<u>MAT1.61.4302</u>	Algebraic Structure	4	4	0	0	4
13	<u>MAT1.61.4303</u>	Vector Calculus	4	4	0	0	4
14	<u>MAT1.61.4304</u>	Algorithms and programming	3	2	1	0	4
15	<u>MAT1.61.4305</u>	Study the School Mathematics Curriculum	3	2	1	0	4
16	<u>MAT1.61.5101</u>	Ordinary Differential Equation	3	2	1	0	5
17	<u>MAT1.61.5201</u>	Mathematics learning media	3	2	1	0	5
18	<u>MAT1.61.5301</u>	Lesson Plan Mathematics	3	2	1	0	5
19	<u>MAT1.61.5302</u>	Learning Evaluation Mathematics	3	2	1	0	5
20	<u>MAT1.61.5303</u>	Mathematical Statistics I	3	2	1	0	5
21	<u>MAT1.61.5304</u>	Discrete mathematics	3	2	1	0	5
22	<u>MAT1.61.6011</u>	Real Analysis I	3	2	1	0	6
23	<u>MAT1.61.6201</u>	Micro Teaching	3	3	0	0	6
24	<u>MAT1.61.6202</u>	Mathematics Education and Teaching Research Methods	3	2	1	0	6
25	<u>MAT1.61.6301</u>	Introduction to Operations	3	2	1	0	6
26	<u>MAT1.61.7101</u>	Research Seminar Thesis	2	0	2	0	7
27	<u>MAT1.61.7102</u>	Sampling Technique	3	2	1	0	7
Number of Credits			84	62	22	0	
B.Final Project/Thesis							
1	<u>MAT1.61.7301</u>	Thesis	4	4	0	0	7
Number of Credits			4	4	0	0	
7). Study Program Elective Courses							
A.Maximum Choice of 3 Credits from 14 Credits							
1	<u>MAT2.61.6011</u>	Transformation Geometry	3	2	1	0	6
2	<u>MAT2.61.6102</u>	History of Mathematics	2	2	0	0	6
3	<u>MAT2.61.6103</u>	Actuarial	3	2	1	0	6
4	<u>MAT2.61.6104</u>	Numerical Method	3	2	1	0	6

No	Code	Courses	SKS			Sem	
			Quantity	T	PL		L
5	<u>MAT2.61.6201</u>	Advanced Computer Applications	3	1	2	0	6
Number of Credits			14	9	5	0	
B.Choose Minimum 4 credits from 34 credits							
1	<u>MAT2.61.8101</u>	Multivariate Analysis	3	3	0	0	8
2	<u>MAT2.61.8102</u>	Finite Group Theory	3	3	0	0	8
3	<u>MAT2.61.8103</u>	Introduction to Topology	3	3	0	0	8
4	<u>MAT2.61.8104</u>	Math Statistics 2	3	2	1	0	8
5	<u>MAT2.61.8105</u>	Database Complex Variable	3	2	1	0	8
6	<u>MAT2.61.8106</u>	Function Theory	3	2	1	0	8
7	<u>MAT2.61.8201</u>	Mathematical Modeling	3	2	1	0	8
8	<u>MAT2.61.8202</u>	Real Analysis 2	3	3	0	0	8
9	<u>MAT2.61.8301</u>	Applied Regression Analysis	3	2	1	0	8
Number of Credits			27	22	5	0	

Synopsis**UNP1.60.1401 Religious Education 3 Credits**

The One and Only Godhead: faith and piety, divine philosophy (Theology); Humans: human nature, human dignity, human responsibility; Law: raise awareness to obey God's law, the prophetic function of religion in law: Moral: religion as a source of morals, morals in life; Science, Technology and Arts: Faith, science and technology, and charity as a unit, the obligation to demand and practice knowledge, the responsibility of scientists and artists; inter-religious harmony: religion is God's grace for all, togetherness in religious plurality; Society: civilized and prosperous society, the role of religious communities in realizing a civilized and prosperous society, human rights and democracy; Culture: academic culture, work ethic, open and fair attitude; Politics: the contribution of religious adherents to political life,

UNP1.60.1402 Pancasila Education 2 Credits

This course contains the meaning of urgency and reasons for the need for Pancasila education in Higher Education; Pancasila in the current history of the Indonesian nation; Pancasila as a philosophical system, as the basis of the state

The Republic of Indonesia, as the state ideology, as an ethical system, and Pancasila as the basis for the value of developing science; Thinking and implementing Pancasila in dealing with current actual problems, such as human rights, racial and economic problems, and the problem of radicalism that must be solved in accordance with the values of Pancasila.

UNP1.60.1403 Citizenship Education 2 Credits

This course contains the nature of civic education in developing full undergraduate or professional abilities; the essence and urgency of national identity as one of the determinants of nation building and character, the urgency of national integrity and national unity; the constitutional values and norms of the 1945 Constitution of the Republic of Indonesia and the constitutional provisions of the legislation under the Constitution; harmony of obligations and rights of the state and citizens in a democracy that is based on people's sovereignty and deliberation for consensus; the nature, instrumentation, and practice of Indonesian democracy based on Pancasila and the 1945 Constitution of the Republic of Indonesia; the historical dynamics of constitutional, socio-political, cultural, and contemporary contexts of sovereign law enforcement; the historical dynamics and the urgency of the insight into the archipelago as a collective conception and view of the Indonesian nationality in the context of world relations; national urgency and challenges and defend the country for Indonesia in building a collective commitment to nationality.

UNP1.60.1404 Indonesian 2 Credits

This course contains the Conception of Indonesian Language, History of Indonesian Language, Position and Functions of Indonesian Language, Indonesian Language Variety, Indonesian Spelling, (punctuation letters, words and absorption elements: Effective Sentences, Definition of Characteristics, Terms of Effective Sentences: Paragraphs Types, Functions and Developments: Writing Outline Theme, Topic, Title and Type of Outline: Writing Text (Scientific Academic Texts and Non-Academic Texts: BI Official Letters (Format and Types of Indonesian Official Letters.

UNP1.60.1405 English 2 Credits

This course contains the development of English language skills in an integrated manner by taking into account the needs of students according to their fields/ majors, including understanding basic sentence patterns that help students understand various English references and equip students with communication skills in English according to their field of expertise.

UNP1.61.1201 Fundamentals of Education 2 Credits

Provide insight into human nature, the nature and importance of education, the foundations and principles of education, thoughts about education

UNP1.61.2101 Educational Psychology 2 Credits

This course examines/discusses the basic concepts of educational psychology, growth, student development, intelligence, talent, creativity, motivation, memory, individual differences and learning theories.

UNP1.61.2102 Administration and Education Supervision 2 Credits

Educational Administration and Supervision courses are courses that provide insight, basic concepts and processes as well as the scope of Educational Administration and Supervision and apply them in professional school management.

UNP1.60.3101 Entrepreneurship 3 Credits

This course contains knowledge, attitudes and skills based on creative and innovative thinking regarding the basic principles of entrepreneurship, entrepreneurial development models, entrepreneurial strategies, business ethics in entrepreneurship, opportunity analysis, business feasibility studies and business management (marketing, production, finance), resources, business legality, technology and information)

UNP1.61.4201 Guidance and Counseling 2 Credits

Guidance and Counseling is a compulsory university education course that provides insight and understanding of the basic concepts of BK, including; understanding, background, objectives, functions, principles, principles and code of conduct of BK, BK development fields, types of BK services, and BK protection activities as well as BK implementation operations in curriculum implementation 2013. In addition, it also discusses the role of the Principal, Deputy Principal, Subject Teachers, Class homeroom teachers, BK teachers or counselors and other personnel as well as BK Supervisors in BK services in schools.

UNP2.60.1401 Basic Natural Sciences 2 Credits S

This course contains the nature and scope of the human mind and its development, the development of science, the earth and the universe the diversity of living things and their distribution, living things in natural ecosystems, natural resources and the environment, the benefits and impacts of science and technology on social life, the history of human civilization and technological developments, some important technological developments, and issues

environment

UNP2.60.1402 Basic Socio-Cultural Sciences 2 Credits

This course contains: Basic concepts in social and cultural sciences to study Indonesian society and changes in Indonesian society and culture. The subjects are humans and human culture as individuals and human social beings, moral values and human law, human diversity and equality, science technology and human arts and the environment.

UNP2.60.2101 Physical Fitness Education 2 Credits

This course applies the effects and benefits of various movement activities for physical fitness and health through various games, competitions, and sports exercises and abilities.

Analyze the importance of physical activity to maintain and develop and physiological functions of the body and health and can be tolerated pkan throughout life.

UNP2.60.2102 Japanese 2 Credits

Japanese language courses equip students with knowledge about Japanese language practice so that students have the ability to read and communicate using Japanese.

UNP2.60.2103 Multicultural Education 2 Credits

This multicultural education course contains the concept of multicultural education: the urgency of multicultural education in a diverse Indonesian society, building an inclusive diversity paradigm through educational institutions. prospects and constraints of multicultural implementation, implementation of multicultural education in Indonesia, as well as character building of students through the application of multicultural ideology in the field of education.

UNP2.60.2401 History of the Struggle of the Indonesian Nation 2 Credits

The History of the Nation's Struggle course discusses the meaning and historical meaning of the nation's struggle, imperialism and colonialism, the struggle of the Indonesian nation against imperialism and colonialism, the Indonesian national movement, the struggle for independence, the meaning of the proclamation of efforts to maintain independence against various threats that threaten the unitary state of the Republic of Indonesia, the Republic of Indonesia.

FMA1.60.1302 Calculus 4 Credits

This course discusses the real number system, equations and inequalities, absolute values and absolute inequalities, coordinate systems and simple graphs, functions, limits and continuity, derivatives, related rates, graphs, and integrals.

FMA1.60.1303 General Physics 4 Credit Points

This course discusses quantities and units, particle kinematics, particle dynamics, work and energy, linear momentum, angular momentum and rigid bodies, static fluids, dynamic fluids, concepts of temperature and heat, and the laws of thermodynamics.

FMA1.60.2102 General Biology 4 Credit Points

This course discusses the knowledge of living things and scientific methods, cells as the basis of life, metabolism, structure and organization of plant and animal bodies, biodiversity, structure, functions and processes in human organ systems, ecology, genetics and evolution and biotechnology.

FMA1.60.2103 General Chemistry 4 Credit Points

This course discusses Stoichiometry, Chemical Energetics, Atomic Structure, Periodic System of Elements, Chemical Bonds and Molecular Geometry, Forms of Matter and Chemical Equilibrium.

MAT1.61.1301 Introduction to Basic Mathematics 3 Credits

Sets and their operations, Cartesian number sets and multiplication, types and inverse functions, types of relations and inverse relations, set algebra, duality, indexed sets and partitions, cardinal numbers and their operations, finite sets, infinite sets, countable sets, and uncounted sets, proportion, proportion function, argument, tautology, quantified proposition function, proof of the validity and invalidity of quantified argument, determining the truth value of composite propositions with arithmetic, Boolean polynomials in electric current networks

MAT1.61.1302 Basic Algebra and Trigonometry 3 Credits

Understand algebraic forms, operations of algebraic forms, decompose into factors, decompose fractions into partial fractions, Root Forms: arithmetic roots, operations of root forms, Extracting roots from root forms, Improper exponents: Operations and their properties, Logarithmic forms: Operations and their properties, Equations, Functions, and Inequality: Squares, Exponents, Logarithms, Polynomials, Rationals, Irrations, Sigma Notation, Sequences and Series,

Comparison of trigonometry, basic trigonometric formulas, periodicity, formulas for the sum and difference of Sine and Cosine and double angles, Addition and Multiplication of Sine and Cosine, Theorem of Sine and Cosine and area of triangles, Trigonometric equations and inequalities, Graphs of trigonometric functions and cyclometric functions.

MAT1.61.1101 Computer Applications 2 Credits

This course will start by getting to know computer devices, both software and hardware. Followed by studying Microsoft Office software (word, excel and power point) as well as supporting software in the field of mathematics such as minitab, SPSS and so on.

MAT1.61.2301 Advanced Calculus 4 Credits

Real number systems, inequalities and absolute values, functions and limits, infinite series and series, alternating series, absolute convergence, conditional convergence, power series and their operations, Taylor series, Maclaurin series, coordinate system, surfaces in three dimensional space, functions two or more variables, the limit of a two-variable function, continuity, partial derivatives, differentiability, double and triple integrals, drawing graphs.

MAT1.61.2302 Geometry of Fields and Spaces 3 Credit Points

Plane geometry includes parallel lines and planes, congruent and congruent triangles, circles, drawings and locus, and areas of plane figures. The geometry of space includes the area and volume of the shape of the space. Furthermore, it also discusses painting in space, the point of intersection of lines and planes, angles, and distances in space.

MAT1.61.2101 English for Mathematics 2 Credits

Take an inventory of vocabulary and terms in the fields of Arithmetic, Algebra, Trigonometry, Geometry, Statistics, etc., understand the meaning and use it in English orally and in writing, understand English mathematical texts, and write mathematical statements in the form of definitions, theorems, and proof in English.

MAT1.61.3301 Analytical Geometry of Planes and Spaces 4 Credit Points

Position line by line, line by plane, plane by plane. The properties of a conic section (line, circle, parabola, ellipse, hyperbola). Position line by line, line by plane, plane by plane, plane by sphere. The properties of simple surfaces and conical tubes,

spheres, ellipsoids, parabolas and hyperbolas

MAT1.61.3302 Elementary Statistics 4 Credits

Role of statistics, Types of data, Population and sample, Parameters and statistics, Data collection, Data presentation, Descriptive and Inferential Statistics, Concentration measure, Dispersion measure, Location measure, Parameter estimation, Confidence interval, Hypothesis test, Simple linear regression, Software use statistics.

MAT1.61.3303 Psychology of Mathematics Learning 2 Credits

Understanding, theories, principles and factors that influence the act of learning as well as several schools of mathematics learning theory.

MAT1.61.3304 Elementary Linear Algebra 4 Credits

Course competence can be achieved by mastering the material **matrix:** matrices and their orders, basic operations of matrices, and inverses of matrices; **System of Linear Equations:** Gaussian Elimination, Elementary Matrix and Inverse Search Methods, SPL and Invertibility and Homogeneous SPL; **Determinants:** Determinant Functions, Row Reduction, Minor and Cofactor Matrices, and Cramer's Rule; **Vector Space:** Vectors in R^2 and R^3 , n -Euclides Spaces, Real Vector Spaces, Subspaces, Linear Combinations and Freedoms, Bases and Dimensions, Rank Matrix; **Inner Product Space:** Inner Product Spaces and measures (Length, Distance, and Angle), Orthonormality; **Eigen Space:** Eigenvalues and Vectors, EigenSpace Bases, Diagonalization; **Linear Transformation:** Definition of Linear Transformation (TL), Kernel and Range, TL from R^n to R_m , TL Matrix

MAT1.61.3305 Number Theory 3 Credit Points

Natural, whole, integer, rational, irrational, real and complex number systems. Mathematical Induction, Divisible and Binomial coefficients, Congruence, Diophantus linear equations, basic properties of congruence, linear congruence, congruence systems and Chinese Remaining Theorems, Multiplicative Functions: tau and sigma functions, Euler functions, and Ceiling and Floor functions, Primitive Functions : order of integers, primitive roots, arithmetic indices, and primality tests, Quadratic congruence: quadratic congruence law of quadratic reciprocity, Diophantus nonlinear equations: Pythagorean triples, Fermats Last Theorems and Sums of Squares.

MAT1.61.4301 Mathematics Learning Strategy 3 Credits

This course aims to equip students with knowledge

about teaching techniques, teaching strategies, teaching methods, teaching approaches, and contemporary mathematics learning models. form the attitudes and behaviors that students need in their work according to the level of expertise based on the knowledge and skills they master. Based on this understanding, this course is directed to shape students' pedagogical abilities as prospective mathematics teachers.

Lecture activities begin with a brief orientation on the duties and responsibilities of the teacher, the competencies needed by the teacher, and the problems encountered in learning mathematics, as well as the teacher's role in carrying out active, interactive and fun mathematics learning. In this orientation, students get an idea of the importance of teachers mastering and being skilled at using various methods, approaches, and selected learning models.

MAT1.61.4302 Structure Algebra 4 Credits

Binary operations; Groups and their properties; Sub groups and their properties; Cyclic group; Symmetry group; Koset; Normal subgroup; factor group; Homomorphism and Group Isomorphism; Rings and their properties; ring isomorphism; Sub rings; Ideal; Integral domains; Fields; and Ring Polynomials.

MAT1.61.4303 Vector Calculus 4 Credits

Vectors in planes, vector-valued functions, vectors in three-dimensional space, surfaces in three-dimensional space, functions with two or more variables, partial derivatives, limits and continuity, directed and gradient derivatives, chain rules, Lagrange method, fold integrals, vector fields, line integrals, Green's theorem on planes, surface integrals, Gaussian divergence theorem, Stokes' theorem, introduction to differential equations

MAT1.61.4304 Algorithm and programming 3 Credits

Algorithm (how to compose and analyze an algorithm), the basics of computer programming, the Pascal programming language in which it will study variables and data types, input and output, condition selection, loops, arrays, procedures and functions.

MAT1.61.4305 Study of School Mathematics Curriculum 3 Credits

Analyzing the material, sequence and depth of the mathematics curriculum material at the basic education level, as well as the learning process (learning experience, methods, and evaluation)

MAT1.61.5301 Mathematics Learning Design 3 Credits

Skilled in designing and developing learning tools (syllabus, lesson plans, teaching materials, media and assessment instruments) and using them for the benefit of learning mathematics. In addition, he is skilled in developing mathematical abilities, high-level mathematical thinking, and a positive attitude towards mathematics through designed learning tools.

MAT1.61.5302 Evaluation of Mathematics Learning 3 Credits

This course discusses the nature of learning evaluation, development of tests and non-tests, indicators used to measure the quality of assessment tools, and processing measurement results, as well as their application in the field of mathematics studies. After studying this course, students are expected to master various concepts of procedures and techniques for assessing the learning process and learning outcomes of mathematics. For this reason, students are required to make examples of evaluating the process and results of learning mathematics. Students' abilities will be measured by tests.

MAT1.61.5201 Mathematics learning media 3 credits

Familiarize yourself with various media and teaching aids for high school mathematics and exercises on their creation, use and maintenance.

MAT1.61.5303 Mathematics Statistics I 3 Credits S

Theories of combinatoric analysis: counting techniques, permutations and combinations, probability: definition of probability, laws of probability, conditional probability, independent events and Bayes' theorem. Random variables and their distributions: probability functions of discrete and continuous random variables, joint probability functions, marginal and conditional probability functions. Mathematical expectations, expected values of random variables and their properties, Chebychere's theorem and moment generating functions. Some of the probability distributions of special random variables: discrete uniform distribution, Bernoulli distribution, Binomial, Hypergeometric, Multinomial, negative binomial, and Geometric distribution, continuous uniform distribution, normal, gamma, exponential, and chi-square distribution.

MAT1.61.5101 Ordinary Differential Equations 3 Credits

Types and orders of PD, Initial value problems and boundary value problems, First-order GDP, First-order GDP solution methods, Picard method, high-order GDP, High-order GDP solving methods, Solving real phenomena problems that can be modeled with GDP, PD solving with series rank,

Frobenius Method, Bessel Function, Legendre Polynomial, PD System, PD Solving with Laplace Transform, GDP Numerical Solution

MAT1.61.5304 Discrete Mathematics 3 Credits

Logical functions, Bole's Algebra, Pigeon's Nest Principle, Exclusion-Inclusion Principle, Generating Functions and Graph theory.

MAT1.61.6201 Micro Teaching 3 Credits

This course aims to form the attitudes and behaviors required by students in their work according to their level of expertise based on the knowledge and skills they have mastered. Based on this understanding, this course is directed to form students' professional abilities as professional teachers/educators.

The learning program starts from planning learning activities, implementing learning, and then conducting evaluations. This course examines the steps in implementing a learning program. Therefore, in this course, students are trained to have the basic skills needed to carry out classroom learning. Basic teaching skills training in the form of micro (Peer Teaching) includes basic questioning skills, reinforcement skills, variation skills, explaining skills, opening and closing lessons, classroom management skills, group discussion leadership skills, and small group teaching skills.

As a skill-building course (*skills*), This course is directed to provide real experience for students to play themselves as teachers/educators in the classroom in the form of micro-learning exercises. Various basic skills that must be mastered by students are trained in this course. The more tangible benefit is preparing students before participating in the actual teaching practice in the classroom.

MAT1.61.6202 Research Methods for Mathematics Education and Teaching 3 Credits

Definition of research, reasons for the need for research, research objectives, research functions, sources of knowledge (approach in obtaining the truth), scientific and non-scientific methods. Types of Research: descriptive, historical, correlational, causal comparative, experimental, and development

(developmental research). Problem: problem identification, problem selection, problem formulation, problem background. Literature review: reading sources, criteria for choosing reading sources, organizing the substance of theoretical studies. Hypothesis: understanding the hypothesis, various hypotheses. Variables: understanding and types of variables,. Research Instruments: types, types of data collection tools, selection of data collection tools, quality of data collection tools (validity, reliability, objectivity). Definition of population and sample, criteria for representative samples, and sampling techniques. Data analysis techniques: scoring, tabulation, data description, statistical test (inference), and interpretation of data analysis results. Conclusions, implications and research suggestions: conclusions (how to make decisions), implications, and suggestions. Research proposal writing.

MAT1.61.6301 Introduction to Operations Research 3 Credits

This course is designed to introduce the use of mathematics in solving optimization problems that can be formulated into linear functions. Emphasis is given to problem formulation, mastery of solving techniques and the meaning of geometry. Topics that will be discussed include: linear programming, simplex method, duality, and sensitivity analysis.

MAT1.61.6011 Real Analysis I 3 Credits

Algebraic Properties, Sequence Properties, Absolute Values, Complete Properties and Their Applications, Sequences and Limits, Sequence Limit Theorem, Monotone Sequences, Bolzano-Weierstrass Theorem, Cauchy Criteria, True Divergent Sequences.

MAT1.61.7101 Thesis Seminar 2 Credits

Prepare proposals in accordance with issues approved by the supervisor, present and defend the draft proposal in front of the board of examiners.

MAT1.61.7301 Thesis 4 Credits

Designing Instruments, Conducting Research, Writing Research Reports, Defending Research Reports in front of the Examiner board

MAT1.61.7102 Sampling Technique 3 Credits

Some concepts of statistical theory and research design, simple random sampling, proportion and percentage sampling of sample size estimates, layered random sampling, systematic sampling

MAT2.61.6101 Transformation Geometry 3 Credits

This course equips students to understand the concepts and principles of transformation on a flat plane. The material includes: Definition of Transformation, Isometry, Composition Reflection, and some isometry, among others half-turn, congruence, and dilation shift, spin, reflection sliding, transformations.

MAT2.61.6201 Advanced Computer Applications 3 Credits

This course will begin with getting to know software to create mathematics learning media. Followed by studying learning media maker software (macro media flash) as well as supporting software in the field of mathematics.

MAT2.61.6102 History of Mathematics 2 Credits

History of Mathematics by Age: Ancient Egypt, Mesopotamia, Ancient Greece, Alexandria, Late Greek Period, China, India, Arab Empire, Europe to XIV Century, XV Century to XX Century. History of Mathematics Based on the Discovery of Matter. History of Mathematics Based on Inventors

MAT2.61.6103 Actuarial 3 Credits

This lecture begins with material that discusses the actuarial world, interest rates, definite annuities, amortization schedules and sinking funds, concepts of opportunity theory, mortality tables, life annuities, pure endowments, life insurance and the concept of net premium reserves.

MAT2.61.6104 Numerical Method 3 Credits

Error definition, definition, source and examples of error, an error propagation and its arborescence. Finding the roots of nonlinear equations using the halves method, false position, Newton's and Secant's methods. Polynomial interpolation using Newton's divided difference, Newton's forward and backward interpolation, Lagrange interpolation.

MAT2.61.8301 Applied Regression Analysis 3 Credits

Simple Linear Regression, Multiple Linear Regression, Model Fit, Residual Analysis, Transformation for Unsuitable Regression Model, Best Model Selection, Multi collinearity.

MAT2.61.8101 Multivariate Analysis 3 Credits

Multivariate technique classification, measurement scale, statistical and vector concepts and matrix operations, data reduction. Review of multiple regression analysis & applications. Discrimination analysis & application. Principal component analysis. Factor analysis & application. Cluster & application analysis. Multi-dimensional scale & multivariate analysis application.

MAT2.61.8102 Group Theory Up to 3 Credits

Definition of finite groups, examples of various types of finite groups, definitions of permutations, symmetry groups, and permutation classes, definitions of alternating groups, understanding of basic properties related to special finite groups (symmetry, alternating), understanding of normalizers, centralizers, commutators, and center, Jordan Holder decomposition theorem, understanding group action on sets, understanding Sylow's group and Sylow's theorem.

MAT2.61.8103 Introduction to Topology 3 Credits

Topological Spaces, Bases and subbases, Continuity, Metric Spaces, Countability, Separation axioms, Compactness, Connectivity, and Complete Metric Spaces.

MAT2.61.8104 Mathematical Statistics 2 3 Credits

Random variable function: distribution function technique, transformation technique and moment generating function technique. Distribution of chi-square, t, F and order statistics. Point estimation: moments method, maximum Likelihood method, Bayes estimator, unbiased estimator, and sufficient statistics. Hypothesis testing: statistical hypothesis testing, Losses and Risks, The Neyman-Pearson Lemma, Power function for a test and Likelihood ratio test.

MAT2.61.8105 Theory of Complex Variable Functions 3 Credit Points

Complex Number Systems, Topological Concepts of Point Sets in Complex Planes, Complex Functions: Limits and Continuous, Differentials of Complex Functions, Cauchy Riemann Equations, Analytical Functions, Elementary Functions, Complex Integrals, Cauchy-Goursat Theorem, Cauchy Integral Formulas, Some Theorems on Complex Integrals .

MAT2.61.8201 Mathematical Modeling 3 Credits

Understanding mathematical models and models, The process of modeling real problems, Types of mathematical models and problems, Stages of forming mathematical models, Models based on the rate of change, Static and dynamic models, Deterministic and stochastic models, Optimization models, Mathematical models in

various disciplines.

MAT2.61.8106 Database 3 Credits

This course begins with an introduction to databases followed by database architecture, database design, Entity relationship diagrams (ERD), normalization, Structural Query Language (SQL), using application software to create databases such as Microsoft Visual basic, PHP, MySQL and etc.

MAT2.61.8202 Real Analysis 2 3 Credits

Limits: Function Limits, Sequence Criteria for Limits, Divergence Criteria, Limit Theorems, Extension of the concept of limits. **Continuous Function:** Continuous Functions, Discontinuous Criteria, Interval Continuity, Uniform Continuous, Monotonous Functions, and Inverse Functions. **Derivative:** Derivatives, Mean Value Theorem Average, L'Hospital's Rule, Taylor's Theorem. **Integral:** Riemann integral, Fundamental Theorems of Calculus, Integral Approximation.

f.

Study Program : Mathematics (S1)

1) Vision

Become a nationally reputable study program in mathematics in 2020 based on faith and piety.

2) Mission

The mission of the Mathematics Study Program is as follows:

1. Organizing quality education based on faith and piety.
2. Carry out research of national reputation in the field of mathematics and its applications.
3. Carry out quality community service in the field of mathematics and its applications.
4. Develop cooperation with various government agencies, private and *stakeholders*.

3) Purpose

The Objectives of the Mathematics Study Program, FMIPA UNP **generally** are: To produce a Bachelor of Mathematics who has a competitive and comparative advantage according to national quality standards.

The Objectives of the Mathematics Study Program, FMIPA UNP **in particular** is:

1. Produce Mathematics Bachelors who have mathematical competence and development and have *soft skills*, good emotional and spiritual intelligence.
2. Produce quality standards of content, process and assessment of lectures.
3. Provide maximum educational facilities and infrastructure.
4. Produce research in the field of mathematics and its applications that are increasingly of high quality.
5. Utilizing the results of research in the field of mathematics and applied for science and technology enrichment, quality improvement, fulfillment of knowledge-based community needs.
6. Publish research results in the field of mathematics and applied through seminars, journals, and books at national and international levels.
7. Carry out quality community service to solve problems faced by the community in the field of mathematics and its applications.
8. Increase cooperation at local and regional levels with Universities and Local Governments.

9. Increasing national level cooperation with the Ministry National, Institution Government Non Ministry and organization/society p profession.

4) Graduate Competencies

Competencies of graduates of the Mathematics Study Program of FMIPA UNP dirdefine as follows:

1. Field of Work Ability

- a. Able to develop mathematical thinking, starting from procedural / computational understanding to a broad understanding including exploration, logical reasoning, generalization, abstraction, and formal proof (CP-KK 1).
- b. Able to observe, recognize, formulate and solve problems through a mathematical approach with or without the help of software (CP-KK 2)
- c. Able to reconstruct, modify, analyze / think in a structured way to the mathematical problems of an system/problem, assessing accuracy and inter-achieve it (CP-KK 3)
- d. Able to take advantage of various alternativesif solving mathematical problems that have been readily available independent or groups to make the right decisions (CPKK4)
- e. Able to adapt or develop themselves, both in mathematics and other relevant fields (including fields in the world of work)

2. Knowledge Mastery Ability

- a. Mastering mathematical theoretical concepts including mathematical logic, discrete mathematicsit, algebra, analysis and geometry, and probability theory and statistics (CP-PP 1)
- b. Mastering the principles of mathematical modeling, online programier, differential equations, and numerical methods (CP-

3. PP 2) Managerial Ability:

- a. Able to communicate and cooperate with community members.
- b. Able to negotiate with applied field practitioners.

4. Attitudes and Values:

- a. Understanding the values of character, science, and the life of the nation and state.
- b. Able to carry out work honestly, disciplined, and responsible.
- c. Able to act ethically and morally.

5) Course Structure

Department : Mathematics

Study Program : Mathematics (S1)

No	Code	Courses	SKS			Sem
			Total	TPL		
1). University Compulsory Courses						
A. Mandatory						
1	UNP1.60.1401	Religious education	3	3	00	1
2	UNP1.60.1402	Pancasila Education	2	2	00	1
3	UNP1.60.1403	Education Citizenship	2	2	00	2
4	UNP1.60.1404	Indonesian	2	2	00	2
5	UNP1.60.1405	English	2	2	00	2
6	UNP1.60.3101	Entrepreneurship	3	3	00	4
Number of Credits			14	14	00	
2). University Elective Courses						
A. Choose 2 of 18 Credits						
1	UNP2.60.1401	Basic Natural Science	2	2	00	1
2	UNP2.60.1402	Basic Socio-Cultural Sciences	2	2	00	1
3	UNP2.60.2101	Fitness Education Physical	2	2	00	2
4	UNP2.60/2102	Japanese language	2	2	00	2
5	UNP2.60.2103	Multicultural Education	2	2	00	2
6	UNP2.60/2401	Struggle History Indonesian nation	2	2	00	2
Number of Credits			12	12	00	
3). Faculty Compulsory Courses						
A. Mandatory						
1	FMA1.60.1302	Calculus	4	3	10	1
2	FMA1.60.1303	General Physics	4	3	10	1
3	FMA1.60.2102	General biology	4	3	10	2
4	FMA1.60.2103	General Chemistry	4	3	10	2
Number of Credits			16	12	40	
4). Study Program Compulsory Courses						
A. Compulsory Courses for Study Programs						
1	MAT1.62.1001	Analytical Geometry	3	3	00	1

No	Code	Courses	Quantity	SKS			Sem
				T	P	L	
2	MAT1.62.1002	Computer application	2	1	1	0	1
3	MAT1.62.1003	English For Mathematics	2	2	0	0	1
4	MAT1.62.202	Advanced Calculus	4	4	0	0	2
5	MAT1.62.2003	Basic Introduction Mathematics	3	3	0	0	2
6	MAT1.62.3001	Elementary Linear Algebra	4	4	0	0	3
7	MAT1.62.3002	Elementary Statistics	4	4	0	0	3
8	MAT1.62.3004	Vector Calculus	4	4	0	0	3
9	MAT1.62.3005	Discrete mathematics	3	3	0	0	3
10	MAT1.62.4001	Differential Equation Ordinary	4	4	0	0	4
11	MAT1.62.4002	Algebraic Structure	4	4	0	0	4
12	MAT1.62.4003	Chance Theory	4	4	0	0	4
13	MAT1.62.4004	Actuarial	3	3	0	0	4
14	MAT1.62.4005	Algorithm and Programming	3	1	2	0	4
15	MAT1.62.4006	Transformation Geometry	3	3	0	0	4
16	MAT1.62.5001	Numerical Method	3	3	0	0	5
17	MAT1.62.5002	Real Analysis 1	3	3	0	0	5
18	MAT1.62.5003	Mathematical Statistics	4	4	0	0	5
19	MAT1.62.5004	Operations Research	4	4	0	0	5
20	MAT1.62.6001	Real Analysis 2	3	3	0	0	6
21	MAT1.62.6002	Mathematical Modeling	4	3	1	0	6
22	MAT1.62.6003	Research methods	2	1	1	0	6
23	MAT1.62.7001	Complex Analysis	4	4	0	0	7
24	MAT1.62.7002	Thesis Seminar	2	0	2	0	7
Number of Credits			79	72	7	0	
B. Study Program Compulsory Courses Program							
1	MAT1.62.8001	Thesis	4	2	2	0	8
Number of Credits			4	2	2	0	
5). Study Program Elective Courses							
A. Group Choice k Analytical Skills (SELECT MINIMAL 3 DARI 18 SKS)							
1	MAT2.62.5001	Equation Theory	3	3	0	0	5

No	Code	Courses	Total	SKS		Sem	
				TPL			
		Differential					
2	MAT2.62.7001	Introduction to Topology	3	3	00	7	
3	MAT2.62.7002	Introduction to Analysis Functional	3	3	00	7	
4	MAT2.62.7012	Numerical Analysis	3	3	00	7	
5	MAT2.62.8001	Introduction to Size Theory	3	3	00	8	
6	MAT2.62.8002	Calculus of Variations	3	3	00	8	
Number of Credits			18	18	00		
B. Choice of Algebra Expertise Group (CHOOSE MINIMUM 3 OF 15 SKS)							
1	MAT2.62.5002	History of Mathematics	3	3	00	5	
2	MAT2.62.5003	Number Theory	3	3	00	5	
3	MAT2.62.6001	Linear Algebra	3	3	00	6	
4	MAT2.62.7003	Module Theory	3	3	00	7	
5	MAT2.62.8003	Finite Group Theory	3	3	00	8	
Number of Credits			15	15	00		
C. Choice of Statistics Expertise Group (CHOOSE MINIMUM 3 OF 3 27credits)							
1	MAT2.62.5004	Introduction to Stochastics	3	3	00	5	
2	MAT2.62.5005	Sampling Technique	3	3	00	5	
3	MAT2.62.6002	Regression Analysis	3	3	00	6	
4	MAT2.62.6003	Multivariate Analysis	3	3	00	6	
5	MAT2.62.6004	Non Parametric Statistics	3	3	00	6	
6	MAT2.62.7004	Forecasting Techniques	3	3	00	7	
7	MAT2.62.7005	Experimental design	3	3	00	7	
8	MAT2.62.7006	Linear Model	3	3	00	7	
9	MAT2.62.7007	Life Test Analysis	3	3	00	7	
Number of Credits			27	27	00		
D. Choice of Financial and Actuarial Mathematics Expertise Group (PILIHMINIMAL 3 OF 15 CREDITS)							
1	MAT2.62.5006	Advanced Actuarial	3	3	00	5	
2	MAT2.62.6005	Investment Management	3	3	00	6	
3	MAT2.62.7008	Company Operations Life insurance	3	3	00	7	
4	MAT2.62.7009	Statistical Method	3	3	00	7	

No	Code	Courses	SKS				Sem
			Quantity	T	P	L	
		Actuarial					
5	MAT2.62.8004	Table Formation Mortality	3	3	0	0	8
Number of Credits			15	15	0	0	
E. Choice of Modeling and Computing Expertise Group (SELECT MINIMAL 2 OF 17 CREDITS)							
1	MAT2.62.5007	Differential Equation Partial	3	3	0	0	5
2	MAT2.62.6066	Graph Theory	3	3	0	0	6
3	MAT2.62.6007	System Introduction Dynamic	3	3	0	0	6
4	MAT2.62.7010	Database	3	3	0	0	7
5	MAT2.62.7011	Biology Mathematics	3	3	0	0	7
6	MAT2.62.8005	Game Theory	2	2	0	0	8
Number of Credits			17	17	0	0	
F. Choice of Expertise Groups outside of KBK (Choose MINIMUM 2 of 14credits)							
1	MAT2.62.5008	Management	3	3	0	0	5
2	MAT2.62.6008	Field practice	3	3	0	0	6
3	MAT2.62.8006	industrial psychology	2	2	0	0	8
4	MAT2.62.8007	Mathematics Teaching	3	2	1	0	8
5	MAT2.62.8008	Managerial Accounting	3	3	0	0	8
Number of Credits			14	13	1	0	

Synopsis

UNP1.60.1401 Religious Education 3 Credits

The One and Only Godhead: faith and piety, divine philosophy (Theology); Humans: human nature, human dignity, human responsibility; Law: raise awareness to obey God's law, prophetic function of religion in law: Moral: religion as a source of morals, morals in life; Science, Technology and Arts: Faith, science and technology, and charity as a unit, the obligation to demand and practice knowledge, the responsibility of scientists and artists; inter-religious harmony: religion is God's grace for all, togetherness in religious plurality; Society: civilized and prosperous society, the role of the people

religion in realizing a civilized and prosperous society, human rights and democracy; Culture: academic culture, work ethic, open and fair attitude; Politics: the contribution of religious adherents in political life, the role of religious adherents in realizing national unity and integrity.

UNP1.60.1402 Pancasila Education 2 Credits

This course contains the meaning of urgency and reasons for the need for Pancasila education in Higher Education; Pancasila in the current history of the Indonesian nation; Pancasila as a philosophical system, as the basis of the state of the Republic of Indonesia, as a state ideology, as an ethical system, and Pancasila as the basis for the value of developing science; Thinking and implementing Pancasila in dealing with current actual problems, such as human rights, racial and economic problems, and the problem of radicalism that must be solved in accordance with the values of Pancasila.

UNP1.60.1403 Citizenship Education 2 Credits

This course contains the nature of civic education in developing full undergraduate or professional abilities; the essence and urgency of national identity as one of the determinants of nation building and character, the urgency of national integrity and national unity; the constitutional values and norms of the 1945 Constitution of the Republic of Indonesia and the constitutional provisions of the legislation under the Constitution; harmony of obligations and rights of the state and citizens in a democracy that is based on people's sovereignty and deliberation for consensus; the nature, instrumentation, and practice of Indonesian democracy based on Pancasila and the 1945 Constitution of the Republic of Indonesia; the historical dynamics of constitutional, socio-political, cultural, and contemporary contexts of sovereign law enforcement; the historical dynamics and the urgency of the insight into the archipelago as a collective conception and view of the Indonesian nationality in the context of world relations; national urgency and challenges and defend the country for Indonesia in building a collective commitment to nationality.

UNP1.60.1404 Indonesian 2 Credits

This course contains the Conception of Indonesian Language, History of Indonesian Language, Position and Functions of Indonesian Language, Indonesian Language Variety, Indonesian Spelling, (punctuation letters, words and absorption elements: Effective Sentences, Definition of Characteristics, Terms of Effective Sentences: Paragraphs Types, Functions and Developments: Writing Outline Theme, Topic, Title and Type of Outline: Writing Text (Scientific Academic Texts and Non-Academic Texts: BI Official Letters (Format and Types of Indonesian Official Letters.

UNP1.60.1405 English 2 Credits

This course contains the development of English language skills in an integrated manner by taking into account the needs of students according to their fields/ majors, including understanding basic sentence patterns that help students understand various English references and equip students with communication skills in English according to their field of expertise.

UNP1.60.3101 Entrepreneurship 3 Credits

This course contains knowledge, attitudes and skills based on creative and innovative thinking regarding the basic principles of entrepreneurship, entrepreneurial development models, entrepreneurial strategies, business ethics in entrepreneurship, opportunity analysis, business feasibility studies and business management (marketing, production, finance). , resources, business legality, technology and information)

UNP2.60.1401 Basic Natural Sciences 2 Credits S

This course contains the nature and scope of the human mind and its development, the development of science, the earth and the universe the diversity of living things and their distribution, living things in natural ecosystems, natural resources and the environment, the benefits and impacts of science and technology on social life, the history of human civilization and technological developments, some important technological developments, and environmental issues

UNP2.60.1402 Basic Socio-Cultural Sciences 2 Credits

This course contains: Basic concepts in social and cultural sciences to study Indonesian society and changes in Indonesian society and culture. The subjects are humans and human culture as individuals and human social beings, moral values and human law, human diversity and equality, science technology and human arts and the environment.

UNP2.60.2101 Physical Fitness Education 2 Credits

This course applies the effects and benefits of various movement activities for physical fitness and health through various games, competitions, and sports exercises and abilities.

analyze the importance of physical activity to maintain and develop and physiological functions of the body and health and can be pkan

throughout life.

UNP2.60.2102 Japanese 2 Credits

Japanese language courses equip students with knowledge about Japanese language practice so that students have the ability to read and communicate using Japanese.

UNP2.60.2103 Multicultural Education 2 Credits

This multicultural education course contains the concept of multicultural education: the urgency of multicultural education in a diverse Indonesian society, building an inclusive diversity paradigm through educational institutions. prospects and constraints of multicultural implementation, implementation of multicultural education in Indonesia, as well as character building of students through the application of multicultural ideology in the field of education.

UNP2.60.2401 History of the Struggle of the Indonesian Nation 2 Credits

The History of the Nation's Struggle course discusses the meaning and historical meaning of the nation's struggle, imperialism and colonialism, the struggle of the Indonesian nation against imperialism and colonialism, the Indonesian national movement, the struggle for independence, the meaning of the proclamation of efforts to maintain independence against various threats that threaten the unitary state of the Republic of Indonesia, the Republic of Indonesia.

FMA1.60.1302 Calculus 4 Credits

This course discusses the real number system, equations and inequalities, absolute values and absolute inequalities, coordinate systems and simple graphs, functions, limits and continuity, derivatives, related rates, graphs, and integrals.

FMA1.60.1303 General Physics 4 Credit Points

This course discusses quantities and units, particle kinematics, particle dynamics, work and energy, linear momentum, angular momentum and rigid bodies, static fluids, dynamic fluids, concepts of temperature and heat, and the laws of thermodynamics.

FMA1.60.2102 General Biology 4 Credit Points

This course discusses the knowledge of living things and scientific methods, cells as the basis of life, metabolism, structure and organization of the body

plants and animals, biodiversity, structure, function and processes in human organ systems, ecology, genetics and evolution and biotechnology.

FMA1.60.2103 General Chemistry 4 Credit Points

This course discusses Stoichiometry, Chemical Energetics, Atomic Structure, Periodic System of Elements, Chemical Bonds and Molecular Geometry, Forms of Matter and Chemical Equilibrium.

MAT1.62.1001 Analytical Geometry 3 Credits

Coordinate system (in plane and in space), distance between two points in plane and in space, equation of line in plane, circle, parabola, ellipse, hyperbola, plane, line in space and sphere

MAT1.62.1002 Computer Applications 2 Credits

Familiarize yourself with computer equipment, both software and hardware. Followed by studying Microsoft Office software (word, excel and power point) as well as supporting software in the field of mathematics such as Minitab, SPSS and so on.

MAT1.62.1003 English for Mathematics 2 Credits

Inventory of vocabulary and terms in the fields of Arithmetic, Algebra, Trigonometry, Geometry, Statistics, and others. Understand the meaning and use it in English both orally and in writing, understand English mathematical texts, and write mathematical statements in the form of definitions, theorems, and proofs in English

MAT1.62.202 Advanced Calculus 4 Credits 5

Real number systems, inequalities and absolute values, functions and limits, infinite series and series, alternating series, absolute convergence, conditional convergence, power series and their operations, Taylor series, Maclaurin series, coordinate system, surfaces in three dimensional space, functions two or more variables, the limit of a function of two variables, continuity, partial derivatives, differentiability, double and triple integrals, drawing graphs.

MAT1.62.2003 Introduction to Basic Mathematics 3 Credits

Set Theory: Sets and Operations, Sets of Numbers and Cartesian Multiplication, Types and Inverses of Functions, Relations, Algebra Set, Duality, Indexed Set, Numbered Set. Mathematical Logic: Propositions, Propositional Functions, Arguments, Quantities, Tautology, Proof

The Validity of Proposition Functions, and Quantitative Functions Validity Proof.

MAT1.62.3001 Elementary Linear Algebra 4 Credits

Matrices: matrices and their orders, basic operations of Matrix, and Inverse of Matrix; System of Linear Equations: Gaussian Elimination, Elementary Matrix and Inverse Search Methods, SPL and Invertible and Homogeneous SPL; Determinants: Determinant Functions, Row Reduction, Minor and Cofactor Matrices, and Cramer's Rule; Vector Spaces: Vectors in R^2 and R^3 , n-Euclides Spaces, Real Vector Spaces, Subspaces, Linear Combinations and Freedoms, Bases and Dimensions, Rank Matrix; Inner Product Spaces: Inner Product Spaces and measures (Length, Distance, and Angle), Orthonormality; Eigen Space: Eigen Values and Vectors, Base Eigen Space, Diagonalization; Linear Transformation: Definition of Linear Transformation (TL), Kernel and Range, TL from R^n to R_m , TL Matrix.

MAT1.62.3002 Elementary Statistics 4 Credits

Role of statistics, Types of data, Population and sample, Parameters and statistics, Data collection, Data presentation, Descriptive and Inferential Statistics, Concentration measure, Dispersion measure, Location measure, Parameter estimation, Confidence interval, Hypothesis test, Simple linear regression, Usage statistics software

MAT1.62.3004 Vector Calculus 4 Credits

Vectors in planes, vector-valued functions, vectors in three-dimensional space, surfaces in three-dimensional space, functions with two or more variables, partial derivatives, limits and continuity, directed and gradient derivatives, chain rules, Lagrange method, fold integrals, vector fields, line integrals, Green's theorem on planes, surface integrals, Gaussian divergence theorem, Stokes' theorem, introduction to differential equations.

MAT1.62.3005 Discrete Mathematics 3 Credits

Logical Functions, Boolean Algebra, Pigeon Nest Principle, Inclusion Exclusion Principle, Generating Functions, and Graph Theory.

MAT1.62.4001 Ordinary Differential Equations 4 Credits

Types and orders of PD, Initial value problems and boundary value problems, First-order GDP, First-order GDP settlement methods, Picard method, high-order GDP, High-order GDP solving methods, Solving real phenomena problems that can be modeled with GDP, PD solving with power series, Frobenius method, Bessel function, Legendre polynomial, PD system,

PD Solution with laplace transform, GDP Numerical Solution.

MAT1.62.4002 Structure Algebra 4 Credits

Binary Operations, Groups and their properties, Sub-groups and their properties, Cyclic Groups, Symmetry Groups, Cosets, Normal Subgroups, Factor Groups: Homomorphisms and Group Isomorphisms, Rings and their properties, Ring Isomorphisms, Sub-Rings, Ideal, Domain Integral, Field, and Ring Polynomial.

MAT1.62.4003 Probability Theory 4 Credits

Basic Principles of Counting, Combinations and Permutations, Probability, Conditional Probability, Bayes' Theorem, Random Variables, Mathematical Expectations, Density Probability Functions, Moment Generating Functions, Chebychev Inequality, Probability Distribution or Distribution, Sampling Distribution.

MAT1.62.4004 Actuarial 3 Credits

actuarial world, interest rate, defined annuity, amortization schedule and *sinking funds*, concepts of probability theory, mortality table, life annuity, pure endowment, life insurance and net premium reserve concept

MAT1.62.4005 Algorithm and Programming 3 Credits

algorithm (how to compile and analyze an algorithm), the basics of computer programming, the Pascal programming language in which it will study variables and data types, input and output, condition selection, loops, arrays, procedures and functions.

MAT1.62.4006 Transformation Geometry 3 Credits

Definition of Transformation, Isometry, Composition Transformation and several isometry, including reflection, half-turn, shear, rotation, reflection shear, congruence, and dilation.

MAT1.62.5001 Numerical Method 3 Credits

error (definition, source and example of error, error propagation and its absorption), root of nonlinear equation using halves method, false position, Newton and Secant method, and polynomial interpolation using Newton's division difference, Newton's back and forth interpolation, Lagrange interpolation

MAT1.62.5002 Real Analysis 1 3 Credits

Real Numbers: Algebraic Properties, Sequence Properties, Absolute Values, Complete Properties and Their Applications. **Real Number Sequence:** Sequences and their Limits, Limit Theorem

Sequences, Monotonous Sequences, Bolzano-Weierstrass Theorem, Cauchy's Criteria, True Divergent Sequences. Function Limits, Sequence Criteria for Limits, Divergence Criteria, Limit Theorems, Extension of the concept of limit

MAT1.62.5003 Mathematical Statistics 4 Credits

special probability distribution (uniform distribution, binomial, Poisson, normal, geometric, negative binomial, hypergeometric, multinomial, multiple hygeometric, gamma, exponential, chi-square, beta, multiple normal), random variable transformation, sampling distribution (mean distribution, chi -square, tstudent, F, statistical means), parameter estimation theory (unbiased estimator, principle-compliant efficient, sufficient, moment method, maximum likelihood method, Bayesian estimator), and hypothesis testing theory

MAT1.62.5004 Operations Research 4 Credits

the use of mathematics in solving optimization problems that can be formulated into non-linear functions. Emphasis is given to problem formulation, mastery of solving techniques and the meaning of geometry. The topics that will be discussed include: one-dimensional minimization methods, unconstrained optimization techniques, and constrained optimization techniques.

MAT1.62.6001 Real Analysis 2 3 Credits

Continuous Function: Continuous Functions, Discontinuous Criteria, Interval Continuity, Uniform Continuous, Monotonous Functions, and Inverse Functions. **Derivative :** Derivatives, Mean Value Theorem Average, L'Hospital's Rule, Taylor's Theorem. **Integral :** Riemann Integrals, Fundamental Theorems of Calculus, Approximation of Integrals.

MAT1.62.6002 Mathematical Modeling 4 Credits

Understanding mathematical models and models, The process of modeling real problems, Types of mathematical models and problems, Stages of forming mathematical models, Models based on the rate of change, Static and dynamic models, Deterministic and stochastic models, Optimization models, Mathematical models in various disciplines.

MAT1.62.6003 Research Methods 2 Credits

Definition of research, reasons for the need for research, research objectives, research functions, sources of knowledge (approach in obtaining the truth), scientific and non-scientific methods. Types of Research: descriptive, historical, correlational, causal comparative, experimental, and developmental research. Problems: problem identification, problem selection,

problem formulation, problem background. Literature review: reading sources, criteria for choosing reading sources, organizing the substance of theoretical studies. Hypothesis: understanding the hypothesis, various hypotheses. Variables: understanding and types of variables,. Research Instruments: types, types of data collection tools, selection of data collection tools, quality of data collection tools (validity, reliability, objectivity). Definition of population and sample, criteria for representative samples, and sampling techniques. Data analysis techniques: scoring, tabulation, data description, statistical test (inference), and interpretation of data analysis results. Conclusions, implications and research suggestions: conclusions (how to make decisions), implications, and suggestions. Research proposal writing.

MAT1.62.7001 Complex Analysis 4 Credits

Complex Number Systems, Topological Concepts in Complex Fields, Mapping on complex numbers, Complex Functions, Limits and Continuouss, Differential Complex Functions, Cauchy Riemann Equations, Analytical Functions, Elementary Functions, Complex Integrals, Cauchy - Goursat Theorem, Cauchy Integral Formulas, Some Theorems on complex integrals. Sequences and series of complex numbers, Taylor series and Laurent series, Singularity, Poles, Residues and their use, Conformal Mapping and their uses.

MAT1.62.7002 Thesis Seminar 2 Credits

writing research proposals and presenting research proposals that will be used as thesis

MAT1.62.8001 Thesis 4 Credits

submit and write the results of his research in the form of a thesis as a final project as one of the ways to get a bachelor's degree. students are able to defend the thesis they wrote on a thesis exam in front of the board of examiners. Students are also able to make a research resume that is sourced from a thesis source into a scientific article published in the form of an E-Jurnal

MAT2.62.5001 Differential Equation Theory 3 Credit Points

Existence and singularity theorems, linear PD theory and linear systems, Sturm theory, Sturm Liouville problem, Characteristic and orthogonality functions, Orthonormal functions, Fourier series trigonometry, Phase Spaces, Paths, Critical points, Periodic solutions and cycle limits, Kryloff and Bogoliuboff methods.

MAT2.62.5002 History of Mathematics 3 Credits

History of Mathematics by Age: Ancient Egypt, Mesopotamia, Greece

Ancient, Alexandrian, Late Greek Period, China, India, Arab Empire, Europe to XIV Century, XV Century to XX Century. History of Mathematics Based on the Discovery of Matter. History of Mathematics Based on Inventors.

MAT2.62.5003 Number Theory 3 Credit Points

Number System: natural, whole, integer, rational, irrational, real and complex. Mathematical Induction, Divisible and Binomial coefficients, Congruence: Diophantus linear equations, basic properties of congruence, linear congruence, congruence systems and Chinese Remaining Theorems, Multiplicative Functions: tau functions and sigma functions (, Euler functions, and Ceiling and Floor functions, Functions Primitives: order of integers, primitive roots, arithmetic indices, and primality tests, Quadratic Congruence: quadratic congruence of the law of quadratic reciprocity, Diophantus' nonlinear equations: Pythagorean triples, Fermats Last Theorems and Sums of Squares.

