MODULE DESCRIPTION

Master Program in Pharmacy

Faculty of Pharmacy
Universitas Padjadjaran

2020

FOREWORD

Praise our gratitude to God Almighty for His mercy and approval in compiling the Curriculum and Module Description Master Program in Pharmacy at the Faculty of Pharmacy, Universitas Padjadjaran. This book was prepared to be a reference in the implementation of the Master Program in Pharmacy.

This book contains a variety of information about Faculty of Pharmacy which is presented systematically starting from an introduction covering the history of the establishment of Faculty of Pharmacy, vision, mission, educational objectives and graduate competencies;curriculum and study load; curriculum content;learning strategies;evaluation system and student affairs. This book is expected to improve the education management system, as well as material in developing education programs at Faculty of Pharmacy Universitas Padjadjaran.

Thank you.

Jatinangor, August 2020

Dean of the Faculty of Pharmacy

Prof. Dr. Ajeng Diantini, M.Sc., Apt.

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CHAPTER 1
INTRODUCTION

VISIONS, MISSIONS, PROFILE, AND LEARNING ACHIEVEMENT

1.1 History

The development of pharmaceutical science are needed and has been very fast to improve the quality of pharmacy product development. The main purpose was to achieve better pharmacy product, evaluation and quality control as well as quality assurance. Intervention of high quality pharmacist were shown to help optimize processes of managerial, production, evaluation, and assurance therefore will improve the quality of medication of diseases.

The Faculty of Pharmacy, previously having the status as the Department of Pharmacy, was established on February 19, 1959, as the fifth of the seven departments belonged to the Faculty of Exact and Natural Sciences (FIPPA), Universitas Padjadjaran. At that time, academic activities of the Department of Pharmacy took place at Jl. Ir. H. Juanda No. 4 Bandung and the Institute of Natural Sciences (LIPA) at Jl. Singaperbangsa No. 1 Bandung. In 1978, the location moved to Jl. Maulana Yusuf No. 12 Bandung, which was previously occupied by the Faculty of Dentistry. After the new campus of the Faculty of Mathematics and Natural Sciences (FMIPA) in Jatinangor-Sumedang was completed, the Department of Pharmacy, together with other departments at FMIPA, moved to the campus in Jatinangor on September 1986. On October 17, 2006, the Department of Pharmacy changed its status become the Faculty of Pharmacy. The Master program in Pharmacy was started since January 10, 2011 after obtaining the permission from the Ministry of National Education. This study program began accepting new students in the semester period of August - February in Academic Year 2011/2012 and obtained an A accreditation from LAM-PTKes in December 2017.

1.2 Vision and Mission

The vision of the Master Program in Pharmacy is to become an excellent Master Program in Pharmacy in Research and International Competitive by 2024.

The mission of the Master Program in Pharmacy of the Faculty of Pharmacy is:

a. Organizing research-based master of pharmacy education which is relevant to the development of science and technology and meets the demands of the community.
b. Organizing the management of the Master of Pharmacy Study Program which are professional, accountable and regionally competitive.
c. Carrying out research which oriented towards scientific publications, innovative products and superior policies in the pharmaceutical field.
d. Carrying out services / community services by utilizing the results of research in the pharmaceutical field.
e. Organizing cooperation in the pharmaceutical sector through the pentahelix concept.

1.3 Objectives

The objectives of the Master Program in Pharmacy are:

1. Creating competent academicians in the field of pharmacy with RESPECT characteristics (Responsible, Excellent, Scientific Rigor, Professional, Encouraging, Creative and Trust) and uphold the nobility of Sundanese culture and national culture in the diversity of world cultures.
2. Realizing the management of the Master of Pharmacy Study Program which is professional, accountable and has an excellent reputation in the region.
3. Increasing the capacity of excellent research and innovation in the pharmaceutical field based on the Principal Scientific Pattern (Pola Ilmiah Pokok (PIP) of Unpad.
4. Realizing service / community service by utilizing research results in the pharmaceutical field.
5. Realizing mutual benefit in the pharmaceutical field through the pentahelix concept.

1.4 Profile of Master Program in Pharmacy

Graduates of this study program will be absorbed by the market at the regional, national and international levels. Graduates will become lecturers, researchers at universities, research institutes, government and non-government institutions.

1. Regional Level

   At the regional level, graduates will be absorbed by state and private universities in West Java, with the total 14 undergraduate pharmacy study programs. Additionally, the graduates also can be be absorbed by the government agencies in West Java such as the Public Health Office, The Indonesian Food and Drug Authority (BPOM), and the Government Research Institute. Furthermore, graduates can also be absorbed by non-government (private) agencies such as pharmaceutical industries, health foundation, Non-Governmental Organizations (NGOs), and others.