MAT2.62.5004 Introduction to Stochastics 3 Credits

Conditional Probability, Conditional Expectation, Discrete and Continuous Distribution, Discrete Time Markov Chain, Transition Probability Matrix, First Step Analysis, Random Motion. Long-Term Behavior of Markov Chains: Regular Transition Probability Matrix, State Classification, Basic Limit Theorem, Irreducible Markov Chain, Continuous Time Markov Chain, Pure Birth Process, Pure Death Process, and Queue Theory.

MAT2.62.5005 Sampling Techniques 3 Credits

This course discusses the basics of sampling (basic sampling technique, sampling method, sampling error), probability sampling (simple random sampling, stratified sampling, systematic sampling, cluster sampling) and chance sampling (incidental sampling, convenient sampling). , total sampling, snowball sampling, purposive sampling).

MAT2.62.5006 Advanced Actuarial 3 Credits

Multiple Decrement (Joint Distribution, Joint Life Status, Last Survivor Status and Dependent Lifetime Model), Multiple Decrement Models (Random Survivorship Group and Associated Single Decrement Tables) and Application of Theory Multiple Decrements.

MAT2.62.5007 Partial Differential Equations 3 Credits

Fourier Series, Fourier Series Sine and Cosine, Fourier Transform,

General understanding and provisions regarding PDP, formation of PDP, integral PDP, linear PDP level 1 with constant and non-constant coefficients, separate variable solutions, level 2 linear PDP with constant and non-constant coefficients, Initial Value Problems for Heat Equations, Liouville Strum Theory, Dirichlet problem, Initial value problem of Heat equation, Application of PDP in other fields, eg vibration, transmission, conduction.

MAT2.62.5008 Management 3 Credits

Concepts, principles, approaches and processes of management in organizations. Concepts, principles, approaches and management processes in the field of work, such as offices, cooperatives and agribusiness.

MAT2.62.6001 Linear Algebra 3 Credits

Matrix and Linear System: Essential Algebraic Properties and Fields, Matrices and Partitions, Special Matrices, and Matrix Equivalence; **Vector Space:** Vector spaces and their properties, subspaces, linear and base freedom, rank matrices, coordinates and isomorphisms, determinants and linear equations; Matrix Presentation of Homomorphisms; Canonical Form Theory; Calculate; Inner Product Space; Normal Linear Transformation; Quadratic Shape.

MAT2.62.6002 Regression Analysis 3 Credits

Simple Linear Regression, Multiple Linear Regression, Model Fit, Residual Analysis, Transformation for Unsuitable Regression Models, Best Model Selection, Multicollinearity

MAT2.62.6003 Multivariate Analysis 3 Credits

Normal multivariate distribution, inference about mean vector, and theory of estimation (estimation of mean vector and covariance matrix, confidence interval and hypothesis testing of one and two population vectors) and manova.

MAT2.62.6004 Non-Parametric Statistics 3 Credits

Definition of Non-Parametric Statistics of Scaling Variables, Strengths and Weaknesses of Parametric Techniques and Non-Parametric Techniques. One sample case: Binomial test, Chi-Square test, Kolmogorov Smirnov test, and Run test. The two sample cases are related: Mc-Nemar test, Sign test, and Rank test, Wilcoxon Signed Paired Data. Case of two independent data samples: Fisher's Exact Probability Test, Chi-Square test, Median test, and U-Mann Withney test. Associative test: Spearman rank correlation coefficient, and Kendal correlation coefficient.

MAT2.62.6005 Investment Management 3 Credits

Material that discusses the meaning of investment and the investment process. To be able to invest, it must be understood about the theory of profit (return) and risk. Furthermore, it is discussed about capital market instruments including stocks, bonds and derivative instruments. Furthermore, it is discussed in more detail regarding Mutual Funds as one of the investment instruments in the capital market whose popularity is starting to rise. Then it is studied about portfolio theory and how to choose an efficient portfolio from various assets. Theory *Mean Variance Efficient Portfolio*, Markowitz models, *Capital Asset Pricing Model* becomes the next discussion accompanied by its application in investing.

MAT2.62.6006 Graph Theory 3 Credits

Basic definitions, Miscellaneous Graphs, Modeling with Graphs, Operations on Graphs, Connected Graphs, Euler Graphs, Hamilton Graphs, Tree and Forest Graphs, Planar and Dual Graphs, Graph Coloring, Digraphs, Matching Graphs, Network Flow.

MAT2.62.6007 Introduction to System Dynamics 3 Credits

Geometry of Linear Systems, Nonlinear Systems, Flow around Fixed Points, Central Manifold Theorem, Normal Forms, Hamilton Systems, Bifurcations.

MAT2.62.6008 Field Work Practice 3 Credits

Field work practice is an internship activity for final year students in government or private agencies/companies that have an interest in mathematics and data processing/management. This activity aims to apply the knowledge / skills acquired during college and prepare prospective graduates to enter the world of work.

MAT2.62.7001 Introduction to Topology 3 Credits

Definition of topology, topology space, subset of point sets in topological space, sum topology, product topology, bases and subbases, continuous functions, Dense sets, and separable axioms Count, Axiom of Separation.

MAT2.62.7002 Introduction to Functional Analysis 3 Credits

Vector space, normed space, banach space: definition and basic properties, examples of normed space and banach space. Pre Hilbert space: understanding and nature. Definition of norm and distance in pre Hilbert space, Orthogonal and Orthonormal vectors in pre Hilbert space. Hilbert Room:

understanding and basic properties of Transformation of Hilbert spaces to other Hilbert spaces, operators and continuous linear functions on Hilbert spaces, Banach algebra, self adjoint, projection operators.

MAT2.62.7003 Theory Module 3 Credits

Definition of module; Submodules; Kuosen Module (Factor Module); Direct Amount; Exact Lines; Homomorphism; Simple Module, Free Module; Projective Module; Free Module on Main Ideal Areas (DIU); FG Module over DIU.

MAT2.62.7004 Forecasting Techniques 3 Credits

1) Definition of Forecasting, 2) Fundamentals of Quantitative Forecasting, 3) Average Method (Average), 4) Exponential Smoothing Method, 5) Other Smoothing Methods, 6) Fundamentals of Time Series Analysis, and 7) Box-Jenkins method.

MAT2.62.7005 Trial Design 3 Credits

Basic Concepts of Experimental Design, Important Elements in Experimental Design: Repetition, Randomization, and Control of Diversity. Effect Model of Experimental Design: Fixed Model, Randomized Model, and Mixed Model. Several Standard Randomized Designs: Completely Randomized Design, Block Random Design, Latin Square Design, Graeco-Latin Design, and Divided Block Design. Multiple Comparison Test: Least Significant Difference, Tukey's Test, Duncan's Test, Scheffe's Test, and Orthogonal Comparative Test. Various Factorial Experiments.

MAT2.62.7006 Linear Model 3 Credits

linear models in matrix notation (Review of vector and matrix algebra, inverse matrices, general inverse matrices and special inverse matrices, random variable matrices and their properties, model representation in matrix form, use of matrices for analysis of linear models (regression models, models) experimental design, and general model), calculate the estimated value of the full power model parameter, and calculate the estimated value of the non-full power model parameter

MAT2.62.7007 Life Test Analysis 3 Credits

Life and Reliability Test Theory, Probability Failure Model, Complete Censored Data, Non Parametric Life Test Procedure, Reliability System, Applied Stochastic Process in Reliability.

MAT2.62.7008 Life Insurance Company Operations 3 Credits

Life insurance company operations; competence, regulation, and ethics in the life insurance industry; formation and structure in life insurance companies; the organizational structure of the insurance company; marketing strategies and activities; and departments in life insurance companies.

MAT2.62.7009 Actuarial Statistical Methods 3 Credits

Introduction to regression analysis, simple regression, multiple regression (OLS estimator properties, classical assumption test, inference to parameters), Regression with dummy variables, Regression with stochastic independent variables, Serial correlation and heteroscedasticity in regression models, Generalized Least Square (GLS) Estimator) and its properties, Extrapolation and refinement of time series data, seasonal time series model, Stationary time series model, random-walk model, cointegration model, moving average model, autoregression model, ARMA, ARIMA, ARIMA model estimation, Diagnostic check, Forecasting with ARIMA models, application of models and computational studies using econometric software.

MAT2.62.7010 Database 3 Credits

The introduction to the database is followed by database architecture, database design, Entity relationship diagrams (ERD), normalization, Structural Query Language (SQL), using application software to create databases such as Microsoft Visual basic, PHP, MySQL and so on.

MAT2.62.7011 Mathematics Biology 3 Credits

Mathematical models, qualitative properties of differential equations, single-species and multi-species population models, discrete and continuous population models, age-structured population models, deterministic population models, growth models, examples of the use of population models in various fields

MAT2.62.7012 Numerical Analysis 3 Credits

Definition of Numerical Analysis, Taylor Series, Convergence, Computer Arithmetic and Error Analysis, Nonlinear Equations, Interpolation, Numerical Integration (Composite Rules and Gaussian Quadrature), Numerical GDP and PDP

MAT2.62.8001 Introduction to Size Theory 3 Credits

Algebra, Sigma-Algebra, Measurable Spaces, Measurable Sets, Measured Functions, Measures, Measuring Spaces, Integrals, Integrated Functions, Monotonous Convergence Theorem, Fatou's Lemma, Properties of Integrals, Integral Functions, Positivity and Linearity of Integrals, Lebesgue Dominance Convergence Theorem, Lebesgue space (Lp), Convergence mode, Size decomposition,

Generalization of Measures (Generation of Measures).

MAT2.62.8002 Variation Calculus 3 Credits

Elements of Theory, General Forms of Variation Problems, General Variations of Functionalities, Canonical Forms of Euler's Equations, Second Variation, Various Applications.

MAT2.62.8003 Group Theory Up to 3 Credits

Semi Group, Monoid, Fundamental Group, Direct Product, Factor Group, Group and Relations, Group Homomorphism, Isomorphism, Auto Morphism, Group Composed, Group Action, Finite Group,

MAT2.62.8004 Formation of Mortality Table 3 Credits

Survival and multi-state models, parametric and non-parametric methods for survival data analysis and Graduation principles and methods.

MAT2.62.8005 Game Theory 2 Credits

History of Game Theory, Definition, Elements and Rules of the Game, Pure and Mixed Strategy, Information Games, Asymmetric Information.

MAT2.62.8006 Industrial Psychology 2 Credits

Introduction to industrial and organizational psychology, organization, the basics of individual behavior, individual perceptions and decisions, motivation, value attitudes and job satisfaction, job selection and placement, decision making, leadership, communication, team and team work, conflict and negotiation, basics organizational structure and organizational culture, as well as organizational change and work stress.

MAT2.62.8007 Teaching Mathematics 3 Credits

Contains Learning Evaluation, Learning Design, Learning Strategies and Learning Psychology.

MAT2.62.8008 Managerial Accounting 3 Credits

The basic concepts of management accounting, activity-based accounting, calculation of the cost of products and services, and planning and control, all of which lead to the decision-making process that will be carried out by the decision maker.

Study Program: Statistics (S1)

1) Vision

To become one of the leading statistical study programs at the national level in the fields of education, government, economy, and the environment based on faith and piety in 2027.

2) Mission

- a. Organizing quality education with a curriculum oriented to the fields of education, government, economics, and the environment to produce a Bachelor of Statistics who is faithful and devoted
- b. Carry out research, development and application of statistics in the fields of education, government, economics, and the environment, as well as publish at the national and international levels
- c. Providing services to the community as an effort to apply statistics in the fields of education, government, economy, and the environment
- d. Collaborating with educational institutions, government agencies, the private sector, and *stakeholders*

3) Purpose

1. Forming students who have faith and piety
2. Produce graduates who are knowledgeable, skilled, professional, and able to apply statistics in the fields of education, government, economics, and the environment
3. Produce statistical research for the development and application of statistics in the fields of education, government, economics, and the environment,
4. Publish research results at national and international levels
5. Generate community service in the field of Statistics which quality

4) Curriculum

Mathematics Department

Study Program : Statistics (S1)

No	Code	Courses	SKS				Sem
			Quantity	T	P	L	
1). Ma ta University Compulsory Tuition							
A.Required							
1	STAT001	KKN	2	0	0	2	7
2	UNP1.50.1401	English	2	2	0	0	2
3	UNP1.50.1402	Religious education	3	3	0	0	1
4	UNP1.50.1403	Pancasila Education	2	2	0	0	1
5	UNP1.50.1404	Civic education	2	2	0	0	2
6	UNP1.50.1405	Indonesian	2	2	0	0	4
7	UNP1.60.3101	Entrepreneurship	3	3	0	0	6
8	UNP1.60.5401	Real Work Lecture (KKN)	2	0	0	2	5
Number of Credits			32	28	0	4	
2). University Elective Courses							
A.Choose 2 of the 18 credits of the university's choice of MK							
1	UNP2.60.1401	Basic Natural Science	2	2	0	0	1
2	UNP2.60.1402	Basic Socio-Cultural Sciences	2	2	0	0	1
3	UNP2.60.2101	Physical Fitness Education	2	2	0	0	2
4	UNP2.60/2102	Japanese	2	2	0	0	2
5	UNP2.60.2103	Multicultural Education	2	2	0	0	2
6	UNP2.60/2401	History of the Indonesian Nation's Struggle	2	2	0	0	2
7	UNP2.60/2402	Disaster Management	2	2	0	0	2
8	UNP2.60.3401	Natural Culture MinangKabau	2	2	0	0	3
9	UNP2.60.3402	Information and communication technology	2	0	2	0	3
Number of Credits			18	16	2	0	
3). Faculty Compulsory Courses							
A.Required							
1	FMA1.60.1302	Calculus	4	3	1	0	1
2	FMA1.60.1303	General Physics	4	3	1	0	1
3	FMA1.60.2102	General biology	4	3	1	0	2

No	Code	Courses	SKS				Sem
			Quantity	T	P	L	
4	FMA1.60.2103	General Chemistry	4	3	1	0	2
Number of Credits			16	12	4	0	
4). Study Program Compulsory Courses							
A.Required							
1	STAT002	Logic and Sets	3	3	0	0	1
2	STAT003	Elementary Linear Algebra	3	3	0	0	1
3	STAT004	Descriptive Statistical Method	3	3	0	0	1
Number of Credits			9	9	0	0	
B.Study Program Compulsory Courses							
1	STA1.62.1001	Logic and Sets	3	3	0	0	1
2	STA1.62.1002	Descriptive Statistical Method	3	3	0	0	1
3	STA1.62.1003	Elementary Linear Algebra	3	3	0	0	1
4	STA1.62.2001	Inferential Statistical Method	3	3	0	0	2
5	STA1.62.3001	Chance Theory	3	3	0	0	3
6	STA1.62.4001	Mathematical Statistics	3	3	0	0	4
Number of Credits			18	18	0	0	

Synopsis

UNP1.60.1401 Religious Education 3 Credits

The One and Only Godhead: faith and piety, divine philosophy (Theology); Humans: human nature, human dignity, human responsibility; Law: raise awareness to obey God's law, the prophetic function of religion in law: Moral: religion as a source of morals, morals in life; Science, Technology and Arts: Faith, science and technology, and charity as a unit, the obligation to demand and practice knowledge, the responsibility of scientists and artists; inter-religious harmony: religion is God's grace for all, togetherness in religious plurality; Society: civilized and prosperous society, the role of religious communities in realizing a civilized and prosperous society, human rights and democracy; Culture: academic culture, work ethic, open and fair attitude; Politics: the contribution of religious adherents to political life,

UNP1.60.1402 Pancasila Education 2 Credits

This course contains the meaning of urgency and reasons for the need for Pancasila education in Higher Education; Pancasila in the current history of the Indonesian nation; Pancasila as a philosophical system, as the basis of the state of the Republic of Indonesia, as a state ideology, as an ethical system, and Pancasila as the basis for the value of developing science; Thinking and implementing Pancasila in dealing with current actual problems, such as human rights, racial and economic problems, and the problem of radicalism that must be solved in accordance with the values of Pancasila.

UNP1.60.1403 Citizenship Education 2 Credits

This course contains the nature of civic education in developing full undergraduate or professional abilities; the essence and urgency of national identity as one of the determinants of nation building and character, the urgency of national integrity and national unity; the constitutional values and norms of the 1945 Constitution of the Republic of Indonesia and the constitutional provisions of the legislation under the Constitution; harmony of obligations and rights of the state and citizens in a democracy that is based on people's sovereignty and deliberation for consensus; the nature, instrumentation, and practice of Indonesian democracy based on Pancasila and the 1945 Constitution of the Republic of Indonesia; the historical dynamics of constitutional, socio-political, cultural, and contemporary contexts of sovereign law enforcement; the historical dynamics and the urgency of the insight into the archipelago as a collective conception and view of the Indonesian nationality in the context of world relations; national urgency and challenges and defend the country for Indonesia in building a collective commitment to nationality.

UNP1.60.1404 Indonesian 2 Credits

This course contains the Conception of Indonesian Language, History of Indonesian Language, Position and Functions of Indonesian Language, Indonesian Language Variety, Indonesian Spelling, (punctuation letters, words and absorption elements: Effective Sentences, Definition of Characteristics, Terms of Effective Sentences: Paragraphs Types, Functions and Developments: Writing Outline Theme, Topic, Title and Type of Outline: Writing Text (Scientific Academic Texts and Non-Academic Texts: BI Official Letters (Format and Types of Indonesian Official Letters.

UNP1.60.1405 English 2 Credits

This course contains the development of English language skills in an integrated manner by taking into account the needs of students according to their field / department, including understanding basic sentence patterns that help

students understand various references in English and equip students with communication skills in English according to their field of expertise.

UNP1.60.3101 Entrepreneurship 3 Credits

This course contains knowledge, attitudes and skills based on creative and innovative thinking regarding the basic principles of entrepreneurship, entrepreneurial development models, entrepreneurial strategies, business ethics in entrepreneurship, opportunity analysis, business feasibility studies and business management (marketing, production, finance), resources, business legality, technology and information

UNP1.60.5401 Real Work Lecture (KKN) 2 Credits

Real Work Lecture (KKN) is a field activity for students who are taking the final part of the S-1/D4/Applied Bachelor education program. This program is actually mandatory for all students, because the university believes that this program is able to encourage student empathy, and can contribute to solving problems that exist in society. Community service activities are a tangible form of the university's contribution to the community, industry, local government and community groups who want to be economically and socially independent. This KKN program requires Field Supervisors (DPL) and students to play an active role in knowing the existing problems, even before they plunge for 1 to 2.5 months in the midst of the community. Concept "working with community"

has replaced

concept "working for the community".

UNP2.60.1401 Basic Natural Sciences 2 Credits S

This course contains the nature and scope of the human mind and its development, the development of science, the earth and the universe the diversity of living things and their distribution, living things in natural ecosystems, natural resources and the environment, the benefits and impacts of science and technology on social life, the history of human civilization and technological developments, some important technological developments, and environmental issues

UNP2.60.1402 Basic Socio-Cultural Sciences 2 Credits

This course contains: Basic concepts in social and cultural sciences to study Indonesian society and societal changes and

Indonesian culture. The subjects are humans and human culture as individuals and human social beings, moral values and human law, human diversity and equality, science technology and human arts and the environment.

UNP2.60.2101 Physical Fitness Education 2 Credits

This course applies the effects and benefits of various movement activities for physical fitness and health through various games, competitions, and sports exercises and abilities.

Analyze the importance of physical activity to maintain and develop physiological functions of the body and health and can be tolerated throughout life.

UNP2.60.2102 Japanese 2 Credits

Japanese language courses equip students with knowledge about Japanese language practice so that students have the ability to read and communicate using Japanese.

UNP2.60.2103 Multicultural Education 2 Credits

This multicultural education course contains the concept of multicultural education: the urgency of multicultural education in a diverse Indonesian society, building an inclusive diversity paradigm through educational institutions. prospects and constraints of multicultural implementation, implementation of multicultural education in Indonesia, as well as character building of students through the application of multicultural ideology in the field of education.

UNP2.60.2401 History of the Struggle of the Indonesian Nation 2 Credits

The History of the Nation's Struggle course discusses the meaning and historical meaning of the nation's struggle, imperialism and colonialism, the struggle of the Indonesian nation against imperialism and colonialism, the Indonesian national movement, the struggle for independence, the meaning of the proclamation of efforts to maintain independence against various threats that threaten the unitary state of the Republic of Indonesia, the Republic of Indonesia.

UNP2.60.2402 Disaster Management 2 Credits

This course refers to Law No. 24 of 2007 concerning Disaster Management (Disaster Management) which includes the introduction of facts or evidence of disaster events, introduction of the concept of disaster, types of disasters, characteristics of disasters, natural disasters, non-natural disasters, disasters

social, vulnerable, disaster / hazard (hazard), potential hazard, vulnerability, (vulnerability), capacity, principle of risk reduction (risk), prevention, mitigation, preparedness, disaster prediction, disaster impact, disaster response procedures and emergency response, analysis of rehabilitation and reconstruction needs.

UNP2.60.3401 Minangkabau Natural Culture 2 Credits

This course contains material on Minangkabau customs, both objective and subjective. Through the study of objective and subjective customs, students are expected to be able to understand Minangkabau human identity and be able to find the values of progress contained in adat that are relevant to the challenges of 21st century competence, namely multiculturalism, cooperation, problem solving and so on.

UNP2.60.3402 Information and Communication Technology 2 Credits

This course learns about information and communication technology that can make daily work easier. Understanding usage "Office Applications" software, Internet Technology, Device usage learning animation development software, technology development and application use in education and being able to recognize internet-based business.

FMA1.60.1302 Calculus 4 Credits

This course discusses the real number system, equations and inequalities, absolute values and absolute inequalities, coordinate systems and simple graphs, functions, limits and continuity, derivatives, related rates, graphs, and integrals.

FMA1.60.1303 General Physics 4 Credit Points

This course discusses quantities and units, particle kinematics, particle dynamics, work and energy, linear momentum, angular momentum and rigid bodies, static fluids, dynamic fluids, concepts of temperature and heat, and the laws of thermodynamics.

FMA1.60.2102 General Biology 4 Credit Points

This course discusses the knowledge of living things and scientific methods, cells as the basis of life, metabolism, structure and organization of plant and animal bodies, biodiversity, structure, functions and processes in human organ systems, ecology, genetics and evolution and biotechnology.

FMA1.60.2103 General Chemistry 4 Credit Points

This course discusses Stoichiometry, Chemical Energetics, Atomic Structure, Periodic System of Elements, Chemical Bonds and Molecular Geometry, Forms of Matter and Chemical Equilibrium.

STA1.62.1001 Logic and Sets 3 Credits

This course discusses logic: propositions, quantifiers, propositional functions, arguments, substitute rules, tautology proofs, quantified propositional functions, formation of truth values and sets: sets and their operations, Venn diagrams, Cartesian products, family of sets and index sets, set of numbers, relations and algebraic functions.

STA1.62.1002 Descriptive Statistical Method 3 Credits

This course discusses the basics of statistics: the role of statistics, statistics and statistics, statistical data, population and samples, data collection, data presentation, frequency distribution and graphs, central tendency values (mean, median, mode), location size (quartiles), deciles, percentiles), dispersion measures (range, inter-quartile range, quartile deviation, mean deviation, variance and standard deviation, standard value and coefficient of variation), moment, slope and taper.

STA1.62.1003 Elementary Linear Algebra 3 Credits

This course is the first course that teaches the basic concepts of matrices and vectors. Starting with the introduction of matrices and basic operations as well as elementary row operations (OBE) and their applications. Then proceed to the introduction of vectors and their operations. This concept is extended to the vector space R and its base search. The concept of matrices is deepened with the introduction of eigenvalues and eigenvectors. This course ends with the concept of diagonalization of arbitrary square matrices.

STA1.62.2001 Inferential Statistical Method 3 Credits

This course discusses discrete distributions (binomial distribution, geometric distribution, Poisson distribution, negative binomial distribution, hypergeometric distribution) and continuous (normal distribution, t-student distribution, chi square distribution, F distribution, exponential distribution), parameter estimation and Hypothesis test.

STA1.62.3001 Probability Theory 3 Credits

This course discusses the rules of counting (addition rules,

multiplication rules, permutations, combinations, binomial coefficients), combinatorics (probability of an event, laws of probability, conditional probability, Bayes theorem, independent events), random variables (discrete random variables, continuous random variables, probability mass functions, probability solid functions, cumulative distribution function, marginal probability function, conditional probability function), and expected values (mean, variance, nth moment), Chebychev's theorem, moment generating function, linear combination moment.

STA1.62.4001 Mathematics Statistics 3 Credits

This course discusses the special probability distribution of discrete and continuous random variables, functions of random variables, sampling distribution, parameter estimation theory, estimator evaluation methods, hypothesis testing, and test evaluation methods.

Study Program: Statistics (D3)

1) Vision

To become one of the nationally reputable vocational study programs in Statistics in 2020 based on faith and piety.

2) Mission

The mission of the Statistics Study Program at the DIII level of the Mathematics Department, FMIPA UNP is:

- a) Organizing structured and programmed vocational education activities by integrating theory and practice based on faith and piety (M-1).
- b) Carry out research in the field of Statistics of national reputation both in the development of science and its application (M-2).
- c) Carrying out community service activities with national reputation in the field of Statistics application (M-3).
- d) Develop cooperation with various universities, government institutions, state-owned and private companies, both local, regional and national (M-4).

3) Purpose

The objectives of the Statistics Study Program at the DIII level of the Mathematics Department, FMIPA UNP are:

- a) Produce middle statisticians who fear God Almighty, have noble character, are honest, disciplined, and are responsible (T-1.1).
- b) Produce graduates who are able to compete at the national level by having the ability:
 - i. apply field knowledge.(T-1.2). statistics in various
 - ii. use analysis statistics for study problems and find solutions to appropriate as well present them (T-1.3).
 - iii. usesoftware required for statistical analysis (T-1.4).
- c) Produce and improve the quality of research in the field of statistics and its applications with national reputation (T-2.1).
- d) Utilizing the results of statistical and applied research to support the progress of science and technology (T-2.2).

- e) Publish the results of research in the field of statistics and applied through seminars, journals, and books at the national level (T-2.3).
- f) Carry out quality community service to solve problems faced by the community in the field of statistics and applications with a national reputation (T-3.1).
- g) Increasing cooperation with universities, local governments, professional organizations, as well as business and industry at the local, regional, and national levels (T-4.1).

4) Graduate Competencies

Competencies of graduates of the Statistics Study Program level DIII Mathematics Department, FMIPA UNP can be formulated as follows:

1. Competence in the Field of Work:

- a. Have the ability to formulate problems and develop efficient data collection designs and apply them in the form of simple surveys and standard experiments in accordance with the context of the problems encountered.
- b. Able to manage and analyze data using detailed techniques with the help of statistical software and translate analysis results according to the context at hand.
- c. Have the ability to present various analysis results in a form that is easily understood by users.

2. Knowledge Mastery:

Able to think deductively, inductively, logically, analytically and structured in understanding statistical methods and theories so that they can apply them correctly

3. Managerial Ability:

- a. Able to communicate and cooperate with community members.
- b. Able to negotiate with applied field practitioners.

4. Attitudes and Values:

- a. Understanding the values of character, science, and the life of the nation and state.
- b. Able to carry out work honestly, disciplined, and responsible.
- c. Able to act ethically and morally.

5) Course Structure

Major : Math
Study program : Statistics (D3)

No	Code	Courses	Quantity	SKS			Sem
				T	P	L	
1). Craft Skills Course (MKB)							
A. Mandatory							
1	STK1.52.6001	Data analysis	3	1	0	2	6
Number of Credits			3	1	0	2	
2). University Compulsory Courses							
A. Mandatory							
1	UNP1.50.1401	English	2	2	0	0	2
2	UNP1.50.1402	Religious education	3	3	0	0	1
3	UNP1.50.1403	Pancasila Education	2	2	0	0	1
4	UNP1.50.1404	Indonesian Citizenship	2	2	0	0	2
5	UNP1.50.1405	Education	2	2	0	0	2
6	UNP 1.50.3101	Entrepreneurship	3	3	0	0	3
Number of Credits			14	14	0	0	
3). University Elective Courses							
A. Choose 2 Credits from 7 Credits							
1	UNP2.50.1401	Basic Socio-Cultural Sciences	2	2	0	0	1
2	UNP2.50.1402	Basic Natural Sciences	2	2	0	0	1
Number of Credits			4	4	0	0	
B. Choose 2 of 10 Credits							
1	UNP2.50.2102	Multicultural Education	2	2	0	0	2
Number of Credits			2	2	0	0	
C. Choose 2 of 6 Credits							
1	UNP2.50.2101	Japanese language	2	2	0	0	2
2	UNP2.50.2401	History of the Indonesian Nation's Struggle	2	2	0	0	2
Number of Credits			4	4	0	0	
4). Study Program Compulsory Courses							
A. Mandatory							
1	STK1.52.1001	Introduction to Basic Mathematics	3	2	1	0	1

No	Code	Courses	Quantity	SKS			Sem
				T	PL		
2	STK1.52.1002	Math 1	3	2	1	0	1
3	STK1.52.1003	Statistical Method 1	3	2	1	0	1
4	STK1.52.1004	Matrix Algebra	3	2	1	0	1
5	STK1.52.1005	Introduction to Information Technology	2	0	2	0	1
6	STK1.52.202	Statistical Methods 2	3	2	1	0	2
7	STK1.52.2003	Algorithm and Programming	3	1	2	0	2
8	STK1.52.2004	Introduction to Economics	3	3	0	0	2
9	STK1.52.2005	Demographics	2	2	0	0	2
10	STK1.52.206	Math 2	3	2	1	0	2
11	STK1.52.3001	Statistical Theory 1	3	2	1	0	3
12	STK1.52.3002	Statistical Computing	3	1	2	0	3
13	STK1.52.3007	Database	3	1	2	0	3
14	STK1.52.3008	Sampling Method Applied	3	2	1	0	3
15	STK1.52.3009	Regression Analysis	3	2	1	0	3
16	STK1.52.3010	Explorative Data Analysis of	3	1	2	0	3
17	STK1.52.3011	Nonparametric Statistics	3	2	1	0	3
18	STK1.52.4001	Statistical Theory 2	3	2	1	0	4
19	STK1.52.4002	Forecasting Method	3	2	1	0	4
20	STK1.52.4003	Applied Multivariate Statistics	3	2	1	0	4
21	STK1.52.4004	Survey Method	3	1	1	1	4
22	STK1.52.4005	Experiment Design	3	2	1	0	4
23	STK1.52.5001	Actuarial	3	2	1	0	5
24	STK1.52.5002	Quality Control Statistics	3	2	1	0	5
25	STK1.52.5003	Categorical Data Analysis	3	2	1	0	5
26	STK1.52.5004	Research Methods	2	1	1	0	5
27	STK1.52.5005	Field practice	4	0	0	4	5
28	STK1.52.5006	Seminar	2	0	2	0	5
29	STK1.52.6002	Management	2	2	0	0	6
30	STK1.52.6003	Thesis	4	0	0	4	6
Number of Credits			87	47	31	9	
5). Study Program Elective Courses							
A. Choice							
1	STK2.52.4003	Introduction to Simulation	3	0	2	1	4

No	Code	Courses	Quantity	SKS			Sem
				T	P	L	
2	STK2.52.4005	Introduction to Linear Models	3	2	1	0	4
3	STK2.52.4006	Introduction to Econometrics	3	2	1	0	4
4	STK2.52.5001	Introduction to Life Test Analysis of	3	2	1	0	5
5	STK2.52.5004	Marketing Research Methods	3	1	2	0	5
6	STK2.52.5005	Education Statistics	3	0	2	1	5
Number of Credits			18	7	9	2	

Synopsis

UNP1.50.1401 English 2 Credits

This course contains the development of English language skills in an integrated manner by taking into account the needs of students according to their fields/ majors, including understanding basic sentence patterns that help students understand various English references and equip students with communication skills in English according to their field of expertise.

UNP1.50.1402 Religious Education 3 Credits

or this course contains about: God Almighty and Divinity: security and piety, the philosophy of divinity (Theology); Humans: human nature, human dignity, human responsibility; Law: raise awareness to obey God's law, the prophetic function of religion in law: Moral: religion as a source of morals, morals in life; Science, Technology and Arts: Faith, science and technology, and charity as a unit, the obligation to demand and practice knowledge, the responsibility of scientists and artists; inter-religious harmony: religion is God's grace for all, togetherness in religious plurality; Society: civilized and prosperous society, the role of religious communities in realizing a civilized and prosperous society, human rights and democracy; Culture: academic culture, work ethic, open and fair attitude; Political:

UNP1.50.1403 Pancasila Education 2 Credits

This course contains the meaning of urgency and reasons for the need for Pancasila education in Higher Education; Pancasila in the current history of the Indonesian nation; Pancasila as a philosophical system, as the basis of the state

The Republic of Indonesia, as the state ideology, as an ethical system, and Pancasila as the basis for the value of developing science; Thinking and implementing Pancasila in dealing with current actual problems, such as human rights, racial and economic problems, and the problem of radicalism that must be solved in accordance with the values of Pancasila.

UNP1.50.1404 Citizenship Education 2 Credits

This course contains the nature of civic education in developing full undergraduate or professional abilities; the essence and urgency of national identity as one of the determinants of nation building and character, the urgency of national integrity and national unity; the constitutional values and norms of the 1945 Constitution of the Republic of Indonesia and the constitutional provisions of the legislation under the Constitution; harmony of obligations and rights of the state and citizens in a democracy that is based on people's sovereignty and deliberation for consensus; the nature, instrumentation, and practice of Indonesian democracy based on Pancasila and the 1945 Constitution of the Republic of Indonesia; the historical dynamics of constitutional, socio-political, cultural, and contemporary contexts of sovereign law enforcement; the historical dynamics and the urgency of the insight into the archipelago as a collective conception and view of the Indonesian nationality in the context of world relations; national urgency and challenges and defending the country for Indonesia in building a national collective commitment

UNP1.50.1405 Indonesian 2 Credits

This course contains the Conception of Indonesian Language, History of Indonesian Language, Position and Functions of Indonesian Language, Variety of Indonesian Language, Indonesian Spelling, (punctuation letters, words and absorption elements: Effective Sentences, Definition of Characteristics, Terms of Effective Sentences: Paragraphs,, Types, Functions and Development: Writing Outline Theme, Topic, Title and Type of Outline: Writing Text (Scientific Academic Texts and Non-Academic Texts: BI Official Letters (Format and Types of Indonesian Official Letters)

UNP 1.50.3101 Entrepreneurship 3 Credits

This course contains knowledge, attitudes and skills based on creative and innovative thinking regarding the basic principles of entrepreneurship, entrepreneurial development models, entrepreneurial strategies, business ethics in entrepreneurship, opportunity analysis, business feasibility studies and business management (marketing, production, finance). , resources, business legality, technology and information)

UNP2.50.1401 Basic Socio-Cultural Sciences 2 Credits

This course contains: basic concepts of social and cultural sciences to study Indonesian society and changes in Indonesian society and culture, the subjects of which are humans and human culture and human civilization as individuals and social beings as well as moral and legal values, human harmony and equality human science, technology and art, human and environment

UNP2.50.1402 Basic Natural Sciences 2 Credits

This course contains the nature and scope of the human mind and its development, the development of science, the earth and the universe the diversity of living things and their distribution, living things in natural ecosystems, natural resources and the environment, the benefits and impacts of science and technology on social life, the history of human civilization and technological developments, some important technological developments, and environmental issues

UNP2.50.2101 Japanese 2 Credits

Japanese language courses equip students with knowledge about Japanese language practice so that students have the ability to read and communicate using Japanese.

UNP2.50.2102 Multicultural Education 2 Credits

This multicultural education course contains the concept of multicultural education: the urgency of multicultural education in a diverse Indonesian society, building an inclusive diversity paradigm through educational institutions. prospects and constraints of multicultural implementation, implementation of multicultural education in Indonesia, as well as character building of students through the application of multicultural ideology in the field of education

UNP2.50.2401 History of the Struggle of the Indonesian Nation 2 Credits

The History of the Nation's Struggle course discusses the meaning and historical meaning of the nation's struggle, imperialism and colonialism, the struggle of the Indonesian nation against imperialism and colonialism, the Indonesian national movement, the struggle for independence, the meaning of the proclamation of efforts to maintain independence against various threats that threaten the unitary state of the Republic of Indonesia, the Republic of Indonesia.

STK1.52.1001 Introduction to Basic Mathematics 3 Credits

Elementary Mathematical Logic: propositions, quantifiers, propositional functions, arguments,

substitution rules, tautological proofs, quantified proposition functions, quantified proofs of the validity and invalidity of arguments, determine the truth value of a composite proposition by arithmetic. Set Theory: sets and set operations, Venn diagrams, Cartesian products, family sets and index sets, sets of numbers, relations and set algebraic functions, cardinality.

STK1.52.1002 Mathematics 1 3 Credits

Real number system (properties of real numbers, inequalities, absolute values, square roots, squares, coordinate systems, equations of lines, graphs of quadratic equations); Functions and limits (functions and graphs, operations on functions, trigonometric functions, limits, continuous); Derivatives (slope of tangents, derivation rules, derivatives of sin and cos, chain rules, high-order derivatives of implicit function derivatives); Use of derivatives (maximum and minimum, monotony and concavity, optimum problem, limit at infinity, limit at infinity, graphing); Integral (indefinite integral, definite integral, definite integral properties); Transcendent Functions (original exponent and logarithm).

STK1.52.1003 Statistical Methods 1 3 Credits

The role of statistics, statistics and statistics, statistical data, population and samples, and data collection. Presentation of data, frequency distribution and graphs. Central tendency values: mean, median, and mode. Location measures: quartiles, decills, and percentiles. Measures of dispersion: range, inter-quartile range, quartile deviation, mean deviation, variance and standard deviation, standard value, and coefficient of variance. Moment, slope and tapering.

STK1.52.1004 Matrix Algebra 3 Credits

Matrices and matrix operations, special matrices in statistics, determinants, rank matrices, inverse matrices and generalized inverse matrices, solutions to systems of linear equations, vector spaces, linear transformations, matrix diagonalization, eigenvalues and eigenvectors, and matrix differentiation.

STK1.52.1005 Introduction to Information Technology 2 Credits

Computer systems and organization, word processing, worksheets, multimedia, and the internet.

STK1.52.2002 Statistical Methods 2 3 Credits

Probability distribution: discrete probability distribution, continuous probability distribution, binomial distribution, Poisson, normal, t-student, chi-square and F distribution. Sampling, sampling distribution, parameter estimation and hypothesis testing. Testing the homogeneity of multiple variances, and testing the similarity of multiple means (one-way analysis of variance)

STK1.52.2003 Algorithm and Programming 3 Credits

Understanding algorithms and programming, program structures, variables, data types, input and output statements, condition selection, loops, arrays, procedures and functions

STK1.52.2004 Introduction to Economics 3 Credits

Law of demand, law of supply, prices, consumer behavior and producer behavior as well as existing market forms in the economy. Developments in macroeconomic analysis, economic growth, inflation, unemployment, money supply and money demand. As well as other forms of government intervention in the economy.

STK1.52.2005 Demographics 2 Credits

Discusses the basics of demography, population theories, population composition and distribution, population dynamics (fertility, mortality, and population mobility), population growth, and employment, population problems and policies.

STK1.52.2006 Mathematics 2 3 Credits

Integration techniques (partial integrals, rational function integrals, trigonometric integrals); Indeterminate forms and improper integrals, Functions of two variables, Partial Derivatives, Limits and Continuous of two-variable functions, Differentiation, Chain rule, maximum and minimum, and Lagrange's method, chain rule. Double integral over square and non-square areas, double integral in polar coordinates

STK1.52.3001 Statistical Theory 1 3 Credits

Combinatoric Analysis: Numbering Techniques, Permutations, Combinations, and Binomial Coefficients. Probability: Probability of Events, Laws of Probability, Conditional Probability, Bayes' Theorem, and Independent Events. Probability Distribution: Probability Functions of Discrete and Continuous Random Variables, Combined Probability Functions, Marginal and Conditional Probability Functions. Mathematical Expectations: Expected Values of Random Variables and their Properties, Chebychev's Theorem, Moment Generating Functions, Product Moments, Moments of Linear Combinations, and Conditional Expectations

STK1.52.3002 Computational Statistics 3 Credits

Introduction to SPSS and Minitab, data input and manipulation of data formats in SPSS and Minitab, descriptive statistics and graphing with SPSS and Minitab, statistical inferential analysis with SPSS and Minitab

STK1.52.3007 Database 3 Credits

Database system, data model and conceptual design, design design and normalization, physical design, relational algebra, database construction.

STK1.52.3008 Applied Regression Analysis 3 Credits

Definition of regression modeling, regression parameter estimation, simple linear regression with least squares method, Correlation Analysis, Multiple and polynomial regression, regression with matrix approach, regression with more than one independent variable, Residual and Outlier Analysis, Incompatible Regression Model, Violation of Assumptions, Transformation of Model Suitability Test, Diagnostics and Influential Observations, Selection of the Best Model

STK1.52.3009 Sampling Method 3 Credits

Basic Sampling Techniques, Sampling Methods, Simple Random Sampling, Sampling Errors, Stratification Sampling, Systematic Sampling, Cluster Sampling, Sampling Techniques for Social, Business and Industrial Cases

STK1.52.3010 Exploratory Data Analysis 3 Credits

Definition of Exploratory Data Analysis, Statistical Measures for Data, Stem Leaf Charts, Letter Value Displays, Box Diagrams, Data Transformations, Resistance Lines, and Polish Medians.

STK1.52.3011 Nonparametric Statistics 3 Credit Points

The basic concepts of nonparametric, nonparametric analysis for one sample, nonparametric analysis for two or more samples that are not independent, nonparametric analysis for two or more independent samples, Goodness of fit test, and rank correlation

STK1.52.4001 Statistical Theory 2 3 Credits

Some Special Probability Distributions: Uniform, Binomial, Poisson, and Normal Distributions. Variable Transformation. Special Probability Distribution: Negative and Geometric, Hypergeometric, Multinomial, and Multiple Hypergeometric Binomial Distributions. Special Probability Density Functions: Gamma Distribution, Exponent, ChiSquare, Beta and Multiple Normal Distribution. Functions of Random Variables: Techniques for Distribution Functions, Transformations, and Moment Generating Functions. Sample Distribution: Mean Distribution, Chi-Square, t-Student, F, and Average Statistics. Point Estimator : Unbiased Estimator, Efficient, Sufficient, Moment Method, Maximum Likelihood Method, and Bayesian Estimator.

STK1.52.4002 Forecasting Method 3 Credits

The use of moving average, exponential smoothing, regression analysis for forecasting time series data. Breakdown of data components, seasonal trends and residuals. Method of adjustment to seasonal factors (additive or multiplicative). Several approaches with resistant/robust methods. Estimation via autoregression model, integrated model and Boxjenkins model

STK1.52.4003 Applied Multivariate Statistics 3 Credits

Aspects of Multivariate Analysis, Multivariate Normal Distribution, Two Population Mean Vector Inference, Multivariate Analysis of Variance, Covariance Matrix Inference, Discriminant Analysis, Principal Component Analysis, Factor Analysis, *multidimensional scaling*, Group Analysis.

STK1.52.4004 Survey Method 3 Credits

This course discusses how to formulate survey problems and objectives, plan surveys, determine sampling techniques and select appropriate survey objects, design questionnaires, organize and organize survey administration in the field, verify and validate data, develop entry programs, conduct field surveys, and analyze, make reports, and present the results of survey data analysis.

STK1.52.4005 Experimental Design 3 Credits

Basic Concepts of Experimental Design, Completely Randomized Design, Randomized Block Design, Latin Square Design, Latin Graeko Square Design, Factorial Design, Nested Design, Divided Plot Design

STK1.52.5001 Actuarial 3 Credits

Measurement of mortality, annuities and life insurance, changing annuities, insurance with recurring sum assured, net premium reserves, redemption value, gross premiums.

STK1.52.5002 Quality Control Statistics 3 Credits

Quality assurance in a modern business environment, Process quality modeling, Inference about process quality: Definition of Statistical Quality Control (PKS), Seven Tools in PKS. The basic concept of control chart: Concept of Variation, Limits of control chart, Type of control chart. Full map attribute . Variable control chart, multivariate control chart. Process Capability Analysis: Process Capability., , How it works Control Graph, Graph

trait controllers, variable control charts, other Statistical Process Control Techniques.

STK1.52.5003 Categorical Data Analysis 3 Credits

Definition of qualitative data, types of categorical data, logistic regression analysis (regression model, use of Minitab, analysis of model accuracy, odds ratio) several association measures, contingency tables, loglinear models, correspondence analysis.

STK1.52.5004 Research Methods 2 Credits

Scientific thinking framework in the research process: Problems, problem identification, problem formulation, hypothesis formulation, variable definition, determining population, sampling, research design, data collection tools, data collection techniques, data analysis, drawing conclusions and interpreting research results. Prepare reports systematically.

STK1.52.5005 Field Work Practice 4 Credits

Practical work is an internship activity for final year students in government and private agencies/companies that have a concern in the field of data processing/management. This activity aims to apply the knowledge/skills acquired during college and prepare prospective graduates to enter the world of work.

STK1.52.5006 Seminar 2 Credits

Students are able to analyze problems about statistics and its applications, and are able to propose alternative solutions in the form of writings and presentations.

STK1.52.6001 Data Analysis 3 Credits

Descriptive statistics for single and group structured data for various types of data scales. Examination and testing of data that includes symmetry, homogeneity of variance and normality. Estimation of parameters for one, two and k populations that are normally distributed and not, the measure of the closeness of the relationship between discrete and continuous scale variables, modeling of the relationship between discrete and continuous scale variables, and multivariate data analysis for discrete and continuous scale data.

STK1.52.6002 Management 2 Credits

Concepts, principles, approaches and processes of management in organizations. Concepts, principles, approaches and management processes in the field of work, such as offices, cooperatives, and agribusiness.

STK1.52.6003 Final Project 4 Credits

The subject matter of the Final Project is directed at the application of statistical theory and methods in various fields.

STK2.52.4003 Introduction to Simulation 3 Credits

Random number generation technique, Monte Carlo simulation, continuous and discrete random variable generator, variation reduction method. Use of simulation in statistical modeling

STK2.52.4005 Introduction to Linear Models 3 Credits

Review of vector and matrix algebra, inverse matrices, general inverse matrices and special inverse matrices, random variable matrices and their properties, model representation in matrix form, use of matrices for analysis of linear models (regression models, experimental design models, and general models)

STK2.52.4006 Introduction to Econometrics 3 Credits

The basic concepts of Macroeconomics. Violation of assumption of Simple and Multiple Linear Regression Model. Model measurement error in variables. Multicollinearity, heteroscedasticity, auto correlation. Lag and autoregressive models. Regression with dummy variable and proxy variable. Simultaneous equation model. Identification rules. Estimation method for identified equations.

STK2.52.5001 Introduction to Life Test Analysis 3 Credits

Reliability, parameter estimation (point and interval estimation), censored data, accelerated life test model.

STK2.52.5004 Marketing Research Methods 3 Credits

Definition of marketing research, market research in practice, market research process, marketing research design and implementation, data collection (primary and secondary), sampling design, and data analysis.

STK2.52.5005 Education Statistics 3 Credits

Inferential statistical methods for educational research data, hypothesis testing and parameter prediction. ANOVA, statistical illustration needed in modern psychological research

5. Study Program: Mathematics Education (S2)

1) Vision

To become a center of excellence in the development of human resources (HR) based on Faith and Taqwa as well as a good academic culture to produce academic staff **professionals in the field of mathematics education**

2) Mission

The missions of the Postgraduate Mathematics Education Study Program at FMIPA UNP are:

- 1) Produce graduates who have high competence and commitment in carrying out educational tasks as well as finding and developing mathematics education pendidikan
- 2) Innovating Mathematics learning
- 3) Forming professional teachers and having deep knowledge in learning Mathematics
- 4) Implement quality mathematics education so that graduates are able to compete at the national level
- 5) Develop community service in the form of cooperation with schools in quality improvement Mathematics learning at school

3) Purpose

The general objective of the proposed PPs State University Mathematics Education Masters Program is to produce graduates who have competence as professional education personnel in the field of mathematics education, both as educators, researchers and developers of mathematics education. In particular, the aim of the PPs UNP Mathematics Education Masters Study Program is to produce graduates who have:

- Faith and Taqwa to God Almighty
- Deep mastery in the field of science and the substance of learning mathematics education
- Ability to increase self-potential and broaden horizons related to mathematics education
- Ability to apply mathematics education
- Ability to carry out research in the field of mathematics education

- Sensitive to problems in the field of mathematics education

- Ability to provide solutions to problems in the field of mathematics education

4) Graduate Competencies

Competencies that are expected to be possessed by graduates of the PPs UNP Mathematics Education Masters Study Program are:

- Have noble character and piety to God Almighty
- Mastering theories, concepts and facts as well as problem solving procedures in the field of mathematics education and being able to apply them in the educational process
- Understanding the characteristics of the development of students.
- Appreciating the values, habits and personalities needed as educators.
- Have the insight, skills and attitudes needed for the development of mathematics education
- Able to communicate effectively with students, peers and the community
- Able to do mathematics education research
- Able to design, implement, evaluate and compile various programs development of learning in the classroom

5) Course Structure

- g. Major : Math
 h. Study program : Mathematics Education (S2)

No	Code	Courses	SKS			Sem	
			Quantity	T	P		L
1). Faculty Elective Courses							
A. Selection							
1	FMA2.80.2301	Development Curriculum	2	2	0	0	2
2	FMA2.80.3301	Learning Design	2	2	0	0	3
Number of Credits			4	4	0	0	
2). Study Program Compulsory Courses							
A. Mandatory							
1	MAT1.82.1001	Learning strategies Mathematics	3	3	0	0	1
2	MAT1.82.1002	Number Theory	3	3	0	0	1
3	MAT1.82.1003	Statistics	2	2	0	0	1
4	MAT1.82.1004	Research methods	3	3	0	0	1
5	MAT1.82.1005	Chance Theory	3	3	0	0	1

No	Code	Courses	SKS			Sem	
			Quantity	T	P		L
6	MAT1.82.202 G	geometry	3	3	0	0	2
7	MAT1.82.2003	Discrete mathematics	3	3	0	0	2
8	MAT1.82.2004	Real Analysis	2	2	0	0	2
9	MAT1.82.2005	Linear Algebra	2	2	0	0	2
10	MAT1.82.2006	Learning Evaluation Mathematics	3	3	0	0	2
11	MAT1.82.3001	Science phylosophy	2	2	0	0	3
12	MAT1.82.3002	Science Foundation Education	3	3	0	0	3
Number of Credits			32	32	0	0	
B. Final Project/Thesis							
1	MAT1.82.3003	Proposal Seminar	1	1	0	0	3
2	MAT1.82.3004	Results Seminar Research	1	1	0	0	3
3	MAT1.82.3005	Thesis Exam	6	6	0	0	3
Number of Credits			8	8	0	0	
3). Study Program Elective Courses							
A. Choice							
1	MAT2.82.3001	Learning Media IT based	2	1	1	0	3
2	MAT2.82.3002	Think Mathematically	2	2	0	0	3
3	MAT2.82.3003	Study Math School	2	2	0	0	3
4	MAT2.82.3004	Labor Management Mathematics	2	2	0	0	3
5	MAT2.82.3005	Realistic Mathematics Education	2	2	0	0	3
Number of Credits			10	9	1	0	

1) General Basic Course (7 credits)

1). Science phylosophy

Discussion of the main ideas that live in the world of philosophy, and axiology as well as scientific terminology, the process of mastering knowledge, values, uses of science and its relation to technology,

culture, religion and decision making, logic, mathematics, statistics and language in thinking activities.

2). Research methods

Discuss in depth about the steps of scientific research with several kinds of approaches, both quantitative and qualitative or other approaches by taking into account the strengths and limitations of each, so that students can submit research proposals for both theses and other research.

3). Statistics

This course discusses the basic concepts of statistics with application and interpretation, including statistical concepts, the selection of statistical analysis for individual score interpretation research problems, various correlation coefficients, prediction of randomization and error in sampling, hypothesis testing, t-test, ANOVA for randomized, block, factorial, and regression designs, as well as data analysis using computer software.

2) Basic Skills Course (3 Credits)

Scientific Foundation of Education

Provide students with the ability to recognize the socio-cultural and philosophical background of education, the interrelationship between socio-cultural life and education, and the role of education in the process of socio-cultural change. The essence of learning is *sociocultural background of education and philosophical foundation of education*.

3) Expertise Course I

1. Mathematics Learning Strategy

This course discusses the function of learning mathematics, various learning and learning theories, various strategies, approaches, and methods of learning, the nature of mathematics and the psychology of mathematics learning, mathematics learning media.

2. Evaluation of Mathematics Learning

This course discusses the principles of evaluation in general, compiling evaluation instruments, processing data and interpreting evaluation results, and their use for evaluating student learning outcomes, and improving teaching in general, authentic assessment.

4) Expertise Course II

1). Number Theory

This course discusses various number systems, such as Natural numbers, Integers, Rational and Irrational numbers, Real and Imaginary numbers, Complex numbers, and their properties.

2). Geometry

This course discusses lines and angles, various flat shapes such as quadrilaterals, triangles and circles, along with their elements and properties. It also discusses various geometric shapes such as cubes, blocks, prisms, cones, tubes, and spheres and their properties, positions of points and lines in space, slices.

3). Chance Theory

This course discusses combinatoric analysis: counting techniques, permutations and combinations, probability, random variables and their distributions, mathematical expectations, and some distributions of random variables.

4). Real Analysis

This course discusses in depth the topics of set algebra, real numbers, functions, limits, derivatives, and sequences.

5). Discrete mathematics

This course discusses the topics of generating functions and their applications, recursive relations, exclusion-inclusion principles, pigeon cage principles, and graph theory.

6). Mathematical Modeling

This lecture discusses the meaning of mathematical models, designing mathematical models of factual problems in various fields such as Physics, Chemistry, Biology, Economics, Engineering and others. Here also discussed various optimization models.

7). IT-Based Learning Media

In this course, students learn various knowledge and skills about using IT to design learning media

8). Classroom Action Research (CAR)

This course discusses: The importance of CAR in relation to teacher assignments, CAR characteristics, CAR steps, data collection techniques and instruments, and data processing techniques. The output of this lecture is a CAR proposal from each student.

9). Study School Math

In this course, students analyze the school mathematics curriculum, its sequence and depth, didactic aspects and the learning process (learning experiences, methods, forms of evaluation, etc.).

10). Math Labor Management

The course discusses efforts to optimize Mathematics Labor in order to improve the quality of the learning process, design various media for learning mathematics in elementary, middle and high school, and implement them in schools.

5) Expertise Course II (4 credits)

1) Learning Design

This course discusses important components in learning that need to be considered in lesson planning and tips for their preparation, so that students' goals will be carried out in a condition ready to learn.

2) Curriculum Development

Many things related to the curriculum are generic in nature, which applies to all fields of study, levels, pathways and types of education. Therefore, this course is designed to provide basic knowledge of the curriculum applicable to all fields study, level and "setting" of education. This consideration is based on on the assumption that postgraduate students, especially in the field of education, need to master in general and thoroughly the various conceptions of the curriculum, the basics and principles of its development, as well as its implications for curriculum design, implementation of lectures from the various available alternatives.

6) Thesis Component

1) Thesis Proposal Seminar

It is a means to seek input from both students and lecturers (other than supervisors) before students go to the field to collect data.

2) Research Results Seminar

It is a means to seek input from both students and lecturers (other than supervisors) on the thesis draft with the aim of perfecting thesis writing.

3) Thesis

It is a scientific work "**Masters**" which contains a study of research results on a minimum of one subject matter: Quantitative or Qualitative research methods or a mixture of both or literature studies can be used with reference to

Guidelines for Writing Postgraduate Thesis of Padang State University.

2. Biology Department

1) Vision, Mission, Objectives and Study Program

a. Vision

Making the Department of Biology in 2020 a professional producer of Bachelor of Biology Education and Biology, high academic culture, superior and intelligent character.

b. Mission

- 1) Creating a campus community with a high enthusiasm for learning.
- 2) Able to think critically and creatively, able to solve problems and be professional in their field.
- 3) Creating a conducive academic climate.
- 4) Equipping graduates with entrepreneurial spirit so that they can create jobs.
- 5) Establish and implement extensive cooperation with various relevant agencies in an effort to improve the performance of the department.

c. Destination

Produce graduates who are qualified, competitive, and able to become professionals in the field of biology and biology education.

d. Study program

The Department of Biology has two study programs, namely: Biology Education Study Program and Biology Study Program. Graduates of the Biology Education Study Program receive a Bachelor of Education (S.Pd.) degree, and graduates of the Biology Study Program receive a Bachelor of Science (S.Si.) degree.

e. Study Load

To complete the study, students of the Biology Education Study Program complete a minimum of 150 credits and students of the Biology Study Program complete a minimum of 148 credits. Completion of studies within a maximum of 14 semesters. Study Load for Study Program students **Biology Education** consists of: 11 SKS MKU, 12 SKS MKDK, 58 SKS MKBK (mandatory) 10 SKS (Optional), 28 SKS MKKPP, 15 SKS MKPP and 24 SKS MKK. Study load of Study Program students **Biology** consists of: 11 SKS MKU, 63 SKS MKK, 22 SKS MKB (mandatory) 54 SKS (Optional), 28 SKS MPB, 6 SKS MBB.

Biology Education Study Program (S1)

1) Vision

Making the Biology Education Study Program in 2020 an institution that produces biology and science teachers who are professional, have high academic culture, excel and have intelligent character.

2) Mission

- a) Organizing a Bachelor of Biology Education in a professional manner, with character and relevant to the needs Indonesian society.
- b) Increasing the role as a pioneer of renewal and excellent problem solver in the field of biology education according to the needs of government and private institutions, so that they can cooperate in the development of the Biology Education Study Program at the national level.
- c) To develop various scientific activities, research, training, consulting, services as well as assessment and development in the field of biology education.

3) Destination

- a) Produce graduates who are able to become educators (teachers) of biology subjects at the secondary education level (SMA/MA) and science subjects at the elementary education level (SMP).
- b) Produce graduates who are able to become researchers in the fields of biology and science education, including: learning strategies, evaluation, development of learning tools and policies.
- c) Produce graduates who have the ability to manage biology education in both formal and non-formal institutions.

4) Competence of graduates

- a) Able to apply their field of expertise and utilize science, technology, and/or art in their field in solving problems and being able to adapt to the situation at hand.

(1) Able to apply mastery of biological concepts and educational sciences in planning, implementing, evaluating learning by utilizing science and technology in accordance with problems in the classroom, laboratory, and school.

(2) Able to solve problems of biology education through scientific research by utilizing advances in science and technology in accordance with the context of the school and the development of students.

(3) Able to apply specific pedagogy to teach biological concepts by considering the characteristics of the concept and appropriate pedagogy as implementation *technological pedagogical content knowledge (TPCK)*.

(4) Able to communicate research results and ideas about biology education related to various alternative solutions to problems in the field of biology education (using international languages).

(5) Able to plan and implement biology learning that develops higher-order (excellent) thinking skills.

(6) Able to apply the concept of educational and technology biology in developing products learning by utilizing science and technology advances to support the implementation of biology learning.

b) Mastering the theoretical concepts of certain fields of knowledge in general and the theoretical concepts of special sections in that field of knowledge in depth, and able to formulating procedural problem solving.

(1) Mastering the theoretical concepts, basic principles and procedures of biology, general pedagogy, biological pedagogy, and knowledge relevant to the ability to educate to manage biology education and learning in schools.

(2) Able to analyze the biology curriculum of high school and junior high school science and also its implementation in the learning process.

(3) Mastering scientific methods to analyze and develop strategies for solving problems in biology education.

c) Able to make strategic decisions based on analysis of information and data and provide guidance in choosing various alternative solutions independently and in groups.

(1) Mastering work skills and managerial capabilities of school laboratory management by utilizing the development of science and technology.

(2) Able to solve problems of biology education through scientific research by utilizing advances in science and technology in accordance with the context of the school and the development of students both independently and in groups.

d) Responsible for their own work and can be given responsibility for the achievement of the organization's work.

(1) Have good morals, ethics, responsibility, personality and independence in completing tasks as a biology educator.

(2) Able to participate in a team and have a commitment to the development of self-potential in a sustainable manner as an educator who has character and deserves to be imitated by students and the community (excellent)

5) Course Structure

Major : Biology

Program Studies : Biology Education (S1)

No	Code	Courses	credits				Sem
			Quantity	T	P	L	
1). Mata University Compulsory Tuition							
A. Required							
1	UNP1.60.1401	Religious education	3	3	0	0	1
2	UNP1.60.1402	Pancasila Education	2	2	0	0	1
3	UNP1.60.1403	Education Citizenship	2	2	0	0	2

No	Code	Courses	credits				Sem
			Quantity	T	PL		
4	UNP1.60.1404	Indonesian	2	2	0	0	1
5	UNP1.60.1405	English	2	2	0	0	1
6	UNP1.60.3101	Entrepreneurship	3	3	0	0	3
7	UNP1.60.7401	Real Work Lecture (KKN)	2	2	0	0	7
8	UNP1.61.1201	Educational Science Fundamentals	2	2	0	0	1
9	UNP1.61.2101	Educational Psychology	2	2	0	0	4
10	UNP1.61.2102	Education Administration And Supervision	2	2	0	0	2
11	UNP1.61.4201	Guidance and counseling	2	2	0	0	4
12	UNP1.61.5101	Experience Program Field 1 (PPL1)	1	0	0	1	5
13	UNP1.61.6401	Experience Program Field 2 (PPL 2)	1	0	0	1	6
14	UNP1.61.7401	Experience Program Field 3 (PPL 3)	3	0	0	3	7
Number of Credits			29	24	0	5	

2). University Elective Courses

A. Choose 2 of 18 Credits

1	UNP2.60.2101	Fitness Education Physical	2	2	0	0	2
2	UNP2.60/2102	Japanese language	2	2	0	0	2
3	UNP2.60.2103	Multicultural Education	2	2	0	0	2
4	UNP2.60/2401	History of the Nation's Struggle Indonesia	2	2	0	0	2
5	UNP2.60/2402	Disaster Management	2	2	0	0	2
6	UNP2.60.3401	Natural Culture MinangKabau	2	2	0	0	3
7	UNP2.60.3402	Information Technology and Communication	2	0	2	0	3
Number of Credits			14	12	2	0	

3). Faculty Compulsory Courses

A. Required

1	FMA1.60.1301	General biology	4	3	1	0	1
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No	Code	Courses	credits				Sem
			Quantity	T	PL		
<u>2</u>	<u>FMA1.60.1304</u>	General Chemistry	4	<u>3</u>	<u>1</u>	<u>0</u>	1
<u>3</u>	<u>FMA1.60.2101</u>	Calculus	4	<u>3</u>	<u>1</u>	<u>0</u>	2
<u>4</u>	<u>FMA1.60.2104</u>	General Physics	4	<u>3</u>	<u>1</u>	<u>0</u>	2
Number of Credits			<u>16</u>	<u>12</u>	<u>4</u>	<u>0</u>	
4). Study Program Compulsory Courses							
A.Required							
<u>1</u>	<u>BIO1.61.1201</u>	Management and Engineering laboratory	3	2	1	0	1
<u>2</u>	<u>BIO1.61.1401</u>	Environmental Science	2	<u>2</u>	<u>0</u>	<u>0</u>	1
<u>3</u>	<u>BIO1.61.2201</u>	Plant Morphology	3	<u>2</u>	<u>1</u>	<u>0</u>	2
<u>4</u>	<u>BIO1.61.2301</u>	Animal Structure	3	<u>2</u>	<u>1</u>	<u>0</u>	2
<u>5</u>	<u>BIO1.61.2302</u>	Plant Anatomy	3	<u>2</u>	<u>1</u>	<u>0</u>	2
<u>6</u>	<u>BIO1.61.3201</u>	Animal Development	2	<u>1</u>	<u>1</u>	<u>0</u>	3
<u>7</u>	<u>BIO1.61.3301</u>	Biology Learning Media	3	<u>2</u>	<u>1</u>	<u>0</u>	3
<u>8</u>	<u>BIO1.61.3302</u>	Microbiology	3	<u>2</u>	<u>1</u>	<u>0</u>	3
<u>9</u>	<u>BIO1.61.3303</u>	Review the High School Biology Curriculum and Textbooks	4	4	0	0	3
<u>10</u>	<u>BIO1.61.3304</u>	Protists and Fungi	3	<u>2</u>	<u>1</u>	<u>0</u>	3
<u>11</u>	<u>BIO1.61.3305</u>	Plant Diversity	3	<u>2</u>	<u>1</u>	<u>0</u>	3
<u>12</u>	<u>BIO1.61.3306</u>	Statistics for Education	2	<u>2</u>	<u>0</u>	<u>0</u>	3
<u>13</u>	<u>BIO1.61.3307</u>	Animal Diversity Invertebrates	3	2	1	0	3
<u>14</u>	<u>BIO1.61.4301</u>	Cell Biology	3	<u>3</u>	<u>0</u>	<u>0</u>	4
<u>15</u>	<u>BIO1.61.4302</u>	Animal Ecology	3	<u>2</u>	<u>1</u>	<u>0</u>	4
<u>16</u>	<u>BIO1.61.4303</u>	Plant Ecology	3	<u>2</u>	<u>1</u>	<u>0</u>	4
<u>17</u>	<u>BIO1.61.4305</u>	Animal Diversity Vertebrates	3	2	1	0	4
<u>18</u>	<u>BIO1.61.4306</u>	Biology Learning Methodology	3	3	0	0	4
<u>19</u>	<u>BIO1.61.5201</u>	Evaluation of Biology Learning Process and Outcomes	3	3	0	0	5

No	Code	Courses	credits				Sem
			Quantity	T	PL		
<u>20</u>	<u>BIO1.61.5202</u>	Program Development Biology Learning	3	3	0	0	5
<u>21</u>	<u>BIO1.61.5301</u>	Biochemistry	3	<u>2</u>	<u>1</u>	<u>0</u>	5
<u>22</u>	<u>BIO1.61.5302</u>	Plant Physiology	3	<u>2</u>	<u>1</u>	<u>0</u>	5
<u>23</u>	<u>BIO1.61.5303</u>	Research methodology Education	3	3	0	0	5
<u>24</u>	<u>BIO1.61.5304</u>	Genetics	3	<u>2</u>	<u>1</u>	<u>0</u>	5
<u>25</u>	<u>BIO1.61.5305</u>	Biotechnology	3	<u>3</u>	<u>0</u>	<u>0</u>	5
<u>26</u>	<u>BIO1.61.6011</u>	Micro learning	2	<u>0</u>	<u>2</u>	<u>0</u>	6
<u>27</u>	<u>BIO1.61.6301</u>	Anatomy and Physiology Human	3	2	1	0	6
<u>28</u>	<u>BIO1.61.6302</u>	Animal physiology	3	<u>2</u>	<u>1</u>	<u>0</u>	6
<u>29</u>	<u>BIO1.61.6303</u>	Scientific writing	2	<u>1</u>	<u>1</u>	<u>0</u>	6
<u>30</u>	<u>BIO1.61.6304</u>	English for Biology	2	2	0	0	6
<u>31</u>	<u>BIO1.61.6305</u>	Evolution	2	<u>2</u>	<u>0</u>	<u>0</u>	6
<u>32</u>	<u>BIO1.61.7101</u>	Research Proposal Seminar	2	<u>0</u>	<u>2</u>	<u>0</u>	7
Number of Credits			<u>89</u>	<u>66</u>	<u>23</u>	<u>0</u>	
B.Final Project/Thesis							
<u>1</u>	<u>BIO1.61.8301</u>	Thesis	4	<u>0</u>	<u>4</u>	<u>0</u>	8
Number of Credits			4	<u>0</u>	<u>4</u>	<u>0</u>	
5). Study Program Elective Courses							
A.Selection							
<u>1</u>	<u>BIO2.61.1101</u>	Life Education Family	2	2	0	0	5
<u>2</u>	<u>BIO2.61.2201</u>	Study and Study	2	<u>2</u>	<u>0</u>	<u>0</u>	2
<u>3</u>	<u>BIO2.61.5201</u>	Biology Learning Innovative	2	2	0	0	5
<u>4</u>	<u>BIO2.61.5202</u>	Authentic Rating	2	<u>2</u>	<u>0</u>	<u>0</u>	5
<u>5</u>	<u>BIO2.61.5203</u>	Biological Entrepreneurship	2	<u>2</u>	<u>0</u>	<u>0</u>	5
<u>6</u>	<u>BIO2.61.6011</u>	Classroom action research	2	<u>2</u>	<u>0</u>	<u>0</u>	6

No	Code	Courses	credits				Sem
			Quantity	T	PL		
7	BIO2.61.6102	Institutional Management Education	2	2	0	0	6
8	BIO2.61.6201	Learning Media Technology Based Information	3	2	1	0	6
9	BIO2.61.6301	Development of educational research instruments	2	2	0	0	6
10	BIO2.61.7101	Biology Learning In English language	2	2	0	0	7
11	BIO2.61.7102	Practicum Development School Biology	2	2	0	0	7
Number of Credits			<u>23</u>	<u>22</u>	<u>1</u>	<u>0</u>	

Synopsis

UNP1.60.1401 Religious Education 3 Credits

The One and Only Godhead: faith and piety, divine philosophy (Theology); Humans: human nature, human dignity, human responsibility; Law: raise awareness to obey God's law, the prophetic function of religion in law: Moral: religion as a source of morals, morals in life; Science, Technology and Arts: Faith, science and technology, and charity as a unit, the obligation to demand and practice knowledge, the responsibility of scientists and artists; inter-religious harmony: religion is God's grace for all, togetherness in religious plurality; Society: civilized and prosperous society, the role of religious communities in realizing a civilized and prosperous society, human rights and democracy; Culture: academic culture, work ethic, open and fair attitude; Politics: the contribution of religious adherents to political life,

UNP1.60.1402 Pancasila Education 2 Credits

This course contains the meaning of urgency and reasons for the need for Pancasila education in Higher Education; Pancasila in the current history of the Indonesian nation; Pancasila as a philosophical system, as the basis of the state of the Republic of Indonesia, as a state ideology, as an ethical system, and Pancasila as the state ideology

basic value of science development; Thinking and implementing Pancasila in dealing with current actual problems, such as human rights, racial and economic problems, and the problem of radicalism that must be solved in accordance with the values of Pancasila.

UNP1.60.1403 Citizenship Education 2 Credits

This course contains the nature of civic education in developing full undergraduate or professional abilities; the essence and urgency of national identity as one of the determinants of nation building and character, the urgency of national integrity and national unity; the constitutional values and norms of the 1945 Constitution of the Republic of Indonesia and the constitutional provisions of the legislation under the Constitution; harmony of obligations and rights of the state and citizens in a democracy that is based on people's sovereignty and deliberation for consensus; the nature, instrumentation, and practice of Indonesian democracy based on Pancasila and the 1945 Constitution of the Republic of Indonesia; the historical dynamics of constitutional, socio-political, cultural, and contemporary contexts of sovereign law enforcement; the historical dynamics and the urgency of the insight into the archipelago as a collective conception and view of the Indonesian nationality in the context of world relations; national urgency and challenges and defend the country for Indonesia in building a collective commitment to nationality.

UNP1.60.1404 Indonesian 2 Credits

This course contains the Conception of Indonesian Language, History of Indonesian Language, Position and Functions of Indonesian Language, Indonesian Language Variety, Indonesian Spelling, (punctuation letters, words and absorption elements: Effective Sentences, Definition of Characteristics, Terms of Effective Sentences: Paragraphs Types, Functions and Developments: Writing Outline Theme, Topic, Title and Type of Outline: Writing Text (Scientific Academic Texts and Non-Academic Texts: BI Official Letters (Format and Types of Indonesian Official Letters.

UNP1.60.1405 English 2 Credits

This course contains the development of English language skills in an integrated manner by taking into account the needs of students according to their fields/ majors, including understanding basic sentence patterns that help students understand various English references and equip students with communication skills in English according to their field of expertise.

UNP1.61.1201 Fundamentals of Education 2 Credits

Provide insight into human nature, the nature and importance of education, the foundations and principles of education, thoughts about education

UNP1.61.2101 Educational Psychology 2 Credits

This course examines/discusses the basic concepts of educational psychology, growth, student development, intelligence, talent, creativity, motivation, memory, individual differences and learning theories.

UNP1.61.2102 Administration and Education Supervision 2 Credits

Educational Administration and Supervision courses are courses that provide insight, basic concepts and processes as well as the scope of Educational Administration and Supervision and apply them in professional school management.

UNP1.60.3101 Entrepreneurship 3 Credits

This course contains knowledge, based on creative attitude and skills thinking and basic entrepreneurship, development innovative on the principles of models model entrepreneurship, strategy entrepreneurship, business ethics in entrepreneurship, opportunity analysis, business feasibility studies and business management (marketing, production, finance, resources, business legality, technology and information)

UNP1.61.4201 Guidance and Counseling 2 Credits

Guidance and Counseling is a compulsory university education course that provides insight and understanding of the basic concepts of BK, including; understanding, background, objectives, functions, principles, principles and code of conduct of BK, BK development fields, types of BK services, and BK protection activities as well as BK implementation operations in the implementation of the 2013 Curriculum. In addition, it also discusses the role of the Principal, Deputy Principal , subject teachers, homeroom teachers, BK teachers or counselors and other personnel as well as BK supervisors in BK services at schools.

UNP1.61.5101 Field Experience Program 1 (PPL1) 1 Credit

provide experience for students to observe and how teachers plan to implement learning using various educational media media

UNP1.61.6401 Field Experience Program 2 (PPL 2) 1 SKS

Provide experience for students to make observations on the attitudes and ways of teachers planning and carrying out assessments and evaluations

UNP1.60.7401 Real Work Lecture (KKN) 2 Credits

Real Work Lecture (KKN) is a field activity for students who are taking the final part of the S-1/D4/Applied Bachelor education program. This program is actually mandatory for all students, because the university believes that this program is able to encourage student empathy, and can contribute to solving problems that exist in society. Community service activities are a tangible form of the university's contribution to the community, industry, local government and community groups who want to be economically and socially independent. This KKN program requires Field Supervisors (DPL) and students to play an active role in knowing the existing problems, even before they plunge for 1 to 2.5 months in the midst of the community. Concept "working with community"

has replaced concept "working for the community".

UNP1.61.7401 Field Experience Program 3 (PPL 3) 3 Credits

Provide real experience for students to practice teaching and other school activities for one semester

UNP2.60.2101 Physical Fitness Education 2 Credits

This course applies the effects and benefits of various movement activities for physical fitness and health through various games, competitions, and sports exercises as well as the ability to analyze the importance of physical activity to maintain and improve health. develop the body's physiological functions and health and can be applied throughout life.

UNP2.60.2102 Japanese 2 Credits

Japanese language courses equip students with knowledge about Japanese language practice so that students have the ability to read and communicate using Japanese.

UNP2.60.2103 Multicultural Education 2 Credits

This multicultural education course contains the concept of multicultural education: the urgency of multicultural education in a diverse Indonesian society, building an inclusive diversity paradigm through educational institutions, prospects and constraints of multicultural implementation, implementation of multicultural education in Indonesia, as well as character building of students through the application of multicultural ideology in the field of education.

UNP2.60.2401 History of the Struggle of the Indonesian Nation 2 Credits

The History of the Nation's Struggle course discusses the meaning and significance of the history of the nation's struggle, imperialism and colonialism, the struggle of the Indonesian nation against imperialism and colonialism, the national movement Indonesia, the struggle for independence, the meaning of the proclamation effort defending independence against various threats to the Unitary undermining that State of the Republic of Indonesia, the Republic of Indonesia

UNP2.60.2402 Disaster Management 2 Credits

This course refers to Law No. 24 of 2007 on Disaster Management (Disaster Management) which includes the introduction of facts or evidence of disaster events, introduction of the concept of disaster, types of disasters, characteristics of disasters, natural disasters, non-natural disasters, disasters social, vulnerable, disaster / hazard (hazard), potential hazard, vulnerability, (vulnerability), capacity, principle of risk reduction (risk), prevention, mitigation, preparedness, disaster prediction, disaster impact, disaster response procedures and emergency response, analysis of rehabilitation and reconstruction needs.

UNP2.60.3401 Minangkabau Natural Culture 2 Credits

This course contains material on Minangkabau customs, both objective and subjective. Through the study of objective and subjective customs, students are expected to be able to understand Minangkabau human identity and be able to find the values of progress contained in adat that are relevant to the challenges of 21st century competence, namely multiculturalism, cooperation, problem solving and so on.

UNP2.60.3402 Information and Communication Technology 2 Credits

This course learns about information and communication technology that can make daily work easier. Understanding usage "Office Applications" software, Internet Technology, Device usage learning animation development software, technology development and application use in education and being able to recognize internet-based business.

FMA1.60.1301 General Biology 4 Credit Points

This course discusses the knowledge of living things and scientific methods, cells as the basis of life, metabolism, structure and organization of plant and animal bodies, biodiversity, structure, functions and processes in human organ systems, ecology, genetics and evolution and biotechnology.

FMA1.60.1304 General Chemistry 4 Credit Points

This course discusses Stoichiometry, Chemical Energetics, Atomic Structure, Periodic System of Elements, Chemical Bonds and Molecular Geometry, Forms of Matter and Chemical Equilibrium.

FMA1.60.2101 Calculus 4 Credits

This course discusses the real number system, equations and inequalities, absolute values and absolute inequalities, coordinate systems and simple graphs, functions, limits and continuity, derivatives, related rates, graphs, and integral applications in real problems.

FMA1.60.2104 General Physics 4 Credits

This course discusses quantities and units, particle kinematics, particle dynamics, work and energy, linear momentum, angular momentum and rigid bodies, static fluids, dynamic fluids, concepts of temperature and heat, and the laws of thermodynamics.

BIO1.61.1401 Environmental Science 2 Credits

This course discusses the basics of ecology as the basis for environmental knowledge, the reciprocal relationship between humans and the environment and being able to apply the principles of environmental knowledge in everyday life.

BIO1.61.1201 Laboratory management and engineering 3 credits

This course discusses the introduction of materials, tools and work techniques, work safety in the laboratory

BIO1.61.2301 Animal Structure 3 Credits

This course discusses the organization of the tissue and organ levels in the vertebrate animal body. The topics covered include: animal cells and basic tissues, the integumentary system, the muscular system, the skeletal system, the digestive system, the respiratory system, the circulatory system, the excretory system, the reproductive system, the nervous system and sensory organs, as well as the endocrine and neurosecretory systems.

BIO1.61.2201 Plant Morphology 3 Credits

Able to distinguish the basic structure of plant organs and be able to determine the form of plant life. Make a design and present it

BIO1.61.2302 Plant Anatomy 3 Credits

Students are able critical thinking in **explain** understanding plant cells, tissues and organs and seeking use in industry, agriculture, forestry, and medicine. **student have courage, a sense of responsibility, in present** assignments that are made and have honesty and scientific ethics in making a paper, discussing and understanding basic concepts about cells in plants, plant tissues, such as basic tissue, epidermal tissue, cork tissue, reinforcing tissue and transport tissue as well as the anatomy of plant organs such as roots , stems, leaves, flowers, fruits and seeds.

BIO1.61.3301 Animal Development 3 Credits

This course discusses the notion of developmental biology, developmental theories and developmental principles; gametogenesis; fertilization; cleavage; and blastulation; gastrulation; neurulation; extraembryonic membranes and placenta; organogenesis; developmental disorders; metamorphosis; and regeneration.

BIO1.61.3302 Microbiology 3 Credits

This course discusses microorganisms in general, including prokaryotic organisms and viruses, the position and role of microorganisms in life, morphology and anatomy of microorganisms, nutrition, metabolism and genetics.

microbes, various symbiotic associations in microorganisms, the role of microbes in the immune response.

BIO1.61.3303 Review of High School Biology Curriculum and Textbooks 4 Credits

The Curriculum Review course discusses the basic substance of the curriculum, comparing in the form of determining similarities and differences between the 1994 curriculum and the 2004 curriculum from various aspects. The discussion of this course includes the nature of curriculum biology along with functional links between related sciences, understanding of curriculum foundations and programs, competition standards for study materials, subject competency standards and curriculum signs, specifically exploring the structure of the curriculum.

BIO1.61.3304 Protists and Fungi 3 Credits

This course discusses diversity in the kingdoms protists, fungi, and lichens. Diversity that will be discussed includes classification, structure, stages of the life cycle and discusses procedures for exploration, collection, sampling, and preservation of protists, fungi, and lichens. Identify protists, fungi, and lichens using the key of determination, preservation, or pictures. In addition, distribution, roles, and examples of species from selected groups are discussed. Use concepts, principles, and procedures in the study of protists and fungi to find, analyze, and solve problems collaboratively.

BIO1.61.3305 Plant Diversity 3 Credits

This course discusses the basic principles of plant taxonomy, plant diversity (bryophyta, pterydophyta, and spermatophyta). Diversity that will be discussed includes classification, structure, stages of the life cycle as well as discussing procedures for exploration, collection, sampling, and making plant preservation. Make descriptions and specific characteristics of plant groups. Identify plants using the key of determination, herbarium, or pictures. In addition, distribution, roles, and examples of species from selected groups are discussed. Use

concepts, principles and procedures in diversity study plant religion for find, analyze and solve problem with mutual friends.

BIO1.61.3201 Biology Learning Media 2 Credits

Teaching Materials and Learning Media Development Course

Biology

aims to provide students with an understanding of how to design, compile, implement, and evaluate biology teaching materials and learning media. The process includes, analysis of the concepts to be studied, interconnections between concepts and characteristics of students to select, compile, and develop teaching materials and biology learning media. Students are invited to analyze the 2013 curriculum, high school biology materials, concepts and learning media for biology. The end result of this course is that students can compose and use teaching materials and learning media for biology.

BIO1.61.3306 Statistics for Education 2 Credits

This course discusses descriptive statistics commonly used in educational research and statistical inference which includes probability, theoretical distribution, sampling distribution, parameter estimation, hypothesis testing, regression and correlation, and non-parametric statistics.

BIO1.61.3307 Diversity of Invertebrate Animals 3 Credits

The course aims to deliver students to understand the theories, concepts, and basic principles of taxonomy, nomenclature, classification of diversity and the relationship between the structure and diversity of invertebrate animals. The material in this course covers the characteristics of animals, the history of animal development, the diversity of animal bodies, systematic background, classification systems, taxonomy.

BIO1.61.4301 Cell Biology 3 Credits

1. Understand the nature of cell biology and the functional relationships between related sciences. 2. Understand the concept of cells and cell structures and functions in general 3. Understand the process of cell constituent parts 4. Understand the physiological processes of cell organelles 5. Understand the cell cycle.*Soft Skills/* Character: Integrating the values of honesty, objective, fair, and responsible in carrying out cell biology learning.

BIO1.61.4302 Animal Ecology 3 Credits

This course studies and provides an understanding of the concepts, discussions, goals and interests of animal ecology, the scope, nature and approach of animal ecology studies and their applied aspects. The scope of this course covers the concept of ecosystems, animals in their ecosystems in terms of environmental factors, tolerance range, limiting factors, concepts of time, temperature, main characteristics

animals as heterotrophic, endothermic, exothermic organisms, species as ecological indicators, habitats and niches, food chains and webs, interspecific relationships, succession, response and adaptation. Population and population dynamics which includes structure, sex ratio, age group, density and distribution. Population growth; the concept of r-selected and k-selected species and growth curves.

BIO1.61.4303 Plant Ecology 3 Credits

This course discusses: concepts and development of plant ecology, complexity of environmental factors, populations and communities, plant demography, inter-species interactions, productivity, vegetation analysis, vegetation sampling techniques, topography, succession and terrestrial ecosystems (biomes).

BIO1.61.4305 Vertebrate Animal Diversity 3 Credits

Understand the concept of animal diversity, classification/taxonomy systems and skillfully apply the principles of classifying based on animal biological characteristics (morphology, anatomy, and physiology) based on observations in the laboratory and the surrounding environment, as well as communicating in writing and orally.

BIO1.61.4306 Biology Learning Methodology 3 Credits

Able to understand the theory of educational research methodology including non-scientific and scientific approaches, research and development of science, research problems, problem background, problem formulation, research objectives, assumptions, hypotheses, research questions, research uses, operational definitions, theoretical frameworks, types of research, research design, population, samples, sampling techniques, variables, data, instruments, data analysis techniques, writing scientific papers and research reports. Able to become a prospective researcher who is forward-looking, broad, creative, honest, based on knowledge and technology. Have the knowledge of conducting research and research experience as well as the growth of motivation to research. Have a foundation of mastery of research materials and practices as well as the application of research skills based on biology and biology education.

BIO1.61.5301 Biochemistry 3 Credits

1. Able to use science and technology in teaching Biochemistry and able to adapt to the development of Biochemistry and solve learning problems that occur in the educational environment. 2.

Organizing learning biology and science that educate and nuance PAIKEM 3. Able to a. describe the notion of biochemistry, biomolecules b. describe the nature and character of carbohydrates, proteins, fats and nucleic acids c. describe the metabolism of carbohydrates, proteins, fats and nucleic acids d. explain the relationship of carbohydrates, proteins, and fats e. explain the structure, function and nomenclature of enzymes f. understand and describe energy metabolism g. understand and describe macromolecular metabolism (carbohydrate metabolism,

BIO1.61.5302 Plant Physiology 3 Credits

This course discusses: The processes of life and living activities in plants, starting from plant cells, the relationship between plants and water, soil, nutrients, enzymes, carbohydrate metabolism, photosynthesis, nitrogen metabolism, growth and development, and movement in plants.

BIO1.61.5201 Evaluation of Biology Learning Process and Outcomes 3 Credits

In this course, it will be discussed in connection with the measurement and assessment of learning outcomes, the rules for writing instruments (measuring instruments), writing/making learning outcomes measuring instruments, measurement methods, assessing learning outcomes and analyzing (determining the quality of instruments). lectures Questions and answers, discussions, exercises (large groups, smaller ones to individuals) All activities are assessed from the cognitive, psychomotor and effective aspects.

BIO1.61.5202 Biology Learning Program Development 3 Credits

This course discusses how to prepare annual programs and semester programs, syllabus and lesson plans, develop and analyze subject matter, evaluation tools and learning media, develop remedial and enrichment programs.

BIO1.61.5303 Educational Research Methodology 3 Credits

Able to understand the theory of educational research methodology including non-scientific and scientific approaches, research and development of science, research problems, problem background, problem formulation, research objectives, assumptions, hypotheses, research questions, research uses, operational definitions, theoretical frameworks, types of research, research design, population, samples, sampling techniques, variables, data, instruments, data analysis techniques, writing scientific papers and research reports. Able to be

prospective researchers who are forward-looking, broad, creative, honest, based on knowledge and technology. Have the knowledge of conducting research and research experience as well as the growth of motivation to research. Have a foundation of mastery of research materials and practices as well as the application of research skills based on biology and biology education.

BIO1.61.5304 Genetics 3 Credits

This course discusses the history of genetic development, mitotic division and meiosis, Mendelian laws 1 and 2, Mendelian laws pseudo deviation, probability and Chi-square, sequence and crossover, Mendelian law deviation, genetic material, replication, transcription and translation, mutation genes, DNA repair, population genetics.

BIO1.61.5305 Biotechnology 3 Credits

This course discusses the definition, history and development of biotechnology, fermentation technology, enzyme immobilization, gene cloning, enzymes for DNA manipulation, PCR, stem cell and cell cloning, monoclonal antibodies and ELISA, plant genetic engineering, bioremediation, biogas, biomass and biodiesel, medical biotechnology, DNA fingerprinting, food and industrial biotechnology applications, bioethics and biosafety.

BIO1.61.6301 Human Anatomy and Physiology 3 Credit Points

This course discusses the anatomy and physiology of various organ systems in humans. This course explains the terms in human anatomy and physiology, the skeletal system in humans, the muscular system in humans, the digestive system in humans, the circulatory system in humans, understanding the respiratory system in humans, the excretory system in humans, the reproductive system in humans, and the nervous system in humans, the endocrine system in humans and the sensory system in humans.

BIO1.61.6302 Animal Physiology 3 Credits

Describe the cell as the smallest unit that performs the functions of life and biomembrane transport Describes physiological processes comparatively from low animals to higher animals and their organ structures, such as physiological processes and their organs in the digestive system, osmoregulation and excretion system, circulation system, O₂/CO₂ transport and respiration, nervous system, muscular system, reproductive system and endocrine system *Soft skills*/Character: Able to be a solid person, with good character

noble, wise, and authoritative as well as being a role model

BIO1.61.6303 Scientific Writing 2 Credits

This course discusses scientific writing, including: writing procedures including: writing words, terms, effective sentences and paragraphs, finding and writing writing ideas, scientific thinking, scientific writing framework, writing scientific papers and presenting scientific papers.

BIO1.61.6304 English for Biology 2 Credits

This course aims to provide English language skills in a specific subject, namely biology. This course learns about the importance of English lectures for Biology Education students, recognizing word structures, using context clues, reading phrases, punctuation marks, understanding paragraphs and using efficient reading techniques; skimming and scanning, understanding grammar, applying English orally and in writing, both in the form of a diary, curriculum vitae, application letter, review of articles, and review of learning materials. Students are also trained to listen to biological content using videos, as well as convey their ideas in English-language seminars in the study of biological materials.

BIO1.61.6011 Micro learning 2 Credits

Microteaching aims to establish and develop basic teaching competencies as a provision for teaching practice in schools / educational institutions in order to fully face teaching work in front of the class by having the knowledge, skills, skills and attitudes as professional teachers. The microteaching materials include: understanding the basics of microteaching, compiling a teaching implementation plan (RPP), forming and improving the competence of limited basic teaching skills, integrated teaching basic skills competencies, forming personality competencies, and forming social competencies.

BIO1.61.6305 Evolution 2 Credits

This course discusses the meaning and scope of evolution, the origin of life, classical theory of Darwinian evolution and Neodarwinism, development and challenges of Darwin's theory, evolution, genetics and the environment, evidence and evidence of evolution, variability, gene dynamics in populations, speciation, evolution. molecular, genomic evolution, and macroevolution.

BIO1.61.7101 Research Proposal Seminar 2 Credits

In this course, students are able to create and design a research in the form of a research proposal. Able to communicate ideas in research proposals to audiences at a scientific meeting or seminar, Students are able to defend research ideas and consider suggestions from audiences for changes to research proposals. At the end of the activity students have the character to be very thorough and master the opinions of others well

BIO1.61.8301 Thesis 4 Credits

This course is for students to be able to release and write their research results in the form of a thesis as a TA as one way to get a bachelor's degree. students are able to defend the thesis they wrote on a thesis exam in front of the board of examiners. Students are also able to make a research resume that is sourced from a thesis source into a scientific article published in the form of an E-Journal

BIO2.61.1101 Family Life Education 2 Credits

This course discusses how to create a prosperous and happy family

BIO2.61.2201 Study and Learning 2 Credits

This course discusses the nature of learning, teaching, learning, learning characteristics, learning objectives, learning principles, learning outcomes and learning theories, including behavioristic learning theory, sociocultural revolutionary learning theory, cognitive learning theory, humanistic learning theory, learning theory *multiple intelligences*, and constructivist learning theory.

BIO2.61.5201 Innovative Biology Learning 2 Credits

This course contains the understanding, types and roles of innovation in learning, 21st century biology learning, *blended learning*, scientific inquiry and literacy, collaborative learning through *lesson study*, science/local wisdom-based biology learning, value education-based biology learning and ESQ, and ICT-based biology learning and pembelajaran *E-learning*.

BIO2.61.5202 Authentic Assessment 2 Credits

This course discusses the concept of authentic assessment, the characteristics of authentic assessment and authentic assessment techniques such as observation, oral questions, class presentations, projects, assignments, journals, portfolios, interviews, performance tests, experiments, concept maps, posters. . Through this course, they are also trained to make instruments and rubrics for each authentic assessment.

BIO2.61.5203 Entrepreneurship Biology 2 Credits

This course discusses: entrepreneurial theory covering methods, management and implementation, entrepreneurial spirit and being able to see opportunities for biology-based entrepreneurship, being able to become prospective entrepreneurs who are forward-looking, broad, creative based on biological knowledge and technology, have entrepreneurial knowledge and experience in entrepreneurship as well as growth entrepreneurial motivation and has a foundation of mastery of entrepreneurial materials and practices as well as the application of biology-based entrepreneurial skills.

BIO2.61.6201 Information Technology-Based Learning Media 3 Credits

This course examines ICT-based learning media, which includes the basics of media ranging from the concept of learning media, the influence of information and communication technology developments on learning media and ICT-based learning innovations. This course provides provisions for students to learn to build learning media by utilizing ICT advances, such as: *browsing, search engines, email, mailing lists, blogs, and web*, for development *e-learning*.

BIO2.61.6301 Development of educational research instruments 2 credits

This course discusses the process of developing instruments for both research and evaluation. Students are trained to be able to develop instruments and make rubrics and assessments for process assessment and assessment of learning outcomes. The forms of instruments that are trained to be developed include observation instruments, questionnaires, interviews, graded scales, sociometry, checklists.

BIO2.61.6101 Class 2 Action Research Credits

This course aims to make students understand the writing of scientific papers comprehensively. Lecture materials include the meaning of articles and scientific works, guidelines for articles and scientific works, language and punctuation,

steps and systematic writing of scientific papers, methods of writing journals and methods of referring to citations, how to write scientific papers, rules of referring to citations, how to refer, language of writing scientific papers, systematic writing of scientific papers

BIO2.61.6102 Management of Educational Institutions 2 Credits

This course studies the introduction to management of educational institutions, the basic functions of management of educational institutions, educational organizations, school-based management and higher education, educational leadership models, management information systems, vision, mission, goals and standards of national education, curriculum and learning management, management of quality improvement and education cooperation, management of problems in education, laboratory management, management of teacher professional development, and accreditation of educational institutions.

BIO2.61.7101 Learning Biology in English 2 Credits

This course discusses the importance of teaching skills in English, the identification of English words used in learning with *pronunciation* good and correct ways, how to open learning, give apperception, motivation, ask questions, provide reinforcement, deliver biology material, class management, and close learning in English, and make plans in English, implement it in class, and design evaluations, remedial programs and enrichment in English.

BIO2.61.7102 Development of School Biology Practicum 2 Credits

This course aims to provide an understanding or insight into the nature, role and function of practicum as well as being able to design and manage practicum activities in the learning process. This lecture contains the understanding of practicum, the objectives and functions of the practicum, choosing the concept of material to be practiced based on the analysis of the breadth and depth in the curriculum, planning practicum activities, planning tool models and types of materials and tools to be used in the practicum, carrying out the manufacture and assembling of tool models as well as compiling guidelines for its use (LKS), conducting testing of tool models and their guidelines, making improvements to tool models and guidelines based on test results, preparing teaching plans.

Biology Study Program (S1)

1) Vision

Making the Biology Study Program a superior and dynamic center of education, research, and development in order to produce Bachelor of Science in the field of biology who has faith and devotion to God Almighty, and is able to apply and develop science and technology in society.

2) Mission

- Creating a campus community with a high enthusiasm for learning.
- Creating a conducive academic climate.
- Equipping candidates for Bachelor of Science with biological sciences, so that graduates are expected to be able to think critically and creatively, be able to solve problems, and be professional in their fields.
- Equipping candidates for Bachelor of Science with an entrepreneurial spirit so that they can create jobs.
- Cooperating with various related institutions (especially research/study institutions and centers, laboratories of government and private institutions) in an effort to improve the quality of study program graduates and assist problems found in the field.

3) Purpose

Produce a Bachelor of Science in professional biology, independent ability, soulful entrepreneur ip, and able carry out research to develop solutions to problems biology and found in life in life Public. In 2020, BIOLOGY PRODI will become one of the centers for the study of Biology based on biotechnology to support the development and quality improvement in agriculture and animal husbandry in West Sumatra Province (in particular) and Sumatra (generally).

4) Graduate Competencies

- Main Competencies
 - Mastering biological material.
 - Have work skills in the biology laboratory and in the field.
 - Able to develop knowledge and be able to follow the development of science and technology needed to develop themselves.
 - Able to think logically, analytically, and structured in solving problems found in the world of work and society.

(5) Having character, behavior, responsibility in the world of work that can be imitated by the community.

b) Supporting Competencies

- Able to continue their studies to a higher level.
- Able to communicate orally/written in the national language and international.
- Mastering information technology.

c) Other Competencies

- Capable of entrepreneurship and open the field of work with entrepreneurship spirit provision.
- Able to cooperate with all levels of mas society.

5) Course Structure

Major : Biology
Study program : Biology (S1)

No	Code	Courses	credits				Sem
			Quantity	T	P	L	
1). Science and Skills Course (MKK)							
A.Selection							
1	FMA023	General Chemistry	4	3	1	0	0
Number of Credits			4	3	1	0	
2). Craft Skills Course (MKB)							
A.Required							
1	FMA022	Environmental Knowledge	2	2	0	0	0
Number of Credits			2	2	0	0	
3). University Compulsory Courses							
A.Required							
1	UNP1.60.1401	Religious education	3	3	0	0	2
2	UNP1.60.1402	Pancasila Education	2	2	0	0	2
3	UNP1.60.1403	Education Citizenship	2	2	0	0	1
4	UNP1.60.1404	Indonesian	2	2	0	0	1
5	UNP1.60.1405	English	2	2	0	0	1
Number of Credits			11	11	0	0	

No	Code	Courses	credits				Sem
			Quantity	T	PL		
4). University Elective Courses							
A.Choose 2 of 18 Credits							
1	UNP2.60.1402	Basic Socio-Cultural Sciences	2	2	0	0	1
Number of Credits			2	2	0	0	
5). Faculty Compulsory Courses							
A.Required							
1	FMA1.60.1301	General biology	4	3	1	0	1
2	FMA1.60.1302	Calculus	4	3	1	0	2
3	FMA1.60.1303	General Physics	4	3	1	0	2
4	FMA1.60.1304	General Chemistry	4	3	1	0	1
Number of Credits			16	12	4	0	
6). Study Program Compulsory Courses							
A.Required							
1	BIO1.62.1001	Environmental Knowledge	2	2	0	0	1
2	BIO1.62.2004	Plant Morphology	3	2	1	0	2
3	BIO1.62.2005	Animal Structure	3	2	1	0	2
4	BIO1.62.206	Animal Taxonomy	4	3	1	0	2
5	BIO1.62.2007	Plant Anatomy	3	2	1	0	2
6	BIO1.62.3003	Animal Development	3	2	1	0	3
7	BIO1.62.3004	Cell Biology	3	3	0	0	3
8	BIO1.62.3005	Biochemistry	3	2	1	0	3
9	BIO1.62.3006	Plant Ecology	3	2	1	0	3
10	BIO1.62.3007	Animal Ecology	3	2	1	0	3
11	BIO1.62.3008	Plant Taxonomy	4	3	1	0	3
12	BIO1.62.4001	Animal physiology	3	2	1	0	4
13	BIO1.62.4002	Plant Physiology	3	2	1	0	4
14	BIO1.62.4003	Animal Morphogenesis	3	2	1	0	4
15	BIO1.62.4004	Plant Morphogenesis	3	2	1	0	4

No	Code	Courses	credits				Sem
			Quantity	T	PL		
16	BIO1.62.4005	Basic Microbiology	3	2	1	0	4
17	BIO1.62.4006	Statistics	3	3	0	0	4
18	BIO1.62.4007	Genetics I	2	2	0	0	4
19	BIO1.62.4008	Research Methods and Experimental design	3	3	0	0	4
20	BIO1.62.4009	Biotechnology	3	2	1	0	4
21	BIO1.62.4010	Evolution	2	2	0	0	4
22	BIO1.62.5001	Microtechnical	3	2	1	0	5
23	BIO1.62.5002	Genetics II	2	2	0	0	5
24	BIO1.62.6001	Anatomy and Physiology Human	3	3	0	0	6
25	BIO1.62.6002	Seminar	2	2	0	0	6
26	BIO1.62.6003	Seed Physiology	2	2	0	0	6
27	BIO1.62.6004	Seminar	2	0	2	0	6
28	BIO1.62.7001	Scientific Writing	2	2	0	0	7
29	BIO1.62.7002	Practical work	3	0	0	3	7
30	BIO1.62.7003	Biology Learning	3	3	0	0	7
Number of Credits			84	63	18	3	
B.Final Project/Thesis							
1	BIO1.62.8001	Thesis	4	4	0	0	8
Number of Credits			4	4	0	0	
7). Study Program Elective Courses							
A.Selection							
1	BIO2.62.5001	Basic Social and Cultural Sciences	2	2	0	0	5
2	BIO2.62.5002	Plant Tissue Culture	2	1	1	0	5
3	BIO2.62.5003	Biofertilizer	2	2	0	0	5
4	BIO2.62.5004	Impact Analysis Environment	2	2	0	0	5
5	BIO2.62.5005	Reproductive Physiology Vertebrates	2	2	0	0	5

religion in realizing a civilized and prosperous society, human rights and democracy; Culture: academic culture, work ethic, open and fair attitude; Politics: the contribution of religious adherents in political life, the role of religious adherents in realizing national unity and integrity.

UNP1.60.1402 Pancasila Education 2 Credits

This course contains the meaning of urgency and reasons for the need for Pancasila education in Higher Education; Pancasila in the current history of the Indonesian nation; Pancasila as a philosophical system, as the basis of the state of the Republic of Indonesia, as a state ideology, as an ethical system, and Pancasila as the basis for the value of developing science; Thinking and implementing Pancasila in dealing with current actual problems, such as human rights, racial and economic problems, and the problem of radicalism that must be solved in accordance with the values of Pancasila.

UNP1.60.1403 Citizenship Education 2 Credits

This course contains the nature of civic education in developing full undergraduate or professional abilities; the essence and urgency of national identity as one of the determinants of nation building and character, the urgency of national integrity and national unity; the constitutional values and norms of the 1945 Constitution of the Republic of Indonesia and the constitutional provisions of the legislation under the Constitution; harmony of obligations and rights of the state and citizens in a democracy that is based on people's sovereignty and deliberation for consensus; the nature, instrumentation, and practice of Indonesian democracy based on Pancasila and the 1945 Constitution of the Republic of Indonesia; the historical dynamics of constitutional, socio-political, cultural, and contemporary contexts of sovereign law enforcement; the historical dynamics and the urgency of the insight into the archipelago as a collective conception and view of the Indonesian nationality in the context of world relations; national urgency and challenges and defend the country for Indonesia in building a collective commitment to nationality.

UNP1.60.1404 Indonesian 2 Credits

This course contains the Conception of Indonesian Language, History of Indonesian Language, Position and Functions of Indonesian Language, Indonesian Language Variety, Indonesian Spelling, (punctuation letters, words and absorption elements: Effective Sentences, Definition of Characteristics, Terms of Effective Sentences: Paragraphs Types, Functions and Developments: Writing Outline Theme, Topic, Title and Type of Outline: Writing Text (Scientific Academic Texts and Non-Academic Texts: BI Official Letters (Format and Types of Indonesian Official Letters.

UNP1.60.1405 English 2 Credits

This course contains the development of English language skills in an integrated manner by taking into account the needs of students according to their fields/ majors, including understanding basic sentence patterns that help students understand various English references and equip students with communication skills in English according to their field of expertise.

UNP2.60.1402 Basic Socio-Cultural Sciences 2 Credits

This course contains: Basic concepts in social and cultural sciences to study Indonesian society and changes in Indonesian society and culture. The subjects are humans and human culture as individuals and human social beings, moral values and human law, human diversity and equality, science, technology and human arts and the environment.

FMA1.60.1301 General Biology 4 Credit Points

This course discusses the knowledge of living things and scientific methods, cells as the basis of life, metabolism, structure and organization of plant and animal bodies, biodiversity, structure, functions and processes in human organ systems, ecology, genetics and evolution and biotechnology.

FMA1.60.1302 Calculus 4 Credits

This course discusses the real number system, equations and inequalities, absolute values and absolute inequalities, coordinate systems and simple graphs, functions, limits and continuity, derivatives, related rates, graphs, and integrals.

FMA1.60.1303 General Physics 4 Credit Points

This course discusses quantities and units, particle kinematics, particle dynamics, work and energy, linear momentum, angular momentum and rigid bodies, static fluids, dynamic fluids, concepts of temperature and heat, and the laws of thermodynamics.

FMA1.60.1304 General Chemistry 4 Credit Points

This course discusses Stoichiometry, Chemical Energetics, Atomic Structure, Periodic System of Elements, Chemical Bonds and Molecular Geometry, Forms of Matter and Chemical Equilibrium.

BIO1.62.1001 Environmental Knowledge 2 Credits

The learning outcomes in this course are: 1. Able to master the basics of ecology as the basis of environmental knowledge 2. Understand the reciprocal relationship between humans and the environment 3. Understand the reciprocal relationship between human activities and the environment 4. Able to apply the principles of environmental knowledge in life daily *Soft skills/* Character: Able to become a person who has empathy for environmental sustainability and is grateful for the blessings of the universe created by God Almighty.

BIO1.62.2004 Plant Morphology 3 Credits

1. Able to apply plant morphology and utilize science and technology to the development of plant morphology science in solving problems and being able to adapt to the situation at hand. 2. Mastering theoretical concepts of plant morphology in general, and theoretical concepts of special sections in the field of plant morphology in depth and able to formulate procedural problem solving 3. Able to make the right decisions based on analysis of information and data, and able to provide instructions in choosing various alternative solutions independently and in groups 4. Responsible for own work and can be given responsibility for achieving organizational work results *Soft Skills/* Character: Open and big-hearted, thorough and critical, strategic in thinking and acting, and humble.

BIO1.62.2005 Animal Structure 3 Credits

This course discusses the organization of the tissue and organ levels in the vertebrate animal body. The topics covered include: animal cells and basic tissues, the integumentary system, the muscular system, the skeletal system, the digestive system, the respiratory system, the circulatory system, the excretory system, the reproductive system, the nervous system and sensory organs, as well as the endocrine and neurosecretory systems. Competency standards ; After following this course, students are expected to be able to understand: a. Animal cell structure b. The structure of the tissue that makes up the body of vertebrate animals c. The structure of the organs that make up the body of vertebrate animals

BIO1.62.2006 Animal Taxonomy 4 Credits

1. Know the basics of animal taxonomy and nomenclature and apply 2. Identify and classify animals

based on phylogenetic and morphological classification. 3. Recognize the nature and characteristics of animals. 4. Classify animals and provide examples to the level of taxon class and order. 5. Develop a lineage tree scheme from animal classification 6. Develop a method for observing the determination, identification and classification of animals. *Soft skills/* Character: Able to recognize individual potential, carry out effective communication in classifying animals and be active in learning activities

BIO1.62.2007 Plant Anatomy 3 Credits

Able to master theoretical concepts about cells and cell forms in plants. Able to master the theoretical concepts of tissue in plants. Able to master theoretical concepts specifically about the anatomical structure of plant organs organ

BIO1.62.3003 Animal Development 3 Credits

This course discusses the notion of developmental biology, developmental theories and developmental principles; *gametogenesis; fertilization; cleavage; and blastulation; gastrulation; neurulation; extraembryonic membranes and placenta; organogenesis;* developmental disorders; metamorphosis; and regeneration

BIO1.62.3004 Cell Biology 3 Credit Points

1. Understand the nature of cell biology and the functional relationships between related sciences. 2. Understand the concept of cells and cell structures and functions in general 3. Understand the process of cell constituent parts 4. Understand the physiological processes of cell organelles 5. Understand the cell cycle. *Soft Skills/* Character: Integrating the values of honesty, objective, fair, and responsible in carrying out cell biology learning.

BIO1.62.3005 Biochemistry 3 Credits

1. Able to use science and technology in teaching Biochemistry and able to adapt to the development of Biochemistry and solve learning problems that occur in the educational environment. 2. Organizing biology and science learning that educates and has PAIKEM nuances 3. Able to a. describe the notion of biochemistry, biomolecules b. describe the nature and character of carbohydrates, proteins, fats and nucleic acids c. describe the metabolism of carbohydrates, proteins, fats and nucleic acids d. explain the relationship of carbohydrates, proteins, and fats e.

explain the structure, function and nomenclature of enzymes f. understand and describe energy metabolism g. understand and describe macromolecular metabolism (carbohydrate metabolism, protein metabolism, fat metabolism) h. able to understand and explain the effect of addictive substances on the body *Soft Skills/Character:* Able to recognize individual potential, carry out effective communication in analyzing problems in the metabolism of macromolecular substances (proteins, carbohydrates, fats and nucleic acids) and active in learning activities

BIO1.62.3006 Plant Ecology 3 Credits

1. Understand the concept and development of plant ecology. 2. Understand the effect of the complexity of environmental factors on plants. 3. Understand the concept of population and plant community 4. Able to identify forms of intra and inter-species interactions 5. Able to explain the concept of productivity 6. Able to observe changes in community and plant demographics 7. Able to perform plant vegetation analysis 8. Able to perform vegetation sampling technique 9. Can distinguish characteristics of vegetation types in the world *Soft skills/Character:* Able to recognize individual potential, carry out effective communication in applying ecological principles in life and play an active role in learning activities

BIO1.62.3007 Animal Ecology 3 Credits

This course studies and provides an understanding of the concepts, discussions, goals and interests of animal ecology, the scope, nature and approach of animal ecology studies and their applied aspects. The scope of this course covers the concept of ecosystems, animals in their ecosystems in terms of environmental factors, tolerance range, limiting factors, concepts of time, temperature, the main characteristics of animals as heterotrophs, endothermal, exothermic, species as ecological indicators, habitats and niches.), food chains and webs, interspecific relationships, succession, response and adaptation. Population and population dynamics which includes structure, sex ratio, age group, density and distribution. Population growth; the concept of selected r and selected species k and growth curve

BIO1.62.3008 Taxonomy of Plants 4 Credits

1. Able to explain the basics of plant taxonomy, plant classification klasifikasi *Spermatophyta*. 2. Able to make descriptions and find specific characteristics of selected families 3. Able to identify plants using determination keys and herbarium or pictures 4. Able to

make the correct plant herbarium. *Soft skills/Character:* Able to be a diligent, thorough, honest and professional person in the field of plant taxonomy This course discusses the basic concepts of taxonomy (identification, classification, nomenclature), diversity, development of classification of non-flowering plants which includes algae (*Vyanophyta, Clhorophyta, Phaeophyta, Rhodopyta, Chrysophyta, Euglenophyta*), Fungi, *Lichens, Bryophyta and Pterydophyta*, and the relationship between non-flowering plants. It also discusses the distribution and benefits as well as examples of species from selected orders.

BIO1.62.4001 Animal Physiology 3 Credits

Describe the cell as the smallest unit that performs the functions of life and biomembrane transport Describes physiological processes comparatively from low animals to higher animals and their organ structures, such as physiological processes and their organs in the digestive system, osmoregulation and excretion system, circulation system, O₂/CO₂ transport and respiration, nervous system, muscular system, reproductive system and endocrine system *Soft skills/Character:* Being able to be a solid person, having noble character, wisdom, and authority and being a role model

BIO1.62.4002 Plant Physiology 3 Credits

This course discusses the processes of life and living activities in plants, starting from the relationship of plants to water, soil and nutrients, carbohydrate metabolism, photosynthesis, nitrogen metabolism, to producing growth and movement in plants.

BIO1.62.4003 Animal Morphogenesis 3 Credits

Animal Morphogenesis provides lectures on the induction of tissue morphogens during animal development to form organs and body tissues. The role of inductors and responsiveness in eliciting the initiation of organ formation. and termination of morphogenesis.

BIO1.62.4004 Plant Morphogenesis 3 Credit Points

Plant morphogenesis discusses the understanding of morphogenesis and the concepts of morphogenesis, morphogenesis phenomena, morphogenetic factors, growth substances (growth regulators and plant organization). *Soft skills/Character:* Able to be a diligent, thorough, honest and professional person in the field of plant taxonomy

BIO1.62.4005 Basic Microbiology 3 Credits

This course discusses microorganisms in general, including prokaryotic organisms and viruses, the position and role of microorganisms in life, morphology and anatomy of microorganisms, nutrition, microbial metabolism and genetics, various symbiotic associations in microorganisms, the role of microbes in immune responses.

BIO1.62.4006 Statistics 3 Credits

1. Basic Concepts of Biostatistics 2. Descriptive and Inferential Statistics 3. Frequency Distribution Table 4. Size of Dispersion 5. Measure of Diversity 6. Population and Sample 7. Hypothesis Testing 8. Correlation and Regression 9. Principles of Experimental Design 10. Completely Randomized Design (CRD) 11. Randomized Block Design (RAK) 12. Further Test, *Soft skills*/Character: Value *soft skills* What is expected is that students can work together, be responsible, dare to express opinions and ask questions, respect the opinions of others, learn independently, introspect, self-control and motivation to learn all the time, leadership tolerance, communication, creativity, confidence, mutual respect and initiative.

BIO1.62.4007 Genetics I 2 Credits

Utilization of science and technology in teaching genetics, theories and laws contained in the discussion of genetics and being able to adapt to the development of genetics science and solve genetic problems that occur in life. 2. Able to design genetic learning in accordance with the grouping of materials at the level of the education unit 3. Able to solve problems and apply the principles, laws and theories of genetics through problem analysis and experimental data analysis. 4. Responsible for his own work and can be given responsibility for the achievement of the organization's work. *Soft Skills*/Character: Able to recognize individual potential, carry out effective communication in analyzing and solving genetic problems and active in learning activities

BIO1.62.4008 Research Methods and Experimental Design 3 Credits

This course discusses the concepts of biostatistics including descriptive statistics, parametrics, analysis of variance, experimental design, environmental design in the form of Completely Randomized Design, Randomized Block Design,

One-factor and two-factor (factorial) experiments, correlation and regression, data transformation, further testing and training in the application of statistical techniques to process data and interpret biological research data

BIO1.62.4009 Biotechnology 3 Credits

1. Able to master the science of biotechnology for undergraduate level 2. Able to carry out modern biotechnology practicum correctly 3. Able to make reports from field study activities to biotechnology/molecular biology laboratories 4. Able to tell the results of the latest research in the field of biotechnology from reading journals 5. Able to apply biotechnology knowledge obtained from literature study activities, practicum, and field studies in the form of research proposals. *Soft skills*/Character: Be a student who is diligent, tenacious, tough, patient, and aware of the power of Allah SWT.

BIO1.62.4010 Evolution 2 Credits

Definition of evolution, the theory of evolution and its development. Evolution evidence. Genetic variability and polymorphism. Natural selection, Darwin's hypothesis. Adaptation process. The mechanism and process of speciation. Molecular and cellular evolution. primate evolution.

BIO1.62.5001 Microtechnical 3 Credits

This course discusses how to make permanent or semi-permanent preparations from animal and plant tissues using the Paraffin method which includes sampling techniques, fixation, dehydration, clearing, embedding, sectioning, mounting, staining. and Documentation with microphotography techniques. Whole Mounting for protozoa was also carried out by the Barliesh method.

BIO1.62.5002 Genetics II 2 Credits

1. Able to utilize science and technology in teaching genetics, theories and laws contained in the discussion of genetics and able to adapt to the development of genetics science and solve genetic problems that occur in life. 2. Able to master the theoretical concepts of genetics in general, theories, principles and laws in in-depth genetics and be able to formulate procedural problem solving to be able to act as a biology teacher or science teacher. 3. Responsible for own work and can be given responsibility

on the achievement of the organization's work. *Soft Skills/Character*: Able to recognize individual potential, carry out effective communication in analyzing and solving genetic problems and active in learning activities

BIO1.62.6001 Human Anatomy and Physiology 3 Credit Points

1. Able to understand the definition of human anatomy and physiology as well as terms in Human Physiological Anatomy. 2. Able to understand the integumentary system in humans. 3. Able to understand the Skeleton system in humans. 4. Able to understand the Musculus system in humans. 5. Able to understand the Digestive system in humans. 6. Able to understand the circulatory system in humans. 7. Able to understand the respiratory system in humans. 8. Able to understand the excretory system in humans. 9. Able to understand the human reproductive system. 10. Able to understand the nervous system in humans. 11. Able to understand the endocrine system in humans. 12. Able to understand the sensory system in humans.

BIO1.62.6002 Seminar 2 Credits

In this course, students are able to create and design a research in the form of a research proposal. able communicate ideas in research proposals to the audience at a scientific meeting or seminar, students are able to defend research ideas and consider suggestions from the audience for changes to research proposals. At the end of the activity students have the character to be very thorough and master the opinions of others well

BIO1.62.6003 Seed Physiology 2 Credits

Introduction, Conception of seeds or seeds, Formation of seeds and fruit, Structure of seeds and fruit, Structure and types of seeds, Ripening of seeds, (physiological maturity, germination and growth of seeds, biological processes in the period of seed ripening). Seed germination, (definition of germination, requirements for germination), morphological and physiological germination process, Germination substrate, Normal germination criteria, Dormancy, Seed decline

BIO1.62.6004 Seminar 2 Credits

Students prepare and make proposals for research.

BIO1.62.7001 Scientific Writing 2 Credits

This course provides knowledge and skills in writing scientific papers which include writing procedures according to Indonesian guidelines which include writing words, vocabulary, sentences, paragraphs, terms, effective sentences, looking for writing ideas, how to put ideas into writing, free writing, think scientifically, recognize the framework of scientific writing and write scientific papers in the form of theory and practice by making presentations of scientific papers and tentative proposals.

BIO1.62.7002 Internship 3 Credits

This course provides an opportunity for students to directly communicate all the biological knowledge they have received so far in the world of work, including Research Centers, Industry, Animal Husbandry, Agriculture and the Center for Biotechnology Development (Nuclear reactors). Students for 83 hours of work are in the Industrial Workplace with Internship status, At the end of this activity students must report the KP in the form of writing the KP Report which is guided by 1 Lecturer and 1 Supervisor in the Field

BIO1.62.7003 Learning Biology 3 Credits

Learning Outcomes in this course are: 1. Able to master and apply the nature of learning biology, teacher code of ethics, teacher competence, and basic skills of teachers in learning biology. 2. Able to master the concepts of approaches, methods, strategies, and learning models that can be used in learning biology. 3. Able to master concepts and analyze high school biology learning materials. 4. Able to master the concept of learning media and its types. 5. Able to choose and use appropriate learning media to be used in biology learning based on the analysis of the learning materials carried out. 6. Able to analyze the 2013 curriculum in biology for high school, and able to develop learning tools based on the results of the analysis of the curriculum. 7. Able to carry out biology learning based on the design that has been developed. 8. Able to master and design the concept of remedial and enrichment learning in biology learning. 9. Able to master and apply the concept of competency-based assessment in the process and learning outcomes of high school students in biology subjects. 10. Able to assemble cognitive assessment instruments in the form of objectives and essays, as well as affective and psychomotor assessment instruments in biology learning. 11.

Able to use assessment instruments through trials and analyze test instruments. 12. Able to apply assessments to provide information about students' learning achievement in biology in the learning outcomes report document. *Soft Skills/Character*: Integrating the values of honesty, objective, fair, and responsible in carrying out biology learning.

BIO1.62.7004 Research Proposal Seminar 2 Credits

In this course, students are able to create and design a research in the form of a research proposal. able communicate ideas in research proposals to the audience at a scientific meeting or seminar, students are able to defend research ideas and consider suggestions from the audience for changes to research proposals. At the end of the activity students have the character to be very thorough and master the opinions of others well

BIO1.62.8001 Thesis 4 Credits

This course is for students to be able to release and write their research results in the form of a thesis as a TA as one way to get a bachelor's degree. students are able to defend the thesis they wrote on a thesis exam in front of the board of examiners. Students are also able to make a research resume that is sourced from a thesis source into a scientific article published in the form of a thesis *Ejournal*

BIO2.62.5001 Basic Social and Cultural Sciences 2 Credits

This course provides insight into living with social values in the midst of a society of diverse cultures to get to know each other that diversity so as to strengthen national unity.

BIO2.62.5002 Plant Tissue Culture 2 Credits

This course provides an overview and skills for students about the concepts and principles of tissue culture 2. Able to master about tissue culture laboratory facilities 3. Able to master about tissue culture media and their preparation 4. Able to master methods of preparing explants 5. Able to master acclimatization procedures *plantlet* 6. Able to master about the factors that influence the success of plant tissue culture techniques 7. Able to master about callus culture 8. Able to master about the use of growth regulators (ZPT) in culture

plant tissue 9. Able to master the production of secondary metabolites, *Soft Skills/Character*: Able to be a person who is steady, has character, has noble character, is wise, authoritative, and can be an example

BIO2.62.5003 Biofertilizer 2 Credits

This course discusses the process of forming/manufacturing organic fertilizer by utilizing the fermentation process to improve the quality of the nutrients produced in the form of ready-to-use organic fertilizer.

BIO2.62.5004 Environmental Impact Analysis 2 Credits

AMDAL Terminology, Legislation, Purpose and Benefits of AMDAL, Basic Ecology and Ecosystem Concepts, Environmental Quality Standards, AMDAL Methodology, Identification, Prediction and Evaluation of Environmental Impacts, Environmental Management Plans (RKL), and Environmental Monitoring Plans (RPL), Audits Environment

BIO2.62.5005 Vertebrate Reproductive Physiology 2 Credits

Discusses sex and sex steroids, gonadal function and regulation of gonadal and pituitary function, steroid action in adult animals, fertilization, implantation and formation of the placenta, factors that support pregnancy, preparation for birth, childbirth and breastfeeding and parental care. *Soft skills/Character*: Being able to be a solid person, having noble character, wisdom, and authority and being a role model

BIO2.62.5006 Phytohormones 2 Credits

In this course, the definition, mechanism of action is discussed *phytohorman*, various phytohormones: auxin, gibberellins, cytokinins, eliten, abisic acid, mechanism of action and physiological effects of each phytohormon and its transporters. other plant organic compounds substances that slow down growth allelochemicals

BIO2.62.5007 Taxonomy of Angiosperms 2 Credits

Basic concepts of plant taxonomy, taxonomic history and reporting, nomenclature, variation and speciation, characteristics, general description and classification of several species in Magnoliopsida, Liliopsida, Algae, Ferns and Lichenes

BIO2.62.5008 Plant Ecophysiology 2 Credits

Students are able to utilize science and technology in the field of plant physiology ecology and are able to adapt to situations encountered in solving problems. *Soft Skills/character* : After following the learning process of the Plant Physiology Ecology course, it is expected to produce students who believe and are devoted to Allah SWT, care for the environment, are honest, responsible, have noble character, are introspective, intelligent, skilled, sensitive and empathetic, critical, think rationally, dynamically, get along and understand the actual problems that occur in plants

BIO2.62.5009 Marine Biology 2 Credits

This course will explain the biology of organisms that live in the sea and the coast, especially in its aspect as a resource. Marine environmental factors that determine the mentality and population density of these organisms are specifically those that live in Indonesia. The impact of environmental pollution on marine resources is also a topic to be discussed. This lesson is followed by practicum in coastal and shallow sea areas, practicum includes measurement of physical and chemical factors, how to measure population density and community analysis.

BIO2.62.6001 Cell Genetics 2 Credits

Introduction (Structure and Function of Chromosomes; Variations in Number of Chromosomes); Variations in the number of chromosomes; Changes in chromosomal structure; Gene mutations; Induced genetic changes; DNA repair; Cytoplasmic Inheritance

BIO2.62.6002 Phytopathology 2 Credits

Able to master the symptoms and signs of disease in plants 2. Able to master the causes of disease in plants 3. Able to master virulence factors that cause disease in plants 4. Able to master factors that influence disease development 5. Able to master methods of controlling disease in plants *Soft Skills/Character*: Able to be a person who is steady, has character, has noble character, is wise, authoritative, and can be an example

BIO2.62.6003 Weed Science 2 Credits

Understanding weeds and their limits. Grouping of weeds based on habitat, life cycle, morphology. Weed reproductive organs. Quantitative loss and

qualitative effect of weeds. Types of weed and plant interactions, Allelopathy. Mechanical weed control, technical culture, biological and chemical. Definition of weeds, classification, competition, allelopathy, development and propagation of weeds, the persistence of weeds in a field, aquatic weeds, plantations and rice fields. Mechanical, biological, clinical and integrated weed control and herbicide metabolism

BIO2.62.6004 Endocrinology 2 Credits

Discuss in general about the working relationship, the applicable provisions and methods in the research of the hormone system, as well as the mechanism of action of hormones. Some glands such as the pituitary, thyroid and pancreas are discussed in detail

BIO2.62.6005 Mycology 2 Credits

Students can know and understand the basic concepts of mycology which include classification of fungi, mushroom fruiting body shapes, ways of reproduction (sexual and asexual), reproductive organs, habitats and their importance in human life. Knowing the grouping of fungi based on the classification, namely *Division Myxomycota*, *Division Eumycota*, *Division Mastigomycota*, *Division Zygomycota*, *Division Lichenophyta*, *Division Ascomycota* and *Division Basidiomycota*, and the role of mushrooms in industry and health. *Soft skills/Character*: Able to recognize, understand and explain the basic concepts of Mycology as a science in biology which includes life, carry out effective communication in analyzing and knowing the division of fungi (fungi)

BIO2.62.6006 Soil Microbiology 2 Credits

This course discusses the concepts and processes of soil microbiology, microbial populations in the soil, the role of microbes in various processes in the soil such as soil formation, compost, humus, the process of decomposition of organic matter and pesticides as well as the role of soil microbes in various material cycles and soil fertility. It also discusses the role of soil microbes in causing disease in plants

BIO2.62.6007 Wetland Ecology 2 Credits

Students are able to master science and technology related to the determination and function of a wetland and adapt their abilities to solve wetland problems. Students are able to identify

forming wetlands that occur naturally through natural events or artificially by humans, students are able to make strategic decisions to raise wetlands for the conservation of flora and fauna in it.

BIO2.62.6008 Microbial Physiology 2 Credits

Microbial Physiology is an elective course that facilitates students to explore microbiology in order to prepare students who will conduct research in the field of microbiology. In this course, various physiological processes of microbes that act as biofermentors and biodegradable are discussed.

BIO2.62.6009 Molecular Genetics 2 Credits

This course discusses the molecular processes that occur in transcription for various cell responses to the signals it receives

BIO2.62.6010 Herpetology 2 Credits

Introductory outline of course. Herpetology and its place among other biological courses. Aims, goals, objects and methods of herpetology. History of herpetology. Place and role of Amphibians and reptiles in natural ecosystems. Herptiles and humans. Introduction to taxonomic protocols, ICZN, types, synonymies. Species concept. Tetrapod Relationships and Evolutionary Systematics Characteristics of Amphibians and Reptiles, General anatomy and morphology. Amphibian phylogeny and higher classification, living and heredity groups, adaptive radiation. Origin and Evolution of Amphibians. Land colonization. Living in an amphibiotic environment.

Trends in amphibian evolution. Amphibian diversity: Toads and Frogs. Characteristics of Reptiles. General Anatomy and morphology. Origin and Evolution of Reptiles. Trends in reptilian evolution. Reptile phylogeny and higher classification. Reptile diversity: Chelonia, Rhynchocephalia, Squamata, Crocodylia. Ecology and life history patterns Life Histories and Demography. Sex, Sex Ratio and Sexual dimorphism. Oviparity and Viviparity. Parthenogenesis. Sexual Selection and Mating Systems. Parental Care Modes of Reproduction and Development. Growth, longevity. Foraging Ecology and Diet. Feeding and prey selection. Population Structure and Dynamics. Space and temporal activity patterns. Territoriality and aggression Locomotion and Movements. Behavioral Ecology Communication and Social Behavior Competition, Predation, and Community Organization. Predation and anti-predator mechanisms. Defense Mechanisms and Escape. Orientation and Migration. Green turtle as a model object. Energetics in "cold-blood"

world. Terminology, methodology. Advantages and disadvantages of poikilothermic animals. Metabolism. Physiological Ecology. Thermoregulation and Performance Water Balance and Gas Exchange, Geographical Ecology and biogeography. Conservation Biology. Influence of Man on Amphibian and Reptile Populations. Rare and endangered species. Regional Red Books. Terrarium. Fauna and ecology of herptiles in Republic of Bashkortostan.

BIO2.62.6011 Ornithology 2 Credits

Classification, structure, behavior and distribution of birds (zoogeography) wild type, migratory and endemic. Emphasis is placed on the birds found in Indonesia, especially those related to human life

BIO2.62.6012 Ethnobotany 2 Credits

This course discusses various uses of plants that characterize certain ethnic/racial traits in various parts of the world. Plants as traditional medicine or used as certain tools.

BIO2.62.6013 Population Genetics 2 Credits

Definition of Population Genetics and its Models. Individual distribution patterns (Static and Dynamic). Measuring and detecting genetic variation by means of classical techniques and electrophoresis techniques. Hardy Weingberg Equilibrium. Migration. Mating Pattern. Inbreeding and its Opportunities. Mutation. Selection. Genetic Load Theory. Fitness Population Measurement Business. Interspecific and Intraspecific Competitions.

BIO2.62.6014 Teratology 2 Credits

Theories and concepts of developmental disorders that occur starting from the level of organogenesis, which are influenced by hormones and induction of differentiation and grow with developmental disorders caused by various teratogenic compounds.

BIO2.62.6015 Physiology of Plant Stress 2 Credits

This course discusses the physiological response of plants to the stress they receive, either naturally or artificially

BIO2.62.6016 Immunology 2 Credits

This course discusses how an immunity is formed as a natural or artificial response to certain diseases

BIO2.62.6017 Hydroponics 2 Credits

This course discusses how a plant can grow in water media enriched with micro and macro nutrients, as well as the accompanying physiological aspects.

BIO2.62.6018 Natural Resources Conservation 2 Credits

This course discusses various efforts for the conservation of various natural resources so that they can be used sustainably from an ecological aspect.

BIO2.62.6019 Palynology 2 Credits

This course discusses various pollen structures as adaptations of plants to natural reproduction strategies

BIO2.62.6020 Microbial Genetics 2 Credits

This course discusses gene structure and inheritance patterns in microbes

BIO2.62.7001 Industrial Microbiology 2 Credits

This course provides insight into industrial processes that are supported by physiological activities of microbes as fermenters to improve product quality

BIO2.62.7002 Microbiology of Foodstuffs 2 Credits

Students are able to understand the relationship between microbes and food in realizing healthy food. - Students are able to carry out scientific activities related to microbes that play a role in producing healthy food. - Students are able to identify the types of microbes that play a role in food ingredients. - Students are able to apply the limits of food sanitation treatment in realizing healthy and quality food. Students understand the basic concepts of food microbiology, and understand the relationship between microbes and food in realizing quality food products. Soft skills/Character: Able to be a solid person, have a noble character, be wise, and dignified and be a role model

BIO2.62.7003 Environmental Toxicology 2 Credits

This course is able to use and master for analysis to determine the impact of toxicology from the tissue level to the environmental level, Able to design and determine a research on LC50 from a natural and synthetic pollution able to utilize science and technology in the field of Toxicology starting from analyzing the impact of cellular toxins to the level of organism

BIO2.62.7004 Animal Tissue Culture 2 Credits

This course discusses the history and culture of the development of animal tissue culture including embryonic stem cells/stem cell culture and *Adult Stem Cells* /Adult Cell Culture. Lectures and practicums are carried out so that students have the knowledge and skills to prepare for the Laboratory and have the skills and initial/mediational culture and sub-cultures (*cell lineage*)

BIO2.62.7005 Bioethics 2 Credits

The learning outcomes in this course are: Able to master and apply ethics in the field of biology including animal welfare treatment, especially test animals in the laboratory, ethics for handling biological waste, environmental ethics and scientific ethics in the field of biology.

BIO2.62.7006 Parasitology 2 Credits

Students can know and understand the basic concepts of parasitology which include life, definition and distribution of parasites, as well as the principles of parasitology. Parasite relationship with host (*host*) and their interplay, understanding parasites, parasitism, parasitic animals, vectors, hosts, and their relationship to humans, as well as their prevention and treatment. Soft skills/Character: Able to recognize and understand parasitology which includes life, carry out effective communication in analyzing and knowing the distribution of parasites, as well as the principles of parasitology. Parasite relationship with host (*host*) and their interplay, and their relationship to humans, as well as their prevention and treatment.

BIO2.62.7007 Entomology 2 Credits

This course discusses entomology in general; basic concepts of entomology in biology and their importance; insect phylogenetic relationship

with other groups in the phylum Arthropod; structure and function of external organs; growth and development of insects; insect adaptation and diversity; classification, nomenclature and characteristics of insect life; insect collection and preservation techniques

BIO2.62.7008 Mammology 2 Credits

Discusses the taxonomic principles of mammals, morphology, structure and their relationship to each other. Then what is the function of its existence in nature, its ecology, the form of adaptation and the rules so that it survives in nature?

BIO2.62.7009 Plant Metabolism 2 Credits

Students are able to utilize science and technology in the field of plant physiology ecology and are able to adapt to situations encountered in solving problems. *Soft Skills*/character : After following the learning process of the Plant Physiology Ecology course, it is expected to produce students who believe and are devoted to Allah SWT, care for the environment, are honest, responsible, have noble character, are introspective, intelligent, skilled, sensitive and empathetic, critical, think rationally, dynamically, get along and understand the actual problems that occur in plants

BIO2.62.7010 Plant Specimen Collection and Management 2 Credits

Introduction, collection of plants, purpose of collection, exportation, expedition to prepare botanical expeditions, processing of collections into herbarium specimens, herbarium, management of specimens in herbarium, herbarium study techniques

BIO2.62.7011 Medical Microbiology 2 Credits

This course discusses the role of microorganisms for human health and disease. The scope of microbes that will be discussed is in the realm of bacteriology and virology. This course will explain the introduction to medical microbiology, the principles of Koch's postulates, pathogenesis, virulent factors and the epidemiology of bacterial and viral infections, the body's defense mechanisms against infection, the principles of antimicrobial therapy, infection diagnosis techniques, vaccine development techniques, and antimicrobial compound development techniques.

BIO2.62.7012 Human Genetics 2 Credits

Human Genetics is an elective course that discusses the application of classical and molecular genetic studies in humans. This course discusses

about the development of human genetics, basic concepts about genes and chromosomes, genes, inheritance and human allelic disorder, human chromosomal abnormalities, blood types, population genetics, genetics and cancer, human genome *projects*, diagnosis of human genetic diseases, applications of genetic engineering, in human genetics, and genetic counseling

BIO2.62.7013 Plant Disease Control 2 Credits

This course discusses various ways of transmitting plant diseases by bacteria, viruses with vector intermediaries and natural handling efforts

BIO2.62.7014 Seed Structure 2 Credits

This course discusses the diversity of seed structures as a dispersal strategy for seed plants

BIO2.62.7015 Food and Nutrition 2 Credits

This course covers the relationship of nutrition to food and health, the function of food, grouping food and its nutritional content, food processing and its impact on health, calculating energy needs, determining nutritional status, nutritional problems in Indonesia from social and cultural aspects, and promoting balanced nutrition and designing research for nutrition and food development

BIO2.62.8001 Animal Specimen Collection and Management 2 Credits

This course discusses how to collect invertebrates and vertebrates in the field and their preservation techniques. Collected specimens are documented and archived in a catalog book

BIO2.62.8002 Plant Population Ecology 2 Credits

This course discusses the dynamics of plant populations in terms of ecology.

BIO2.62.8003 Metabolism of Nutrients 2 Credits

This lecture is about the use of substances or nutrients that enter the body and undergo mechanical and chemical changes so that they can be used by the body as nutrients for growth, development and defense.

Biology Education Study Program (S2)

1) Vision

To become a superior study program producing a master's degree in Biology Education that is professional, has character and is able to compete in the era of globalization based on faith and piety in 2020.

2) Mission

- a. Organizing superior education in the field of biology education professionally based on faith and piety.
- b. Organizing excellent research in the field of biology education with character based on faith and piety.
- c. Organizing excellent community service in the field of science and technology based on faith and piety.
- d. Produce master graduates in the field of biology education who are professional, characterized and based on faith and piety

3) Purpose

- a. Develop a professional biology education based on faith and piety through superior research.
- b. Apply and disseminate biology education to improve people's welfare.
- c. Preparing students to become members of the professional community in biology education based on faith and piety.
- d. To produce masters of biology education graduates who are professional, have character, have faith, are pious, and are able to solve social problems.

4) Graduate Competencies

a) Main Competencies

(1) Lecturer:

- (a) Develop concepts and theories to solve problems in biology education and develop the potential of individuals, groups, organizations, and communities
- (b) Able to work together and have high social sensitivity and concern for society and the environment
- (c) Able to produce actual research and get national or international recognition
- (d) Uphold law enforcement and have the spirit to put the interests of the nation and the wider community first.

(2) Researcher in Biology Education Sector:

- (a) Develop knowledge and methodologies in the field of biology education through research to produce innovative and tested works
- (b) Using biological sciences and biology education through an inter- or multidisciplinary approach to solve biology learning problems
- (c) Manage research whose results have the potential to be applied in solving problems in biology learning through an inter- or multidisciplinary approach and gain recognition in the form of scientific publications in accredited scientific journals both nationally and internationally

(3) Teacher:

- (a) Develop concepts and theories to be applied in biology learning and develop the potential of individuals, groups, organizations, and communities
- (b) Able to work together and have high social sensitivity and concern for society and the environment
- (c) Able to produce actual research and get national recognition
- (d) Uphold law enforcement and have the spirit to put the interests of the nation and society at large

(4) Widyaiswara:

- (a) Develop concepts and theories to be applied in biology learning and develop the potential of individuals, groups, organizations, and communities
- (b) Able to work together and have high social sensitivity and concern for society and the environment
- (c) Uphold law enforcement and have the spirit to put the interests of the nation and society at large
- (d) Manage research whose results have the potential to be applied in solving problems in the field of biology education through an inter- or multidisciplinary approach and gain recognition in the form of scientific publications in accredited scientific journals both nationally and internationally

(5) Biology Education Consultant:

- (a) Develop knowledge and methodologies in the field of biology education through research to produce innovative and tested works

- (b) Using biology education disciplines through inter- or multidisciplinary approaches to solve biology learning problems
- (c) Managing research whose results have the potential to be applied in solving human problems by using the discipline of psychology through an inter or multidisciplinary approach and gaining recognition in the form of scientific publications in accredited scientific journals both nationally and internationally

b) Special Competencies

(1) Lecturer:

Delivering concepts and theories of education and biological sciences in the process of teaching and scientific development

(2) Researcher in Biology Education Sector:

- (a) Mastering the concepts and theories of education and biological science
 (b) Able to study problems and their solutions in the context of biology education

(3) Teacher:

Able to link biological science concepts with character values in learning and apply various strategies in the learning process and scientific development

(4) Widyaiswara:

- (a) Conveying the concepts and theories of education and biological sciences in the process of teaching and scientific development
 (b) Able to relate the concept of biological science with character values in the teaching and scientific development process

5). Course Structure

Major : Biology
Study program : Biology Education (S2)

No	Code	Courses	SKS				Sem
			Quantity	T	P	L	
1). Ma ta Faculty Choice Lectures							
A. Choose 0 of 0 Credits							
<u>1</u>	<u>FMA2.80.2301</u>	Curriculum Development	2	<u>2</u>	<u>0</u>	<u>0</u>	2
<u>2</u>	<u>FMA2.80.3301</u>	Learning Design	2	<u>2</u>	<u>0</u>	<u>0</u>	3

No	Code	Courses	SKS				Sem
			Quantity	T	P	L	
Number of Credits			4	<u>4</u>	<u>0</u>	<u>0</u>	
2). Ma ta Study Program Compulsory Tuition							
A. Required							
<u>1</u>	<u>BIO1.82.1001</u>	Animal Cytotaxonomy	2	<u>2</u>	<u>0</u>	<u>0</u>	1
<u>2</u>	<u>BIO1.82.1002</u>	Plant Cytotaxonomy	2	<u>2</u>	<u>0</u>	<u>0</u>	1
<u>3</u>	<u>BIO1.82.1003</u>	Ecology and environment	2	<u>2</u>	<u>0</u>	<u>0</u>	1
<u>4</u>	<u>BIO1.82.1004</u>	Research methodology Continuing Education	3	3	0	0	1
<u>5</u>	<u>BIO1.82.1005</u>	Education Statistics	2	<u>2</u>	<u>0</u>	<u>0</u>	1
<u>6</u>	<u>BIO1.82.1006</u>	Biology Learning Methodology	3	3	0	0	1
<u>7</u>	<u>BIO1.82.202</u>	Physiology of Higher Plants	2	<u>2</u>	<u>0</u>	<u>0</u>	2
<u>8</u>	<u>BIO1.82.2003</u>	Physiology of Animal Behavior	2	<u>2</u>	<u>0</u>	<u>0</u>	2
<u>9</u>	<u>BIO1.82.2004</u>	Genetic and Reproductive Cell	2	<u>2</u>	<u>0</u>	<u>0</u>	2
<u>10</u>	<u>BIO1.82.2005</u>	and Molecular Biology	2	<u>2</u>	<u>0</u>	<u>0</u>	2
<u>11</u>	<u>BIO1.82.2006</u>	Learning Evaluation Biology	3	3	0	0	2
<u>12</u>	<u>BIO1.82.3001</u>	Applied microbiology	2	<u>2</u>	<u>0</u>	<u>0</u>	3
<u>13</u>	<u>BIO1.82.3002</u>	Applied Biotechnology	2	<u>2</u>	<u>0</u>	<u>0</u>	3
<u>14</u>	<u>BIO1.82.3003</u>	Science phylosophy	2	<u>2</u>	<u>0</u>	<u>0</u>	3
<u>15</u>	<u>BIO1.82.3004</u>	Educational Science Foundation	3	<u>3</u>	<u>0</u>	<u>0</u>	3
Number of Credits			<u>34</u>	<u>34</u>	<u>0</u>	<u>0</u>	
B. Final Project/Thesis							
<u>1</u>	<u>BIO1.82.3005</u>	Proposal seminar	1	<u>1</u>	<u>0</u>	<u>0</u>	3
<u>2</u>	<u>BIO1.82.4001</u>	Research Results Seminar	1	<u>1</u>	<u>0</u>	<u>0</u>	4
<u>3</u>	<u>BIO1.82.4002</u>	Thesis	6	<u>6</u>	<u>0</u>	<u>0</u>	4
Number of Credits			8	<u>8</u>	<u>0</u>	<u>0</u>	
3). Study Program Elective Courses							
A. Choose 6 of 8 Credits							
<u>1</u>	<u>BIO2.82.2001</u>	Learning Media Interactive	2	<u>2</u>	<u>0</u>	<u>0</u>	2
<u>2</u>	<u>BIO2.82.2002</u>	Classroom action research	2	<u>2</u>	<u>0</u>	<u>0</u>	2
Number of Credits			4	<u>4</u>	<u>0</u>	<u>0</u>	

Synopsis

FMA2.80.2301 Curriculum Development 2 Credits

Many things related to the curriculum are generic in nature, which applies to all fields of study, levels, pathways and types of education. Therefore, this course is designed to provide basic knowledge about curriculum that applies to all fields of study, levels and "settings" education. This consideration is based on the assumption that postgraduate students, especially in the field of education, need to master in general and thoroughly various conceptions of the curriculum, basics and principles development, and implication to design curriculum, implementation of the lectures from the various available alternatives

FMA2.80.3301 Learning Design 2 Credits

Discusses the basic concepts of instructional system design, learning needs, analysis instructional, formulation of instructional objectives, characteristics of students environment, learning activities, resources and lessons, management learning and the existence of evaluation in terms of learning design

BIO1.82.1001 Animal Cytotaxonomy 2 Credits

This course discusses the principle of classifying invertebrates and vertebrates morphologically and molecularly, and making the correct order of animal taxa based on existing manuals.

BIO1.82.1002 Plant Cytotaxonomy 2 Credits

This course discusses the principles of morphological and molecular grouping of lower and higher plants, as well as making the correct order of plant taxa.

BIO1.82.1003 Ecology and environment 2 Credits

This course discusses the interaction of living things with the biotic and abiotic environment.

BIO1.82.1004 Research Methodology for Advanced Education 3 Credits

This course discusses tips for formulating research ideas, making research designs and communicating ideas effectively

BIO1.82.1005 Education Statistics 2 Credits

This course discusses how to process data and present research data.

BIO1.82.1006 Biology Learning Methodology 3 Credits

This course discusses the basic skills of teachers, teacher and lecturer competencies, various approaches, methods and learning models.

BIO1.82.2002 Physiology of Higher Plants 2 Credits

This course discusses the structure, function and physiological processes of higher plants and the physical and chemical environmental factors that support plant physiology processes.

BIO1.82.2003 Animal Behavioral Physiology 2 Credits

This course discusses cell communication and animal responses to intracellular and extracellular signals

BIO1.82.2004 Genetics and Reproduction 2 Credits

This course discusses classical genetics, molecular genetics, gene mutations, chromosomal mutations, cancer and inheritance to the next generation through sexual and asexual reproduction processes.

BIO1.82.2005 Cell and Molecular Biology 2 Credits

This course discusses the structure, function and molecular mechanisms of cells.

BIO1.82.2006 Evaluation of Biology Learning 3 Credits

This course discusses the concept of evaluation, assessment in the cognitive, affective and psychomotor domains. Assessment according to Bloom's taxonomy, assessment according to PISA and TIMSS standards.

BIO1.82.3001 Applied Microbiology 2 Credits

This course discusses the basic concepts of microbiology and the application of microbes in life

BIO1.82.3002 Applied Biotechnology 2 Credits

This course discusses conventional and modern biotechnology and the application of biotechnology on a small scale and large scale.

BIO1.82.3003 Philosophy of Science 2 Credits

This course discusses the nature of thinking ontology, epistemology and axiology; application of the concept of philosophy of science in thinking

science; and the application of the philosophy of science in everyday life.

BIO1.82.3004 Educational Science Foundation 3 Credits

This course discusses the nature of education from the aspects of ontology, epistemology and axiology and learning theories.

BIO1.82.3005 Seminar proposal 1 credit

This course provides opportunities for students to formulate research problems, determine solutions to research problems and communicate in an effective written form.

BIO1.82.4001 Research Results Seminar 1 Credit

This course provides an opportunity for students to write research results and communicate openly

BIO1.82.4002 Thesis 6 Credits

This course gives students the opportunity to defend their research results in front of the examiner lecturer.

BIO2.82.2001 Interactive Learning Media 2 Credits

This course discusses how to create learning media, develop teaching materials and practical activities

BIO2.82.2002 Action Research Class 2 Credits

This course aims to develop teacher skills in finding problems, finding solutions and realizing it in the form of classroom action research

3. Physics Department

a. Vision

Realizing the Superior Department in Education and Physical Sciences at the National Level in 2020 based on Faith and Taqwa. The mission of the Department of Physics, FMIPA UNP, is to:

- 1) Implementing Excellent Education in the Field of Education and Physics Based on Faith and Taqwa
- 2) Conducting Excellent Research in Education and Physical Sciences.
- 3) Implement Excellent Community Service in the Field of Education and Physical Science.
- 4) Improving the Excellent Management of the Department
- 5) Increase Local, National and International Cooperation

b. Destination

The objectives of the Physics Department of the Faculty of Mathematics and Natural Sciences UNP are:

Prepare graduates who are reliable, qualified, have competitive and comparative advantages at the local, national and regional levels.

c. Study program

Based on the letter of the Director General of Higher Education No. 1499/D/T/1996 regarding the expansion of the mandate, IKIP Padang starts the academic year 1997/1998 in addition to its main task of fostering educational programs, gradually also fostering non-educational programs. Starting on August 4, 1999 IKIP Padang changed its name to Padang State University. Since then the Department of Physics Education has changed to the Department of Physics by fostering two study programs, namely the Physics Education Study Program and the Physics Education Study Program. Physics Study Program.

d. Study Load

To complete undergraduate education in the Department of Physics, students are required to have passed courses of at least 149 credits. For the Physics Education Study Program, general courses are 11 credits, field of expertise courses are 92 credits, basic education courses are 12 credits, learning process skills courses are 18 credits, and education development courses are 16 credits. The Physics Study Program consists of 11 credits of general courses, 78 credits of expertise, 42 credits of creative skills, and 18 credits of creative behavior.

1. Study Program: Physics Education (S1)

1) Vision

In 2020, a Bachelor Study Program that excels in the field of Physics education at the national level based on faith and piety

2) Mission

- a) Improving the quality of education and learning-oriented on technological excellence and religious character (M1)
- b) Increase productivity in research activities oriented to technological developments and character values (M2)
- c) Increase productivity in Community Service activities that are oriented towards the development of science and technology and character development in the community (M3)
- d) Improving the quality of study program governance that is effective and efficient through optimizing the use of information technology (M4)
- e) Increase cooperation with related institutions, both local, national and international (M5)

3) Purpose

The realization of the excellence of the study program in terms of quality and the relevance of the program to the achievement of the Tridharma of Higher Education, which produces graduates of Physics Education who are professional, have the ability in science and technology and superior learning innovation, and are able to compete at local, national and regional levels based on faith and piety"

These objectives can be broken down as follows:

- a) Related to M1: The implementation of education and learning that is oriented towards technological excellence and religious character.
- b) Related to M2: Increased productivity in research activities oriented to technological developments and character values.
- c) Related to M3: Increased productivity in Community Service activities that are oriented towards the development of science and technology and character development in the community.
- d) Related to M4: Increasing the quality of study program management that is effective and efficient through optimizing the use of information technology
- e) Related to M5: Increased cooperation with relevant agencies, both local, national and international.

4) Learning Outcomes of Graduates of the Attitude Study

Program

- a. fear God Almighty and be able to show a religious attitude;
- b. upholding human values in carrying out tasks based on religion, morals, and ethics;
- c. contribute to improving the quality of life in society, nation, state, and the progress of civilization based on Pancasila;
- d. act as citizens who are proud and love their homeland, have nationalism and a sense of responsibility to the state and nation;
- e. respect the diversity of cultures, views, religions, and beliefs, as well as the opinions or original findings of others;
- f. cooperate and have social sensitivity and concern for society and the environment;
- g. obey the law and discipline in the life of society and the state;
- h. internalize academic values, norms, and ethics;
- i. demonstrate an attitude of responsibility for work in the field of expertise independently;
- j. internalize the spirit of independence, struggle, and entrepreneurship; and
- k. have sincerity, commitment, sincerity to develop the attitudes, values, and abilities of students based on the values of local wisdom and noble character and have the motivation to act for the benefit of students and society in general

Knowledge

In the substance of the scientific field

- a. the theoretical concepts of classical and modern (quantum) physics in general;
- b. general concepts, principles, and applications of mathematics, computation, and instrumentation physics;
- c. complete operational knowledge of functions, how to operate general and specific physics instrumentation for the learning process
- d. principles, characteristics, functions, and applications of software in the field of physics.

In educational substance

- a. physics education research methodology;
- b. laboratory management for physics learning

c. the theoretical concept of education, the development of students (physical, intellectual, socio-emotional, moral, spiritual, and socio-cultural background aspects) in general;

d. theoretical concepts, principles, methods, and techniques:

1) Physics Learning (*Physics teaching pedagogy*) in depth which includes: planning, presentation, and management of learning (curriculum, learning resources, media, and learning models), as well as assessment and evaluation of Physics learning processes and outcomes;

2) Development of Physics learning media;

3) Development of Physics laboratory equipment for schools

e. general concepts and management principles (planning, operation, supervision, evaluation, and improvement) of school physics laboratories

f. general concepts, principles, and techniques for mentoring students

g. general concepts and methods of educational research in the field of Physics

Special skill

In the substance of the scientific field:

a. able to make physics learning tools independently according to the needs of users, both schools and the general public by using scientific principles and principles of instructional design;

b. able to make high school physics learning tools through subject matter analysis (*pedagogical content knowledge*) independently in accordance with the applicable curriculum, principles of instructional design, scientific approach, utilizing science and technology, and the surrounding environment;

c. able to analyze problems, find sources of problems, and solve physics instrumentation problems in the physics learning process and physics laboratory management problems in accordance with the rules of physics science.

d. Able to analyze and propose various alternative solutions to physics learning media problems and physics laboratory management problems, as well as conclude them for making the right decisions

e. able to improve the quality, effectiveness, and efficiency of physics learning devices independently by using scientific principles and principles of innovation;

f. able to promote the importance of learning physics for students, parents, and the general public by using the media

conventional or up-to-date communication that is effective and relevant to the target.

In educational substance:

a. able to carry out high school physics learning with scientific approach in accordance with the characteristics of the material and the characteristics of students in order to be able to develop the ability to think and behave scientifically;

b. able to plan and manage resources in classroom administration and use of laboratories for learning Physics

c. able to carry out assessment and evaluation activities of learning processes and outcomes that are valid, reliable, objective, and practical (according to the characteristics of Physics learning) which include:

1) determination of aspects of the learning process and outcomes that are important to be assessed and evaluated;

2) determination of procedures in accordance with the objectives of the assessment and evaluation;

3) development of assessment and evaluation techniques and instruments;

4) implementation of evaluation according to the specified procedures, techniques, and instruments

5) implementation of the assessment moderation process;

6) analysis of the results of the assessment process and learning outcomes for various purposes;

7) administration of continuous assessment of learning processes and outcomes;

d. able to perform reflective analysis of learning (through observation and feedback from students, parents of students and colleagues) to improve the quality of learning;

e. able to conduct classroom action research (*action research*) with a quantitative and/or qualitative approach to solve physics learning problems and report research results in the form of scientific articles;

f. able to provide assistance to students by considering socio-cultural aspects, as well as collaborating with related parties (parents and friends of students, the surrounding community, and peer teachers); and

General Skills

- able to apply logical, critical, systematic, and innovative thinking in the context of the development or implementation of science and technology that pays attention to and applies humanities values in accordance with their field of expertise;
- able to demonstrate independent, quality, and measurable performance;
- able to examine the implications of the development or implementation of science and technology that pays attention to and applies humanities values according to their expertise based on scientific principles, procedures and ethics in order to produce solutions, ideas, designs or art criticism;
- able to compile a scientific description of the results of the studies mentioned above in the form of a thesis or final project report, and upload it on the university's website;
- able to make appropriate decisions in the context of solving problems in their area of expertise, based on the results of information and data analysis;
- able to maintain and develop a network with supervisors, colleagues, peers both inside and outside the institution;
- able to be responsible for the achievement of group work results and to supervise and evaluate the completion of the work assigned to the workers under their responsibility;
- able to carry out the process of self-evaluation of the working group under their responsibility, and able to manage learning independently; and
- able to document, store, secure, and rediscover data to ensure validity and prevent plagiarism.

5). Course Structure

Major : Physics
Study program : Physics Education (S1)

No	Code	Courses	SKS				Sem
			Quantity	T	P	L	
1). Ma ta University Compulsory Tuition							
A.Required							
<u>1</u>	<u>UNP1.60.1401</u>	Religious education	3	<u>3</u>	<u>0</u>	<u>0</u>	1
<u>2</u>	<u>UNP1.60.1402</u>	Pancasila Education	2	<u>2</u>	<u>0</u>	<u>0</u>	1

No	Code	Courses	SKS				Sem
			Quantity	T	PL		
3	UNP1.60.1403	Education Citizenship	2	2	0	0	1
<u>4</u>	<u>UNP1.60.1404</u>	Indonesian	2	<u>2</u>	<u>0</u>	<u>0</u>	1
<u>5</u>	<u>UNP1.60.1405</u>	English	2	<u>2</u>	<u>0</u>	<u>0</u>	1
<u>6</u>	<u>UNP1.60.3101</u>	Entrepreneurship	3	<u>3</u>	<u>0</u>	<u>0</u>	3
<u>7</u>	<u>UNP1.60.7401</u>	Real Work Lecture (KKN)	2	<u>2</u>	<u>0</u>	<u>0</u>	7
<u>8</u>	<u>UNP1.61.1201</u>	Educational Science Fundamentals	2	<u>2</u>	<u>0</u>	<u>0</u>	1
<u>9</u>	<u>UNP1.61.2101</u>	Educational Psychology	2	<u>2</u>	<u>0</u>	<u>0</u>	2
10	UNP1.61.2102	Education Administration And Supervision	2	2	0	0	2
11	UNP1.61.2103	Philosophy of Education	2	<u>2</u>	<u>0</u>	<u>0</u>	2
12	UNP1.61.3102	Field Introduction I School	1	0	0	1	3
<u>13</u>	<u>UNP1.61.4201</u>	Guidance and counseling	2	<u>2</u>	<u>0</u>	<u>0</u>	4
14	UNP1.61.6402	Field Introduction School II	3	0	0	3	6
Number of Credits			30	26	0	4	
2). University Elective Courses							
A.Choose 2 of 18							
<u>1</u>	<u>UNP2.60.1401</u>	Basic Natural Science	2	<u>2</u>	<u>0</u>	<u>0</u>	1
<u>2</u>	<u>UNP2.60.1402</u>	Basic Socio-Cultural Sciences	2	<u>2</u>	<u>0</u>	<u>0</u>	1
3	UNP2.60.2101	Fitness Education Physical	2	2	0	0	2
<u>4</u>	<u>UNP2.60/2102</u>	Japanese language	2	<u>2</u>	<u>0</u>	<u>0</u>	2
<u>5</u>	<u>UNP2.60.2103</u>	Multicultural Education	2	<u>2</u>	<u>0</u>	<u>0</u>	2
6	UNP2.60/2401	History of the Indonesian Nation's Struggle	2	2	0	0	2
<u>7</u>	<u>UNP2.60/2402</u>	Disaster Management	2	<u>2</u>	<u>0</u>	<u>0</u>	2
<u>8</u>	<u>UNP2.60.3401</u>	Natural Culture MinangKabau	2	<u>2</u>	<u>0</u>	<u>0</u>	3
9	UNP2.60.3402	Information and communication technology	2	0	2	0	3
Number of Credits			18	16	2	0	

No	Code	Courses	Quantity	SKS			Sem
				T	PL		
3). Ma ta Faculty Compulsory Lecture							
A.Required							
<u>1</u>	FMA1.60.1302	Calculus	4	3	1	0	1
<u>2</u>	FMA1.60.1303	General Physics	4	3	1	0	1
<u>3</u>	FMA1.60.2102	General biology	4	3	1	0	2
<u>4</u>	FMA1.60.2103	General Chemistry	4	3	1	0	2
Number of Credits			16	12	4	0	
B.Choose 91 of 91 credits of compulsory study program							
<u>1</u>	FIS1.61.2301	Basic Physics	4	3	1	0	2
Number of Credits			4	3	1	0	
4). Study Program Compulsory Courses							
A.Choose 91 of 91 credits of compulsory study program							
<u>1</u>	FIS1.61.1301	Physics Education Statistics	3	3	0	0	1
<u>2</u>	FIS1.61.1302	Electronic and Measurement Instruments	3	2	1	0	1
<u>3</u>	FIS1.61.2302	Math Physics 1	3	3	0	0	2
<u>4</u>	FIS1.61.3201	Basic Electronics Physics	3	3	0	0	3
<u>5</u>	FIS1.61.3302	Learning Strategy 1	3	2	1	0	3
<u>6</u>	FIS1.61.3303	Mechanics	3	2	1	0	3
<u>7</u>	FIS1.61.3304	Middle School Physics Curriculum	3	3	0	0	3
<u>8</u>	FIS1.61.3305	Learning Evaluation Physics	3	3	0	0	3
<u>9</u>	FIS1.61.3306	Math Physics 2	3	3	0	0	3
<u>10</u>	FIS1.61.4201	High School/MA Physics Analysis Class X	3	3	0	0	4
<u>11</u>	FIS1.61.4302	Basic Electronics 2	3	2	1	0	4
<u>12</u>	FIS1.61.4303	Algorithms and Computer Programming	3	2	1	0	4
<u>13</u>	FIS1.61.4304	Electric and Magnet	3	2	1	0	4
<u>14</u>	FIS1.61.4305	Physics Learning Media	3	3	0	0	4

No	Code	Courses	Quantity	SKS			Sem
				T	PL		
15	FIS1.61.4306	Physics Learning Technology Based and Disaster	2	1	1	0	4
<u>16</u>	FIS1.61.5101	Modern Physics	3	3	0	0	5
17	FIS1.61.5201	High School/MA Physics Analysis Class XI	3	3	0	0	5
<u>18</u>	FIS1.61.5301	Waves and Optics	3	2	1	0	5
19	FIS1.61.5302	Physics Lesson Planning	3	3	0	0	5
20	FIS1.61.5303	English For Physical education	2	2	0	0	5
<u>21</u>	FIS1.61.5401	Thermodynamics	3	2	1	0	5
22	FIS1.61.6201	High School/MA Physics Analysis Class XII	3	3	0	0	6
<u>23</u>	FIS1.61.6301	Statistical Physics	3	3	0	0	6
<u>24</u>	FIS1.61.6302	Quantum Physics	3	3	0	0	6
<u>25</u>	FIS1.61.6303	Core Physics	3	3	0	0	6
26	FIS1.61.6305	Research Methodology and Publication	3	2	1	0	6
<u>27</u>	FIS1.61.6307	Micro Learning	2	0	2	0	6
<u>28</u>	FIS1.61.7201	Solid Physics	3	3	0	0	7
Number of Credits			81	69	12	0	
B.P pick 91 of 91 SK S Compulsory Courses for Study Program							
<u>1</u>	FIS1.61.8302	Thesis	6	0	0	6	8
Number of Credits			6	0	0	6	
5). Study Program Elective Courses							
A.Choose 8 Credits from 30 Credits							
<u>1</u>	FIS2.61.5301	Earth and Space Science	2	2	0	0	5
<u>2</u>	FIS2.61.5302	Philosophy of Science	2	2	0	0	5
<u>3</u>	FIS2.61.5401	History of Physics	2	2	0	0	5
<u>4</u>	FIS2.61.6201	Photography	2	1	1	0	6
<u>5</u>	FIS2.61.6302	Environmental Physics	2	1	0	1	6

No	Code	Courses	Quantity	SKS			Sem
				T	PL		
6	FIS2.61.6303	Applied physics	2	1	0	1	6
7	FIS2.61.7101	Electronic Equipment System	2	1	1	0	7
8	FIS2.61.7301	Application of Physics-Based	2	1	1	0	7
9	FIS2.61.7302	TTG Sensor Technology	2	1	0	1	7
10	FIS2.61.7303	Physics Learning Seminar	2	1	1	0	7
11	FIS2.61.7401	Renewable energy	2	1	0	1	7
12	FIS2.61.8201	Capita Selecta Physics Learning	2	1	1	0	8
13	FIS2.61.8301	Health Physics	2	1	0	1	8
14	FIS2.61.8302	Application Software for Science	2	1	1	0	8
15	FIS2.61.8303	Capita Selecta Physics	2	2	0	0	8
Number of Credits			30	19	6	5	

Synopsis

UNP1.60.1401 Religious Education 3 Credits

The One and Only Godhead: faith and piety, divine philosophy (Theology); Humans: human nature, human dignity, human responsibility; Law: raise awareness to obey God's law, the prophetic function of religion in law: Moral: religion as a source of morals, morals in life; Science, Technology and Arts: Faith, science and technology, and charity as a unit, the obligation to demand and practice knowledge, the responsibility of scientists and artists; inter-religious harmony: religion is God's grace for all, togetherness in religious plurality; Society: civilized and prosperous society, the role of religious communities in realizing a civilized and prosperous society, human rights and democracy; Culture: academic culture, work ethic, open and fair attitude; Politics: the contribution of religious adherents to political life,

UNP1.60.1402 Pancasila Education 2 Credits

This course contains the meaning of urgency and the reasons for its need

Pancasila education in Higher Education; Pancasila in the current history of the Indonesian nation; Pancasila as a philosophical system, as the basis of the state of the Republic of Indonesia, as a state ideology, as an ethical system, and Pancasila as the basis for the value of developing science; Thinking and implementing Pancasila in dealing with current actual problems, such as human rights, racial and economic problems, and the problem of radicalism that must be solved in accordance with the values of Pancasila.

UNP1.60.1403 Citizenship Education 2 Credits

This course contains the nature of civic education in developing full undergraduate or professional abilities; the essence and urgency of national identity as one of the determinants of nation building and character, the urgency of national integrity and national unity; the constitutional values and norms of the 1945 Constitution of the Republic of Indonesia and the constitutional provisions of the legislation under the Constitution; harmony of obligations and rights of the state and citizens in a democracy that is based on people's sovereignty and deliberation for consensus; the nature, instrumentation, and practice of Indonesian democracy based on Pancasila and the 1945 Constitution of the Republic of Indonesia; the historical dynamics of constitutional, socio-political, cultural, and contemporary contexts of sovereign law enforcement; the historical dynamics and the urgency of the insight into the archipelago as a collective conception and view of the Indonesian nationality in the context of world relations; national urgency and challenges and defend the country for Indonesia in building a collective commitment to nationality.

UNP1.60.1404 Indonesian 2 Credits

This course contains the Conception of Indonesian Language, History of Indonesian Language, Position and Functions of Indonesian Language, Indonesian Language Variety, Indonesian Spelling, (punctuation letters, words and absorption elements: Effective Sentences, Definition of Characteristics, Terms of Effective Sentences: Paragraphs Types, Functions and Developments: Writing Outline Theme, Topic, Title and Type of Outline: Writing Text (Scientific Academic Texts and Non-Academic Texts: BI Official Letters (Format and Types of Indonesian Official Letters.

UNP1.60.1405 English 2 Credits

This course contains the development of English language skills in an integrated manner by taking into account the needs of students according to their fields/ majors, including understanding basic sentence patterns that help students understand various English references and equip students with communication skills in English according to their needs.

area of expertise.

UNP1.61.1201 Fundamentals of Education 2 Credits

Provide insight into human nature, the nature and importance of education, the foundations and principles of education, thoughts about education

UNP1.61.2101 Educational Psychology 2 Credits

This course examines/discusses the basic concepts of educational psychology, growth, student development, intelligence, talent, creativity, motivation, memory, individual differences and learning theories.

UNP1.61.2102 Administration and Education Supervision 2 Credits

Educational Administration and Supervision courses are courses that provide insight, basic concepts and processes as well as the scope of Educational Administration and Supervision and apply them in professional school management.

UNP1.61.2103 Philosophy of Education 2 Credits

The Philosophy of Education course examines the nature of educational philosophy and its relation to religion, education and culture. Human nature as an educator (inner creative thinking). Streams of Educational Philosophy and their implementation and implications in the administration of education.

UNP1.60.3101 Entrepreneurship 3 Credits

This course contains knowledge, attitudes and skills based on creative and innovative thinking regarding the basic principles of entrepreneurship, entrepreneurial development models, entrepreneurial strategies, business ethics in entrepreneurship, opportunity analysis, business feasibility studies and business management (marketing, production, finance), resources, business legality, technology and information)

UNP1.61.3102 Introduction to School Field I 1 Credit S

Introduction to School Field I (PLP I) is the first stage in the Introduction to School Fields for the Bachelor of Education Program, which is carried out in the third or fourth semester. As a first stage,

after PLP I, it will be continued with Introduction to School Field II (PLP II) in the higher semester.

UNP1.61.4201 Guidance and Counseling 2 Credits

Guidance and Counseling is a compulsory university education course that provides insight and understanding of the basic concepts of BK, including; understanding, background, objectives, functions, principles, principles and code of conduct of BK, BK development fields, types of BK services, and BK protection activities as well as BK implementation operations in curriculum implementation 2013. In addition, it also discusses the role of the Principal, Deputy Principal, Subject Teachers, Class homeroom teachers, BK teachers or counselors and other personnel as well as BK Supervisors in BK services in schools.

UNP1.61.6402 Introduction to School Field II 3 Credits

Introduction to School Fields II (PLP II) is the second stage in the Introduction to School Fields for the Undergraduate Education Program which is carried out in the sixth or seventh semester. As an advanced stage of PLP I, PLP II is intended to strengthen academic competence in education and fields of study through various forms of activities in schools.

UNP1.60.7401 Real Work Lecture (KKN) 2 Credits

Real Work Lecture (KKN) is a field activity for students who are taking the final part of the S-1/D4/Applied Bachelor education program. This program is actually mandatory for all students, because the university believes that this program is able to encourage student empathy, and can contribute to solving problems that exist in society. Community service activities are a tangible form of the university's contribution to the community, industry, local government and community groups who want to be economically and socially independent. This KKN program requires Field Supervisors (DPL) and students to play an active role in knowing the existing problems, even before they plunge for 1 to 2.5 months in the midst of the community. Concept "working with community"

has replaced

concept "working for the community".

UNP2.60.1401 Basic Natural Sciences 2 Credits S

This course contains the nature and scope of the human mind and its development, the development of science, the earth and the universe

the diversity of living things and their distribution, living things in natural ecosystems, natural resources and the environment, the benefits and impacts of science and technology on social life, the history of human civilization and technological developments, some important technological developments, and environmental issues

UNP2.60.1402 Basic Socio-Cultural Sciences 2 Credits

This course contains: Basic concepts in social and cultural sciences to study Indonesian society and changes in Indonesian society and culture. The subjects are humans and human culture as individuals and human social beings, moral values and human law, human diversity and equality, science technology and human arts and the environment.

UNP2.60.2101 Physical Fitness Education 2 Credits

This course applies the effects and benefits of various movement activities for physical fitness and health through various games, competitions, and sports exercises and abilities.

analyze importance activity ^{physical} for maintain and develop the body's physiological functions and health and can be applied throughout life.

UNP2.60.2102 Japanese 2 Credits

Japanese language courses equip students with knowledge about Japanese language practice so that students have the ability to read and communicate using Japanese.

UNP2.60.2103 Multicultural Education 2 Credits

This multicultural education course contains the concept of multicultural education: the urgency of multicultural education in a diverse Indonesian society, building an inclusive diversity paradigm through educational institutions. prospects and constraints of multicultural implementation, implementation of multicultural education in Indonesia, as well as character building of students through the application of multicultural ideology in the field of education.

UNP2.60.2401 History of the Struggle of the Indonesian Nation 2 Credits

The National Struggle History course discusses the meaning and history of the nation's struggle, imperialism and colonialism, struggle

the Indonesian nation against imperialism and colonialism, the Indonesian national movement, the struggle for independence, the meaning of the proclamation of the effort to defend independence against various threats that threaten the unitary state of the Republic of Indonesia, the Republic of Indonesia

UNP2.60.2402 Disaster Management 2 Credits

This course refers to Law No. 24 of 2007 on Disaster Management (Disaster Management) which includes the introduction of facts or evidence of disaster events, introduction of the concept of disaster, types of disasters, characteristics of disasters, natural disasters, non-natural disasters, disasters social, vulnerable, disaster / hazard (hazard), potential hazard, vulnerability, (vulnerability), capacity, principle of risk reduction (risk), prevention, mitigation, preparedness, disaster prediction, disaster impact, disaster response procedures and emergency response, analysis of rehabilitation and reconstruction needs.

UNP2.60.3401 Minangkabau Natural Culture 2 Credits

This course contains material on Minangkabau customs, both objective and subjective. Through the study of objective and subjective customs, students are expected to be able to understand Minangkabau human identity and be able to find the values of progress contained in adat that are relevant to the challenges of 21st century competence, namely multiculturalism, cooperation, problem solving and so on.

UNP2.60.3402 Information and Communication Technology 2 Credits

This course learns about information and communication technology that can make daily work easier. Understanding usage "Office Applications" software, Internet Technology, Device usage learning animation development software, technology development and application use in education and being able to recognize internet-based business.

FMA1.60.1302 Calculus 4 Credits

This course discusses the real number system, equations and inequalities, absolute values and absolute inequalities, coordinate systems and simple graphs, functions, limits and continuity, derivatives, related rates, graphs, and integrals.

FMA1.60.1303 General Physics 4 Credit Points

This course discusses quantities and units, particle kinematics, particle dynamics, work and energy, linear momentum, angular momentum and rigid bodies, static fluids, dynamic fluids, concepts of temperature and heat, and the laws of thermodynamics.

FMA1.60.2102 General Biology 4 Credit Points

This course discusses the knowledge of living things and scientific methods, cells as the basis of life, metabolism, structure and organization of plant and animal bodies, biodiversity, structure, functions and processes in human organ systems, ecology, genetics and evolution and biotechnology.

FMA1.60.2103 General Chemistry 4 Credit Points

This course discusses Stoichiometry, Chemical Energetics, Atomic Structure, Periodic System of Elements, Chemical Bonds and Molecular Geometry, Forms of Matter and Chemical Equilibrium.

FIS1.61.1301 Physics Education Statistics 3 Credits

Physics education statistics course discusses basic concepts in statistics; center size, location size and deviation size; frequency distribution; opportunities; distribution of random variables; parameter estimation with normal distribution, inferential, t , c^2 and f ; hypothesis testing; analysis of variance; simple regression and correlation, non-parametric statistics, and statistical applications in solving physics education problems

FIS1.61.1302 Electronic and Measurement Instruments 3 Credits

Electronic instruments and measurement courses discuss the concepts of measurement and error, direct current meters, direct current bridges, alternating current meters, alternating current bridges, multimeters, oscilloscopes, electronic measuring instruments in Physics and Applications of Physics instruments in various fields.

FIS1.61.2301 Basic Physics 4 Credits

The basic physics course discusses the basic concepts of electricity, magnetism, vibration, waves, optics and modern physics.

FIS1.61.2302 Mathematics Physics 1 3 Credits

Mathematics physics course 1 discusses infinite series: convergent and divergent series, convergence test, alternating series, convergence interval, power series expansion, some uses in physics. complex numbers: complex algebra, Euler's formula, powers and complex roots, exponential functions, hyperbolic functions, trigonometric inverse and hyperbolic. fourier series: use of fourier series, average value, fourier coefficient, dirichlet condition, complex fourier series, even and odd functions, parseval theorem. linear equations and matrices : linear equations, matrices, determinants, cramer's rules, use in physics. vectors: understanding, lines and fields, vector multiplication, vector operators. double integral: double integral, variable change, line integral, green theorem, divergence theorem, stokes theorem.

FIS1.61.3302 Basic Electronics 1 3 Credit Points

Basic electronics course 1 discusses the basic laws of electricity (Ohm's law, Joule, Kirchhof and others), basic circuits using passive components and active components including: voltage divider circuits, current dividers, equivalent circuits, charging and discharging capacitors, circuits passive signal processors, RLC circuits, semiconductor diodes, rectifier and waveforming circuits, bipolar transistors and transistors as amplifiers

FIS1.61.3303 Mechanics 3 Credit Points

This course discusses the relationship between dimensions of mechanics and variables (scalars and vectors) in various mechanics concepts. Two- and three-dimensional kinematics about position vectors, velocity and acceleration, differential and integral applications in mechanical systems with Cartesian, polar, cylindrical and spherical coordinates. Particle dynamics are described through Newton's laws of motion, positional, velocity and time functions, Kepler's laws of orbit, motion of the central force, gravity, gravitational potential, equipotential forces & surfaces, and explain the phenomena of motion under the influence of gravitational force and gravitational potential. Analysis of linear and angular momentum, impulse, work and energy, laws of conservation of energy and momentum. Rigid body mechanics is described in terms of linear and angular momentum, linear and angular velocity, torque,

principal moment of inertia and principal axis, perpendicular axis theorem, some properties of inertia tensor. In Lagrange and Hamilton mechanics, general coordinates, general forces, kinetic and potential energies, Lagrange and Hamilton equations for various motion systems are described. Train skills about mechanical insight with practical work in the laboratory directly or through IT (virtual and tracker).

FIS1.61.3304 Middle School Physics Curriculum 3 Credits

The high school physics curriculum course discusses the definition of curriculum, curriculum characteristics, curriculum components, types and models of curriculum development, the nature of the 2013 curriculum, graduate competency standards (SKL), content standards, process standards, classroom-based assessment and authentic assessment. , character education, mapping skkd/ki-kd, integrated learning, designing semester and annual programs, syllabus, and determining the KKM for high school physics subjects.

FIS1.61.3201 Physics Learning Strategy 3 Credits

The physics learning strategy course discusses describing teacher educational insights, describing the characteristics of the 2013 curriculum, explaining the taxonomy of learning objectives in the cognitive, affective, and psychomotor domains, explaining the objectives and competency standards, discussing various learning theories that underlie learning strategies, discussing and apply learning strategies oriented to student and scientific activities as well as improving thinking skills in learning physics

FIS1.61.3305 Evaluation of Physics Learning 3 Credits

The physics learning evaluation course discusses the comparison of assessments, measurements and tests; Forms, types and techniques of assessment; Assessment functions and criteria; Implementation steps Management of assessment results, Utilization and reporting of class assessment results, validity, reliability, measurement bias; Good judgment principles; Designing assessments and assessment rubrics and conducting case studies so as to be able to conduct an assessment of those implemented in the field.

FIS1.61.3306 Mathematical Physics 2 3 Credits

Mathematics physics course 2 discusses partial differentials: maximum-minimum value problems, boundary conditions problems, variable changes,

leibniz's rule. calculus of variations: Euler's equation, Lagrange's equation. special functions: gamma function, stirling approximation formula, beta function, error function. solution of differential equations with series: power series method, legendre function, probenius method, bessel function, hermite function, leguerre polynomial. partial differential equations: application of the variable separation method to the laplace equation, wave equation, diffusion equation. complex variables: contour integrals, laurent series and remainder theorems, use of residual theorems on integrals. integral transformation: laplace transform, fourier transform

FIS1.61.4302 Basic Electronics 2 3 Credits

Basic electronics course 2 discusses voltage amplifier circuits, buffer circuits, DC coupled amplifier circuits, transistor switch circuits and applications, multivibrator circuits with transistors and applications, operational amplifier circuits and applications

FIS1.61.4303 Algorithm and Computer Programming 3 Credits

Algorithm and computer programming courses discuss the operating system of a number, programming algorithms in the form of flow diagrams, basic programming which includes the basics of the Pascal language, graphic programming, and animation of the basic concepts of physics problems.

FIS1.61.4304 Electricity and Magnetism 3 Credits

The electric-magnetic course discusses the concepts of electrostatics, special techniques for calculating potential, electrostatic fields in materials, magnetostatics, magnetostatic fields in materials, electrodynamics, the law of conservation, and Maxwell's equations and electromagnetic waves.

FIS1.61.4201 Physics Analysis SMA/MA Class X 3 Credits

The physics analysis course for SMA/MA Class X discusses the discussion of physics learning material for class X including: the nature of physics, scientific procedures, measurements, vectors, straight motion, parabolic motion, circular motion, Newton's laws of motion and about gravity, work and energy, impulses and momentum, as well as harmonious vibrations, according to the characteristics of the material and students' thinking process skills keterampilan

FIS1.61.4305 Physics Learning Media 3 Credits

Physics learning media course discusses the meaning and importance of learning media, the role of media in learning, the benefits of media in learning, classification of learning media, selection criteria

learning media, development of learning media, manufacture of simple learning aids, use and management of learning resources (laboratory, library and micro learning), concept of evaluation of learning media, ICT-based learning media, ICT-based learning media software: wordpress, jommla, moodle , etc., and strategies for using media in the physics learning process

FIS1.61.4306 Technology and Disaster Based Physics Learning 2 Credits

The technology and disaster-based physics learning course discusses the application of physics learning based on real and virtual laboratory experiments, the use of ICT in physics learning, the use of video analysis and modeling software in physics learning, and the integration of disaster materials into physics learning.

FIS1.61.5401 Thermodynamics 3 Credits

Basic Concepts of Thermodynamics, Temperature, Partial Differential, Equation of State, Conservation of Energy, Converting Heat to Work, Entropy, Enthalpy, Thermodynamic Potential

FIS1.61.5301 Wave and Optics 3 Credits

Optical waves course discusses harmonic vibrations, one-, two- and three-dimensional mechanical waves, sound waves, electromagnetic waves, modulation, polarization, interference, diffraction, lasers and holography.

FIS1.61.5101 Modern Physics 3 Credits

Modern physics courses discuss introduction to modern physics, special relativity theory, quantum phenomena, atomic structure, quantum theory of the hydrogen atom, many-electron atoms, and molecules.

FIS1.61.5201 Physics Analysis SMA/MA Class XI 3 Credits

The Physics Analysis course for SMA/MA Class XI discusses the discussion of physics learning material for class XI including: balance and rotational dynamics, elastic properties of materials, static fluids, fluid dynamics, heat and its effects, kinetic theory of gases, thermodynamics, mechanical waves, traveling waves and stationary, sound and light waves, optical instruments, global warming phenomena and their effects according to the characteristics

material and students' thinking process skills.

FIS1.61.5302 Physics Lesson Planning 3 Credits

The lesson planning course discusses the application of PBM concepts in learning physics in high school. Various instructional developments in the field of physics studies. Preparation of crime scenes and lesson unit programs (RPP, Teaching Materials, LKS). Different types of teaching skills to be trained in micro learning.

FIS1.61.5303 English for Physics Education 2 Credits

English course for physics education discusses reviewing english grammar, reviewing active english conversation, writing physics lesson plan in english, writing a simple physics teaching material, teaching physics in english

FIS1.61.6301 Statistical Physics 3 Credits

Statistical physics course discusses probability theory, gas kinetic theory, velocity and rate distribution functions, transport phenomena, maxwellboltzmann statistics, bose-einstein statistics, and fermi-dirac statistics

FIS1.61.6302 Quantum Physics 3 Credits

Quantum physics course discusses wave-particle dualism, the basics of quantum physics, general properties of solving the one-dimensional Schrodinger equation, angular momentum, time-independent perturbation method and identical particle systems.

FIS1.61.6303 Core Physics 3 Credits

Core physics courses discuss the structure of the nucleus, nuclear properties, radioactivity, radiation detectors, alpha, beta and gamma decay; radiation protection; core reactions, core styles and models; fission, nuclear power plants, particle accelerators and elementary particles

FIS1.61.6201 Physics Analysis SMA/MA Class XII 3 Credits

The physics analysis course for SMA/MA Class XII discusses the discussion of physics learning material for class XII including: static electricity, direct current circuits, magnetic fields, electromagnetic induction, circuits

alternating current, electromagnetic radiation, special relativity theory, quantum concepts and phenomena, atomic nuclei, energy sources and digital technology, according to the material characteristics and thinking process skills of students

FIS1.61.6305 Research Methodology and Publication 3 Credits

The research methodology course discusses approaches in obtaining the truth of science and research, research methods and designs, research processes and steps, the role of statistics in research, scientific writing, preparation and presentation of mini proposals, scientific papers, techniques for writing scientific articles for journals.

FIS1.61.6307 Micro Learning 2 Credits

Micro learning courses discuss introduction, practice of opening and closing learning skills, practice of explaining skills, practice of basic and advanced questioning skills, practice of skills to provide reinforcement, practice of skills in conducting variations, practice of skills in managing classes and small groups, practice of skills in applying variations of learning methods , practice the skills of applying the learning model.

FIS1.61.7201 Physics of Solids 3 Credit Points

Solid matter physics course discusses X-ray diffraction methods, crystal bonds, lattice vibrations, heat capacity, free electron theory, energy band theory and semiconductor crystals.

FIS1.61.8302 Thesis 6 Credits

Submission of research proposal outlines to the head of study programs, acceptance of research proposal outlines, determination of supervisors 1 and 2, research proposal writing, research proposal seminars, research proposal refinement, research implementation in schools, research report preparation, thesis examination, research report improvement, and article writing for ejournal

FIS2.61.5401 History of Physics 2 Credits

The history of physics course discusses the characteristics of the historical period of physics and analyzes the development of physics in ancient times, before the renaissance

in Europe, the development of classical physics, the development of several branches of physics in the 18th and 19th centuries, the development of physics in the industrial revolution and the development of modern physics.

FIS2.61.5301 Earth and Space Science 2 Credits

In general, knowledge of earth and space includes the lithosphere, hydrosphere, atmosphere and the basics of climatology and the composition of the solar system, stars, celestial spheres, the universe and flight into space, including the use of artificial satellites.

FIS2.61.5302 Philosophy of Science 2 Credits

Science philosophy course discusses the study of philosophy and natural sciences

FIS2.61.6302 Environmental Physics 2 Credits

Environmental physics course discusses the composition of the air, temperature, pressure, humidity and its influence on life, and then relates to weather elements and their measurements. Water on earth: evaporation, water flow, hydrological cycle and ocean currents. Earth with its structure and its relation to earthquakes. Soil structure and basic mineralogy. The sun and energy: the structure of the sun, the strength of the sun's rays, the absorption of energy and the energy cycle. Physical isolation: mechanical, vibration isolation sound, light. Pollution: air, water, soil. Problems with the use of electricity, electromagnetic waves and radioactive materials.

FIS2.61.6201 Photography 2 Credits

Photography course discusses the definition of photography, the use of photography, three steps in the photography process, making business card frames, basic theory and types of cameras based on their shots, five important components of a camera, how to use a camera, steps to take pictures and carry out shooting in a nature studio. , film and paper developer and make it, fixer film and paper and make it, how to wash film and practice washing black and white film, how to print and enlarge photos with enlarger and practice, photographing in a mini studio using flash and umbrella light, panning, freezing, blurring, landscape, how to take photos in a mini studio, how to print passport photos, and basics – basics in photo editing

FIS2.61.6303 Applied Physics 2 Credits

Applied physics courses discuss the application of physics concepts in Industrial Physics, Medical Physics, Reactor Physics and Energy Physics, including Solid State Devices in Industrial Logic Circuits, Photoelectronics, Fiber Optic and Lasers, Power Supply, Inverters and Converters, Open Loop and Closed Loop Feedback System, Electronic Input Output Devices, DC and AC Motors. Physical aspects of muscles and their measurements, physical aspects of the lungs, cardiovascular and their measurements, signal propagation in nerve cells and their measurements, physical aspects of ear and hearing and their measurements, physical aspects of the eye and vision and their measurements, bioenergetics, interaction of radiation with matter, transfer processes energy, Energy deposition and radiation dose calculation, Some physical, chemical, biological processes related to radiation and its effects,

FIS2.61.7401 Renewable Energy 2 Credits

The renewable energy course discusses describing energy sources that can be used to replace fossil fuels with little impact on the environment. Types of alternative energy (solar energy, water energy, biological energy, biomass energy), as well as studying alternative energy conversion systems and their utilization.

FIS2.61.7101 Electronic Equipment System 2 Credits

The electronic equipment system course discusses the electronic equipment system used in everyday life. Understand simple electronic circuits and repairs contained in television systems, computers and networks. Besides that, it also discusses semiconductor components in TV receivers, TV wave receiver methods, computer assembly, I / O systems and computer operating system installations.

FIS2.61.7301 Application of Sensor Technology 2 Credits

The application of sensor technology course discusses sensor systems in measuring physical quantities, knowing the types of sensors, working principles of sensors, sensor characteristics, the principle of converting mechanical quantities to electrical quantities on sensors, as well as their application and use in electronic systems.

FIS2.61.7302 Physics-Based TTG 2 Credits

Physics-based TTG course discusses the technology used

to improve the quality of human life. The study of physical processes on appropriate technology in various types of needs of human life, increasing the ability and understanding of engineering equipment, performing maintenance / repairs on appropriate technological engineering problems that arise and being able to provide solutions to environmental problems with an appropriate technological intervention approach.

FIS2.61.7303 Physics Learning Seminar 2 Credits

The physics learning seminar course discusses techniques for making good presentation media. Good presentation technique. Physics learning seminar exercises: choosing physics education topics for papers, writing simple papers, making presentation media, conducting seminars with panel discussions.

FIS2.61.8301 Health Physics 2 Credits

The health physics course discusses the relationship between physics as a basic science and health sciences as an applied science, the principles of physical phenomena related to humans and their environment, physical sciences related to biomechanics, thermophysics, bioelectricity, biooptics, radiation physics, and instruments in health. .

FIS2.61.8302 Application Software for Science 2 Credits

Application software courses for science discuss the discussion of computer basics, computer operating systems, computer application software, various computer application software, the use of computer application software such as M. Flash, M. Dreamweaver, Freeware and others in teach simple physics problems

FIS2.61.8201 Capita Selecta Learning Physics 2 Credits

The Capita Selecta course for physics learning discusses the latest physics education research results from national and international journals which include: strategies, approaches, and models of physics learning; physics learning tools such as lesson plans, teaching materials, learning media, and physics learning assessment instruments, writing lecture products in the form of papers, and presenting papers.

FIS2.61.8303 Capita Selecta Physics 2 Credits

The Capita Selecta Physics course discusses the introduction: background, objectives, expected results, subjects to be contested, the level of the Olympic selection, the mechanism for selecting participants for the science olympiad at district, provincial, national, and international levels. The quiz questions for the National Physics Olympiad for the National High School include: thermodynamics, mechanics, electricity and magnetism, astronomy, and modern physics. The national science olympiad questions for junior high schools include: quantities, units, and measurements; mechanics; vibrations and waves; optics; substance and heat; electricity and magnetism; and IPBA. Practical strategies in solving physics olympiad questions quickly and easily

2. Study Program: Physics (S1)

1) Vision

Realizing an excellent undergraduate study program in physics at the national level in 2020 based on faith and piety.

2) Mission

Based on the vision, the mission of the Physics Study Program is as follows:

- a) Carry out superior education in the field of Physics based on faith and piety (M1).
- b) Carry out excellent research in the field of physics (M2).
- c) Carrying out Community Service who excels in the field of physics (M3)
- d) Improving the governance of excellent study programs (M4).
- e) Increasing Local, National and International (M5) cooperation.

3) Purpose

Based on the mission described above, the objectives of PSS Physics can be formulated as follows:

1. Improving the competence of students and graduates who are knowledgeable, skilled, professional based on faith and piety (related to M1)
2. Produce quality content, process and assessment of physics learning based on faith and piety (related to M1)
3. Improving the quality of lecturers and education staff on an ongoing basis (related to M1)
4. Provide adequate funds, facilities and learning infrastructure (related to M1)
5. Produce superior research (competitive, innovative and competitive) in the field of physics (related to M2)
6. Utilizing research results in physics for science and technology enrichment and learning, quality improvement, progress and competitiveness of the nation, fulfillment of national development needs and knowledge-based society change (related to M2)
7. Disseminate research results in physical sciences through seminars, publications, patents and books at national and international levels (related to M2)
8. Produce community service that has quality in the field of physics to solve problems faced by the community, utilize appropriate technology, develop science and

enrich learning resources (related to M3).

9. Provide governance with excellent service (related to M4)
10. Increase local level cooperation with similar study programs, local government, business and industry that are relevant to the field of physics (related to M5).
11. Increasing cooperation at the national level of the National Ministry, Non-Ministerial Government Institutions and professional organizations/communities relevant to the field of physical sciences (related to M5).
12. Increasing international level cooperation with higher education institutions of other countries relevant to the field of physics (related to M5).

4) Learning Outcomes of Study Program Graduates

Learning outcomes in accordance with the KKNi are the internationalization of knowledge, attitudes, skills, competencies and accumulated work experience achieved through a structured educational process covering a particular field of knowledge or expertise or through work experience. SKL is a minimum criterion regarding the qualifications of graduates' abilities which include attitudes, knowledge, and skills, which are stated in the formulation of graduate learning outcomes (CPL).

Attitude

- a. Fear of God Almighty and able to show a religious attitude;
- b. Upholding human values in carrying out duties based on religion, morals, and ethics;
- c. Internalize academic values, norms, and ethics;
- d. To act as citizens who are proud and love their homeland, have nationalism and a sense of responsibility to the state and nation;
- e. Appreciate the diversity of cultures, views, religions, and beliefs, as well as the opinions or original findings of others; Contribute to improving
- f. the quality of life in society, nation, state, and the progress of civilization based on Pancasila; Cooperate and have social sensitivity and concern
- g. for society and the environment;
- h. Obey the law and discipline in the life of society and the state;
- i. Internalize the spirit of independence, struggle, and entrepreneurship;

- j. Demonstrate a responsible attitude towards work in their area of expertise independently.

Knowledge Mastery

- a. Mastering the basics of Mathematics and Natural Sciences and their application in everyday life and technology
- b. Mastering the theoretical concepts and basic principles of classical and quantum physics;
- c. Mastering the principles and applications of mathematical physics, computational physics and instrumentation;
- d. Mastering knowledge of technology based on physics and its application.

General Skills

- a. Applying logical, critical, systematic, and innovative thinking in the context of the development or implementation of science and/or technology in accordance with their field of expertise;
- b. Reviewing the implications of developing or implementing science, technology or art in accordance with their expertise based on scientific principles, procedures and ethics to produce solutions, ideas, designs, or art criticisms as well as compiling a scientific description of the results of the study in the form of a thesis or final project report; Make
- c. the right decisions in the context of solving problems in their area of expertise, based on the results of analysis of information and data;
- d. Manage learning independently;
- e. Develop and maintain a network with supervisors, colleagues, peers both inside and outside the institution.

Special skill

- a. Able to formulate physical symptoms and problems through analysis based on observations and experiments;
- b. Able to produce mathematical models or physical models in accordance with the hypothesis or forecast of the impact of the phenomenon that is the subject of discussion;
- c. Able to analyze various alternative solutions to physical problems and conclude them for making the right decisions;
- d. Able to predict the potential application of physical behavior in technology;

- e. Able to disseminate the results of the study of problems and physical behavior of simple symptoms in the form of standard scientific reports or suitable rule working papers

5) Course Structure

Major : Physics
Study program : Physics (S1)

No	Code	Courses	credits			Sem
			Quantity	T	PL	
1). Expertise Course (MKBK)						
A. Mandatory						
1	FIS1.62.2001	Basic Physics	4	3	10	2
2	FIS1.62.5001	Waves and Optics	3	2	10	5
3	FMA1.60.1302	Calculus	4	3	10	1
4	FMA1.60.1303	General Physics	4	3	10	1
Number of Credits			15	11	40	
2). University Compulsory Courses						
A. Mandatory						
1	UNP1.60.1401	Religious education	3	3	00	1
2	UNP1.60.1402	Pancasila Education	2	2	00	1
3	UNP1.60.1403	Civic education	2	2	00	1
4	UNP1.60.1404	Indonesian	2	2	00	1
5	UNP1.60.1405	English	2	2	00	1
6	UNP1.60.3101	Entrepreneurship	3	3	00	3
7	UNP1.60.5401	Real Work Lecture (KKN)	2	0	02	5
Number of Credits			16	14	02	
3). University Elective Courses						
A. Choice						
1	UNP2.60.1401	Basic Natural Science	2	2	00	1
2	UNP2.60.1402	Basic Socio-Cultural Sciences	2	2	00	1
3	UNP2.60.2101	Physical Fitness Education	2	2	00	2
4	UNP2.60.2102	Japanese language	2	2	00	2
5	UNP2.60.2103	Multicultural Education	2	2	00	2

No	Code	Courses	credits			Sem
			Quantity	T	P L	
6	UNP2.60/2401	History of the Indonesian Nation's Struggle	2	2	0 02	
7	UNP2.60.2402	Disaster Management	2	2	0 02	
8	UNP2.60.3401	Natural Culture MinangKabau	2	2	0 03	
9	UNP2.60.3402	Information and communication technology	2	0	2 03	
Number of Credits			18	16	2 0	

4). Faculty Compulsory Courses

A. Mandatory						
1	FMA1.60.2102	General biology	4	3	1 02	
2	FMA1.60.2103	General Chemistry	4	3	1 02	
Number of Credits			8	6	2 0	

5). Study Program Compulsory Courses

A. Mandatory						
1	FIS1.62.1001	Electronic Instruments and Statistical	3	2	1 01	
2	FIS1.62.1002	Measurements for Physics	3	3	0 01	
3	FIS1.62.202	Math Physics 1	3	3	0 02	
4	FIS1.62.3001	Math physics 2	3	3	0 03	
5	FIS1.62.3002	Basic Electronics 1	3	2	1 03	
6	FIS1.62.3003	Computer Mechanics Algorithm and	3	2	1 03	
7	FIS1.62.3004	Programming	3	2	1 03	
8	FIS1.62.3005	Thermodynamics	3	2	1 03	
9	FIS1.62.3006	Biophysics	3	2	1 03	
10	FIS1.62.3007	English for Basic Electronics	2	2	0 03	
11	FIS1.62.4001	Physics 2	3	2	1 04	
12	FIS1.62.4002	Electric and Magnet	3	2	1 04	
13	FIS1.62.4003	Modern Physics	3	3	0 04	
14	FIS1.62.4004	Earth Physics and Computational	3	2	1 04	
15	FIS1.62.4005	Physics Astronomy	3	2	1 04	
16	FIS1.62.4006	Used Electronics	3	3	0 04	
17	FIS1.62.4007	Quantum Physics Disaster	2	2	0 04	
18	FIS1.62.5002	Instrumentation	3	3	0 05	
19	FIS1.62.5003	Solid Physics	3	3	0 05	
20	FIS1.62.6001	Statistical Physics	3	3	0 06	

No	Code	Courses	credits				Sem
			Quantity	T	P	L	
21	FI S1.62.6002	Core Physics	3	3	0	0	6
22	FI S1.62.6003	Modern Optics and Photonics Research	3	3	0	0	6
23	FI S1.62.6004	Methodology and Physics Seminar	3	3	0	0	6
24	FI S1.62.66005	Publications	2	2	0	0	6
25	FI S1.62.7001	Radiation Physics	3	2	1	0	7
26	FI S1.62.7002	Field practice	2	0	0	2	7
Number of Credits			74	61	11	2	
B. Final Project/Thesis							
1	FI S1.62.8001	Thesis	6	0	0	6	8
Number of Credits			6	0	0	6	
6). Study Program Elective Courses							
A. Choice							
1	FI S2.62.4001	Environmental Physics	2	1	0	1	4
2	FI S2.62.4002	Electronic Equipment Systems	2	1	1	0	4
3	FI S2.62.7001	Philosophy of Natural Science	2	2	0	0	7
4	FI S2.62.7002	Photography	2	1	1	0	7
5	FI S2.62.7003	Application Software for the	2	1	1	0	7
6	FI S2.62.8001	History of Physics	2	2	0	0	8
7	FI S2.62.8002	Applied physics	2	1	0	1	8
Number of Credits			14	9	3	2	
B. Choose 9 out of 18 credits of KBK Physics Mate Option Courses rials dan Biofisfish							
1	FI S2.62.6004	Semiconductor Structure and Technology	3	2	1	0	6
2	FI S2.62.6005	Materials Characterization Engineering	3	2	1	0	6
3	FI S2.62.6006	Polymer Physics	3	2	1	0	6
4	FI S2.62.7007	Medical Physics	3	2	1	0	7
5	FI S2.62.7008	Crystallographic Physics	3	2	1	0	7
6	FI S2.62.7009	Magnetic Material	3	2	1	0	7
Number of Credits			18	12	6	0	
C. Choose 9 of 18 credits of the KBK Electronics Elective Course and Instrumentation							
1	FI S2.62.6001	Control System	3	2	1	0	6
2	FI S2.62.6002	Programmable Logic Control	3	2	1	0	6

No	Code	Courses	credits				Sem
			Total TP	L			
3	FI S2.62.6003	Microcontroller	3	2	1	0	6
4	FI S2.62.7004	Mechatronics	3	2	1	0	7
5	FI S2.62.7005	FPGA Device Programming	3	2	1	0	7
6	FI S2.62.7006	Remote Sensing	3	2	1	0	7
Number of Credits			18	12	6	0	
D. Choose 9 of 9 credits of Compulsory KBK Compulsory Physics Courses bag dan Teori							
1	FI S2.62.5010	Advanced Computational Physics	3	2	1	0	5
2	FI S2.62.5012	Group Theory and Symmetry in Physics	3	3	0	0	5
3	FI S2.62.6011	Advanced Computer Programming	3	2	1	0	6
Number of Credits			9	7	2	0	
E. Choose 9 of 9 Credits for the Geophysics KBK Compulsory Course							
1	FI S2.62.5007	Introduction to Geophysics	3	2	1	0	5
2	FI S2.62.5008	Geophysical Data Processing Techniques	3	2	1	0	5
3	FI S2.62.5009	Geology Physics	3	2	1	0	5
Number of Credits			9	6	3	0	
F. Choose 9 out of 9 Credits for the Compulsory KBK Material Physics Courses and nBiophysisyu							
1	FI S2.62.5004	Introduction to Materials Science	3	2	1	0	5
2	FI S2.62.5005	Electronic Materials Physics	3	2	1	0	5
3	FI S2.62.5006	Energy Physics	3	2	1	0	5
Number of Credits			9	6	3	0	
G. Choose 9 out of 9 Credits of the Electronic KBK Compulsory Course at danInstrumentation							
1	FI S2.62.5001	Analog Electronics	3	2	1	0	5
2	FI S2.62.5002	Digital Electronics	3	2	1	0	5
3	FI S2.62.5003	Sensor System	3	2	1	0	5
Number of Credits			9	6	3	0	
. Choose 9 of 18 Credits for Geophysics KBK Elective Courses							
1	FI S2.62.6007	Geoelectric Method	3	2	0	1	6
2	FI S2.62.6008	Electromagnetic Method	3	2	0	1	6
3	FI S2.62.6009	Rock Magnetism Method Gravity	3	2	0	1	6
4	FI S2.62.6010	and Magnetic Method Seismic	3	2	1	0	6
5	FI S2.62.6015	Method	3	2	1	0	6

No	Code	Courses	credits				Sem
			Quantity	T	P	L	
6F	S2.62.7010	Geophysical Computing	3	2	1	0	7
7F	S2.62.7011	Geodynamics	3	2	1	0	7
8F	S2.62.7012	Geophysical Instrumentation	3	2	1	0	7
Number of Credits			24	16	5	3	
. Choose 9 of 18 credits of KBK Compound Physics Elective Courses <i>thread dan Teori</i>							
1F	S2.62.6012	Modeling and Visualization	3	2	1	0	6
2F	S2.62.6013	of Introduction to Particle	3	2	1	0	6
3F	S2.62.6014	Physics Applications	3	3	0	0	6
4F	S2.62.7013	Artificial Intelligence Digital	3	2	1	0	7
5F	S2.62.7014	Image Processing	3	2	1	0	7
6F	S2.62.7015	Introduction to Non-Linear Physics	3	3	0	0	7
7F	S2.62.7016	Electromagnetic Interaction in Matter	3	3	0	0	7
Number of Credits			21	17	4	0	

Synopsis

UNP1.60.1401 Religious Education 3 Credits

The One and Only Godhead: faith and piety, divine philosophy (Theology); Humans: human nature, human dignity, human responsibility; Law: raise awareness to obey God's law, the prophetic function of religion in law; Moral: religion as a source of morals, morals in life; Science, Technology and Arts: Faith, science and technology, and charity as a unit, the obligation to demand and practice knowledge, the responsibility of scientists and artists; inter-religious harmony: religion is God's grace for all, togetherness in religious plurality; Society: civilized and prosperous society, the role of religious communities in realizing a civilized and prosperous society, human rights and democracy; Culture: academic culture, work ethic, open and fair attitude; Politics: the contribution of religious adherents to political life,

UNP1.60.1402 Pancasila Education 2 Credits

This course contains the meaning of urgency and reasons for the need for Pancasila education in Higher Education; Pancasila in the flow of the nation's history

Indonesia; Pancasila as a philosophical system, as the basis of the state of the Republic of Indonesia, as a state ideology, as an ethical system, and Pancasila as the basis for the value of developing science; Thinking and implementing Pancasila in dealing with current actual problems, such as human rights, racial and economic problems, and the problem of radicalism that must be solved in accordance with the values of Pancasila.

UNP1.60.1403 Citizenship Education 2 Credits

This course contains the nature of civic education in developing full undergraduate or professional abilities; the essence and urgency of national identity as one of the determinants of nation building and character, the urgency of national integrity and national unity; the constitutional values and norms of the 1945 Constitution of the Republic of Indonesia and the constitutional provisions of the legislation under the Constitution; harmony of obligations and rights of the state and citizens in a democracy that is based on people's sovereignty and deliberation for consensus; the nature, instrumentation, and practice of Indonesian democracy based on Pancasila and the 1945 Constitution of the Republic of Indonesia; the historical dynamics of constitutional, socio-political, cultural, and contemporary contexts of sovereign law enforcement; the historical dynamics and the urgency of the insight into the archipelago as a collective conception and view of the Indonesian nationality in the context of world relations; national urgency and challenges and defend the country for Indonesia in building a collective commitment to nationality.

UNP1.60.1404 Indonesian 2 Credits

This course contains the Conception of Indonesian Language, History of Indonesian Language, Position and Functions of Indonesian Language, Indonesian Language Variety, Indonesian Spelling, (punctuation letters, words and absorption elements: Effective Sentences, Definition of Characteristics, Terms of Effective Sentences: Paragraphs Types, Functions and Developments: Writing Outline Theme, Topic, Title and Type of Outline: Writing Text (Scientific Academic Texts and Non-Academic Texts: BI Official Letters (Format and Types of Indonesian Official Letters.

UNP1.60.1405 English 2 Credits

This course contains the development of English language skills in an integrated manner by taking into account the needs of students according to their fields/ majors, including understanding basic sentence patterns that help students understand various English references and equip students with communication skills in English according to their field of expertise.

UNP1.60.3101 Entrepreneurship 3 Credits

This course contains knowledge, attitudes and skills based on creative and innovative thinking regarding the basic principles of entrepreneurship, entrepreneurial development models, entrepreneurial strategies, business ethics in entrepreneurship, opportunity analysis, business feasibility studies and business management (marketing, production, finance). , resources, business legality, technology and information)

UNP1.60.5401 Real Work Lecture (KKN) 2 Credits

Real Work Lecture (KKN) is a field activity for students who are taking the final part of the S-1/D4/Applied Bachelor education program. This program is actually mandatory for all students, because the university believes that this program is able to encourage student empathy, and can contribute to solving problems that exist in society. Community service activities are a tangible form of the university's contribution to the community, industry, local government and community groups who want to be economically and socially independent. This KKN program requires Field Supervisors (DPL) and students to play an active role in knowing the existing problems, even

before they plunge for 1 to 2.5 months in the middle
Public. Concept "working with community" have replace
concept "working for the community".

UNP2.60.1401 Basic Natural Sciences 2 Credits S

This course contains the nature and scope of the human mind and its development, the development of science, the earth and the universe, the diversity of living things and their distribution, living things in natural ecosystems, natural resources and the environment, the benefits and impacts of science and technology on social life, the history of human civilization and technological developments, several important technological developments, and environmental issues

UNP2.60.1402 Basic Socio-Cultural Sciences 2 Credits

This course contains: Basic concepts in social and cultural sciences to study Indonesian society and changes in Indonesian society and culture. The subjects are humans and human culture as individuals and human social beings, moral values and human law, human diversity and equality, science technology and human arts and the environment.

UNP2.60.2101 Physical Fitness Education 2 Credits

This course applies the effects and benefits of various movement activities for physical fitness and health through various games, competitions, and sports exercises as well as the ability to analyze the importance of physical activity to maintain and improve health. develop the body's physiological functions and health and can be applied throughout life.

UNP2.60.2102 Japanese 2 Credits

Japanese language courses equip students with knowledge about Japanese language practice so that students have the ability to read and communicate using Japanese.

UNP2.60.2103 Multicultural Education 2 Credits

This multicultural education course contains the concept of multicultural education: the urgency of multicultural education in a diverse Indonesian society, building an inclusive diversity paradigm through educational institutions. prospects and constraints of multicultural implementation, implementation of multicultural education in Indonesia, as well as character building of students through the application of multicultural ideology in the field of education.

UNP2.60.2401 History of the Struggle of the Indonesian Nation 2 Credits

The History of the Nation's Struggle course discusses the meaning and historical meaning of the nation's struggle, imperialism and colonialism, the struggle of the Indonesian nation against imperialism and colonialism, the Indonesian national movement, the struggle for independence, the meaning of the proclamation of efforts to maintain independence against various threats that threaten the unitary state of the Republic of Indonesia, the Republic of Indonesia.

UNP2.60.2402 Disaster Management 2 Credits

This course refers to Law No. 24 of 2007 concerning Disaster Management (Disaster Management) which includes the introduction of facts or evidence of disaster events, introduction to the concept of disaster, types of disasters, characteristics of disasters, natural disasters, non-natural disasters, social disasters, prone, disaster/hazard (hazard), potential hazard, vulnerability, (vulnerability), capacity (capacity), principle of risk reduction (risk), prevention, mitigation, preparedness, disaster prediction, disaster impact, disaster response procedures and emergency response , analysis of rehabilitation needs

and reconstruction.

UNP2.60.3401 MinangKabau Natural Culture 2 Credits

This course contains material on Minangkabau customs, both objective and subjective. Through the study of objective and subjective customs, students are expected to be able to understand Minangkabau human identity and be able to find the values of progress contained in adat that are relevant to the challenges of 21st century competence, namely multiculturalism, cooperation, problem solving and so on.

UNP2.60.3402 Information and Communication Technology 2 Credits

This course learns about information and communication technology that can make daily work easier. Understanding device usage "Office Applications" software, Internet Technology, Use of software development of learning animation, development of technology and use of applications in education and being able to recognize internet-based business.

FMA1.60.1302 Calculus 4 Credits

This course discusses the real number system, equations and inequalities, absolute values and absolute inequalities, coordinate systems and simple graphs, functions, limits and continuity, derivatives, related rates, graphs, and integrals.

FMA1.60.1303 General Physics 4 Credit Points

This course discusses quantities and units, particle kinematics, particle dynamics, work and energy, linear momentum, angular momentum and rigid bodies, static fluids, dynamic fluids, concepts of temperature and heat, and the laws of thermodynamics.

FMA1.60.2102 General Biology 4 Credit Points

This course discusses the knowledge of living things and scientific methods, cells as the basis of life, metabolism, structure and organization of plant and animal bodies, biodiversity, structure and processes in human organ systems, ecology, genetics and evolution and biotechnology.

FMA1.60.2103 General Chemistry 4 Credit Points

This course discusses Stoichiometry, Chemical Energetics, Atomic Structure, Periodic System of Elements, Chemical Bonds and Molecular Geometry, Forms of Matter

and Chemical Equilibrium

FIS1.62.1001 Electronic and Measurement Instruments 3 Credits

Electronic instruments and measurement courses discuss the concepts of measurement and error, direct current meters, direct current bridges, alternating current meters, alternating current bridges, multimeters, oscilloscopes, electronic measuring instruments in Physics and Applications of Physics instruments in various fields.

FIS1.62.1002 Statistics for Physics 3 Credits

Basic notions in statistics, data presentation, center size and location size, symmetry and slope, deviation size, probability theory and probability distribution, sampling distribution, some tests include: normality test, homogeneity test of variance, regression linearity test and correlation. Non-parametric statistics include: sign test, Wilcoxon test, and Liliefors test.

FIS1.62.2001 Basic Physics 4 Credits

The basic physics course discusses the basic concepts of electricity, magnetism, vibration, waves, optics and modern physics

FIS1.62.2002 Mathematical Physics 1 3 Credits

Infinite Series: Converging and Divergent Series, Convergence Test, Alternating Series, Convergence Interval, Power Series Expansion, Some Uses in Physics. Complex Numbers: Complex Algebra, Euler's Formulas, Complex Powers and Roots, Exponential Functions, Hyperbolic Functions, Inverse Trigonometry and Hyperbolic. Fourier Series: Use of Fourier Series, Average Value, Fourier Coefficient, Dirichlet Condition, Complex Fourier Series, Even and Odd Functions, Parseval Theorem. Linear Equations and Matrices : Linear Equations, Matrices, Determinants, Cramer's Rules, Uses in Physics. Vector : Definition, Lines and Fields, Vector Multiplication, Vector Operators. Double Integral : Double Integral, Variable Change, Line Integral, Green's Theorem, Divergence Theorem, Stokes Theorem. Ordinary Differential Equation : Variable Separation,

FIS1.62.3001 Mathematical physics 2 3 credits

Partial Differential: maximum-minimum value problem, boundary condition problem, variable change, Leibniz's rule. Calculus of variations: Euler's Equation, Lagrange's Equation. Special Functions: Gamma function, approximation formula

Stirling, Beta function, Error function. Solution of Differential Equations With Series: power series method, Legendre function, Probenius method, Bessel function, Hermite function, Leguerre polynomial. Partial Differential Equation: application of variable separation method to Laplace equation, wave equation, diffusion equation. Complex Variables: Contour Integral, Laurent series and remainder theorem, use of remainder theorem on integrals. Integral Transformation: Laplace transform, Fourier transform.

FIS1.62.3002 Basic Electronics 1 3 Credit Points

Basic laws of electricity (Ohm's law, Joule, Kirchhof and others), basic circuits using passive components and active components include: voltage divider circuits, current dividers, equivalent circuits, capacitor charging and discharging, passive signal processing circuits, RLC circuits, semiconductor diodes, rectifier and waveforming circuits, bipolar transistors and transistors as amplifiers

FIS1.62.3003 Computer Programming and Algorithm 3 Credits

Operating system of a number, programming algorithms in the form of Flowcharts, Basic Programming which includes the basics of Pascal Language, Graphics Programming, and Animation of basic concepts of physics problems.

FIS1.62.3004 Mechanics 3 Credit Points

This course discusses the relationship between dimensions of mechanics and variables (scalars and vectors) in various mechanics concepts. Two- and three-dimensional kinematics about position vectors, velocity and acceleration, differential and integral applications in mechanical systems with Cartesian, polar, cylindrical and spherical coordinates. Particle dynamics are described through Newton's laws of motion, positional, velocity and time functions, Kepler's laws of orbit, motion of the central force, gravity, gravitational potential, equipotential forces & surfaces, and explain the phenomena of motion under the influence of gravitational force and gravitational potential. Analysis of linear and angular momentum, impulse, work and energy, laws of conservation of energy and momentum. Rigid body mechanics is described in terms of linear and angular momentum, linear and angular velocity, torque, moment of inertia, motion of center of mass system, center of mass velocity, center of mass coordinate system and, principal moment of inertia and principal axis, perpendicular axis theorem, some properties of inertia tensor. In Lagrange and Hamilton mechanics, general coordinates, general forces, kinetic and potential energies, Lagrange and Hamilton equations for various motion systems are described.

FIS1.62.3005 Thermodynamics 3 Credit Points

Basic Concepts of Thermodynamics, Temperature, Partial Differential, Equation of State, Conservation of Energy, Conversion of Heat into Work, Entropy, Enthalpy, Thermodynamic Potential.

FIS1.62.3006 Biophysics 3 Credits

This course discusses Health Physics, Diagnostic Radio Physics, Nuclear Medicine and Medical Instrumentation covering Ionizing radiation in tissues, Electromagnetic biological effects, Sonic irradiation, Molecular effects of ionizing radiation, Thermodynamics and Biology, Non-reverse thermodynamics, Diffusion, permeability & active transport, Membranes - Biological membranes, Information theory & Biology, Energy Transfer Processes and Radioactive tracer techniques and their applications.

FIS1.62.3007 English for Physics 2 Credits

This course contains Basic English Grammar, writing patterns in English, general patterns of reading English books, practice reading books and translating English reading materials.

FIS1.62.4001 Basic Electronics 2 3 Credits

This course discusses voltage amplifier circuits, buffer circuits, DC coupled amplifier circuits, transistor switch circuits and applications, multivibrator circuits with transistors and applications, operational amplifier circuits and applications.

FIS1.62.4002 Electricity and Magnetism 3 Credits

This course covers: electrostatics concepts, special techniques for calculating potential, electrostatic fields in materials, magnetostatics, magnetostatic fields in materials, electrodynamics, conservation law, and Maxwell's equations and electromagnetic waves.

FIS1.62.4003 Modern Physics 3 Credits

The material includes the concepts of: Introduction, Einstein's Special Theory of Relativity, Quantum phenomena, Atomic Structure, Quantum Theory of the Hydrogen Atom, Many Electron Atoms, and Molecules.

FIS1.62.4004 Earth Physics and Astronomy 3 Credit Points

This course discusses general knowledge of the earth and astronomy, including the structure of the earth, hydrosphere, atmosphere, weather and climate as well as natural disasters.

and disaster mitigation as well as the solar system, stars, celestial sphere, ecliptic coordinate system and the universe

FIS1.62.4005 Computational Physics 3 Credits

The Computational Physics course presents various (numerical) approaches that are widely used in solving physics problems. The discussion includes error problems, solving nonlinear equations, systems of linear equations, polynomial interpolation, differential and numerical integrals, and initial value problems of ordinary differential equations, solutions of ordinary differential equations, solutions of partial differential equations.

FIS1.62.4006 Used Electronics 3 Credits

Discusses the application of basic electronic circuits in regulated power supplies, function generators, measurement systems, regulatory systems, object counting systems, and various hobby electronics circuits. Besides, it also discusses electronic equipment contained in life including radio systems, television systems and computer systems.

FIS1.62.4007 Disaster Instrumentation 2 Credits

This course discusses the introduction of systems and the workings of the tools used to detect natural disasters such as earthquakes (seismographs), landslides (remote sensing), tsunamis and volcanoes.

FIS1.62.5001 Waves and Optics 3 Credits

Harmonic vibrations, one, two and three dimensional waves, sound waves, electromagnetic waves, modulation, polarization, interference, diffraction, lasers and holography.

FIS1.62.5002 Quantum Physics 3 Credits

Quantum Physics discusses the quantum phenomena that underlie quantum mechanics and their application in simple examples. Topics–topics covered include wave-particle dualism, fundamentals of quantum physics, general properties of solving one-dimensional Schrodinger equations, angular momentum, time-independent perturbation methods and identical particle systems.

FIS1.62.5003 Physics of Solids 3 Credit Points

Solid matter physics course discusses X-ray diffraction methods, crystal bonds, lattice vibrations, heat capacity, free electron theory, energy band theory and

semiconductor crystal.

FIS1.62.6001 Statistical Physics 3 Credits

This course discusses Probability Theory, Kinetic Theory of Gases, Velocity and Rate Distribution Functions, Transport Phenomena, Maxwell Boltzmann Statistics, Bose Einstein Statistics, and Fermi Dirac Statistics.

FIS1.62.6002 Core Physics 3 Credits

This course covers: core structure; core properties; radioactivity; radiation detector; alpha, beta and gamma decay; radiation protection; core reaction; core styles and models; nuclear fission; nuclear energy plants; accelerators, and elementary particles.

FIS1.62.6003 Modern Optics and Photonics 3 Credits

This course provides knowledge about the application of waves to optical materials. Examples include scanners in supermarkets, photocopiers, compact disk players, holograms, and fiber optics for communication. Therefore, after students take this course, they can analyze problems in optical materials based on the knowledge of waves that have been obtained.

FIS1.62.6004 Research Methodology and Publication 3 Credits

This course describes analyzing the nature, concepts and approaches of scientific research, quantitative and qualitative research, deductive and inductive analysis in research, scientific research procedures, techniques for determining research subjects and objects, research data processing and analysis techniques, and scientific publication techniques of research results. , train students in designing and producing research designs, and train students to present research proposal designs in character in class discussions.

FIS1.62.6005 Physics Seminar 2 Credits

This course presents techniques for making good presentation media, good presentation techniques. Physics seminar exercises: choosing physics topics for papers, writing simple papers, making media presentations, conducting seminars with panel discussions.

FIS1.62.7001 Radiation Physics 3 Credits

The course discusses the properties of nuclear radiation, radiation in materials, radiation measurements, error statistics, types of detectors, electronic circuits for radiation detection, X-ray spectroscopy, data analysis methods, radiation physics applications, and radiation protection.

FIS1.62.7002 Field Work Practice 2 Credits

Refresher lectures and provision of field work knowledge where the participating students are, observation exercises in the form of reports that are ready for seminars in order to determine the mastery of the applied physics material.

FIS1.62.8001 Thesis 6 Credits

Submission of research proposal outlines to study program heads, acceptance of research proposal outlines, determination of supervisors 1 and 2, research proposal writing, research proposal seminars, research proposal refinement, research implementation, research report preparation, thesis examination, research report improvement, and article writing -journal.

FIS2.62.4001 Environmental Physics 2 Credits

Analyzing and interpreting the physical environment of the earth, minerals and rocks, layer structure and earthquake mechanisms, with parameters of temperature, pressure, humidity, dynamics of sea water and tides, ocean currents, atmospheric structure, temperature, pressure, wind speed, and heating with its mechanisms, as well as environmental impact analysis. Analyzing the astrophysical environment: stars, sun, planets, moons, spectrum, dynamics of celestial bodies, astrophysic parameters and instruments and their lessons.

FIS2.62.4002 Electronic Equipment System 2 Credits

This course discusses several topics about electronic equipment systems which include analog and digital electronic equipment systems, communication equipment systems (wave, radio, television, mobile phones), computer systems, household electronic equipment, electronic systems for health and several other latest electronic equipment systems. .

FIS2.62.5001 Analog Electronics 3 Credits

This course discusses sensor signal amplifiers, functional processing, second and fourth order active filters, electronic circuits using timer ICs, electronic circuits using function generator ICs,
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Voltage controlled oscillator (VCO), LED drive IC, voltage and current regulator, relay drive electronic switch, electronic components with pnpn devices, circuit applications in electronics-based instruments.

FIS2.62.5002 Digital Electronics 3 Credits

This course will discuss the binary number system, Boolean algebra, DeMorgan's theorem, Karnough maps. Logic elements: logic switches, logic gates, memory elements, digital ICs (TTL and CMOS). Digital Multivibrators: Digital Schmitt triggers, digital bistables, digital monostable and astable multivibrators. Combination Logic Circuits: Adder, Subtractor, decoder, encoder, multiplexer, demultiplexer, ROM. Sequential Logic Circuits: Latches, flip-flops, registers, shift registers, counters and scalars. Digital to analog converter (DAC), analog to digital converter (ADC), Digital display: seven segment and LCD. Applications in instruments: digital electronic thermometers, three-decade counters, digital capacitance meters and others.

FIS2.62.5003 Sensor System 3 Credits

This course will discuss the meaning of sensors and sensor systems as well as the working principle of sensors in physics, measurement and error and relate them to accuracy, accuracy, apply statistical analysis, and errors in measuring sensor results, understand sensors based on changes in position and displacement, optics, speed and acceleration, humidity of a material and materials, fluid flow and force. Understand the working principle of each sensor based on symptoms and changes Able to try several simple sensors, and have the ability to apply it in the form of a final project to make or assemble sensors, sensor systems, able to use measuring tools supporting sensors such as measuring inertness, pressure, fluxmeters, capacitance meters and other measuring instruments in the laboratory.

FIS2.62.5004 Introduction to Materials Science 3 Credits

This course will discuss the properties of materials, chemical bonds, atomic arrangement in solids, metals, semiconductors, ceramic materials, polymers, magnetic materials, dielectrics, optics, composites and their physical properties as well as biophysical materials.

FIS2.62.5005 Physics of Electronic Materials 3 Credits

This course will discuss the Physics of Semiconductor Technology, Physics of Semiconductor Devices, Thin Layer Technology, Electronic Structure of Materials,

Semiconductor materials, including semiconductor crystal structures, energy band structures of semiconductor materials, charge carrier density, transport mechanisms in semiconductors, junctions in semiconductors, intrinsic and extrinsic semiconductors, phenomena of charge carrier transformation, p-junctions n, Bipolar devices, Semiconductor manufacturing technology, Crystal growth and epitaxy, Film oxidation and deposition, Diffusion and ion implantation, Lithography and etching.

FIS2.62.5006 Energy Physics 3 Credit Points

This course discusses Renewable Energy, Biomass, Energy Conservation and Nuclear Energy covering national energy needs and energy supply, energy sources and future energy needs, solar energy, wind, water, hybrid, biomass, pyrolysis, anaerobic digestion, biogas technology, biodiesel and nuclear.

FIS2.62.5007 Introduction to Geophysics 3 Credits

This course discusses various earth phenomena based on physical principles such as gravity, rotation, waves, electricity, magnetism and applies basic physics theories to geophysical survey methods and the practice of geophysical methods in surveying natural resources.

FIS2.62.5008 Geophysical Data Processing Techniques 3 Credits

This course discusses the basics of mathematical and computational operations for processing geophysical data including signals and systems, fourier series, and fourier transformations, sampling and alliances, convolution and deconvolution, correlation and autocorrelation, filters and transfer function estimation.

FIS2.62.5009 Geology Physics 3 Credit Points

This course discusses the structure of the earth and the minerals that make up the earth, the dynamic processes that take place in the earth's crust, time and changes in the earth's surface including climate change, the potential of natural resources and examines related physical concepts.

FIS2.62.5010 Advanced Computational Physics 3 Credits

This course discusses solving elliptic and parabolic partial equations, Monte Carlo method, finite differential method (2-D,3-D), finite element method (2-D,3-D), boundary condition problems, eigenvalues, linearization, polynomial fittings, splines, Fourier transforms, numerical solutions of equations

Schrodinger and random numbers.

FIS2.62.5012 Group Theory and Symmetry in Physics 3 Credit Points

This course discusses groups and fields: definition of groups, fields, translational groups, orthogonals and Poincares; geometry and vector space: a review of flat Euclid and Minkowski geometries, translational groups, $O(N)$, $U(N)$ groups, Lorentz boosts, $SL(2,C)$ groups and Poincare groups; relativistic wave equations: Klein-Gordon equation, Dirac equation, Clifford algebra, Maxwell equation; Lagrange formulations: Yang-Mills theory, Yang-Mill-Higgs theory and spontaneous symmetry breaking: definition of vacuum, Goldstone's theorem and monopole theory and soliton theory and examples.

FIS2.62.6001 Control System 3 Credits

This course will discuss about structured logic system design, Flowchart-based design, state-based design, control system modeling, basic control actions, response analysis, and control system optimization.

FIS2.62.6002 Programmed Logic Control 3 Credits

This course will discuss the definition and working principle of programmed logic control, basic principles of programmed logic control programming, hardware of programmed logic control, latching, timers, counters and applications of programmed logic control in various fields.

FIS2.626003 Microcontroller 3 Credits

This course will discuss about the 8051 microcontroller, programming with assembly language, arithmetic and logic instructions, minimum systems, timer and counter microcontroller settings, Arduino and its applications as well as microcontroller interface systems with various other devices.

FIS2.62.6004 Semiconductor Structure and Technology 3 Credits

It is an elective subject in the Material Physics Study Group (KBK). This course contains concepts about Semiconductor Material Structure, Semiconductor Energy Levels, Electron-Hole Statistics in Semiconductors, Transport Symptoms in Semiconductors, Measurement of Semiconductor Parameters, Pn-Relation Diodes, Transistors and Semiconductor Manufacturing Technology.

FIS2.62.6005 Material Characterization Techniques 3 Credits

This course will discuss characterization of mechanical properties of materials, characterization of electrical properties of materials, characterization of magnetic properties of materials, characterization of optical properties of materials, characterization of thermal properties of materials, characterization of topography and microstructure of materials and characterization of chemical constituents.

FIS2.62.6006 Polymer Physics 3 Credits

This course material concerns the basic principles of polymers, mechanical and electrical properties of polymers, molecular weights, chemical structure of polymers, evaluation of polymer characteristics and polymer analysis.

FIS2.62.6007 Geoelectric Method 3 Credits

This course discusses the basic theory of measurement, modeling, and data interpretation and the model of the electrical resistivity method, the spontaneous self potential method, the induced polarization method, and the theory of the electromagnetic method and the conductivity of rocks and minerals.

FIS2.62.6008 Electromagnetic Method 3 Credit Points

This course discusses the definition of the Electromagnetic and MT methods, the basic theory of the MT and VLF methods, impedance, resistivity of the earth's structure, measurement systems for the VLF and MT methods, the earth's response function through the MT and VLF methods, data processing and data analysis, data interpretation and CSAMT.

FIS2.62.6009 Method of Rock Magnetism 3 Credits

This course will discuss the introduction of Earth's magnetic field, rock magnetic properties, Magnetic minerals, NRM acquisition, NRM sampling and measurement, Stability, paleomagnetism, Paleomagnetic data statistics and paleomagnetic applications.

FIS2.62.6010 Gravity and Magnetic Method 3 Credits

This course discusses geophysical methods to determine differences in rock density below the earth's surface which includes: introduction to gravity and magnetic methods, basic concepts of gravity, gravity measurements, gravity meter equipment, corrections for gravitational observations, interpolation of gravity data, basic concepts of magnetic methods. , magnetic properties of rocks, the earth's magnetic field, magnetic instruments, magnetic surveys and interpretation of magnetic data.

FIS2.62.6011 Advanced Computer Programming 3 Credits

This course discusses programming techniques using the Delphi programming language, understanding the Delphi work environment, Delphi components, using visual and non-visual components, using components related to data, creating and using components, creating applications, graphics, multimedia, animation. , database application creation and error handling.

FIS2.62.6012 Modeling and Visualization 3 Credits

This course design physics visualization and physics visualization support software, physics visualization basics, introduction to java apple, introduction to streaming processor, introduction to GPU, parallel data processing, animation basics, simulation basics and examples of visualization with simulation.

FIS2.62.6013 Application Software 3 Credits

This course discusses Application Programs which include Wavelets and Multiresolution Processing, Image Compression, Morphological Image Processing, Image Segmentation and Representation and Description

FIS2.62.6014 Introduction to Particle Physics 3 Credit Points

This course discusses the types of elementary particles and their interactions and is able to perform simple collision scattering calculations, brief history of elementary particles, dynamics and fundamental forces, leptons and quarks; scattering and decay; group symmetry and the law of conservation, CPT theorem; tera principle, Feynman diagram, weak interaction and unification.

FIS2.62.6015 Seismic Method 3 Credits

This course discusses the introduction to seismic methods, theory of seismic wave propagation, energy partitioning in the boundary layer, seismic wave geometry, seismic velocity, characteristics of seismic sources, equipment used in data collection, earthquake seismology, seismic reflection methods, processing reflection seismic data, geological interpretation of reflection seismic, refractive seismic method, processing and interpretation of refractive seismic data, 3-D seismic and special application of seismic method.

FIS2.62.7001 Philosophy of Natural Sciences 2 Credits

Knowledge and science, the meaning of philosophy, Natural Sciences (IPA), philosophy of science, philosophy of philosophy, building philosophy of science: ontology, epistemology, axiology, the relationship between philosophy and education, sources of science knowledge, development of reasoning in science, advancing basic science, directing basic science and behavior in advancing basic science.

FIS2.62.7002 Photography 2 Credits

Basic knowledge and principles of photography; camera type, characteristics, and how the camera works; various positions and techniques in shooting, use of light sources in photography, types and types of films and their characteristics, various materials and working processes, darkroom processes, black and white film processes, printing and enlarging black and white photos and exhibitions of photographic works.

FIS2.62.7003 Application Software For Science 2 Credits

Discussion of the basics of computers, computer operating systems, computer application software, various computer application software, the use of computer application software such as Matlab, Maple, Arcview, and Labview in solving simple physics problems.

FIS2.62.7004 Mechatronics 3 Credits

Mechatronics is a combination of several fields of science which include sensor systems, mechanical engineering, electronic systems, computer engineering and control systems. This course will discuss the concepts of mechatronics, sensor components, actuators, signal conditioners, controllers as well as examples and working principles of various mechatronic devices.

FIS2.62.7005 FPGA Device Programming 3 Credits

FPGA Device Programming is programming of integrated circuit devices according to user requirements. This course will discuss the comparison of FPGA technology, FPGA Architecture, FPGA Design, VHDL Programming, Simulation and Synthesis as well as Case Studies on the CPLD Board.

FIS2.62.7006 Remote Sensing 3 Credits

Remote sensing is a science or technique to obtain information about a target or area using an instrument without the need for direct contact with the target or area. This course will discuss
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on the meaning of remote sensing, the basics of physics and sensors, microwaves, interpretation and analysis of image data (image/imagery) as well as examples of remote sensing applications.

FIS2.62.7007 Medical Physics 3 Credits

This course discusses Biomechanics, Biothermodynamics, Biohydrodynamics, Biooptics, Bioacoustics, and Bioelectricity, Radiation Physics covering the Relationship of Physics and Health Sciences, Body Force and Equilibrium Analysis, Body Mass Center, Gravitational Potential Energy of the Body, Human Body as a Thermodynamic System, Heat Transfer, Thermal Energy and Cold Energy in Health, Thermography & Its Diagnostic Uses, Circulatory System, Systemic & Mean Blood Pressure, Pressure Gauges, Lung Mechanics, Physical Laws in Breathing, Effects of Barometric Pressure on Health, Measuring Instruments Lung Volume, Sound Frequency: Sources & Their Effects on the Body, Ultrasonics in the Medical World, Geometrical optics and Optic Instruments, Body Electrical, Cardiac Electrical, Cardiac and Brain Magnetism, Ionizing Radiation, and Biological Effects Due to Radiation.

FIS2.62.7008 Crystallographic Physics 3 Credits

The lecture will discuss Sample Preparation, Crystal Diffraction Methods and Crystal Structure Analysis including Crystal Growth Methods, X-Ray Diffraction, Neutron Diffraction, Synchrotron Diffraction, Sample Specifications, Back Gratings, Crystal Systems and Bravais, Symmetry Operations, Point Groups, Space Groups and Crystal Structure Analysis from diffraction data.

FIS2.62.7009 Magnetic Material 3 Credits

This course covers the magnetic properties of a magnetic material, experimental methods, domains, quantum theory of magnetic materials.

FIS2.62.7010 Computational Geophysics 3 Credits

This course discusses data recording and reading techniques, data operations (1-D, 2-D, 3-D), linearization, polynomial fitting, random number generator, data correlation, potential problem solutions using the differential method and the finite element method (1-D, 2-D, 3-D), elastic deformation problems, viscous flow problems, data recording and reading, one-dimensional data operations, data minimum and maximum (1-D, 2-D), forward modeling, inversion modeling and adaptive damping method.

FIS2.62.7011 Geodynamics 3 Credit Points

This course discusses the basic processes of physics to understand Earth's plate tectonics and various other phenomena related to geology, including Earth's plate tectonic phenomena, Earth's dynamics and their applications as well as elasticity properties (stress, strain, flexure), heat transfer and their applications.

FIS2.62.7012 Geophysical Instrumentation 3 Credits

This course has study materials on instrumentation in earthquake seismology, instrumentation in meteorology, instrumentation in magnetism. The study material in the lecture will discuss the wave ADC seismic, seismic networks and stations, land and marine atmosphere, meteorology, instrumentation.

FIS2.62.7013 Digital Image Processing 3 Credits

This course discusses computer programming which includes basic digital image processing, image improvement in the spatial domain, image improvement in the frequency domain, image restoration and image color processing.

FIS2.62.7014 Artificial Intelligence 3 Credits

This course discusses Fuzzy and Neural Networks, covering the introduction of AI modeling methods, intelligence agents, solving search problems, information search and exploration, opponent search, logical agents, uncertainty, fuzzy recognition, probabilistic reasoning, Hopfield neural networks, genetic algorithms, statistical learning (SVM), Yin Yang computing, neutrosophic theory and case studies of physics problems and AI-based modeling.

FIS2.62.7015 Introduction to Non-Linear Physics 3 Credits

This course discusses various nonlinear physical phenomena that exist in several mediums including non-linear waves in water, air, superconductors and optical materials and their application to shallow sea waves such as tsunami waves, atmospheric Rossby waves and in the field of optical communication.

FIS2.62.7016 Electromagnetic Interaction in Materials 3 Credits

This course will discuss the response of matter to electromagnetic fields. The main topics discussed in this course include the definition of optical constants; the interaction of electromagnetic fields with non-absorptive dielectrics; the interaction of electromagnetic fields with metals, basic concepts

the interaction of electromagnetic fields with non-absorptive matter; the interaction of electromagnetic fields with atoms, molecules, polymers and semiconductor crystals; the interaction of electromagnetic fields with nanostructured materials; the interaction of electromagnetic fields with meta-materials and scattering theory.

FIS2.62.8001 History of Physics 2 Credits

The history of physics course discusses the characteristics of the historical period of physics and analyzes the development of physics in ancient times, before the renaissance in Europe, the development of classical physics, the development of several branches of physics in the 18th and 19th centuries, the development of physics in the industrial revolution and the development of modern physics.

FIS2.62.8002 Applied Physics 2 Credits

Application of physics concepts in Industrial Physics, Medical Physics, Reactor Physics and Energy Physics, including Solid State Devices in Industrial Logic Circuits, Photoelectronics, Fiber Optic and Lasers, Power Supply, Inverters and Converters, Open Loop and Closed Loop Feedback Systems, Electronic Input Output Devices, DC and AC Motors. Physical aspects of muscles and their measurements, physical aspects of the lungs, cardiovascular and their measurements, signal propagation in nerve cells and their measurements, physical aspects of ear and hearing and their measurements, physical aspects of the eye and vision and their measurements, bioenergetics, interaction of radiation with matter, transfer processes energy, Energy deposition and radiation dose calculation, Some physical, chemical, biological processes related to radiation and its effects, and The study of internal and external doses.

3. Study Program: Physics Education (S2)

1) Vision

Center of excellence that produces Masters in the Field of Physics Education who are Professional, Character, and Scholar Based on Faith and Piety to God Almighty in 2020

2) Mission

UNP Physics Education Study Program S-2, in order to produce graduates who have character based on faith and piety, then carry out the mission:

1. Organizing superior education in the field of Physics education.
2. Conducting excellent research in the field of Physics education.
3. Organizing excellent service and community service in the field of Physics education.
4. Produce graduates of Master of Physics Education who are professional, intellectual, with character, faith, and fear of God Almighty One.

3) Purpose

1. Prepare students physical education become a member professional, qualified, and competitive society in the field of Physics education.
2. Developing Physics education science through superior reasoning and research
3. Apply and disseminate knowledge in the field of Physics education based on faith and piety through superior community service.
4. Continuing the tradition of excellence to develop students to become intellectual, character, faithful, and pious and to produce master's graduates through inter and inter-science approaches so that they are able to enter or create jobs in the field of Physics education.

4) Graduate Competencies

Competence of graduates (*learning outcomes*) Master in Physics Education is as follows:

- 1) Develop science education or practice implementation Professional physics learning produces through research for innovative and tested works.
- 2) Solving physics education problems by utilizing education and related sciences through an inter- or multidisciplinary approach.

- 3) Have the ability to integrate phenomena and local wisdom as learning resources into physics learning tools. Responsible and committed as a physics education expert.
- 4) Have the ability to communicate with students, peers, and the community.
- 5) Mastering the concepts, laws and theories of physics and applying them.
- 6) Mastering the concepts, principles and theories that underlie learning and learning physics.
- 7) Have the ability to develop a physics education curriculum at the education unit level.
- 8) Have the ability to develop innovative physics learning models.
- 9) Have creative and innovative abilities in developing teaching materials, media and learning resources.
- 10) Have the ability to develop assessments in learning physics.
- 11) Have the ability to apply and develop physics learning creatively and innovatively.
- 12) Have broad insight into the development of national and international physics education.
- 13) Have the ability to manage research through assessment and development in the field of physics education, the results of which are applicable and worthy of publication at the national or international level in the form of scientific publications in accredited scientific journals.

5) Course Structure

Major : Physics
Study program : Physics Education (S2)

No	Code	Courses	SKS			Sem
			Total	TPL		
1). Study Program Compulsory Courses						
A. Mandatory						
1	FIS1.82.1006	Classical Mechanics	3	2	0	1
2	FIS1.82.1007	Electrodynamics	3	2	0	1

No	Code	Courses	SKS			Sem
			Quantity	TP	L	
3	FIS1.82.1008	Research Method	3	2	0	1
4	FIS1.82.1010	Development of Physics Teaching Materials	2	2	0	1
5	FIS1.82.1011	Development of Physics Learning Model	2	2	0	1
6	FIS1.82.1012	Statistics	2	2	0	1
7	FIS1.82.1013	New and Renewable Energy	2	2	0	1
8	FIS1.82.202	Statistical Mechanics	2	2	0	2
9	FIS1.82.2004	Quantum Mechanics	2	2	0	2
10	FIS1.82.206	Biophysics in Learning Physics	2	2	0	2
11	FIS1.82.2007	Physics Learning Media Development Media	2	2	0	2
12	FIS1.82.2008	Development of Physics Laboratory Tools	2	2	0	2
13	FIS1.82.2009	Evaluation and Process Development Physics Learning	2	2	0	2
14	FIS1.82.2012	Natural Disaster Physics	2	2	0	2
15	FIS1.82.3001	Writing scientific papers and publications	1	1	0	3
16	FIS1.82.3004	Science philosophy	2	2	0	3
17	FIS1.82.3005	Educational Science Foundation	3	2	1	3
Number of Credits			37	33	3	1
B. Final Project/Thesis						
1	FIS1.82.3002	Thesis Exam	6	6	0	3
2	FIS1.82.3003	Thesis Proposal Seminar	1	1	0	3
3	FIS1.82.3006	Research Results Seminar	1	1	0	3
Number of Credits			8	8	0	3
2). Study Program Elective Courses						
A. Choice						
1	FIS2.82.2003	Learning Design	2	2	0	2
2	FIS2.82.2004	Curriculum	2	2	0	2
Number of Credits			4	4	0	2

4. Study Program: Physics (S2)

Course Structure

Physics major

Study Program : Physics (S2)

No	Code	Courses	SKS			Sem
			Quantity	T	P	
1). Study Program Compulsory Courses						
A. Mandatory						
1	FIS1.82.1001	Disaster Physics	2	2	0	1
2	FIS1.82.1002	Information Systems and Disaster Communication	3	3	0	1
3	FIS1.82.1003	Research Methodology	2	2	0	1
4	FIS1.82.1004	Classical Mechanics	3	3	0	1
5	FIS1.82.1005	Electrodynamics	3	3	0	1
6	FIS1.82.2001	Quantum Mechanics	3	3	0	2
7	FIS1.82.2003	Statistical Mechanics	3	3	0	2
8	FIS1.82.2010	Disaster Risk Reduction	3	3	0	2
9	FIS1.82.3009	Scientific Writing and Publication	2	2	0	3
Number of Credits			24	24	0	0
B. Final Project/Thesis						
1	FIS1.82.2011	Thesis proposal	2	2	0	2
2	FIS1.82.3007	Results Seminar	3	3	0	3
3	FIS1.82.3008	Thesis Exam	4	4	0	3
Number of Credits			9	9	0	0
2). Study Program Elective Courses						
A. Choice						
1	FIS2.82.2001	Renewable energy	3	3	0	2
2	FIS2.82.202	Time-lapse Gravity App and	2	2	0	2
3	FIS2.82.3001	Sensor System	2	2	0	3
4	FIS2.82.3002	Seismology	2	2	0	3
5	FIS2.82.3003	Remote Sensing	2	2	0	3
6	FIS2.82.3004	Nano Materials and Functional	2	2	0	3
7	FIS2.82.3005	Material Physics Devices	2	2	0	3

No	Code	Courses	SKS			Sem	
			Quantity	T	P		L
8	FIS2.82.3006	Paleo, Rock and Environment Magnetism	2	2	0	0	3
9	FIS2.82.3007	Industrial Electronics	2	2	0	0	3
10	FIS2.82.3008	Physics Instrumentation System	2	2	0	0	3
11	FIS2.82.3009	Photonic and Magnetic Materials	2	2	0	0	3
12	FIS2.82.3010	Medical Physics and Radiation	2	2	0	0	3
13	FIS2.82.3011	Biophysical System Computing	2	2	0	0	3
14	FIS2.82.3012	Bio Material Technology	2	2	0	0	3
15	FIS2.82.3013	Bio Molecular Physics	2	2	0	0	3
Number of Credits			31	31	0	0	

4. Chemistry Department

a. Vision

To become an excellent department in the field of Chemistry and Chemistry Education based on the values of piety to God Almighty.

b. Mission

- 1) Produce graduates who have high academic abilities and are professional in the field of Chemistry and Chemistry Education and can develop science and technology.
- 2) Make the academic community of the Department of Chemistry with a high academic culture and proactive in implementing the Tridharma of Higher Education.
- 3) Providing services to the community in the field of chemistry and chemistry education.
- 4) Produce graduates who are able to apply their knowledge for themselves, their families and communities, as well as employment.
- 5) Produce graduates as qualified members of society and actively participate in development.
- 6) Cooperating with other universities and related institutions in improving the implementation of the Tridharma of Higher Education.
- 7) Become the best FMIPA UNP in the field of Mathematics and Natural Sciences, in addition to its main task of producing professional Mathematics and Natural Sciences education staff based on faith and piety.
- 8) Organizing Education to produce graduates who have high academic abilities and professionalism in the fields of Mathematics and Natural Sciences and education

c. Destination

- 1) Improving the efficiency and effectiveness of education and teaching in the field of chemistry.
- 2) Produce graduates who are able to compete in the job market.
- 3) Participate in improving the quality of chemistry education in schools and universities.
- 4) Produce graduates who can follow further studies.
- 5) Produce research that can be implemented to improve people's living standards.

d. Study program

The Department of Chemistry, FMIPA UNP has two study programs, namely the Chemistry Education study program and the Chemistry study program.

e. Study Load

To complete undergraduate and postgraduate studies in Chemistry, students are required to have passed at least 144 credits of courses which include compulsory courses (138 credits for Chemistry Education Study Program, and 126 credits for Chemistry Education Study Program) and a minimum of elective courses (6 credits for Chemistry Education Study Program). and 18 credits for PS Chemistry)

1. Chemistry Education Study Program (S1)

- 1) **Vision**
To become a superior, dynamic and quality study program in Western Indonesia in the Field of Chemistry Education in 2020 based on the values of piety to God Almighty.
- 2) **Mission.**
 - a. Carry out quality, professional and superior Chemistry Education based on faith and piety
 - b. Carry out research in the field of chemistry education
 - c. Providing quality services to the community in the field of Chemistry Education.
 - d. Increase cooperation with other universities and related institutions.
- 3) **Destination**
The aim of the Chemistry Education Study Program is to produce educational graduates who:
 - a) Mastering chemistry teaching materials comprehensively and able to teach (scientific communication) well based on the applicable curriculum.
 - b) Able to apply knowledge and skills in the field of chemistry education.
 - c) Able to work both in the field of chemistry education and in social life.
 - d) Able to follow the development of science, technology and art and can apply it in teaching chemistry.
- 4) **Competencies of Graduates of Chemistry Education Study Program**
Work ability
 - Able to describe SK and KD chemistry into learning
 - Able to make chemistry learning tools
 - Able to provide alternative solutions to chemistry learning problems
 - Able to use IT in learning chemistry creatively

Knowledge Mastery

Mastering school chemistry and its enrichment, learning theories, lesson planning, learning media, learning strategies, studying the school chemistry curriculum, evaluating the process and learning outcomes and learning IT for learning.

6) Course Structure

Major : Chemistry
Study program : Chemistry Education (S1)

No	Code	Courses	SKS			Sem	
			Quantity	T	P		L
1). Science and Skills Course (MKK)							
A.Required							
1	FMA1.60.1304	General Chemistry	4	3	1	0	1
2	KIM1.61.2103	Basic chemistry	4	3	1	0	2
Number of Credits			8	6	2	0	
2). University Compulsory Courses							
A.Required							
1	UNP1.60.1401	Religious education	3	3	0	0	1
2	UNP1.60.1402	Pancasila Education	2	2	0	0	1
3	UNP1.60.1403	Indonesian Citizenship	2	2	0	0	1
4	UNP1.60.1404	Education	2	2	0	0	1
5	UNP1.60.1405	English	2	2	0	0	1
6	UNP1.60.3101	Entrepreneurship	3	3	0	0	3
7	UNP1.60.5401	Real Work Lecture (KKN)	2	0	0	2	5
8	UNP1.61.1201	Fundamentals of Educational	2	2	0	0	1
9	UNP1.61.2101	Psychology Education	2	2	0	0	1
10	UNP1.61.2102	Education Administration And Supervision	2	2	0	0	2
11	UNP1.61.2103	Philosophy of Education	2	2	0	0	2
12	UNP1.61.4201	Guidance and counseling	2	2	0	0	4
13	UNP1.61.5101	Experience Program Field 1 (PPL1)	1	0	0	1	5
14	UNP1.61.6401	Experience Program Field 2 (PPL 2)	1	0	0	1	6
15	UNP1.61.7401	Experience Program Field 3 (PPL 3)	3	0	0	3	7

No	Code	Courses	SKS			Sem
			Quantity	T	P	
Number of Credits			31	24	0	7
3). Ma ta University Elective Course						
A. Choose 2 credits from 18 credits						
1	UNP2.60.1401	Basic Natural Science	2	2	0	0
2	UNP2.60.1402	Basic Socio-Cultural Sciences	2	2	0	0
3	UNP2.60.2101	Fitness Education Physical	2	2	0	0
4	UNP2.60/2102	Japanese language	2	2	0	0
5	UNP2.60.2103	Multicultural Education	2	2	0	0
6	UNP2.60/2401	History of the Indonesian Nation's Struggle	2	2	0	0
7	UNP2.60/2402	Disaster Management	2	2	0	0
8	UNP2.60.3401	Natural Culture MinangKabau	2	2	0	0
9	UNP2.60.3402	Information and communication technology	2	0	2	0
Number of Credits			18	16	2	0
4). Faculty Compulsory Courses						
A. Required						
1	FMA1.60.1301	General biology	4	3	1	0
2	FMA1.60.1302	Calculus	4	3	1	0
3	FMA1.60.2104	General Physics	4	3	1	0
Number of Credits			12	9	3	0
5). Study Program Compulsory Courses						
A. Required						
1	KIM1.61.2104	English For Chemistry	2	2	0	0
2	KIM1.61.2105	Mathematics Chemistry	2	2	0	0
3	KIM1.61.3101	Physical Chemistry 1	4	3	1	0
4	KIM1.61.3102	Organic Chemistry 1	4	3	1	0
5	KIM1.61.3103	Analytical Chemistry 1	4	3	1	0
6	KIM1.61.3104	Structure of School Chemistry	4	3	1	0
7	KIM1.61.3201	Inorganic Compounds 1	3	3	0	0
8	KIM1.61.3202	Chemistry Lesson Planning	3	3	0	0
9	KIM1.61.4101	Chemistry learning evaluation	3	3	0	0

No	Code	Courses	SKS			Sem
			Quantity	T	PL	
10	KIM1.61.4102	Chemical Physics 2	4	3	1	0
11	KIM1.61.4103	Organic Kima 2	4	3	1	0
12	KIM1.61.4104	Analytical Chemistry 2	4	3	1	0
13	KIM1.61.4105	Reaction Basics Inorganic	4	3	1	0
14	KIM1.61.4201	School Chemistry 2	3	3	0	0
15	KIM1.61.5101	Learning strategies	3	3	0	0
16	KIM1.61.5102	Learning Media and IT	2	2	0	0
17	KIM1.61.5103	Chemistry Physics 3	3	3	0	0
18	KIM1.61.5104	Organic Chemistry III	3	3	0	0
19	KIM1.61.5105	Elemental Chemistry	3	3	0	0
20	KIM1.61.5106	Basic Biochemistry	3	2	1	0
21	KIM1.61.5201	School Chemistry 3	2	2	0	0
22	KIM1.61.6011	Research methodology Education	2	2	0	0
23	KIM1.61.6102	Chemistry Seminar	2	2	0	0
24	KIM1.61.6201	Micro teaching	2	2	0	0
25	KIM1.61.6202	School Chemistry Laboratory Management Skills	2	2	0	0
26	KIM1.61.6302	Education Statistics	2	2	0	0
27	KIM1.61.6303	Spectrometric Analysis	2	2	0	0
28	KIM1.61.6304	Biochemistry Metabolism	3	3	0	0
29	KIM1.61.7302	Applied Chemistry	2	0	2	0
Number of Credits			84	73	11	0
B. Final Project/Thesis						
1	KIM1.61.7301	Thesis	6	6	0	0
Number of Credits			6	6	0	0
6). Study Program Elective Courses						
A. choose 8 credits from 40 credits						
1	KIM2.61.1101	Chemical environment	2	2	0	0
2	KIM2.61.1102	computer application	2	0	2	0
3	KIM2.61.6011	Computer application	2	0	2	0
4	KIM2.61.6201	Visits to Educational Institutions	2	2	0	0

No	Code	Courses	SKS			Sem	
			Quantity	T	P		L
5	KIM2.61.6301	Management and Chemical Entrepreneurship	2	2	0	0	6
6	<u>KIM2.61.6302</u>	Molecular modeling	2	2	0	0	6
7	<u>KIM2.61.6303</u>	Multirepresentation of chemistry	2	2	0	0	6
8	<u>KIM2.61.6304</u>	Natural Materials Chemistry	2	2	0	0	6
9	<u>KIM2.61.6305</u>	Chemical environment	2	2	0	0	6
Number of Credits			<u>18</u>	<u>14</u>	<u>4</u>	<u>0</u>	

Synopsis

UNP1.60.1401 Religious Education 3 Credits

The One and Only God: faith and piety, philosophy divinity (Theology); Human: human nature, human dignity, human responsibility Law: raise awareness to obey God's law, prophetic function of religion in law: Moral: religion as a source of morals, morals in life Science, Technology and Arts: Faith, science and technology, and charity as an obligation to demand and practice knowledge, the responsibility of scientists and artists; inter-religious harmony: religion is a blessing from God for all, togetherness in religious plurality; Society: civilized and prosperous society, the role of religious communities in realizing a civilized and prosperous society, Human Rights (HAM) and democracy; Culture: academic culture, work ethic, open and fair attitude; Politics: the contribution of religious adherents to political life, the role of religious adherents in realizing national unity.

UNP1.60.1402 Pancasila Education 2 Credits

This course contains the meaning of urgency and reasons for the need for Pancasila education in Higher Education; Pancasila in the current history of the Indonesian nation; Pancasila as a philosophical system, as the basis of the state of the Republic of Indonesia, as a state ideology, as an ethical system, and Pancasila as the basis for the value of developing science; Thinking and implementing Pancasila in dealing with current actual problems, such as human rights, racial and economic problems, and the problem of radicalism that must be solved in accordance with the values of Pancasila.

UNP1.60.1403 Citizenship Education 2 Credits

This course contains the nature of citizenship education in

develop full undergraduate or professional abilities; the essence and urgency of national identity as one of the determinants of nation building and character, the urgency of national integrity and national unity; the constitutional values and norms of the 1945 Constitution of the Republic of Indonesia and the constitutional provisions of the legislation under the Constitution; harmony of obligations and rights of the state and citizens in a democracy that is based on people's sovereignty and deliberation for consensus; the nature, instrumentation, and practice of Indonesian democracy based on Pancasila and the 1945 Constitution of the Republic of Indonesia; the historical dynamics of constitutional, socio-political, cultural, and contemporary contexts of sovereign law enforcement; the historical dynamics and the urgency of the insight into the archipelago as a collective conception and view of the Indonesian nationality in the context of world relations;

UNP1.60.1404 Indonesian 2 Credits

This course contains the Conception of Indonesian Language, History of Indonesian Language, Position and Functions of Indonesian Language, Indonesian Language Variety, Indonesian Spelling, (punctuation letters, words and absorption elements: Effective Sentences, Definition of Characteristics, Terms of Effective Sentences: Paragraphs Types, Functions and Developments: Writing Outline Theme, Topic, Title and Type of Outline: Writing Text (Scientific Academic Texts and Non-Academic Texts: BI Official Letters (Format and Types of Indonesian Official Letters.

UNP1.60.1405 English 2 Credits

This course contains the development of English language skills in an integrated manner by taking into account the needs of students according to their fields/ majors, including understanding basic sentence patterns that help students understand various English references and equip students with communication skills in English according to their field of expertise.

UNP1.61.1201 Fundamentals of Education 2 Credits

Provide insight into human nature, the nature and importance of education, the foundations and principles of education, thoughts about education

UNP1.61.2101 Educational Psychology 2 Credits

This course examines/discusses the basic concepts of educational psychology, growth, student development, intelligence, talent, creativity, motivation, memory, individual differences and learning theories.

UNP1.61.2102 Administration and Education Supervision 2 Credits

Educational Administration and Supervision courses are courses that provide insight, basic concepts and processes as well as the scope of Educational Administration and Supervision and apply them in professional school management.

UNP1.61.2103 Philosophy of Education 2 Credits

The Philosophy of Education course examines the nature of educational philosophy and its relation to religion, education and culture. Human nature as an educator (inner creative thinking). Schools of Philosophy of Education and their implementation and implications in organizing education.

UNP1.60.3101 Entrepreneurship 3 Credits

This course contains knowledge, based on creative attitude and skills thinking and basic entrepreneurship, development innovative on the principles of models model entrepreneurship, strategy entrepreneurship, business ethics in entrepreneurship, opportunity analysis, business feasibility studies and business management (marketing, production, finance, resources, business legality, technology and information)

UNP1.61.4201 Guidance and Counseling 2 Credits

Guidance and Counseling is a compulsory university education course that provides insight and understanding of the basic concepts of BK, including; understanding, background, objectives, functions, principles, principles and code of conduct of BK, BK development fields, types of BK services, and BK protection activities as well as BK implementation operations in the implementation of the 2013 Curriculum. In addition, it also discusses the role of the Principal, Deputy Principal , subject teachers, homeroom teachers, BK teachers or counselors and other personnel as well as BK supervisors in BK services at schools.

UNP1.61.5101 Field Experience Program 1 (PPL1) 1 Credit

provide experience for students to observe and how teachers plan to implement learning using various educational media media

UNP1.60.5401 Real Work Lecture (KKN) 2 Credits

Real Work Lecture (KKN) is a field activity for students who are taking the final part of the S-1/D4/Applied Bachelor education program. This program is actually mandatory for all
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students, because the university believes that this program is able to encourage student empathy, and can contribute to solving problems that exist in society. Community service activities are a tangible form of the university's contribution to the community, industry, local government and community groups who want to be economically and socially independent. This KKN program requires Field Supervisors (DPL) and students to play an active role in knowing the existing problems, even before they plunge for 1 to 2.5 months in the midst of the community. Concept "working with community"

has replaced
concept "working for the community".

UNP1.61.6401 Field Experience Program 2 (PPL 2) 1 SKS

Provide experience for students to make observations on the attitudes and ways of teachers planning and carrying out assessments and evaluations

UNP1.61.7401 Field Experience Program 3 (PPL 3) 3 Credits

Provide real experience for students to practice teaching and other school activities for one semester

UNP2.60.1401 Basic Natural Sciences 2 Credits S

This course contains the nature and scope of the human mind and its development, the development of science, the earth and the universe, the diversity of living things and their distribution, living things in natural ecosystems, natural resources and the environment, the benefits and impacts of science and technology on social life, history. human civilization and technological developments, some important technological developments, and environmental issues

UNP2.60.1402 Basic Socio-Cultural Sciences 2 Credits

This course contains: Basic concepts in social and cultural sciences to study Indonesian society and changes in Indonesian society and culture. The subjects are humans and human culture as individuals and human social beings, moral values and human law, human diversity and equality, science technology and human arts and the environment.

UNP2.60.2101 Physical Fitness Education 2 Credits

This course applies the effects and benefits of various movement activities for physical fitness and health through various games, competitions, and sports exercises and abilities.

analyze importance activity ^{physical} for maintain and develop the body's physiological functions and health and can be applied throughout life.

UNP2.60.2102 Japanese 2 Credits

Japanese language courses equip students with knowledge about Japanese language practice so that students have the ability to read and communicate using Japanese.

UNP2.60.2103 Multicultural Education 2 Credits

This multicultural education course contains the concept of multicultural education: the urgency of multicultural education in a diverse Indonesian society, building an inclusive diversity paradigm through educational institutions. prospects and constraints of multicultural implementation, implementation of multicultural education in Indonesia, as well as character building of students through the application of multicultural ideology in the field of education.

UNP2.60.2401 History of the Struggle of the Indonesian Nation 2 Credits

The History of the Nation's Struggle course discusses the meaning and historical meaning of the nation's struggle, imperialism and colonialism, the struggle of the Indonesian nation against imperialism and colonialism, the Indonesian national movement, the struggle for independence, the meaning of the proclamation of efforts to maintain independence against various threats that threaten the unitary state of the Republic of Indonesia, the Republic of Indonesia.

UNP2.60.2402 Disaster Management 2 Credits

This course refers to Law No. 24 of 2007 on Disaster Management (Disaster Management) which includes the introduction of facts or evidence of disaster events, introduction of the concept of disaster, types of disasters, characteristics of disasters, natural disasters, non-natural disasters, disasters social, vulnerable, disaster / hazard (hazard), potential hazard, vulnerability, (vulnerability), capacity, principle of risk reduction (risk), prevention, mitigation, preparedness, disaster prediction, disaster impact, disaster response procedures and emergency response, analysis of rehabilitation and reconstruction needs.

UNP2.60.3401 Minangkabau Natural Culture 2 Credits

This course contains material on Minangkabau customs, both objective and subjective, through the study of objective and subjective customs, students

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are expected to be able to understand the identity of Minangkabau people and be able to find the values of progress contained in adat that are relevant to the challenges of 21st century competence, namely multiculturalism, cooperation, problem solving and so on.

UNP2.60.3402 Information and Communication Technology 2 Credits

This course learns about information and communication technology that can make daily work easier. Understanding usage "Office Applications" software, Internet Technology, Device usage learning animation development software, technology development and application use in education and being able to recognize internet-based business.

FMA1.60.1301 General Biology 4 Credit Points

This course discusses the knowledge of living things and scientific methods, cells as the basis of life, metabolism, structure and organization of plant and animal bodies, biodiversity, structure, functions and processes in human organ systems, ecology, genetics and evolution and biotechnology.

FMA1.60.1302 Calculus 4 Credits

This course discusses the real number system, equations and inequalities, absolute values and absolute inequalities, coordinate systems and simple graphs, functions, limits and continuity, derivatives, related rates, graphs, and integrals.

FMA1.60.1304 General Chemistry 4 Credit Points

This course discusses Stoichiometry, Chemical Energetics, Atomic Structure, Periodic System of Elements, Chemical Bonds and Molecular Geometry, Forms of Matter and Chemical Equilibrium.

FMA1.60.2104 General Physics 4 Credits

This course discusses quantities and units, particle kinematics, particle dynamics, work and energy, linear momentum, angular momentum and rigid bodies, static fluids, dynamic fluids, concepts of temperature and heat, and the laws of thermodynamics.

KIM1.61.2103 Basic chemistry 4 credits

This course discusses solution chemistry, colloids, chemical kinetics, redox and electrochemistry, elemental chemistry (hydrogen, oxygen, nitrogen, phosphorus, halogens,

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noble gases, alkali metals, alkaline earth metals, transition groups), nuclear chemistry and radio chemistry, organic compounds, biochemistry and lab work.

KIM1.61.2104 English for Chemistry 2 Credits

Discussing reading and pronunciation, grammar, vocabulary and idioms in chemistry textbooks

KIM1.61.2105 Mathematics Chemistry 2 Credits

This course discusses mathematical concepts related to chemical problems, namely: function graphs, spatial geometry and trigonometry, differentials, integrals, differential equations, coordinate systems, matrices and determinants, complex numbers and operators.

KIM1.61.3101 Chemical Physics 1 4 Credit Points

This course explains gas equations of state, thermodynamic variables, first law, thermochemistry, second law, third law, material equilibrium, phase one and multicomponent equilibrium. solutions, chemical equilibrium in gases and non-electrolyte solutions, ionic equilibrium, surface chemistry and electrochemistry and practical work on these topics.

KIM1.61.3102 Organic Chemistry 1 4 Credits

This course discusses; definition of carbon compounds, analysis of compounds and molecular formulas hybridization of sp³, sp² and sp carbon atoms, determine the forms of hybrid orbitals, formation of covalent bonds, sigma bonds and pi bonds, bond angles, introduction of organic compounds, saturated and unsaturated hydrocarbons, alkanes, cycloalkanes, alkenes, alkynes and aromatics, organic compounds with single functional groups (aliphatic and aromatic), hydroxy compounds, halides, carbonyls, carboxylic acids and their derivatives as well as practical work on these topics

KIM1.61.3103 Analytical Chemistry 1 4 Credit Points

Qualitative analysis includes cation recognition and group separation reactions. Gravimetry includes depositional and volatilization methods. Titrimetry (Volummetry) includes several terminology, neutralization titration, precipitation titration, complexometry, redox titration. The steps of chemical analysis include problem identification, method selection, sampling, sample application, measurement, data processing and conclusion drawing

KIM1.61.3104 Structure of Inorganic Compounds 4 Credits

Discusses the structure of Inorganic compounds, including: (1) Atomic Structure:

development of atomic theory, especially the wave mechanics atomic model and the electron configuration of elements. (2) A brief overview of the periodic table of elements and their relation to some of the important periodic properties of the elements (metal/electropositive properties, non-metallic/electronegative properties, atomic size, ionization potential, electron affinity, electronegativity); concepts of chemical bonds and electronegativity, especially Pauling's concept of the relationship between bond energies and electronegativity differences. (3) Ionic compounds: the formation of ionic compounds, the use of the Born-Haber circle. Stability of ionic compounds based on lattice energy and heat of formation, role and size of ionic radii, properties of ionic compounds (hardness, non-polar character, boiling point, melting point). (4) Molecular structure: formation of covalent compounds based on: valence bond theory (VBT), hybridization and VSEPR theory, molecular orbital theory (MOT); Complex compounds: bond formation, structure, nomenclature, bond theory in complex compounds: VBT (valence bond theory), CFT (crystal field theory).

KIM1.61.3201 School Chemistry 1 3 Credits

Discussed about: Development of indicators and learning objectives based on KD, concept analysis, and problem analysis for class X material, namely the nature of chemistry, scientific methods, safety and security of work in the laboratory, and the role of chemistry in life; atomic structure, electron configuration relationships in the periodic table of elements; similarity of elemental properties and periodicity of elements; chemical bonds, molecular shape, and intermolecular interactions; molecular shape; interactions between particles; electrolyte and nonelectrolyte solutions; Oxidation and reduction reactions and nomenclature of compounds; Basic laws of chemistry and stoichiometry

KIM1.61.3202 Chemistry Lesson Planning 3 Credits

Analyzing the curriculum, formulating indicators and learning objectives, Determining Teaching Methods and Media, compiling evaluations, compiling RPP and SP according to the teaching planning model, implementing limited teaching in accordance with the teaching planning that has been prepared

KIM1.61.4201 School Chemistry 2 3 Credits

Discussed about: Development of indicators and learning objectives based on KD, concept analysis, and problem analysis for class XI material, namely hydrocarbon compounds; crude oil; combustion of hydrocarbons; thermochemistry; the rate of the reaction and the factors that influence it; rate law and determination of the rate of a reaction; chemical equilibrium and equilibrium shift, equilibrium shift and the factors that influence it; acid and base; ionic balance and pH of the salt solution; ionic and solution balance

buffer; titration; and colloidal systems.

KIM1.61.4101 Chemistry learning evaluation 3 credits

Discusses measurement, assessment, and basic principles of evaluation, techniques and instruments for assessing the learning process and techniques and evaluation instruments

KIM1.61.4102 Chemical Physics 2 4 Credit Points

Discusses: The kinetic theory of gases, properties of gas transport, Chemical kinetics, Reaction mechanisms, Effects of temperature on reaction rates, Catalysis, Photochemistry and practical work on the above topics

KIM1.61.4103 Organic Kima 2 4 Credits

This course discusses chemical formulas, nomenclature, manufacture, reactions, classification, chemical-physical properties, their presence, and the use of several organic compounds including esters, amides, amines, enolates, carbanions, dual-function acids, carbohydrates, lipids, Amino acids, peptides and proteins, alkaloids, flavonoids, steroids and terpenoids and practical work on the above topics

KIM1.61.4104 Analytical Chemistry 2 4 Credits

Learn about separation in chemical analysis including: distillation, extraction, chromatography including paper chromatography, thin layer, column chromatography, introduction to gas chromatography and HPLC, basics of electroanalysis include: indicator electrode, comparison electrode, potential meter and pH meter

KIM1.61.4105 Fundamentals of Inorganic Reactions 4 Credits

Discusses about inorganic reactions which include: Chemical forces, the basic principles of chemical reactions; bond energy, enthalpy and entropy, solubility of substances and the role of the medium in chemical reactions, acid-base systems: water ion systems, solvent systems, proton acceptor donor systems, electron pair acceptor donor systems, and proton affinities, redox and electrochemical systems: reaction relationships redox and acid-base reactions, inorganic reactions in aqueous and non-aqueous media, as well as practical work on some of the topics above

KIM1.61.5201 School Chemistry 3 2 Credits

Discusses about: Development of indicators and learning objectives based on KD, concept analysis, and problem analysis for class XII material, namely the colligative properties of solutions; colligative properties of electrolyte and nonelectrolyte solutions; cell

voltaic; elemental chemistry; structure, nomenclature, properties, isomers, identification and use of compounds; benzene and its derivatives; and structure, nomenclature, properties, use and classification of macromolecules

KIM1.61.5101 Learning Strategy 3 Credits

This course discusses learning models, strategies, and methods and their application to chemistry learning

KIM1.61.5102 Learning and IT Media 2 Credits

Discussing learning media and IT applications in planning, making and using media

KIM1.61.5103 Chemical Physics 3 3 Credit Points

This course discusses the theory of gas kinetics, chemical kinetics, complex reaction orders, consecutive reactions, reaction mechanisms and reaction rate theory, homogeneous, heterogeneous catalysts, acids and bases, enzymes and their implications in chemical reactions. Photochemistry: laws of photochemistry, intra and intermolecular processes, fluorescence and phosphorescence

KIM1.61.5104 Organic Chemistry III 3 Credit Points

Organic compounds with natural ingredients are terpenoids, steroids, phenyl, propane, polyketyl hormones, xanthenes and quinones, flavonoids and alkaloids. Changes in each group include the source of plants or organisms, the origin of biogenesis, specific reactions that reflect each group and the use of organic compounds from natural materials.

KIM1.61.5105 Elemental Chemistry 3 Credit Points

Discussing about the elements (history, existence, manufacture, properties, compounds, structure and uses) includes: s block elements; alkaline and alkaline earth elements, p block elements; boron group elements, carbon, nitrogen, oxygen, halogens and noble gases, d block elements; important transition elements, especially first series transition elements, f block elements; lanthanide and actinide elements

KIM1.61.5106 Basic Biochemistry 3 Credits

Discusses the basic principles of biochemistry, cell structure and function, water, amino acids, proteins, enzymes, carbohydrates, nucleic acids, lipids, vitamins, minerals, hormones, antibodies, antibiotics and transport through cell membranes as well as practicum on the above topics

KIM1.61.6201 Micro teaching 2 credits

Discusses the basics of microteaching and the eight basic skills in teaching

KIM1.61.6202 School Chemistry Laboratory Management Skills 2 Credits

Discusses laboratory management and practicum implementation in schools, as well as discussions about planning laboratory activities for high school/MA chemistry materials

KIM1.61.6101 Educational Research Methodology 2 Credits

This course discusses how to find the truth of science, understanding research, problem selection, data collection, data analysis techniques, research proposals, use of references, developing theoretical frameworks, research and research reports.

KIM1.61.6102 Chemistry Seminar 2 Credits

Train to compose scientific concepts in writing and convey them in the forum orally. Identifying a problem and its approach, data collection techniques, data complications, and problem formulation. Techniques and strategies for conveying popular scientific communication data

KIM1.61.6302 Education Statistics 2 Credits

Discuss basic statistics and its application to educational research

KIM1.61.6303 Spectrometric Analysis 2 Credits

This course discusses the relationship of electromagnetic energy with molecules or atoms and Spectrophotometer methods and instruments.

KIM1.61.6304 Biochemistry Metabolism 3 Credits

Discusses digestion, metabolism in general (Carbohydrates, Proteins, Lipids), photosynthesis and genetic engineering. and practice the above topics

KIM1.61.7301 Thesis 6 Credits

Determination of the problem in the object of research; identification of problems within the scope of education in the field of chemistry, and selection of problems to be solved. Preparation of activity plans, sharpening problems, determining

approach/problem solving method as well as research methodology, program formulation and activity implementation schedule. Preparation of activities; technical preparation (compilation of instruments, selection of tools/materials, etc.), administrative preparation (completion of permits, etc.), data processing and analysis. Presentation of theses or reports, printing and duplicating of theses/reports

KIM1.61.7302 Applied Chemistry 2 Credits

Practicing making shoe polish, making porcelain and ceramic cleaners, making charcoal briquettes, making solid, liquid and dab soap, making VCO, making nata, making tofu and tempeh, making soy milk, making soy sauce, making mosquito repellent, and making wet noodles. and making yogurt

KIM2.61.1101 Environmental Chemistry 2 Credits

This course studies the hydrological cycle, characteristics of water bodies, chemical reactions in the aquatic environment, heavy metal and refrigerant cycles, changes in species of chemical compounds in waters, water pollution, atmospheric composition, photochemical reactions in the atmosphere, ozone-depleting chain reactions, changes in compound species. chemistry in the atmosphere, basic knowledge of EIA, environmental quality standards, basic knowledge of wastewater treatment.

KIM2.61.1102 Computer application 2 Credits

learn skills for _____ operate _____ computer and use it in the field of work, especially those related to education. Able to access the internet and understand about websites and email, able to use software for scientific writing, graphic design, and making learning media

KIM2.61.6301 Chemical Management and Entrepreneurship 2 Credits

a B C

KIM2.61.6101 Computer Applications 2 Credits

This course learns the skills to operate computers and use them in the field of work, especially those related to education. Able to access the internet and understand about websites and email, able to use software for scientific writing, graphic design, and making learning media

KIM2.61.6302 Molecular modeling 2 credits

This course studies the modeling of chemical systems, starting from modeling 3-dimensional structures based on x, y and z coordinates, calculating physical and chemical properties, predicting the biological activity of a compound, and predicting interactions that occur in a system.

KIM2.61.6303 Multirepresentation of chemistry 2 credits

This course studies how to represent chemistry at three levels; i.e. the level of macroscopic representation

KIM2.61.6304 Natural Materials Chemistry 2 Credits

This course studies organic compounds with natural ingredients such as terpenoids, steroids, phenyl, propane, polyketyl hormones, xanthenes and quinones, flavonoids and alkaloids. Changes in each group include the source of plants or organisms, the origin of biogenesis, specific reactions that reflect each group and the use of organic compounds from natural materials.

KIM2.61.6305 Environmental Chemistry 2 Credits

This course studies the hydrological cycle, characteristics of water bodies, chemical reactions in the aquatic environment, heavy metal and refrigerant cycles, changes in species of chemical compounds in waters, water pollution, atmospheric composition, photochemical reactions in the atmosphere, ozone-depleting chain reactions, changes in compound species. chemistry in the atmosphere, basic knowledge of EIA, environmental quality standards, basic knowledge of wastewater treatment.

2. Chemistry Study Program (S1)

1. Vision.

Becoming an excellent study program at the national level in 2020 based on devotion to God Almighty

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Mission.

- a. Carry out excellent education in the field of Chemistry based on faith and piety
- b. Carry out excellent research in the field of chemistry
- c. Improving the governance of study programs with excellent service in
- d. Carrying out community service that excels in the field of chemistry
- e. Carry out local, national and international cooperation

2. Destination

- a. Objectives To produce graduates as qualified members of society and actively participate in development.
- b. Collaborating with other universities, industry and chemistry study programs to produce Chemistry graduates who:
- c. Mastering chemistry material comprehensively, so as to be able to find, understand, explain and formulate methods solving problems in chemistry.
- d. Able to apply chemistry in the field of work, either directly or indirectly.
- e. Able to be entrepreneurial in the chemical field to create jobs.
- f. Able to follow the development of science and technology, especially chemistry and can apply it to the community.

3. Competence of graduates

a. Main Competencies

Field of Work Competence

1. Able to produce appropriate conclusions based on the results of identification, analysis, isolation, transformation and synthesis of chemicals that have been carried out
2. Able to solve science and technology problems in general and simple chemistry such as identification, analysis, isolation, transformation and synthesis of micromolecules through the application of knowledge of molecular structure and properties, analysis and synthesis methods in specific chemical fields, as well as the application of relevant technologies.

3. Able to present several alternative solutions in the field of identification, analysis, isolation, transformation and synthesis of chemicals at a simple molecular level that can be used as a basis for quick decision making

4. Mastering knowledge of structure, molecular properties, identification, separation, characterization, transformation, synthesis of micromolecular chemicals and their applications

5. Mastering knowledge of functions, how to operate common chemical instruments

Knowledge Mastery Competence

Mastering knowledge of structure, molecular properties, identification, separation, characterization, transformation, synthesis of micromolecular chemicals and their applications. Mastering knowledge of functions, how to operate common chemical instruments. Mastering the applications *software*, basic instruments, standard methods for analysis and synthesis in general or more specific chemistry fields (organic, biochemical, analytical, physical or inorganic chemistry)

b. Special Competencies

Field of Work Competence

1. Mastering the application *software*, basic instruments, standard methods for analysis and synthesis in general or more specific chemistry fields (organic, biochemical, analytical, physical or inorganic chemistry)
2. Able to design procedures and setup practicum tools in the fields of chemistry, analysis and synthesis
3. Able to operate one of the chemical instruments such as XRF, AAS, HPLC, FTIR, GC-MS, HIC, DTA, UV-Vis Spectrophotometer to conduct advanced research
4. Able to apply chemistry in the field of chemical guidance for high school students
5. Mastering chemistry as the basis for continuing education in the Chemistry Masters program S
6. Able to create jobs in the sale of tools and chemicals
7. Able to create jobs in the field of household chemical production such as making soap, syrup, nata, vco, soy sauce, noodles and others
8. Able to use computer in computational chemistry
9. Able to use English in daily life
10. Have a noble personality, good character and fear of God Almighty

4) Course Structure

Department : Chemistry

program Study : Chemistry (S1)

No	Code	Courses	credits				Sem
			Quantity	T	P	L	
1). University Compulsory Courses							
A.Required							
1	UNP1.60.1401	Religious education	3	3	0	0	1
2	UNP1.60.1402	Pancasila Education	2	2	0	0	1
3	UNP1.60.1403	Education Citizenship	2	2	0	0	1
4	UNP1.60.1404	Indonesian	2	2	0	0	1
5	UNP1.60.1405	English	2	2	0	0	1
6	UNP1.60.3101	Entrepreneurship	3	3	0	0	3
7	UNP1.60.5401	Real Work Lecture (KKN)	2	0	0	2	5
Number of Credits			16	14	0	2	
2). University Elective Courses							
A.Choose 2 of 18 Credits							
1	UNP2.60.1402	Basic Socio-Cultural Sciences	2	2	0	0	1
2	UNP2.60/2402	Disaster Management	2	2	0	0	2
Number of Credits			4	4	0	0	
B.Choose 2 of 6 Credits							
1	UNP2.60.1401	Basic Natural Science	2	2	0	0	1
2	UNP2.60.2101	Fitness Education Physical	2	2	0	0	2
3	UNP2.60/2102	Japanese language	2	2	0	0	2
4	UNP2.60.2103	Multicultural Education	2	2	0	0	2
5	UNP2.60/2401	History of the Nation's Struggle Indonesia	2	2	0	0	2
6	UNP2.60.3401	Natural Culture MinangKabau	2	2	0	0	3
7	UNP2.60.3402	Information Technology and Communication	2	0	2	0	3
Number of Credits			14	12	2	0	

No	Code	Courses	credits				Sem
			Quantity	T	PL		
3). Faculty Compulsory Courses							
A.Required							
1	FMA1.60.1301	General biology	4	3	1	0	1
2	FMA1.60.1302	Calculus	4	3	1	0	1
3	FMA1.60.1303	General Physics	4	3	1	0	1
4	FMA1.60.1304	General Chemistry	4	3	1	0	1
Number of Credits			16	12	4	0	
4). Study Program Compulsory Courses							
A.Required							
1	KIM1.62.1001	Management and work safety laboratory	2	1	0	1	1
2	KIM1.62.2001	Chemistry Math	2	2	0	0	2
3	KIM1.62.202	Statistics	2	2	0	0	2
4	KIM1.62.2004	basic chemistry	4	3	1	0	2
5	KIM1.62.2005	English for chemistry	2	2	0	0	2
6	KIM1.62.3001	Organic chemistry 1	4	3	1	0	3
7	KIM1.62.3002	Physical Chemistry 1	4	3	1	0	3
8	KIM1.62.3003	Analytical chemistry 1	4	3	1	0	3
9	KIM1.62.3004	Structure of Inorganic Compounds	4	3	1	0	3
10	KIM1.62.4001	Organic Chemistry 2	4	3	1	0	4
11	KIM1.62.4002	Analytical Chemistry 2	4	3	1	0	4
12	KIM1.62.4003	Chemical Physics 2	4	3	1	0	4
13	KIM1.62.4004	Basic Inorganic Reaction	4	3	1	0	4
14	KIM1.62.4005	Chemical industry	2	2	0	0	4
15	KIM1.62.5001	Physical Chemistry 3	3	3	0	0	5
16	KIM1.62.5002	Basic Biochemistry	4	3	1	0	5
17	KIM1.62.5003	Organic Chemistry 3	3	3	0	0	5
18	KIM1.62.5004	Elemental Chemistry	4	3	1	0	5

No	Code	Courses	credits				Sem
			Quantity	T	PL		
19	KIM1.62.5005	Electrochemistry	4	3	1	0	5
20	KIM1.62.5006	Industrial Visit	1	1	0	0	5
21	KIM1.62.6001	Metabolic biochemistry	4	3	1	0	6
22	KIM1.62.6002	Instrument Analysis 1	3	2	1	0	6
23	KIM1.62.6003	Chemical environment	2	1	0	1	6
24	KIM1.62.6004	Industrial Practice	2	0	0	2	6
25	KIM1.62.6005	Organic Chemistry Physics	2	2	0	0	6
26	KIM1.62.6006	Core chemistry and Computational	2	2	0	0	6
27	KIM1.62.6007	Chemistry radiochemistry	2	2	0	0	6
28	KIM1.62.7001	Analysis of molecular structure	2	2	0	0	7
29	KIM1.62.7002	Analysis Instrument 2	3	2	1	0	7
30	KIM1.62.7003	Molecular Biochemistry	3	2	1	0	7
31	KIM1.62.7004	Chemistry Research	2	2	0	0	7
32	KIM1.62.7005	Methodology Applied Chemistry	2	2	0	0	7
33	KIM1.62.7006	Literature Seminar	2	1	1	0	7
34	KIM1.62.7007	Proposal Seminar	2	2	0	0	7
35	KIM1.62.8001	Results Seminar	1	1	0	0	8
36	KIM1.62.8002	Thesis examination	3	3	0	0	8
Number of Credits			102	81	17	4	
5). Study Program Elective Courses							
A.Choose 2 of 6 Credits							
1	KIM2.62.4001	Computer application	2	0	2	0	4
2	KIM2.62.4002	Chemical modeling	2	2	0	0	4
3	KIM2.62.4003	Multi Representation of Chemistry	2	2	0	0	4
Number of Credits			6	4	2	0	
B.Choose min 8 credits, 6 credits in the field group research							
1	KIM2.62.5001	Polymer Physics Chemistry 2		2	0	0	5
2	KIM2.62.5002	Colloidal and surface chemistry 2		2	0	0	5

No	Code	Courses	credits				Sem
			Quantity	T	PL		
3	KIM2.62.5003	Surface physics chemistry	2	2	0	0	5
4	KIM2.62.5004	Capita Seleka of Physical Chemistry	2	2	0	0	5
5	KIM2.62.5005	Inorganic polymer chemistry Capita	2	2	0	0	5
6	KIM2.62.5006	seleka of organic chemistry Kapita	2	2	0	0	5
7	KIM2.62.5007	seleka of biochemistry	2	2	0	0	5
8	KIM2.62.5008	Capita selecta analytical chemistry	2	2	0	0	5
9	KIM2.62.5009	Capita selecta chemistry inorganic	2	2	0	0	5
10	KIM2.62.6001	Food Biochemistry	2	2	0	0	6
11	KIM2.62.6002	Coordination Chemistry	2	2	0	0	6
12	KIM2.62.6003	Material Chemistry	2	2	0	0	6
13	KIM2.62.6004	Surfactant Chemistry	2	2	0	0	6
14	KIM2.62.6005	Chemical Thermodynamics	2	2	0	0	6
15	KIM2.62.6006	Metal organo	2	2	0	0	6
16	KIM2.62.6007	Organic polymer chemistry	2	2	0	0	6
17	KIM2.62.6008	Nanotechnology	2	2	0	0	6
18	KIM2.62.6009	Enzymology	2	2	0	0	6
19	KIM2.62.6010	Synthetic organic chemistry	2	2	0	0	6
20	KIM2.62.6011	Modern chromatographic techniques	2	2	0	0	6
21	KIM2.62.6012	Applied analysis	2	2	0	0	6
22	KIM2.62.6013	Preconcentration Technique	2	2	0	0	6
23	KIM2.62.6014	Catalyst chemistry	2	2	0	0	6
24	KIM2.62.6015	Membrane technology	2	2	0	0	6
25	KIM2.62.6016	Inorganic Synthesis	2	2	0	0	6
26	KIM2.62.6017	Fuel Cell	2	2	0	0	6
27	KIM2.62.6018	Medical biochemistry	2	2	0	0	6
28	KIM2.62.7001	Natural Chemicals	2	2	0	0	7
29	KIM2.62.7002	Solid Substance Chemistry	2	2	0	0	7
30	KIM2.62.7003	Chemical Kinetics	2	2	0	0	7

No	Code	Courses	credits				Sem
			Quantity	T	PL		
31	KIM2.62.7004	Biotechnology	2	2	0	0	7
32	KIM2.62.7005	Advanced Analysis Techniques	2	2	0	0	7
33	KIM2.62.7006	Biosensor	2	2	0	0	7
34	KIM2.62.7007	Advanced inorganic chemistry	2	2	0	0	7
35	KIM2.62.7008	Quantum chemistry	2	2	0	0	7
36	KIM2.62.7009	Ceramic and composite chemistry	2	2	0	0	7
Number of Credits			72	72	0	0	

Synopsis

UNP1.60.1401 Religious Education 3 Credits

The One and Only Godhead: faith and piety, divine philosophy (Theology); Humans: human nature, human dignity, human responsibility; Law: raise awareness to obey God's law, the prophetic function of religion in law: Moral: religion as a source of morals, your character in life; Science, Technology and Arts: Faith, science and technology, and society as a unit, the obligation to demand and practice knowledge, the responsibility of scientists and artists; inter-religious harmony: religion is God's grace for all, togetherness in religious plurality; Civilized and prosperous society, the role of religious communities in creating a civilized and prosperous society, Human Rights (HAM) and democracy Culture: academic culture, work ethic, open and fair attitude; Politics: the contribution of religious adherents in political life,

UNP1.60.1402 Pancasila Education 2 Credits

This course contains the understanding of the urgency and reasons for the need for Pancasila education in Higher Education; Pancasila in the current history of Indonesia; Pancasila as a philosophical system, as the state foundation of the Republic of Indonesia, as a state ideology, as an ethical system, and Pancasila as the basis for the value of developing science; The thinking and implementation of Pancasila faces current actual problems, such as issues of human rights, racial and economic criticism, as well as problems of radicalism that must be solved in accordance with the values of Pancasila.

UNP1.60.1403 Citizenship Education 2 Credits

This course contains the nature of civic education in developing full undergraduate or professional abilities; the essence and urgency of national identity as one of the determinants of nation building and character, the urgency of national integrity and national unity; constitutional values and norms of the 1945 Constitution of the Republic of Indonesia and the constitutional provisions of the legislation under the Constitution; harmony of obligations and rights of the state and citizens in a democracy that is based on people's sovereignty and deliberation for consensus; the nature, instrumentation, and practice of Indonesian democracy based on Pancasila and the 1945 Constitution of the Republic of Indonesia; constitutional historical dynamics, socio-political culture,

UNP1.60.1404 Indonesian 2 Credits

This course contains the Conception of Indonesian Language, History of Indonesian Language, Position and Functions of Indonesian Language, Indonesian Language Spelling Variations, (punctuation letters, words and absorption elements: Effective Sentences, Definition of Characteristics, Terms of Effective Sentences: Paragraphs, Types, Functions and Development: Writing Framework Theme, Topic, Title and Type of Outline: Writing Text (Scientific Academic Text and Non-Academic Text: BI Official Letter (Format and Type of Indonesian Official Letter.

UNP1.60.1405 English 2 Credits

This course contains the development of English language skills in an integrated manner by paying attention to the needs of students according to the midwife of their department, including understanding basic sentence patterns that help students understand various English references and equip students with communication skills in English according to their field of expertise.

UNP1.60.3101 Entrepreneurship 3 Credits

This course contains knowledge, attitudes and skills based on creative and innovative thinking regarding the basic principles of entrepreneurship, entrepreneurial development models, entrepreneurial strategies

business ethics in entrepreneurship, opportunity analysis, business feasibility studies and business management (marketing, production, finance, business legality resources, technology and information)

UNP1.60.5401 Real Work Lecture (KKN) 2 Credits

The Real Work Lecture (KKN) is a field activity for students who are taking the final part of the S-1/D 4/Applied Bachelor's education program. This program is actually mandatory for all students, because the university believes that this program can encourage student empathy, and can contribute to solving problems that exist in society. Community service activities are a tangible form of the university's contribution to the community, industry, local government and community groups who want to be economically and socially independent. This KKN program requires Field Supervisors (DPL) and students to play an active role in knowing the existing problems, even

before they plunge for 1 to 2.5 months in the middle Public. Concept "working with community" have replace concept "working for the community".

UNP2.60.1401 Basic Natural Sciences 2 Credits S

This course contains the nature and scope of the human mind its development, the development of science, the earth and the universe, the diversity of living things and their distribution, living things in natural ecosystems, natural resources and the environment, the benefits and impacts of science and technology on social life, the history of human civilization and technological developments, several important technological developments, and issues environment

UNP2.60.1402 Basic Socio-Cultural Sciences 2 Credits

This course contains: Basic concepts in social and cultural sciences to study Indonesian society and changes in Indonesian society and culture. The subjects are humans and human culture as individuals and human social beings, moral values and human law, human diversity and equality, science, technology and human arts and the environment.

UNP2.60.2101 Physical Fitness Education 2 Credits

This course applies the effects and benefits of various movement activities for physical fitness and health through various activities

kinds of games, competitions, and sports exercises as well as the ability to analyze the importance of physical activity to maintain and develop physiological functions of the body and health and can be applied throughout life.

UNP2.60.2102 Japanese 2 Credits

Japanese language courses equip students with knowledge about Japanese language practice so that students have the ability to read and communicate using Japanese.

UNP2.60.2103 Multicultural Education 2 Credits

This multicultural education course contains the concept of multicultural education: the urgency of multicultural education in a diverse Indonesian society, building an inclusive diversity paradigm through educational institutions. prospects and constraints of multicultural implementation, implementation of multicultural education in Indonesia, and character building of students through the application of multicultural ideology in the field of education.

UNP2.60.2401 History of the Struggle of the Indonesian Nation 2 Credits

The History of the Nation's Struggle course discusses the meaning and historical meaning of the nation's struggle, imperialism and colonialism, the struggle of the Indonesian nation against imperialism and colonialism, the Indonesian national movement, the struggle for independence, the meaning of the proclamation of the effort to defend independence against various threats that threaten the unitary state of the Republic of Indonesia, NKRI

UNP2.60.2402 Disaster Management 2 Credits

This course refers to Law No. 24 of 2007 concerning Disaster Management, which includes the introduction of facts or evidence of disaster events, introduction to the concept of disaster, types of disaster characteristic of disasters, natural disasters, non-natural disasters, social disasters, disaster swamps/hazards (hazards), potential hazards, vulnerability, capacity, principles of risk reduction (risk prevention, mitigation, preparedness, disaster prediction, disaster impact, disaster response procedures and emergency response, analysis of rehabilitation needs and reconstruction.

UNP2.60.3401 MinangKabau Natural Culture 2 Credits

This course contains material on Minangkabau customs, both object and subjective. Through the study of objective and subjective customs, students are expected to be able to understand Minangkabau human identity and be able to discover the values of progress contained in adat that are relevant to the challenges of 21st century competence, namely multiculturalism, problem solving cooperation and so on.

UNP2.60.3402 Information and Communication Technology 2 Credits

This course learns about information and communication technology that can make daily work easier. Understanding device usage "Office Applications" software, Internet Technology, Software usage development of learning animations, development of technology and use of applications in the field of education as well as being able to recognize internet-based business.

FMA1.60.1301 General Biology 4 Credit Points

This course discusses knowledge of living things and scientific methods, cells as the basis of life, metabolism, structure and organization of plant and animal bodies, biodiversity, structure, functions and processes in human organ systems, ecology, genetics and evolution as well as biotechnology.

FMA1.60.1302 Calculus 4 Credits

This course discusses the real number system, equations and inequalities, absolute values and absolute inequalities, coordinate systems and simple graphs, functions, limits and continuity, derivatives, related rates, graphs and integrals.

FMA1.60.1303 General Physics 4 Credit Points

This course discusses quantities and units, particle dynamics of particle kinematics, work and energy, linear momentum, angular momentum and rigid bodies, static fluids, dynamic fluids, concepts of temperature and heat, and the laws of thermodynamics.

FMA1.60.1304 General Chemistry 4 Credit Points

This course discusses Stoichiometry, Chemical Energetics, Atomic Structure, Periodic System of Elements, Chemical Bonds and Molecular Geometry, Z Form and Chemical Equilibrium.

KIM1.62.1001 Laboratory work management and safety 2 credits

This course must be followed by new students as a provision in carrying out practicum in the laboratory

KIM1.62.2001 Mathematics Chemistry 2 Credits

This course discusses mathematical concepts related to chemistry problems, namely; graphs of functions, space geometry and differential trigonometry, integrals, differential equations, coordinate systems, matrices and determinants, complex numbers and operators

KIM1.62.2002 Statistics 2 Credits

This course studies statistics which are useful in learning chemistry

KIM1.62.2004 basic chemistry 4 credits

This course discusses solution chemistry, colloids, chemical kinetics, redox and electrochemistry, elemental chemistry (hydrogen, oxygen, nitrogen, phosphorus, halogens, noble g, alkali metals, alkaline earth metals, transition groups), nuclear chemistry and chemical rad, organic compounds, biochemistry and practicum

KIM1.62.2005 English for chemistry 2 credits

Improve English language skills through reading and pronunciation exercises, improve grammar, enrich vocabulary and use idioms and usage, especially chemistry textbooks

KIM1.62.3001 Organic chemistry 1 4 credits

This course discusses; understanding of carbon compounds, analysis of compounds and molecular formulas hybridization of sp³, sp² and sp carbon atoms, determining the form of hybrid orbitals, formation of covalent bonds, sigma bonds and bond angle pH bonds, introduction of organic compounds, saturated and unsaturated hydrocarbons alkanes, cycloalkanes, alkenes, alkynes and aromatics, single-function organic compounds (aliphatic and aromatic), hydroxy compounds, halides, carbonyls, carboxylic acids and their derivatives

KIM1.62.3002 Chemical Physics 1 4 Credit Points

Explain the equations of state of gases, thermodynamic variables, first law

thermochemistry, second law, third law, single and multicomponent phase equilibrium of matter. solution, chemical equilibrium in gas and non-electrolyte solutions, ionic equilibrium, surface chemistry and electrochemistry.

KIM1.62.3003 Analytical chemistry 1 4 Credit Points

The steps of chemical analysis include problem identification, method selection, sampling, sample application, measurement, processing and conclusion. Qualitative analysis includes cation-loving reactions and group separation. Gravimetry includes depositional and volatilization methods. Titrimetry (Volumetry) includes several terminology, neutralization titration, precipitation titration, complexometry, redox titration.

KIM1.62.3004 Structure of Inorganic Compounds 4 Credits

Discusses the structure of inorganic compounds, including: Atomic structure, development of atomic theory, especially atomic models, wave mechanics, and elemental electron configurations. A brief overview of the periodic table of elements and their relation to some of the important periodic properties of the elements (metal/electropositive shift, non-metal/electronegative properties, atomic size, ionization potential, electron affinity, electronegativity); concepts of chemical bonding and electronegativity, especially Pauling's concept of the relationship between bond energies and electronegativity differences. Ionic compounds: formation of ionic compounds using the Born-Haber cycle. The stability of ionic compounds is based on ionization energy and heat of formation, the role and size of ionic radii, properties of ionic compounds (hardness, non-polar character, boiling point, melting point). The molecular structure of the formation of covalent compounds is based on:

KIM1.62.4001 Organic Chemistry 2 4 Credits

This course learns about chemical formulas, nomenclature, making reactions, classification, chemical-physical properties, their presence, and the use of several organic compounds including esters, amides, amines, enolates, carbanions, dual-functional acids, carbohydrates, lipids, acids. Amines, peptides and proteins, flavonoid alkaloids, steroids and terpenoids.

KIM1.62.4002 Analytical Chemistry 2 4 Credits

This course learns about separation in chemical analysis including distillation, extraction, chromatography including paper chromatography, thin layer column chromatography, introduction to gas chromatography and HPLC

KIM1.62.4003 Chemical Physics 2 4 Credit Points

This course discusses: kinetic theory of gases, properties of gas transport, chemical kinetics, reaction mechanisms, effect of temperature on reaction rates, photochemical catalysts.

KIM1.62.4004 Basic Inorganic Reaction 4 Credits

This course discusses inorganic reactions which include: Chemical forces, the basic principles of chemical reactions; bond energy, enthalpy and entropy, solubility and the role of the medium in chemical reactions, acid-base systems: ion systems a solvent systems, proton acceptor donor systems, electron pair acceptor donor systems, and proton affinities, redox and electrochemical systems: redox reactions relationships and acid-base reactions, inorganic reactions in aqueous medium and non-aqueous medium.

KIM1.62.4005 Industrial chemistry 2 Credits

This course discusses the application of various fields of chemistry in industry, such as cement, soap, coal, ceramics and others.

KIM1.62.5001 Physical Chemistry 3 3 Credit Points

This course studies the theory of gas kinetics, chemical kinetics, complex reaction orders, consecutive reactions, reaction mechanisms and reaction rate theory. Homogeneous, heterogeneous catalysts, acids and bases, enzymes and their implications in chemical reactions. Photochemistry: laws of photochemistry, intra and intramolecular processes, fluorescence, and phosphorescence.

KIM1.62.5002 Basic Biochemistry 4 Credits

This course discusses the basic principles of biochemistry, cell structure and function, water, amino acids, proteins, enzymes, carbohydrates, nucleic acids, lipids, vitamin minerals, hormones, antibodies, antibiotics and transport through cell membranes.

KIM1.62.5003 Organic Chemistry 3 3 Credits

This course studies intramolecular properties: bond dissociative energy, bond moment and dipole moment. Structural effects on molecular reactivity: inductive, mesomeric and steric effects. Types of reaction mechanisms and methods of determining non-kinetic and kinetic reaction mechanisms. Intermolecular properties include organic reactions, reaction mechanisms and factors that influence reactivity. Substitution reactions (SN, SE, SH) in aliphatic and aromatic systems, elimination reactions (E1, E2, Ei, E1cB), super reactions (electrophilic, nucleophilic and free radicals). The 1,2 da rearrangement reactions instead of 1,2 rearrangements in electron-deficient systems (shift to CN and O atoms), rearrangements in electron-rich systems. Oxidation-reduction reactions, general rules for the oxidation state of the C atom, as well as the mechanism of oxidation and reduction reactions.

KIM1.62.5004 Elemental Chemistry 4 Credit Points

This course studies the elements (history, existence, properties, compounds, structures and uses) including: s block elements; alkaline and alkaline earth elements, p block elements; boron group elements, carbon nitrogen, oxygen, halogens and noble gases, d block elements; important transition elements, especially the first series transition elements, f block elements; lanthanide and actinide elements.

KIM1.62.5005 Electrochemistry 4 Credit Points

This course studies electrochemical cell reactions, energy and potential, electrochemical instruments and their applications.

KIM1.62.5006 Industrial Visit 1 Credit

This course visits industry and research institutes of kim as well as campuses related to chemistry.

KIM1.62.6001 Metabolic biochemistry 4 Credits

This course discusses digestion, metabolism in general (Carbohydrates, Proteins, Lipids), photosynthesis and genetic engineering.

KIM1.62.6002 Instrument Analysis 1 3 Credits

Eye college this learn about various kind of instrument spectrophotometry such as: UV-Vis, IR, MS, Raman, and NMR.

KIM1.62.6003 Environmental Chemistry 2 Credits

This course discusses the notion of the environment, the relationship between chemistry and the environment, environmental pollution, additives, and environmental toxicants.

KIM1.62.6004 Industrial Practice 2 Credits

This course requires students to carry out industrial-industrial field practice related to chemistry for 1 to 3 months.

KIM1.62.6005 Organic Chemistry Physics 2 Credits

Intramolecular properties: bond dissociation energy, bond moment and dipole moment. Structural effects on molecular reactivity: inductive, mesomeric and steric effects. Types of reaction mechanisms and methods of determining non-kinetic and kinetic reaction mechanisms. Intermolecular properties include organic reactions, reaction mechanisms and factors affecting reactivity Substitution reactions (SN, SE, SH) in aliphatic and aromatic systems, elimination reactions (E1, E2, Ei, E1cB), addition reactions (electrophilic, nucleophilic), and free radicals). The 1,2 rearrangement reactions instead of 1,2 rearrangements in the electron-deficient system (shift to C, N and O atoms), rearrangements in the electron-rich system. Oxidation-reduction reactions: general rules for the oxidation state of C atoms and the mechanism of oxidation and reduction reactions

KIM1.62.6006 Core chemistry and radiochemistry 2 Credit Points

This course studies the structure of atoms, particles of matter, decay properties of nuclear models, nuclear reactions and their mechanisms, types of reactions in the interaction of radioactive radiation with matter, detection and measurement of nuclear energy radioactivity, radioisotope applications, and radiation chemistry.

KIM1.62.6007 Computational Chemistry 2 Credits

This course studies computer programming languages and how they are used in chemistry, both in education and research. In teaching chemistry is studying chemistry through the CD program. In kim is to determine the reaction order, bond energy, bond length, structure and properties of compounds through the Calzaferri program, EHMO, and others.

KIM1.62.7001 Molecular structure analysis 2 Credits

This course studies the interpretation of data obtained through

FTIR, GC, MS, UV-Vis and NMR analysis.

KIM1.62.7002 Instrument Analysis 2 3 Credits

This course studies the instruments used in chemical analysis such as XRD, XRF, DTG, DSC, DTA.

KIM1.62.7003 Bio Molecular Chemistry 3 Credits

This course studies genetic engineering including the expression of recombinant DNA, genetic material, DNA and RNA.

KIM1.62.7004 Chemical Research Methodology 2 Credits

This course studies the techniques of making research proposals.

KIM1.62.7005 Chemical Literature Seminar 2 Credits

This course teaches students seminars on chemical literature

KIM1.62.7006 Applied Chemistry 2 Credits

This course studies the application of chemistry in everyday life

KIM1.62.7007 Proposal Seminar 2 Credits

This course requires students to present a research proposal on a final project.

KIM1.62.8001 Seminar Results 1 Credit

This course requires students to present the results of their research.

KIM1.62.8002 Thesis Exam 3 Credits

In this course, students will be tested comprehensively on all the knowledge gained during college.

KIM2.62.4001 Computer Applications 2 Credits

This course learns the skills to operate computers and use them in the field of work, especially those related to midwives

chemistry. Able to access the internet and understand about websites and email, able to use Microsoft Office materials, such as: MS Word, M Excel and MS Power Point, able to edit photos using Photoshop software, able to understand and create learning media in the form of interactive CDs using Macromedia Director and Flash.

KIM2.62.4002 Chemical modeling 2 Credits

This course studies how to describe chemical compounds through a computer.

KIM2.62.4003 Multi Representation Chemistry 2 Credits

This course teaches the multi-representation of chemistry.

KIM2.62.5001 Polymer Physics Chemistry 2 Credits

This course studies the synthesis and reactions of thermodynamic polymers and the kinetics of polymerization, physical characterization of polymerized polymers, testing and use of polymers. Organic polymers and their characteristics, polyphosphazenes, polysaxones and related polymers, and various other organic polymers. The polymer in solution will be related to lattice theories and molecular weight distribution, measurements of light scattering, osmotic pressure and viscosity. Rheological, thermal, and core magnetic resonance (NMR) characterization of solid polymers.

KIM2.62.5002 Colloidal and surface chemistry 2 Credit Points

The scope of colloid and surface chemistry, sedimentation and fusion and their equilibrium, solution thermodynamics, osmotic and equilibrium Donnan viscosity and aqueous dispersion, light scattering, surface tension and contact contact, applications of pure solutions, adsorption of solutions, structure of colloids in surfactant solutions, adsorption physics at the solid-gas and liquid-liquid interfaces of metal surfaces, microscopy, spectroscopy, diffractometry, Van der Waals attraction and flocculation, electrophoresis, electrophoresis and other electrokinetic phenomena.

KIM2.62.5003 Surface physics chemistry 2 Credit Points

This course studies surface chemistry, surface analysis and reactions that occur on the surface.

KIM2.62.5004 Capita Selecta Chemical Physics 2 Credits

This course studies the theory and application of physical chemistry

KIM2.62.5005 Inorganic polymer chemistry 2 Credits

This course studies the chemistry of inorganic polymers and their applications

KIM2.62.5006 Capita selekta organic chemistry 2 Credit Points

This course studies biodiversity and floristic studies

KIM2.62.5007 Capita selekta biochemistry 2 Credits

This course studies toxicology and bioactivity.

KIM2.62.5008 Capita selekta analytical chemistry 2 Credits

This course studies about modified electrodes and liquid membranes

KIM2.62.5009 Capita selekta inorganic chemistry 2 Credit Points

This course discusses the synthesis and characterization of inorganic materials journals.

KIM2.62.6001 Food Biochemistry 2 Credits

This course studies the implementation of biochemistry in the food sector.

KIM2.62.6002 Coordination Chemistry 2 Credits

This course discusses coordination compounds: 1. Brief explanation of atomic orbitals, hybrid bonds involving d orbitals with ligand orbitals, and magnetic properties 2. Effect of ligand fields on splitting orbitals d, octahedral field, tetrahedral field and planar quadrilateral field, the effect of ligand field on color, CFSE, absorption spectrum, spectrochemical series, Effe John's Teller 3. Orbital overlap metrics, Orbital σ , orbital π premises complex ion molecular orbitals, charge transfer 4. Environmental factors of concentration, metal ions, coordination groups, simple addition reactions, oxidation reduction substitutions, coordinated ligand reactions. 5. High spin, low spin d coordination numbers, geometric isomers, optical isomers, coordination isomers ionization isomers. 6. Complex ion stability, stability constant, central ion charge, CFS

charge distribution, ligands, ligands, determination of stability constants, spectroscopy and electrochemistry. 7. Reaction rate, inert and labile complex, substitution reaction mechanism, SN1, SN2 process, octahedral substitution, quadrilateral substitution data on redox reaction mechanism.

KIM2.62.6003 Material Chemistry 2 Credits

This course studies the types of materials, the process of making materials and the application of chemical materials in industry

KIM2.62.6004 Surfactant Chemistry 2 Credits

This course studies surfactant chemistry and its applications

KIM2.62.6005 Chemical Thermodynamics 2 Credit Points

This course studies advanced thermodynamics and its applications

KIM2.62.6006 Metal organo 2 Credits

This course studies metallic organo and their classification

KIM2.62.6007 Organic polymer chemistry 2 Credits

This course studies the chemistry of organic polymers and their applications

KIM2.62.6008 Nanotechnology 2 Credits

This course studies nanotechnology and nanomaterials

KIM2.62.6009 Enzymeology 2 Credits

This course studies enzymes and their roles as well as the technology of enzyme fermentation.

KIM2.62.6010 Synthetic organic chemistry 2 credits

This course studies synthetic organic chemistry.

KIM2.62.6011 Modern chromatographic techniques 2 Credits

This course studies modern chromatography and its instruments

KIM2.62.6012 Applied analysis 2 Credits

This course studies applied analysis

KIM2.62.6013 Preconcentration Technique 2 Credits

This course studies pre-concentration techniques

KIM2.62.6014 Catalyst chemistry 2 Credits

This course studies the chemistry of catalysts

KIM2.62.6015 Membrane technology 2 Credits

This course discusses membrane technology

KIM2.62.6016 Inorganic Synthesis 2 Credits

This course studies inorganic synthesis

KIM2.62.6017 Fuel Cell 2 Credits

This course studies fuel cells

KIM2.62.6018 Medical biochemistry 2 Credits

This course studies medical biochemistry

KIM2.62.7001 Chemistry of Natural Materials 2 Credits

This course studies organic compounds with natural ingredients such as steroids, phenyl, propane, polyketones, hormones, xanthenes and quinones, flavonoids and alkaloids. Changes in each group include the source of plant growth or the origin of the biogenesis, specific reactions that reflect each group and the use of natural organic compounds.

KIM2.62.7002 Solid Substance Chemistry 2 Credits

This course studies the chemistry of inorganic and organic solids.

KIM2.62.7003 Chemical Kinetics 2 Credits

This course learns more about chemical kinetics

4. Competence of graduates

Main Competencies

The main competencies of graduates of S2 Chemistry Education are:

- have broad knowledge in the field of chemistry which includes organic chemistry, inorganic chemistry, biochemistry, physical chemistry, analytical chemistry, and basic sciences of chemistry;
- have the basic concepts of education, chemistry education and the teaching and learning process of chemistry;
- proficient in planning teaching programs based on the applicable curriculum;
- have competence in solving problems–problems encountered in the interaction of learning and laboratory management;
- flexible in choosing and developing learning methods and media needed in the learning process
- able to evaluate learning outcomes and carry out actions– follow-up actions as a result of the evaluation.

Supporting Competencies

Supporting competencies for graduates of S2 Chemistry Education are:

- have skills in computer science and the internet in the context of developing ICT-based learning media (*Information Communication and Technology*);
- able to seek information from various sources of information, both primary and secondary, searching via the internet, and textbooks, as well as being able to analyze and communicate the information obtained for teaching progress;
- mastering the use of information technology,
- Able to behave in accordance with values and norms religion and develop student character.

5. Course Structure

Major : Chemistry
Study program : Chemistry Education (S2)

No	Code	Courses	SKS			Shem.	
			Quantity	T	P		L
1). Ma ta Faculty Choice Lectures							
A. Mandatory for S1 NK							
<u>1</u>	<u>FMA2.80.2301</u>	Curriculum Development	2	<u>2</u>	<u>0</u>	<u>0</u>	2
<u>2</u>	<u>FMA2.80.3301</u>	Learning Design	2	<u>2</u>	<u>0</u>	<u>0</u>	3
Number of Credits			4	4	0	0	

No	Code	Courses	SKS			Shem.	
			Quantity	T	P		L
2). Ma ta Study Program Compulsory Tuition							
A. Mandatory							
<u>1</u>	<u>KIM1.82.1001</u>	Educational Research	3	<u>3</u>	<u>0</u>	<u>0</u>	1
<u>2</u>	<u>KIM1.82.1002</u>	Methods Learning Strategies	3	<u>3</u>	<u>0</u>	<u>0</u>	1
<u>3</u>	<u>KIM1.82.1003</u>	Education Statistics	2	<u>2</u>	<u>0</u>	<u>0</u>	1
<u>4</u>	<u>KIM1.82.1004</u>	Biochemistry	2	<u>2</u>	<u>0</u>	<u>0</u>	1
<u>5</u>	<u>KIM1.82.1005</u>	Organic Chemistry	2	<u>2</u>	<u>0</u>	<u>0</u>	1
<u>6</u>	<u>KIM1.82.1006</u>	Analytical Chemistry	2	<u>2</u>	<u>0</u>	<u>0</u>	1
7	KIM1.82.2002	Information Technology- Based Learning Media	2	2	0	0	2
<u>8</u>	<u>KIM1.82.2003</u>	Inorganic Chemistry	2	<u>2</u>	<u>0</u>	<u>0</u>	2
<u>9</u>	<u>KIM1.82.2004</u>	Matter and Energy	2	<u>2</u>	<u>0</u>	<u>0</u>	2
<u>10</u>	<u>KIM1.82.2005</u>	Evaluation of Chemistry Learning	3	<u>3</u>	<u>0</u>	<u>0</u>	2
<u>11</u>	<u>KIM1.82.2007</u>	Proposal Seminar	1	<u>1</u>	<u>0</u>	<u>0</u>	2
<u>12</u>	<u>KIM1.82.3001</u>	Science phylosophy	2	<u>2</u>	<u>0</u>	<u>0</u>	3
<u>13</u>	<u>KIM1.82.3002</u>	Educational Science Foundation	3	<u>3</u>	<u>0</u>	<u>0</u>	3
<u>14</u>	<u>KIM1.82.3003</u>	for Physical Chemistry Laboratory	2	<u>1</u>	<u>1</u>	<u>0</u>	3
<u>15</u>	<u>KIM1.82.3004</u>	Management	2	<u>2</u>	<u>0</u>	<u>0</u>	3
<u>16</u>	<u>KIM1.82.4001</u>	Results Seminar	1	<u>0</u>	<u>0</u>	<u>1</u>	4
<u>17</u>	<u>KIM1.82.4002</u>	Thesis Exam	4	<u>2</u>	<u>0</u>	<u>2</u>	4
Number of Credits			38	34	1	3	
3). Study Program Elective Courses							
A. Choose 2 of 4 Credits							
<u>1</u>	<u>KIM2.82.3001</u>	Capita Selecta Chemistry Education	2	2	0	0	3
<u>2</u>	<u>KIM2.82.3002</u>	Green Chemistry	2	<u>1</u>	<u>1</u>	<u>0</u>	3
Number of Credits			4	3	1	0	

Synopsis

FMA2.80.2301 Curriculum Development 2 Credits

Many things related to the curriculum are generic in nature, which applies to all fields of study, levels, pathways and types of education. Therefore,

This course is designed to provide basic knowledge of curriculum that applies to all fields of study, levels and "settings" education. This consideration is based on the assumption that postgraduate students, especially in the field of education, need to master in general and thoroughly the various conceptions of the curriculum, the basics and principles of its development, as well as the implications for curriculum design, implementation of lectures from various available alternatives.

FMA2.80.3301 Learning Design 2 Credits

Discusses the basic concepts of instructional system design, learning needs, instructional analysis, formulation of instructional objectives, characteristics of students and the environment, learning activities, learning resources, learning management and the existence of evaluation in terms of learning design

KIM1.82.1001 Educational Research Methods 3 Credits

This course studies the nature of scientific thinking, scientific methods and writing research proposals

KIM1.82.1002 Learning Strategy 3 Credits

This course studies:

1. Learning and learning
2. Learning strategies
3. Learning theory
4. Constructivism in learning Inquiry in
5. learning
6. Learning model
7. Contextual teaching learning

KIM1.82.1003 Education Statistics 2 Credits

This course studies

1. Definition and use of Distribution
2. statistics
3. Centering size
4. Dispersion size
5. inclination
6. Probability Theory

KIM1.82.1004 Biochemistry 2 Credits

This course studies

1. Micromolecule
2. Macromolecule
3. Metabolism of carbohydrates, lipids and amino acids
4. Photosynthesis
5. Molecular cloning genetic
6. information flow
7. Biotechnology

KIM1.82.1005 Organic Chemistry 2 Credits

This course studies

1. Stereochemical organic
2. reaction mechanism
3. Chirality and active optics
4. Reaction mechanism theory

KIM1.82.1006 Analytical Chemistry 2 Credits

This course studies

1. Qualitative analysis
2. Quantitative analysis
3. Chemical separation
4. Spectrophotometric analysis

KIM1.82.2002 Information Technology-Based Learning Media 2 Credits

This course studies

1. Introduction to internet and email
2. management Creating a chemistry learning
3. website Making media using powerpoint
4. Making media using interactive macromedia
5. flash CD using Autorun enterprise

KIM1.82.2003 Inorganic Chemistry 2 Credits

This course studies

1. Fundamentals of inorganic chemistry
2. Development of atomic structure The
3. periodicity of the elements
4. Chemical bonding model and theory

5. Acid base theory
6. Chemical reactions
7. Characteristics of nonmetal compounds

KIM1.82.2004 Matter and Energy 2 Credits

This course studies

1. atomic theory
2. Basic laws of chemistry
3. Chemical Bond
4. Chemical reaction stoichiometry

KIM1.82.2005 Chemistry Learning Evaluation 3 Credits

This course studies

1. The basic concept of educational evaluation
2. Assessment of the learning process
3. Evaluation in the preparation and implementation of learning outcomes tests
4. Analyzing questions
5. Authentic assessment

KIM1.82.2007 Proposal Seminar 1 Credit

This course studies about:

1. Relevant references
2. Chemistry education problems
3. Mode of presentation and scientific argumentation
4. Techniques for writing scientific papers

KIM1.82.3001 Philosophy of Science 2 Credits

This course studies

1. The concept of philosophy of science in ontology, epistemology, axiology The
2. concept of philosophy of science in scientific thinking
3. Philosophy of science in everyday life

KIM1.82.3002 Educational Science Foundation 3 Credits

This course studies

1. Socio-cultural background and educational philosophy The
2. relationship between socio-cultural life and education The role of
3. education in the process of socio-cultural change

KIM1.82.3003 Laboratory Management 2 Credits

This course studies

1. Laboratory Work Safety B3
2. material handling
3. Dangerous experimental technique
4. Administration and arrangement of laboratory equipment
5. Making chemical kits

KIM1.82.3004 Physical Chemistry 2 Credits

This course studies

1. Thermodynamics
2. Thermochemistry
3. Equilibrium
4. Reaction kinetics

KIM1.82.4001 Seminar Results 1 Credit

This course studies

1. Actual problems in chemistry education Developing
2. ideas to find solutions Developing research designs
- 3.
4. Research Implementation
5. Presentation and presentation of research results

KIM1.82.4002 Thesis Exam 4 Credits

This course studies

1. Analysis of the results of scientific
2. research; theses and articles
3. Presentation and Final Examination

KIM2.82.3001 Capita Selecta Chemistry Education 2 Credits

This course studies

1. Multiple representatives
2. Scientific approach
3. Learning models
4. High order thinking

KIM2.82.3002 Green Chemistry 2 Credits

This course studies

1. Implementation of green chemistry in chemistry learning Low-effect chemical technology
2. Renewable and lasting chemicals Reduction
3. of chemical accidents
4. Practicum / experiment based on green chemistry

5. Science Education

Study Program : Science Education

Vision, Mission, Goals, and Competencies of Study Program Graduates

a. Vision

Science Education Undergraduate Study Program "The Year 2028 as a Study Program who excel in Sumatra in the field of natural science and technology education characterized by local wisdom based on devotion to God Almighty

b. Mission

1. Organizing a quality Natural Science education process by utilizing various resources and technology in learning by taking into account the local wisdom of West Sumatra and Indonesia
2. Organizing research activities in the field of Science Education and disseminating the results at national and international levels.
3. Organizing community service activities as the implementation of education and research results for the advancement of the nation and local wisdom of West Sumatra
4. Improving the governance of study programs by involving all existing elements
5. Initiate and enhance local, national and international cooperation.

c. Destination

1. Ensuring the process and learning outcomes in the Science Education PSS are of quality according to quality standards, and utilizing technology in learning based on local wisdom in West Sumatra and Indonesia.
2. Produce research in the field of Science and Education Education spread result on level national nor international.
3. Well done service activities to society as the implementation of education and research results for the progress of the nation and maintaining the local wisdom of West Sumatra
4. The realization of improved governance of study programs by involving all elements at the university and faculty level,

so that facilities and infrastructure are available and a conducive academic atmosphere is formed

5. Established local, national, and international cooperation in the effort to develop the Science Education PSS

d. Competence

1. Attitude Competence

Attitude competence is translated into several performances, namely as follows:

- a. Fear of God Almighty and able to show a religious attitude
- b. Upholding human values in carrying out duties based on religion, morals, and ethics
- c. Internalizing academic values, norms, and ethics
- d. Act as citizens who are proud and love their homeland, have nationalism and a sense of responsibility to the country and nation
- e. Appreciate the diversity of cultures, views, religions, and beliefs, as well as the opinions or original findings of others
- f. Contributing to improving the quality of life in society, nation, state, and progress of civilization based on Pancasila
- g. Cooperate and have social sensitivity and concern for society and the environment
- h. Obey the law and discipline in social and state life
- i. Internalize the spirit of independence, struggle, and entrepreneurship
- j. demonstrate an attitude of responsibility for work in their field of expertise independently and
- k. Have sincerity, commitment, sincerity to develop the attitudes, values, and abilities of students

2. Knowledge competence

Knowledge competence is described in the following points:

- a. Able to formulate learning objectives of Natural Sciences (IPA) in junior high schools according to curriculum objectives, and design, plan, and implement learning using a variety of approaches (*inquiries* (find answers through observation and/or experimentation) needed to achieve learning objectives and build skills

critical thinking (*critical thinking*), problem solving (*problem solving skills*) as well as performance capabilities (*performance skills*)

- b. Able to design and select appropriate activities, strategies, and learning resources to teach concepts and understanding of scientific processes and relationships and natural patterns through the empirical experience of junior high school students by:
 - 1) Considering the diversity of learning profiles, socio-cultural, emotional, intellectual, and physical aspects of students and fostering student learning motivation;
 - 2) Using relevant technology and/or laboratory activities (if required);
 - 3) Considering chemical safety factors and procedures and treatment ethics (*ethical treatment*) against living organisms inside or outside the classroom;
 - c. able to design and use authentic learning evaluation tools, techniques, and strategies both formal and informal (observations, student work portfolios, performance on assignments, projects, self-assessments, group assessments, and standardized tests) to evaluate student performance and learning progress (ideas, preconceptions, knowledge) continuously and effectively and interpret the results to modify strategies and improve learning science in junior high school in a sustainable manner;
 - d. Able to build students' scientific literacy skills through the implementation of science learning;
 - e. Able to conduct classroom research (*classroom research*) to evaluate the learning process, test methods, strategies, and learning resources and write the results in the form of studies as input for continuous improvement of science learning;
 - f. Able to analyze various alternative solutions that exist for science learning problems and conclude them for appropriate decision making and if necessary involve the school community (parents, students, teachers, the community);
- ##### 3. Supporting Competencies
- a. able to apply logical, critical, systematic, and innovative thinking
 - b. in the context of the development or implementation of science and technology that pays attention to and applies humanities values in accordance with their field of expertise;
 - c. able to demonstrate independent, quality, and measurable performance;

- d. able to examine the implications of the development or implementation of science and technology that pays attention to and applies humanities values according to their expertise based on scientific principles, procedures and ethics in order to produce solutions, ideas, designs or art criticisms;
 - e. able to compile a scientific description of the results of the studies mentioned above in the form of a thesis or final project report, and upload it on the university's website;
 - f. able to make appropriate decisions in the context of solving problems in their area of expertise, based on the results of information and data analysis;
 - g. able to maintain and develop a network with supervisors, colleagues, colleagues both inside and outside the institution.
 - h. able to be responsible for the achievement of group work results and supervise and evaluate the completion of the work assigned to the workers under their responsibility.
 - i. able to carry out the process of self-evaluation of the work group under their responsibility, and able to manage learning independently
4. Other Competencies
- a. Mastering theoretical concepts in the field of Natural Sciences (IPA), which consists of:
 - 1) physics (measurement, mechanics, heat, vibration, sound waves, electricity, magnetism, optical systems and modern physics) and their application in biological systems
 - 2) biology (diversity of living things, evolution, genes, cells, systems in living things, ecological relationships and interdependence)
 - 3) chemistry (the concept of matter particles, atoms and periodic structures, chemical reactions, chemicals) and their application and influence in living systems ;
 - 4) the earth, solar system and the processes that occur in it master the
 - b. theoretical concepts of educational theory (*pedagogy*)
 - c. mastering theoretical concepts of developmental characteristics of learners
 - d. mastering theoretical concepts of curriculum, approaches, strategies, models, methods, techniques, teaching materials, media and learning resources for science education.

- e. master complete operational knowledge about functions, how to operate common science instruments and analysis of data and information from these instruments; safety procedures, and work safety in the science laboratory.
- f. Mastering knowledge about the function and use of technology, especially information and communication technology that is relevant to the development of the quality of science education

1. Course Structure

Natural Science Education Study Program

No	Code	Courses	credits			Sem
			Total	TPL		
1). Expertise Course (MKBK)						
A. Mandatory						
1	FMA1.60.1301	General biology	4	3	1	0
2	IPA050	Calculus	4	3	1	0
Number of Credits			8	6	2	0
2). University Compulsory Courses						
A. Mandatory						
1	UNP1.60.1401	Religious education	3	3	0	0
2	UNP1.60.1402	Pancasila Education	2	2	0	0
3	UNP1.60.1403	Civic education	2	2	0	0
4	UNP1.60.1404	Indonesian	2	2	0	0
5	UNP1.60.1405	English	2	2	0	0
6	UNP1.60.3101	Entrepreneurship	3	3	0	0
7	UNP1.60.5401	Real Work Lecture (KKN)	2	0	0	2
8	UNP1.61.1201	Educational Science Fundamentals	2	2	0	0
9	UNP1.61.2011	Educational Psychology	2	2	0	0
10	UNP1.61.2102	Education Administration And Supervision	2	2	0	0
11	UNP1.61.2103	Philosophy of Education	2	2	0	0
12	UNP1.61.4201	Guidance and counseling	2	2	0	0
13	UNP1.61.6401	Field Experience Program 2 (PPL 2)	1	0	0	1
		Field Experience Program 3 (PPL 3)	3	0	0	3
Number of Credits			32	26	0	6

No	Code	Courses	credits				Sem
			Quantity	T	P	L	
3). University Elective Courses							
A. Choose 2 of 18 Credits							
1	UNP2.60.1401	Basic Natural Science	2	2	0	0	1
2	UNP2.60.1402	Basic Socio-Cultural Sciences	2	2	0	0	1
3	UNP2.60.2101	Physical Fitness Education	2	2	0	0	2
4	UNP2.60.2102	Japanese language	2	2	0	0	2
5	UNP2.60.2103	Multicultural Education	2	2	0	0	2
6	UNP2.60.2401	History of the Indonesian Nation's Struggle	2	2	0	0	2
7	UNP2.60.2402	Disaster Management	2	2	0	0	2
8	UNP2.60.3401	Natural Culture MinangKabau	2	2	0	0	3
9	UNP2.60.3402	Information and communication technology	2	0	2	0	3
Number of Credits			18	16	2	0	
4). Faculty Compulsory Courses							
A. Mandatory							
1	FMA1.60.1303	General Physics	4	3	1	0	1
2	FMA1.60.1304	General Chemistry	4	3	1	0	1
3	FMA1.60.2101	Calculus	4	3	1	0	2
Number of Credits			12	9	3	0	
5). Study Program Compulsory Courses							
A. Choose 90 of 90 credits of compulsory study program							
1	IPA1.61.1301	Education Statistics	2	2	0	0	1
2	IPA1.61.1401	Basics of Environmental Science	2	2	0	0	1
3	IPA1.61.2301	Mechanics Science	3	3	0	0	2
4	IPA1.61.2033	Basics of organic chemistry ICT	3	2	1	0	2
5	IPA1.61.2304	for Science Learning Diversity of	3	3	0	0	2
6	IPA1.61.2305	Living Things Thermal Physics	3	2	1	0	2
7	IPA1.61.3301		3	3	0	0	3
8	IPA1.61.3302	Fundamentals of Inorganic Chemistry	3	2	1	0	3
9	IPA1.61.3303	in Earth Sciences and Astronomy	2	2	0	0	3
10	IPA1.61.3304	Science Laboratory Management	2	2	0	0	3
11	IPA1.61.3305	Science Media and Learning Resources	2	1	1	0	3

No	Code	Courses	credits				Sem
			Quantity	T	P	L	
12	IPA1.61.3306	Study and Development of Science Education Curriculum	3	3	0	0	3
13	IPA1.61.3401	Introduction to Ecology	3	3	0	0	3
14	IPA1.61.4301	Waves and Optics	3	3	0	0	4
15	IPA1.61.4302	Integrated Science Class VII	3	2	1	0	4
16	IPA1.61.4303	Strategy and Design for Science Learning	3	2	1	0	4
17	IPA1.61.4304	Fundamentals of Analytical Chemistry	3	2	1	0	4
18	IPA1.61.4401	Anatomy and Physiology of Living Things	3	2	1	0	4
19	IPA1.61.5301	Magnetic Electricity	3	3	0	0	5
20	IPA1.61.5302	Basics of Integrated Science	3	2	1	0	5
21	IPA1.61.5303	Microbiology class VIII	3	2	1	0	5
22	IPA1.61.5304	Evaluation of Science Learning Process and Outcomes	3	3	0	0	5
23	IPA1.61.5401	Ethnoscience and Local Wisdom of	3	2	1	0	5
24	IPA1.61.6301	Modern Physics	3	3	0	0	6
25	IPA1.61.6302	Basics of Biochemistry	3	2	1	0	6
26	IPA1.61.6303	Integrated IPA Class IX	3	2	1	0	6
27	IPA1.61.6304	Microteaching	3	2	1	0	6
28	IPA1.61.6305	Biotechnology Science Learning Research	3	3	0	0	6
29	IPA1.61.6306	Methodology	3	2	1	0	6
30	IPA1.61.7301	English for IPA	2	2	0	0	7
Number of Credits			84	69	15	0	
B. Choose 90 of 90 credits of compulsory study program							
1	IPA1.61.8401	Thesis	6	0	0	6	8
Number of Credits			6	0	0	6	
6). Study Program Elective Courses							
A. Choose 10 of the 20 credits of the study program's elective courses.							
1	IPA2.61.3301	Capita Selecta IPA	2	2	0	0	3
2	IPA2.61.3401	Conservation of Natural Materials and	2	2	0	0	3
3	IPA2.61.4301	Energy Resources	2	2	0	0	4
4	IPA2.61.5301	Physics Technology	2	2	0	0	5
5	IPA2.61.5302	Applied Chemistry	2	1	1	0	5
6	IPA2.61.6301	Redox and Electrochemistry	2	1	1	0	6

No	Code	Courses	credits				Sem
			Quantity	T	P	L	
7	IPA2.61.6302	Food Chemistry	2	1	1	0	6
8	IPA2.61.6303	Applied Biology	2	1	1	0	6
9	IPA2.61.7301	Applied physics	2	1	1	0	7
10	IPA2.61.7401	Science Entrepreneur	2	2	0	0	7
Number of Credits			20	15	5	0	

Synopsis

UNP1.60.1401 Religious Education 3 Credits

The One and Only Godhead: faith and piety, divine philosophy (Theology); Humans: human nature, human dignity, human responsibility; Law: raise awareness to obey God's law, the prophetic function of religion in law; Moral: religion as a source of morals, morals in life; Science, Technology and Arts: Faith, science and technology, and charity as a unit, the obligation to demand and practice knowledge, the responsibility of scientists and artists; inter-religious harmony: religion is God's grace for all, togetherness in religious plurality; Society: civilized and prosperous society, the role of religious communities in realizing a civilized and prosperous society, human rights and democracy; Culture: academic culture, work ethic, open and fair attitude; Politics: the contribution of religious adherents to political life,

UNP1.60.1402 Pancasila Education 2 Credits

This course contains the meaning of urgency and reasons for the need for Pancasila education in Higher Education; Pancasila in the current history of the Indonesian nation; Pancasila as a philosophical system, as the basis of the state of the Republic of Indonesia, as a state ideology, as an ethical system, and Pancasila as the basis for the value of developing science; Thinking and implementing Pancasila in dealing with current actual problems, such as human rights, racial and economic problems, and the problem of radicalism that must be solved in accordance with the values of Pancasila.

UNP1.60.1403 Citizenship Education 2 Credits

This course contains the nature of citizenship education in

develop full undergraduate or professional abilities; the essence and urgency of national identity as one of the determinants of nation building and character, the urgency of national integrity and national unity; the constitutional values and norms of the 1945 Constitution of the Republic of Indonesia and the constitutional provisions of the legislation under the Constitution; harmony of obligations and rights of the state and citizens in a democracy that is based on people's sovereignty and deliberation for consensus; the nature, instrumentation, and practice of Indonesian democracy based on Pancasila and the 1945 Constitution of the Republic of Indonesia; the historical dynamics of constitutional, socio-political, cultural, and contemporary contexts of sovereign law enforcement; the historical dynamics and the urgency of the insight into the archipelago as a collective conception and view of the Indonesian nationality in the context of world relations;

UNP1.60.1404 Indonesian 2 Credits

This course contains the Conception of Indonesian Language, History of Indonesian Language, Position and Functions of Indonesian Language, Indonesian Language Variety, Indonesian Spelling, (punctuation letters, words and absorption elements: Effective Sentences, Definition of Characteristics, Terms of Effective Sentences: Paragraphs Types, Functions and Developments: Writing Outline Theme, Topic, Title and Type of Outline: Writing Text (Scientific Academic Texts and Non-Academic Texts: BI Official Letters (Format and Types of Indonesian Official Letters.

UNP1.60.1405 English 2 Credits

This course contains the development of English language skills in an integrated manner by taking into account the needs of students according to their fields/ majors, including understanding basic sentence patterns that help students understand various English references and equip students with communication skills in English according to their field of expertise.

UNP1.61.1201 Fundamentals of Education 2 Credits

Provide insight into human nature, the nature and importance of education, the foundations and principles of education, thoughts about education

UNP1.61.2101 Educational Psychology 2 Credits

This course examines/discusses the basic concepts of educational psychology, growth, student development, intelligence, talent, creativity, motivation, memory, individual differences and learning theories.

UNP1.61.2102 Administration and Education Supervision 2 Credits

Educational Administration and Supervision courses are courses that provide insight, basic concepts and processes as well as the scope of Educational Administration and Supervision and apply them in professional school management.

UNP1.61.2103 Philosophy of Education 2 Credits

The Philosophy of Education course examines the nature of educational philosophy and its relation to religion, education and culture. Human nature as an educator (inner creative thinking). Streams of Educational Philosophy and their implementation and implications in the administration of education.

UNP1.60.3101 Entrepreneurship 3 Credits

This course contains knowledge, attitudes and skills based on creative and innovative thinking regarding the basic principles of entrepreneurship, entrepreneurial development models, entrepreneurial strategies, business ethics in entrepreneurship, opportunity analysis, business feasibility studies and business management (marketing, production, finance), resources, business legality, technology and information)

UNP1.61.4201 Guidance and Counseling 2 Credits

Guidance and Counseling is a compulsory university education course that provides insight and understanding of the basic concepts of BK, including; understanding, background, objectives, functions, principles, principles and code of conduct of BK, BK development fields, types of BK services, and BK protection activities as well as BK implementation operations in the implementation of the 2013 Curriculum. In addition, it also discusses the role of the Principal, Deputy Principal, subject teachers, homeroom teachers, BK teachers or counselors and other personnel as well as BK supervisors in BK services at schools.

UNP1.60.5401 Real Work Lecture (KKN) 2 Credits

Real Work Lecture (KKN) is a field activity for students who are taking the final part of the S-1/D4/Applied Bachelor education program. This program is actually mandatory for all students, because the university believes that this program is able to encourage student empathy, and can contribute to solving problems that exist in society. Community service activities are a form of

the real contribution of the university to the community, industry, local government and community groups who want to be economically and socially independent. This KKN program requires Field Supervisors (DPL) and students to play an active role in knowing the existing problems, even before they plunge for 1 to 2.5 months in the midst of the community. Concept "*working with community*" has replaced concept "*working for the community*".

UNP1.61.6401 Field Experience Program 2 (PPL 2) 1 SKS

Provide experience for students to make observations on the attitudes and ways of teachers planning and carrying out assessments and evaluations

UNP1.60.7401 Real Work Lecture (KKN) 2 Credits

Real Work Lecture (KKN) is a field activity for students who are taking the final part of the S-1/D4/Applied Bachelor education program. This program is actually mandatory for all students, because the university believes that this program is able to encourage student empathy, and can contribute to solving problems that exist in society. Community service activities are a tangible form of the university's contribution to the community, industry, local government and community groups who want to be economically and socially independent. This KKN program requires Field Supervisors (DPL) and students to play an active role in knowing the existing problems, even before they plunge for 1 to 2.5 months in the midst of the community. Concept "*working with community*"

has replaced concept "*working for the community*".

UNP1.61.7401 Field Experience Program 3 (PPL 3) 3 Credits

Provide real experience for students to practice teaching and other school activities for one semester

UNP2.60.1401 Basic Natural Sciences 2 Credits S

This course contains the nature and scope of the human mind and its development, the development of science, the earth and the universe, the diversity of living things and their distribution, living things in natural ecosystems, natural resources and the environment, the benefits and impacts of science and technology on social life, history, human civilization and technological developments, some important technological developments, and environmental issues

UNP2.60.1402 Basic Socio-Cultural Sciences 2 Credits

This course contains: Basic concepts in social and cultural sciences to study Indonesian society and changes in Indonesian society and culture. The subjects are humans and human culture as individuals and human social beings, moral values and human law, human diversity and equality, science technology and human arts and the environment.

UNP2.60.2101 Physical Fitness Education 2 Credits

This course applies the effects and benefits of various movement activities for physical fitness and health through various games, competitions, and sports exercises as well as the ability to analyze the importance of physical activity to maintain and improve health. develop the body's physiological functions and health and can be applied throughout life.

UNP2.60.2102 Japanese 2 Credits

Japanese language courses equip students with knowledge about Japanese language practice so that students have the ability to read and communicate using Japanese.

UNP2.60.2103 Multicultural Education 2 Credits

This multicultural education course contains the concept of multicultural education: the urgency of multicultural education in a diverse Indonesian society, building an inclusive diversity paradigm through educational institutions. prospects and constraints of multicultural implementation, implementation of multicultural education in Indonesia, as well as character building of students through the application of multicultural ideology in the field of education.

UNP2.60.2401 History of the Struggle of the Indonesian Nation 2 Credits

The History of the Nation's Struggle course discusses the meaning and historical meaning of the nation's struggle, imperialism and colonialism, the struggle of the Indonesian nation against imperialism and colonialism, the Indonesian national movement, the struggle for independence, the meaning of the proclamation of efforts to maintain independence against various threats that threaten the unitary state of the Republic of Indonesia, the Republic of Indonesia.

UNP2.60.2402 Disaster Management 2 Credits

This course refers to Law No. 24 of 2007 concerning Disaster Management (Disaster Management) which includes the introduction of facts or evidence of disaster events, introduction to the concept of disaster, types of disasters, characteristics of disasters, natural disasters, non-natural disasters, social disasters, prone, disaster/hazard (hazard), potential hazard, vulnerability, (vulnerability), capacity (capacity), principle of risk reduction (risk), prevention, mitigation, preparedness, disaster prediction, disaster impact, disaster response procedures and emergency response, analysis of rehabilitation and reconstruction needs.

UNP2.60.3401 Minangkabau Natural Culture 2 Credits

This course contains material on Minangkabau customs, both objective and subjective. Through the study of objective and subjective customs, students are expected to be able to understand Minangkabau human identity and be able to find the values of progress contained in adat that are relevant to the challenges of 21st century competence, namely multiculturalism, cooperation, problem solving and so on.

UNP2.60.3402 Information and Communication Technology 2 Credits

This course learns about information and communication technology that can make daily work easier. Understanding device usage "Office Applications" software, Internet Technology, Use of software development of learning animation, development of technology and use of applications in education and being able to recognize internet-based business.

FMA1.60.1301 General Biology 4 Credit Points

This course discusses the knowledge of living things and scientific methods, cells as the basis of life, metabolism, structure and organization of plant and animal bodies, biodiversity, structure, functions and processes in human organ systems, ecology, genetics and evolution and biotechnology.

FMA1.60.1303 General Physics 4 Credit Points

This course discusses quantities and units, particle kinematics, particle dynamics, work and energy, linear momentum, angular momentum and rigid bodies, static fluids, dynamic fluids, concepts of temperature and heat, and the laws of thermodynamics.

FMA1.60.1304 General Chemistry 4 Credit Points

This course discusses Stoichiometry, Chemical Energetics, Atomic Structure, Periodic System of Elements, Chemical Bonds and Molecular Geometry, Forms of Matter and Chemical Equilibrium.

FMA1.60.2101 Calculus 4 Credits

This course discusses the real number system, equations and inequalities, absolute values and absolute inequalities, coordinate systems and simple graphs, functions, limits and continuity, derivatives, related rates, graphs, and integral applications in real problems.

IPA1.61.1301 Education Statistics 2 Credits

Basic notions in statistics, data presentation, center size and location size, symmetry and slope, deviation size, probability theory and probability distribution, sampling distribution, some tests include: normality test, homogeneity test of variance, regression linearity test and correlation. Non-Parametric Statistics include: sign test, test *wilcoxon*, and test *Liliefors*

IPA1.61.1401 Fundamentals of Environmental Science 2 Credits

Air: its composition, temperature, pressure, humidity and its effect on life. Water: water holding, evaporation, vapor pressure, velocity of water in soil, water cycle. Soil: soil composition, simple mineralogy. The sun and energy: solar strength, absorption of materials, energy cycles and energy balances, photosynthesis. Weather: meteorological quantities, weather balloons, weather water cycle, climate and vegetation. Insulation: scale insulation, sound insulation, sunlight insulation. Pollution: air pollution, water pollution, soil pollution, noise pollution, noise pollution, urban fields, society and pollution. Some household problems: laundry soap powder, paint, toxins, noise and so on

IPA1.61.2301 Mechanics IPA 3 Credits

Science Mechanics is an Expertise Course (MKBK). Mechanics course is a course that discusses the motion of an object and the effects of forces on the motion of the object. The discussion in this course is divided into two, namely classical mechanics and quantum mechanics. After attending this course, students are expected to be able to understand the concepts and principles of mechanics in general, so that they can analyze and solve problems from particle mechanics, to quantum mechanics.

IPA1.61.2033 Fundamentals of organic chemistry 3 credits

Organic Chemistry basics course is one of the subjects in the field of expertise, with the aim that students can understand various organic phenomena and their existence in living things. This course is designed to provide an understanding of the meaning of carbon compounds, compound analysis and molecular formulas for the hybridization of sp^3 , sp^2 , and sp carbon atoms. Determine the forms of hybrid orbitals, the formation of covalent bonds, sigma bonds, and pi bonds, bond angles, introduction of organic compounds, saturated and unsaturated hydrocarbons, alkanes, cycloalkanes, alkenes, alkynes and aromatics, organic compounds with single functional groups (aliphatic and aromatic).), hydroxy compounds, halides, carbonyls, carboxylic acids, and their derivatives, as well as practical work on certain topics

IPA1.61.2304 ICT for Science Learning 3 Credits

The ICT course for science learning is one of the subjects in the field of expertise that aims to provide understanding and skills in utilizing technology and information in the implementation of science learning in schools. This course is designed to provide understanding and soft skills about technology and information that can be applied in the implementation of science learning in schools.

IPA1.61.2305 Diversity of Living Things 3 Credits

This course explains the concept of species, and their relation to the diversity of living things, the purpose and benefits of biological diversity in ecological, social, and economic terms. Explain the taxonomic principles (determination, classification, and nomenclature) of living things in the kingdom monera, protists, fungi, plants and animals. Explain the approach to preserving the diversity of living things that are in accordance with human needs in ecological, social, and economic contexts. Describe the facts and causes of the decline in the level of diversity of living things and propose prevention plans in Sumatra and Indonesia.

IPA1.61.3301 Thermal Physics 3 Credits

Thermal Physics is an Expertise Course (MKBK). Thermal physics course is a subject that discusses thermal energy, its properties, applications and advantages in everyday life. After carrying out this lecture, students are expected to be able to understand the concepts and principles of thermal energy in general, so that they can analyze thermal energy problems, both problems in the form of questions, practicums and problems that occur in everyday life.

IPA1.61.3401 Introduction to Ecology 3 Credits

This course will discuss the basic concepts and principles of ecology, ecosystems, energy in ecosystems, biogeochemical cycles, limiting factors in the environment, population dynamics, interactions between species, succession, tropical ecology, and environmental ethics and apply the knowledge possessed in activities in the surrounding environment/community.

IPA1.61.3302 Fundamentals of Inorganic Chemistry 3 Credits

The basics of Inorganic Chemistry course is one of the subjects in the field of expertise, with the aim that students can understand various things related to inorganic materials found in the surrounding environment and apply them in science learning at school. This course is designed to provide an understanding of chemical forces, basic principles of chemical reactions, bond energies, enthalpy and entropy, solubility of substances and the role of the medium in chemical reactions, acid base systems, water ion systems, solvent systems, proton acceptor donor systems, electron pair donor acceptor system, proton affinity, redox system, and electrochemistry which includes the relationship of redox reactions and acid-base reactions.

IPA1.61.3303 Earth Sciences and Astronomy 2 Credits

This course is a compulsory subject for the science education study program with a weight of 2 credits. As the name implies, the study material for this course focuses on two things, namely earth and space. When discussing the earth, students are expected to be able to understand the earth and its three layers, as well as the dynamic processes that take place in each layer. In addition, the study of the earth is also equipped with the topic of earth disasters, adaptation and mitigation. The study of astronomy begins with a discussion of the theory of the origin of the universe and the solar system, the solar system, and the characteristics of the sun, stars, and planet earth.

IPA1.61.3304 Laboratory Management Science 2 Credits

This course is a compulsory subject for all students majoring in Science Education with a weight of 3 credits. Through this course, students are expected to be able to recognize the laboratory as a whole, starting from the meaning, function, layout, organization and administration, as well as how best to store tools and materials in the laboratory. In addition, students are also expected to be able to understand the principles of safety and work safety in the laboratory which includes regulations in the laboratory,

accidents that can occur, how to do a first aid kit and what actions to take when an accident occurs in the laboratory. Furthermore, students are expected to be able to recognize the function and use of glassware, optical instruments, and tools for physiological and microbiological experiments. To support an understanding of the materials or substances in the laboratory, students are also expected to understand the chemicals and their handlers, starting from the level of purity, how to prepare the solution, the type of solution/reagent used for the experiment, to the handling of the waste. Furthermore, students are expected to be able to evaluate the condition of the existing laboratory facilities in the Faculty of Mathematics and Natural Sciences, Padang State University.

IPA1.61.3305 Media and Science Learning Resources 2 Credits

This course discusses media or intermediaries for the science learning process which is enriched by the study of various teaching materials that can be used as provisions for prospective teachers. Students are expected to be able to master various uses of learning media effectively in applying them in the science learning process at school, especially at the junior high school level.

IPA1.61.3306 Study and Development of Science Education Curriculum 3 Credits

This course of study and development of the science curriculum is a compulsory subject to provide experience in the form of knowledge, attitudes, and skills to science education students in studying the science curriculum in junior high school. The focus of the study includes: (1) examining the professional competency standards of teachers as curriculum developers for the 2013 Curriculum; (2) examine the differences in the basic framework which includes: the nature, foundation, principles, and structure of the 2013 curriculum; (3) examine graduate competency standards, content standards, process standards, and assessment standards in the 2006 curriculum and 2013 curriculum according to the Ministry of Education and Culture policy; (4) examine the syllabus of the 2006 curriculum and the 2013 curriculum in the field of science; (5) designing learning plans that include: indicators, materials, learning strategies, assessments, and media and good learning resources referring to the 2013 curriculum, namely thematic-integrative.

IPA1.61.4301 Wave and Optics 3 Credits

Optical Waves is an Expertise Course (MKBK). Optical waves course is a course that discusses waves, their characteristics, properties and their application in everyday life. After carrying out this course, students are expected to be able to

understand the concepts and principles of waves and optics in general, so that they can analyze wave and optical problems, both problems in the form of questions, practicums and problems that occur in everyday life.

IPA1.61.4401 Anatomy and Physiology of Living Things 3 Credit Points

Anatomy and Physiology of Living Things is a course that discusses the structure of cells, tissues and organs, basic concepts of physiology, growth and development, metabolism, locomotion systems, respiratory systems, circulatory systems, digestive systems, excretory systems, coordination systems, reproductive systems. , studying the diseases of living things.

IPA1.61.4302 Integrated Science Class VII 3 Credits

The Integrated Science Class VII course is one of the subject areas of expertise that aims to discuss the concept of integrated science learning material for class VII in junior high schools. This course is designed in addition to providing an understanding of concepts related to science learning for class VII in junior high school, it also discusses learning approaches, common misconceptions and assessments, media that can be used in learning. The study concepts discussed are science concepts for class VII that have been determined by the government in the curriculum 2013.

IPA1.61.4303 Science Learning Strategy and Design 3 Credits

This course includes material on identifying student characteristics and learning science for junior high school, analyzing curriculum, formulating learning objectives, analyzing learning materials, determining and designing learning experiences that are in accordance with the characteristics of the material and learning objectives, determining approaches and methods according to the characteristics of the material and learning objectives.

IPA1.61.4304 Fundamentals of Analytical Chemistry 3 Credits

This course is a basic and mandatory course. After attending this course, students are expected to be able to explain the basics of chemical analysis methods, especially conventional ones. This course discusses the scope and classification of analytical chemistry, stages of analytical work, statistical applications in data processing, qualitative analysis of inorganic substances, gas analysis, water-free titration. Implementation of lectures using a concept approach in the form of lectures, questions and answers and exercises and is equipped with LCD

and task completion.

IPA1.61.5301 Electricitymagnetism 3 Credits

Magnetism is an Expertise Course (MKBK). Electricity-magnetism course is a course that discusses electrostatics and magnetostatics and their application in everyday life. After carrying out this lecture, students are expected to be able to understand the concepts and principles of magnetic electricity in general, so that they can analyze magnetic electricity problems, both problems in the form of questions, practicals and problems that occur in everyday life.

IPA1.61.5302 Fundamentals of Microbiology 3 credits

This course discusses the grouping of microorganisms based on morphological characteristics, chemical and molecular coloring, the role of microorganisms in nature, reproduction, growth and metabolism of microorganisms, summarizes the latest research in the field of microbiology through journal reviews and discussions

IPA1.61.5401 Ethnoscience and Local Wisdom 3 Credits

This Ethnoscience and Local Wisdom course is a course that discusses the principles and concepts of basic science and environmental technology based on Minangkabau local wisdom and designs and uses applied science concepts related to Minangkabau local wisdom in an integrated way in science learning. Develop an ethnoscience-based learning model that develops views on the social environment, culture and religious attitudes.

IPA1.61.5303 Integrated science class VIII 3 credits

The Integrated Science Class VIII course is one of the courses in the field of expertise that aims to discuss the concept of integrated science learning material for class VIII in junior high schools. This course is designed in addition to providing an understanding of concepts related to science learning for class VIII in junior high school, it also discusses learning approaches, common misconceptions and assessments that can be used in learning. The study concepts discussed are science concepts for class VIII that have been set by the government in the 2013 curriculum

IPA1.61.5304 Evaluation of Science Learning Process and Outcomes 3 Credits

This course provides a basic understanding of educational evaluation which includes mastering the objectives and functions of assessment, the role of evaluation in PBM; evaluation procedures and forms; assessed ability; planning, preparation, analysis of test subjects, validity and reliability of tests/tests (concepts and process skills) processing of assessment results; performance assessment, including portfolio, practicum assessment; and class-based assessment.

IPA1.61.6301 Modern Physics 3 Credits

Modern physics is a subject in the field of expertise (MKBK). Modern physics courses provide an explanation from the 19th century on a phenomenon, where the phenomenon can only be explained by modern devices. Modern physics generally assumes that a consistent explanation of these observations would incorporate elements of quantum mechanics and relativity. After carrying out this lecture, students are expected to be able to understand the concepts and principles of modern physics in general, so that they can analyze modern physics problems, both problems in the form of questions, practicums and problems that occur in everyday life.

IPA1.61.6302 Fundamentals of Biochemistry 3 Credits

The basics of biochemistry course is one of the subjects in the field of expertise, with the aim that students can understand various things related to chemistry in the life sciences. This course discusses the basic principles of biochemistry, cell structure and function, water, amino acids, proteins, enzymes, carbohydrates, nucleic acids, lipids, vitamins, minerals, hormones, antibodies, antibiotics, and membrane transport.

IPA1.61.6303 Integrated Science Class IX 3 Credits

This course discusses the material of the human reproductive system, the reproductive system of plants and animals; population development and environmental impacts; atoms, ions, and molecules; static electricity, electric circuits and sources of electrical energy, magnetism and electromagnetic induction, human heredity; environmentally friendly technology production, biotechnology and food production, soil and life

IPA1.61.6304 Microteaching 3 Credits

This course aims to train students to analyze the latest curriculum according to the curriculum used by the government. This course requires students to be able to analyze the curriculum so that they are able to make

lesson plans, syllabus and learning scenarios to prepare students to be skilled in teaching. This course aims to prepare students to carry out professional training programs, especially in analyzing junior high school science subject matter, estimating the level of depth and breadth of teaching materials, making teaching preparation programs and lesson plans, as well as practicing them, choosing and using appropriate approaches, methods, and media to teach the material. certain.

IPA1.61.6305 Research Methodology for Science Learning 3 Credits

This course discusses research methods, research problems and variables, how to obtain information for research purposes, types of research in the field of research, sampling techniques, instrumentation, research design, data collection and analysis, writing proposals or research plans.

IPA1.61.6306 Biotechnology 3 Credits

This course is an applicative-theoretical interdisciplinary. After taking this course, students are expected to understand that biotechnology is developed on the basis of the application of biological processes that are packaged in a certain technology to meet the needs of human life. In addition, students are also expected to have insight into the ethics of Biotechnology that can be used as a basis for building independent attitudes in responding to policy issues and the implementation of biotechnology in human life. This course examines and discusses biological concepts that underlie the development and application of biotechnology in various aspects of human life. The study begins with the understanding and basic principles of Biotechnology, the biological concepts that underlie the development of Biotechnology, followed by a discussion on the application of biotechnology in the food/beverage and drug/pharmaceutical industries, medicine, agriculture, forestry, environment and energy resources. As a provision for attitude development, this course also examines and discusses issues related to the ethics of implementing Biotechnology. Learning is presented mostly through contextual teaching and learning by revealing facts (biotechnology products or processes) found in everyday life, including through lectures, questions and answers, assignments and group discussions. This course also examines and discusses issues related to the ethics of implementing Biotechnology. Learning is presented mostly through contextual teaching and learning by revealing facts (biotechnology products or processes) found in everyday life, including through lectures, questions and answers, assignments and group discussions. This course also examines and discusses issues related to the ethics of implementing Biotechnology. Learning is presented mostly through contextual teaching and learning by revealing facts (biotechnology products or processes) found in everyday life, including through lectures, questions and answers, assignments and group discussions.

IPA1.61.7301 English for Science 2 Credits

This course is a compulsory subject for the science education study program which is intended so that students are able to use knowledge about science education

basic tenses and English material that has been obtained previously in the activity *scientific reading, speaking, and writing*. Through this course, students are expected to be able to master the four basic tenses (simple present, past tense, present perfect, and present continuous) when used in academic writing, then students are also expected to be able to master the form of passive sentences, use of gerunds and to-infinitives, adjectives clause, noun clause and its application in *scientific reading, speaking, and writing*.

IPA1.61.8401 Thesis 6 Credits

Submission of research proposal outlines to the head of study programs, acceptance of research proposal outlines, determination of supervisors 1 and 2, research proposal writing, research proposal seminars, research proposal refinement, research implementation in schools, research report preparation, thesis examination, research report improvement, and article writing for e-journal

IPA2.61.3401 Conservation of Natural Resources 2 Credits

This course is an elective course, after taking this course students are expected to master the basic concepts of conservation and natural resources. Further studies cover the conservation of biology and biodiversity, various types of energy conservation, supporting factors for energy conservation, energy conservation related to sustainable development and the role of culture in the conservation of natural resources in Indonesia.

IPA2.61.3301 Capita Selecta IPA 2 Credits

This course is an elective course, after attending this course students are expected to be able to respond wisely to issues that are developing at this time according to their scientific field.

IPA2.61.4301 Matter and Energy 2 Credits

This course is one of the elective courses of the study program with a weight of 2 credits. This course is also a deepening of what students have learned in General Chemistry courses. Through this course, students are expected to be able to further understand the concepts of Matter and Energy, ranging from the notion of matter and its various forms, classification of matter, atoms and molecules, subatomic particles, the arrangement of atoms in matter, the concept of energy and its changes, the law of conservation of energy, to various form of energy use in human life.

IPA2.61.5301 Technology Physics 2 Credits

Technology is an Expertise Course (MKBK) which is an elective course. After carrying out this lecture, students are expected to be able to understand the concepts and principles of physics so that they can apply them in facilitating work and daily activities in the form of technology. Both technology across the physical sciences, as well as technology that only uses one concept of physics. Neither complex technology, nor simple technology.

IPA2.61.5302 Applied Chemistry 2 Credits

The Science Applied Chemistry course is one of the subjects in the field of expertise (optional) which aims to provide an understanding of the manufacture of chemical products that are commonly found in everyday life. Students are expected to be able to apply knowledge of science, especially chemistry, in the manufacture of materials for daily needs

IPA2.61.6301 Redox and Electrochemistry 2 Credit Points

Materials and Energy, This course is an elective course with a weight of 2 credits that students can take as a deepening of this material that has been discussed in General Chemistry lectures. Through this course, students are expected to be able to simplify redox reactions using various methods that have been known so far; understand the standard Reduction Potential and its use in calculations; understand the workings of the Voltaic Cell and its components; understand the thermodynamics of redox reactions; understand the effect of concentration on standard reduction potential; able to understand the intent and perform calculations with the Nernst equation; know the types of batteries and understand how they work; understand the physical and chemical changes that occur in the corrosion process; understand the process of electrolysis and recognize the components of an electrolytic cell,

IPA2.61.6302 Foodstuff Chemistry 2 Credits

The Food Chemistry Science course is one of the subjects in the field of expertise (optional) which aims to provide an understanding of the processing of foodstuffs that are commonly found in everyday life and viewed from the point of view of the study of chemistry. Students are expected to be able to apply science knowledge, especially chemistry in manufacturing, as well as control the quality of food ingredients in daily life.

IPA2.61.6303 Applied Biology 2 Credits

The course content includes: biogas production, hydroponics and plant propagation, tape yeast making, tempeh yeast making, nata de coco making, coconut fermentation by fermentation, yogurt making, white bread making.

IPA2.61.7301 Applied Physics 2 Credits

Applied Physics is an Expertise Course (MKBK) which is an elective course. After carrying out this course, students are expected to be able to understand the concepts and principles of physics so that they can apply them in facilitating work and daily activities.

IPA2.61.7401 Science Entrepreneur 2 Credits

This course is an elective course. After attending this course, students are expected to master the principles of entrepreneurship which include the scope, nature, values and characteristics as well as the nature and spirit of entrepreneurship. Able to conduct business analysis, develop business plans, practice entrepreneurial methods.

Entrepreneurship is related to creative and innovative abilities to seek science-based business opportunities.

E. ORGANIZATION AND PERSONNEL

Faculty Leaders

1. Dean and Deputy Dean

Dean : Prof. Dr. H. Lufri, M.S
Deputy Dean I : Dr. Yulkifli, S.Pd, M.Si
Deputy Dean II : Drs. Hendra Syarifuddin, M.Si, Ph.D
Deputy Dean III : Dr. Hardeli, M. Si.

2. Faculty Senate

Chairman : Prof. Dr. Lufri, M.S
Members : Dr. Yulkifli, S.Pd, M.Si
: Drs. Hendra Syarifuddin, M.Si., Ph.D
: Dr. Hardeli, M.Si
: Muhammad Subhan, S.Si., M.Si
: Dr. Azwir Anhar, M.Si
: Dr. H. Mawardi, M.Si
: Dr. Ratnawulan, M.Si
: Prof. Dr. H. Ahmad Fauzan, M.Pd., M.Sc
: Dr. Edwin Musdi, M.Pd
: Drs. Syafriandi, M.Si
: Drs. H. Yarman, M.Pd
: Dra. Moralita Chatri, M.P
: Drs. Mades Fifendy, M.Biomed
: Dr. Hj. Zulyusri, MP
: Dra. Helendra, M.S
: Prof. Drs. Ali Amran, M.Pd., MA., Ph.D
: Dra. Andromeda, M.Si
: Dr. Indang Dewata, M.Si
: Budhi Oktavia, S.Si., M.Si., Ph.D
: Prof. Dr. Festiyed, M.S
: Drs. Amali Putra, M.Pd
: Dr. H. Ahmad Fauzi, M.Si
: Syafriani, M.Si., Ph.D

3. Administration

Kabag Tata Usaha : Erizon, S.Pd
Kasubag Umum dan BMN : Usman, S.Pd
Kasubag Akademik dan Kemahasiswaan : Dra. Fitriani
Kasubag Perenc. Keuangan & Kepegawaian : Ernawati, S.Pd

4. Department Leader

a. Mathematics

Chairman : Muhammad Subhan, S.Si, M.Si

Secretary : Dra. Dewi Murni, M.Si

b. Biology

Chairman : Dr. H. Azwir Anhar, M.Si

Secretary : Dr. H. Syamsurizal, M. Biomed

c. Physics

Chairman : Dr. Ratnawulan, M.Si

Secretary : Yohandri, S.Si, M.Si, Ph.D

d. Chemistry

Chairman : Dr. Mawardi, M.Si

Secretary : Edi Nasri, S.Si, M.Si

e. Science Education

Chairman : Dra. Yurnetti, M.Pd

Secretary : Tuti Lestari, S.Si, M.Si

f. Coordinator of TPB Courses

Chairman : Dra. Hidayati, M.Si

5. Study Program Leader

a. Biology Program Chairman (S1) : Dr. Ramadhan Sumarmin, S.Si, M.Si

b. Physics Program Chairman (S1) : Syafriani, S.Si, M.Si, Ph.D

c. Physics Program Chairman (S2) : Dr. Hamdi, M.Si

d. Environmental Science Program Chairman (S2) : Dr. Indang Dewata, M.Si

e. Chemistry Program Chairman (S1) : Hary Sanjaya, M.Si

f. Mathematics Program Chairman (S1) : Dra. Media Rosha, M.Si

g. Biology Education Program Chairman (S1) : Drs. Ardi, M.Si

h. Biology Education Program Chairman (S2) : Dr. Yuni Ahda, S.Si, M.Si

i. Physics Education Program Chairman (S1) : Dra. Yenni Darvina, M.Si

j. Physics Education Program Chairman (S2) : Dr. Ahmad Fauzi, M.Si

k. Chemistry Education Program Chairman (S1) : Dr. Fajriah Azra, S.Pd, M.Si

l. Chemistry Education Program Chairman (S2) : Budhi Oktavia, S.Si, M.Si, Ph.D

m. Mathematics Education Program Chairman (S1) : Dr. Irwan, M.Si

n. Statistics Program Chairman (S1) : Dr. Dony Permana, M.Si

o. Educational Science Program Coordinator (S3) : Prof. Dr. Ahmad Fauzan, M.Pd, M.Sc

p. Mathematics Education Program Coordinator (S2) : Dr. Yerizon, M.Si

q. Statistics Program Coordinator (D3) : Dra. Nonong Amalita, M.Si

6. Laboratory Management

a. Mathematics

Laboratory Chairman : Suherman, S.Pd, M.Si

Laboratory Secretary : Meira Parma Dewi, S.Si, M.Kom

b. Biology

Laboratory Chairman : Drs. Mades Fifendi, M.Biomed

Laboratory Secretary : Dr. Dwi Hilda, M.Si

Sub Laboratory Coordinator

- Developmental Structure / : Dra. Helendra, M.S

Animal Systematics

- Microbiology : Irdawati, M.Si

- Function Biology : Dr. Linda Advinda, M.Kes

- Genetics & Biotechnology : Dr. Yuni Ahda, M.Si

- Environmental Biology : Dra. Vauzia, M.Si

- Fundamental Biology : Dr. Moralita Chatri, M.P

- Learning : Dra. Heffi Alberida, M.Si

- Research : Dr. Violita, M.Si

c. Physics

Laboratory Chairman : Drs. Akmam, M.Si

Laboratory Secretary : Zuhendri Kamus, S.Pd, M.Si

Sub Laboratory Coordinator

- Fundamental Physics : Dra. Hidayati, M.Si

- Advanced Physics : Drs. Hufri, M.Si

- Electronics & : Drs. H. Asrizal, M.Si

Instrumentation

- Material Physics & : Dr. Ramli, M.Si

Biophysics

- Physics Learning : Dra. Murtiani, M.Pd

- Workshop & Photography : Dra. Yurnetti, M.Pd

- Computational Physics : Drs. H. Masril, M.Si

- Geophysics : Harman Amir, S.Si, M.Si

d. Chemistry

Laboratory Chairman : Dr. rer. nat, Jon Efendi, M.Si

Laboratory Secretary : Dr. Rahadian. Z, S.Pd, M.Si

Study Field Coordinator

- General Chemistry : Dra. Iryani, M.Si

- Organic Chemistry : Dra. Sri Benti Etika, M.Si

- Physics Chemistry : Dr. Hardeli, M.Si

- Analytical Chemistry : Alizar, S.Pd, M.Si, Ph.D

- Biochemistry : Drs. Iswendi, M.S

- Inorganic Chemistry : Dra. Hj. Bayharti, M.Sc

- Chemistry Learning : Prof. Dr. Hj. Elizar, M.Pd

- Chemistry Research : Drs. Iswendi, M.S

7. Supporting Facilities

- a. Mathematics Laboratory**
The Department of Mathematics has a laboratory that can be used for student practicum, which consists of a mathematics learning laboratory and a computational and statistical laboratory.
- b. Biology Laboratory**
The Department of Biology has 8 laboratories, namely basic biology laboratories, botany, zoology, plant physiology, ecology, biotechnology, genetics, animal physiology, microbiology, biology learning and computer labor, all of which are equipped with equipment according to the needs of student practicum and research.
- c. Physics Laboratory**
The Department of Physics has 8 laboratories, namely 1) basic physics, 2) physics learning, 3) materials and biophysics, 4) workshops & photography, 5) computing, 6) Geophysics, 7) electronics & instrumentation, 8) advanced physics.
- d. Chemistry Laboratory**
The Chemistry Department has 8 laboratories, namely basic chemistry laboratories, organic chemistry, physical chemistry, analytical chemistry, biochemistry, inorganic chemistry, instruments, chemistry learning, and chemical research laboratories, all of which are equipped with various practical equipment and are used for student practicum and research.
- e. Faculty and Department Reading Room**
Faculties and each department have 1 reading room, which has a variety of textbooks and references for research.

8. Teaching Staff of the Faculty of Mathematics and Natural Sciences

No.	Code	Name	Education
Biology Department			
1	3227	Drs. Armen, S.U	S2
2	3228	Drs. Ristiono, M.Pd	S2
3	3229	Prof. Dr. Lufri, M.S	S3
4	3230	Drs. Mades Fifendy, M.Biomed	S2

No.	Code	Name	Education
5	3232	Dra. Helendra, MS	S2
6	3233	Dr. Azwir Anhar., M.Si	S3
7	3234	Dra. Des M, MS	S2
8	3235	Dr. Linda Advinda, M. Kes.	S3
9	3240	Dr. Moralita Chatri, MP	S3
10	3241	Dra. Heffi Alberida, M.Si	S2
11	3242	Dr. Syamsurizal, M. Biomed	S3
12	3243	Drs. Ardi, M.Si	S2
13	3244	Dr. Zulyusri, M. P	S3
14	3245	Dr. Yuni Ahda, S.Si, M.Si	S3
15	3246	Irma Lelani Eka Putri, S.Si, M.Si	S2
16	3247	Dr. Ramadhan Sumarmin, S.Si , M.Si	S3
17	3248	Dr. Abdul Razak, S.Si, M.Si	S3
18	3249	Dr. Vauzia, M.Si	S3
19	3250	Irdawati, M.Si	S2
20	3251	Dr. Dwi Hilda Puteri, S.Si., M.Biomed	S3
21	3252	Dezi Handayani, M.Si	S2
22	3254	Dr. Violita, S.Si, M.Si	S3
23	3255	Ernie Novriyanti, S.Pd, M.Si	S2
24	3256	Muhyiatul Fadilah, S.Si,M.Pd.	S2
25	3257	dr. Elsa Yuniarti, S.ked, M.Biomed	S2
26	3258	Rahmawati D, S.Pd, M.Pd	S2
27	3259	Fitri Arsih, S.Si., M.Pd	S2
28	3260	Rahmadhani Fitri, M.Pd	S2
29	3261	Indra Hartanto, S.TP, MP	S2
30	3262	Resti Fevria, S.TP, MP	S2
31	3263	Relsas Yogica, S.Pd, M.Pd	S2
32	3264	Siska Alicia Farma, S.Pd, M.Biomed	S2
33	3265	Yosi Laila Rahmi, M.Pd	S2
34	181041	Rijal Satria, Ph.D	S3
35	172031	Ganda Hijrah Selaras, M.Pd	S2
36	181022	Fitra Arya Dwi Nugraha, S.Si, M.Si	S2

No.	Code	Name	Education
Physics Department			
1	3320	Dra. Murtiani, M.Pd	S2
2	3323	Drs. Amali Putra, M.Pd	S2
3	3327	Drs. Akmam, M. Si	S2
4	3328	Drs. Gusnedi, M. Si	S2
5	3329	Prof. Dr. Festiyed, MS	S3
6	3331	Dra. Yenni Darvina, M.Si	S2
7	3332	Drs. Masril, M.Si	S2
8	3333	Dr. Hamdi, M. Si	S3
9	3334	Drs. Asrizal, M.Si	S2
10	3335	Drs. Hufri, M.Si	S2
11	3336	Dr. Ahmad Fauzi., M,Si	S3
12	3337	Dr. Ratnawulan, M.Si	S3
13	3338	Drs. Letmi Dwiridal, M. Si	S2
14	3339	Syafriani, S. Si , M.Si, Ph.D	S3
15	3340	Harman Amir, S. Si, M.Si	S2
16	3341	Dr. Fatni Mufit, S.Pd, M.Si	S2
17	3342	Zulhendri Kamus, S.Pd, M.Si	S2
18	3343	Dr. Ramli, S.Pd, M.Si	S3
19	3344	Dr. Yulkifli, S.Pd, M.Si	S3
20	3345	Pakhrur Razi, S.Pd, M.Si	S2
21	3346	Nofi Yendri Sudiar, S.Si	S2
22	3347	Yohandri, M.Si, Ph.D	S3
23	3348	Dra. Hidayati, M.Si	S2
24	3350	Riri Jonuarti, S.Pd, M.Si	S2
25	3351	Silvi Yulia Sari, M.Pd	S2
26	3352	Renol Afrizon, M.Pd	S2
27	3353	Rio Anshari, S.Pd, M.Si	S2
28	3354	Wahyuni Satria Dewi, S.Pd, M.Pd	S2
29	3322	Dr. Desnita, M.Si	S3
30	171027	Fandi Oktasendra, M. Sc	S2
31	172026	Fanny Rahmatina Rahim, M.Pd	S2

No.	Code	Name	Education
32	172061	Rahmah Evita Putri, M.Pd	S2
33	181032	Rahmat Hidayat, S.Pd, M.Si	S2
34	171074	Mairizwan, S.Pd, M.Si	S2
Chemistry Department			
1	3419	Dra. Bayharti, M.Sc	S2
2	3422	Drs. Iswendi, MS	S2
3	3424	Prof. Dr. Elizar, M. Pd	S3
4	3425	Dr. Andromeda, M.Si	S3
5	3426	Dra. Sri Benti Etika, M. Si	S2
6	3427	Drs. Bahrizal, M. Si	S2
7	3428	Dr. Mawardi, M. Si	S3
8	3429	Dr. Jon Efendi, M.Si	S3
9	3431	Dr. Hardeli, M. Si	S3
10	3432	Prof. Dr. Minda Azhar, M.Si	S3
11	3433	Dra. Suryelita, M.Si	S2
12	3435	Dra. Syamsi Aini, M.Si, Ph.D	S3
13	3437	Dra. Iryani, MS	S2
14	3438	Ananda Putra., S.Si, M.Si, Ph.D	S3
15	3439	Budhi Oktavia, S.Si, M. Si, Ph.D	S3
16	3440	Dr. Indang Dewata, M. Si	S3
17	3441	Dr. Rahadian Z, S.Pd, M.Si	S3
18	3442	Dr. Fajriah Azra, S.Pd, M.Si	S3
19	3443	Miftahul Khair, S.Si, M.Sc, Ph.D	S3
20	3444	Edi Nasra, S.Si, M.Si	S2
21	3445	Umar Kalmar Nizar, S.Si, M.Si, Ph.D	S3
22	3446	Dr. Yerimadesi, S.Pd, M.Si	S3
23	3447	Dr. Desy Kurniawati, S.Pd, M.Si	S3
24	3448	Deski Beri, S.Si, M.Si	S2
25	3449	Effendi, S.Pd, M.Sc	S2
26	3450	Sherly Kasuma Warda Nings, S.Si.,M.Si	S2
27	3451	Guspatni, S.Pd, MA	S2
28	3452	Hary Sanjaya, M.Si	S2

No.	Code	Name	Education
Physics Department			
29	3453	Fitri Amelia, S.Si, M.Si	S2
30	3454	Zonalia Fitriza, M.Pd	S2
31	3455	Fauzana Gazali, M.Pd	S2
32	3456	Alizar, S.Pd, M.Sc, Ph.D	S2
33	3457	Eka Yusmaita, S.pd, M.Pd	S2
34	0213	Melindra Mulia, S.Si, M.Si	S2
35	172025	Faizah Qurrata Aini, S.Pd, M.Pd	S2
36	172038	Hesty Parbuntari, S.Pd, M.Sc	S2
37	182007	Annisa Dewi Pangestuti, S.Si., M.Si	S2
Mathematics Department			
1	3125	Dr. Edwin Musdi, M.Pd	S3
2	3126	Dra. Elita Zusti Jamaan, MA	S2
3	3127	Dra. Sri Elniati, MA	S2
4	3128	Drs. Mukhni, M.Pd	S2
5	3129	Drs. H. Yarman, M. Pd	S2
6	3131	Dra. Media Rosha, M.Si	S2
7	3132	Dra. Arnellis, M.Si	S2
8	3134	Dr. Armiati, M.Pd	S3
9	3136	Dra. Jazwinarti, M.Pd	S2
10	3137	Dra. Fitriani Dwina, M.Ed	S2
11	3138	Dra. Minora Longgom Nasution, M.Pd	S2
12	3140	Prof. Dr. Ahmad Fauzan, M.Pd	S3
13	3142	Drs. Syafriandi, M.Si	S2
14	3143	Dr. Irwan, M.Si	S3
15	3144	Dra. Dewi Murni, M.Si	S2
16	3146	Drs. Atus Amadi Putra, M.Si	S2
17	3147	Dra. Nonong Amalita, M. Si	S2
18	3148	Drs. Hendra Syarifuddin, M.Si, Ph.D	S3
19	3149	Drs. Yusmet Rizal, M. Si	S2
20	3150	Dr. Yerizon, M.Si	S3
21	3151	Dra. Helma, M. Si,	S2
22	3152	Suherman, S.Pd, M.Si	S2

No.	Code	Name	Education
23	3153	Muhammad Subhan, S. Si, M.Si	S2
24	3154	Dodi Vionanda, S.Si, M.Si	S2
25	3155	Dr. Dony Permana, M.Si	S3
26	3156	Meira Parma Dewi, S.Si, M.Kom	S2
27	3157	Riry Sriningsih, S.Si,M.Sc	S2
28	3158	Mirna, S.Pd, M.Pd	S2
29	3159	Devni Prima Sari, S.Si., M.Si	S2
30	3160	Yenni Kurniawati, S.Si., M.Si	S2
31	3161	Defri Ahmad, S.Pd, M.Si	S2
32	3162	Dr. Ali Asmar, M.Pd	S3
33	3163	Fridgo Tasman, S.Pd, M.Sc	S2
34	3164	Fitri Mudia Sari, S.Si, M.Si	S2
35	0246	Heru Maulana, S.Pd, M.Si	S2
36	172007	Anggit Reviana Dewi Agustyani, S.Pd, M.Pd	S2
37	172019	Dina Fitria, S.Pd, M.Si	S2
38	172041	Khairani, S.Pd, M.Pd	S2
39	182005	Admi Salma, S.Pd., M.Si	S2
40	182016	Fadhilah Fitri, S.Si., M.Stat	S2
41	182032	Nurul Afifah Rusyda, S.Pd., M.Pd	S2
Science Education Department			
1	3325	Dra. Yurnetti, M. Pd	S2
2	3423	Dr. Latisma Dj, M.Si	S3
3	172119	Dr. Skunda Diliarosta, M.Pd	S3
4	172001	Tuti Lestari, S.Si, M.Si	S2
5	171006	Arief Muttaqiin, S.Pd, M.Pd	S2
6	171008	Aristo Hardinata, S.Pd, M.Pd	S2
7	172061	Rahmah Evita Putri, S.Pd, M.Pd	S2
8	182034	Rani Oktavia, S.Pd., M.Pd	S2
9	172047	Monica Prima sari, M.Pd	S2