2. National Level

   At the national level, graduates can be absorbed by 79 undergraduate study programs. Additionally, it can also be absorbed by national government agencies such as BPOM, and Research Institutions, pharmaceutical industries. Graduates can also be absorbed by non-government (private) agencies such as the pharmaceutical industry, health foundations, Non-Governmental Organizations (NGOs), and others.

3. International

   Graduates of the Master program in pharmacy can be absorbed by neighbouring country such as Malaysia at several public and private universities. As a reference, graduates of the Master Program

in Pharmacy of Unpad have been absorbed by several universities in Malaysia, namely the University of Kuala Lumpur (UniKL) and Geometrica College.

1.4 Learning Outcome and Specific Learning Outcome

Learning achievements of Master Program in Pharmacy were based on Vision, Mission and Profiles of graduates, and also learning outcomes (CP) from the Indonesian Pharmacy Higher Education Association (APTFI), Annex to Permenristekdikti No. 44 of 2015 concerning SNPT and input from pharmaceutical experts and advances in science and technology in the pharmaceutical field.

The main competencies of the Master Program in Pharmacy Universitas Padjadjaran, graduates will be able to:

1. Pharmaceutical Analysis and Medicinal Chemistry Concentration/Field

1.1. Able to carry out drug research and development in the context of drug discovery and product development. Divided into specific LO that were supported by courses:

1.1.1 Able to List and explain the psychochemical properties of solute and solvent that affect solubility, stability, and other bio pharmaceutical properties in drug dosage forms development.

1.1.2 Able to explain important factors for design, development and evaluation of different dosage form and drug delivery system

1.1.3 Able to Present the ability to interpret and analyze data

1.1.4 Able to Present the ability to interpret and analyze data

1.2 Able to carry out quality assurance tests for drug dosage form. Divided into specific LO that were supported by courses:

1.2.1 Able to Develop, validate and apply different instrumental analytical technique in drug analysis on various drug dosage form

1.2.2 Able to Characterize and evaluate the psychochemical properties of pharmaceutical ingredients

1.3 Able to implement their knowledge in the teaching and learning process in higher education in the field of pharmaceutical analysis and medicinal chemistry. Divided into specific LO that were supported by courses:

1.3.1 Able to Present organized information orally, persuasively yet logical manner using documentations and supporting tool

1.3.2 Able to Show contributions in individual or group project.

1.4 Communicate scientific information effectively both orally and in writing in seminars / conferences or scientific journals to inform and educate professional colleagues and peer reviews. Divided into specific LO that were supported by courses:

1.4.1 Able to Analyze and interpret data.

1.4.2 Able to Present organized information orally, persuasively yet logical manner using documentations and supporting tool

2. Pharmaceutics and Pharmaceutical Technology Concentration/Field

2.1 Able to develop an understanding of knowledge about basic concepts in pharmaceutical science, especially in the manufacture of pharmaceutical products / industry. Divided into specific LO that were supported by courses:

2.1.1 Able to List and explain the psychochemical properties of solute and solvent that affect solubility, stability, and other bio-pharmaceutical properties in drug dosage forms development of drugs, herbal medicine & supplement, and cosmetics

2.1.2 Able to explain important factors for design, development and evaluation of different dosage form and drug delivery system

2.1.3 Able to Develop, validate and apply different instrumental analytical technique in drug analysis on various drug dosage form

2.1.4 Able to Identify and elaborate drug absorption, distribution, metabolism and excretion principles along with factors that influence the process

2.2 Integrating advanced knowledge and concepts in pharmaceutical science, especially Pharmaceutics and pharmaceutical technology. Divided into specific LO that were supported by courses:

2.2.1 Able to Analyze and interpret data

2.2.2 Able to explain critical factors in designing, production and evaluation various drug dosage form and other drug delivery system

2.2.3 Able to Characterize and evaluate physicochemical properties of pharmaceutical ingredients

2.3 Able to develop group dynamics and teamwork skills in the field of pharmaceutics and pharmaceutical technology. Divided into specific LO that were supported by courses:

2.3.1 Show contributions in individual or group project

2.3.2 Able to Summarize information and communicate its development obtained from group experience

2.4 Communicate scientific information effectively both orally and in writing in seminars / conferences or scientific journals to inform and educate professional colleagues and peer reviews. Divided into specific LO that were supported by courses:

2.4.1 Able to Collect, analyze and interpret scientific literature and disseminated the information orally or in writing

2.4.2 Able to Present organized information orally, persuasively yet logical manner using documentations and supporting tools

2.4.3 well organized and able to make technical and analytical document with relevant content

3. Pharmaceutical Biology Concentration/Field

3.1 Able to carry out drug research and development in the context of drug discovery and product development. Divided into specific LO that were supported by courses:

3.1.1 Able to explain the psychochemical properties of solute and solvent that affect solubility, stability, and other bio-pharmaceutical properties in drug dosage forms development of herbal medicine

3.1.2 Able to explain and apply mechanism of certain drug in molecular and cellular level

3.1.3 Able to Present the ability to interpret and analyze data

3.1.4 Apply different instrumental analytical techniques in herbal drug analysis for drug's pharmacological effect evaluation

3.1.5 Able to design, produced and evaluation different herbal dosage form and its delivery system

3.2 Integrating advanced knowledge and concepts in pharmaceutical science, especially pharmacy biology. Divided into specific LO that were supported by courses:

3.2.1 Able to Analyze and interpret data

3.2.2 Able to characterize and evaluate physicochemical properties of active compound from natural product

3.2.3 Able to Apply different separation techniques from natural product for isolation of marker and active compound

3.3 able to develop group dynamics and teamwork skills in the field of pharmaceutical biology. Divided into specific LO that were supported by courses:

3.3.1 Able to Show contributions in individual or group project

3.3.2 Able to Summarize information and communicate its development obtained from group experience

3.4 Communicate scientific information effectively both orally and in writing in seminars / conferences or scientific journals to inform and educate professional colleagues and peer reviews. Divided into specific LO that were supported by courses:

3.4.1 Able to Collect, analyze and interpret scientific literature and disseminated the information orally or in writing

3.4.2 Able to Present organized information orally, persuasively yet logical manner using documentations and supporting tools

3.4.3 well organized and able to make technical and analytical document with relevant content

4. Pharmacology Concentration/Field

4.1 Able to carry out drug research and development in the context of drug discovery and product development. Divided into specific LO that were supported by courses:

4.1.1 List and explain the psychochemical properties of solute and solvent that affect solubility, stability, and other bio pharmaceutical properties in drug dosage forms development

4.1.2 Able to explain and apply mechanism of certain drug in molecular, cellular and organ system

4.1.3 Able to Analyze and interpret data.

4.1.4 Able to Apply different instrumental analytical techniques in drug analysis for drug's pharmacological effect evaluation

4.1.5 Able to asses and evaluate therapy outcome based on knowledge how drug enter to targeting receptor

4.2 Able to apply pharmacokinetic knowledge and processes and principles of pharmacodynamics to discuss therapeutic and toxic outcomes of medicinal compounds. Divided into specific LO that were supported by courses:

4.2.1 Able to apply pharmacokinetic process related to absorption, distribution, metabolism and drug excretion

4.2.2 Able to evaluate impact of pharmacokinetic process of drug action

4.2.3 Able to use pharmacodynamic principle to discuss drug action mechanism and clinical outcome

4.3 Able to implement their knowledge in analyzing, interpreting and criticizing scientific literature in the field of pharmacology. Divided into specific LO that were supported by courses:

4.3.1 Able to Present organized information orally, persuasively yet logical manner using documentations and supporting tool

4.3.2 Able to Show contributions both in individual or group project

4.3.3 Able to do literature study independently using database and publication related to pharmacology to solved problem in pharmacology field

4.4 Communicate scientific information effectively both orally and in writing in seminars / conferences or scientific journals to inform and educate professional colleagues and peer reviews. Divided into specific LO that were supported by courses:

4.4.1 Able to Analyze and interpret data.

4.4.2 Able to Analyze, interpret and criticize about study design, data interpretation and compatibility conclusion of the scientific literature

4.4.3 Able to Collect, analyze and interpret scientific literature and disseminated the information orally or in writing

The supporting competencies of Master Program in Pharmacy graduates from the Faculty of Pharmacy Unpad are in accordance with the general attitudes and skills of the masters listed in the Annex of Permenristekdikti No. 44 of 2015 concerning SNPT. Supporting competencies consist of:

1. Attitude:

1.1 Be devoted to God Almighty and able to show a religious attitude.

1.2 Upholding human values in carrying out pharmaceutical duties based on religion, morals and ethics.

1.3 Contributing in the improvement of the quality of life in society, nation, state, and advancement of civilization based on Pancasila.

1.4 Behaving as citizens who are proud and love the country, have nationalism and a sense of responsibility to the state and nation.

1.5 Appreciating the diversity of cultures, views, religions and beliefs, as well as the opinions or original findings of others, especially in the pharmaceutical field.

1.6 Work together and have social sensitivity and care for the community and the environment.

1.7 Obeying the law and discipline in social life.

1.8 Internalizing academic values, norms and ethics.

1.9 Demonstrate an attitude of responsibility for work in their field of expertise independently.

1.10 Internalizing the spirit of independence, struggle, and entrepreneurship, especially in the pharmaceutical field.

2. General Skills:

2.1 Able to make decisions in the context of problems solving in the development of pharmaceutical science, knowledge and technology based on analytical or experimental studies of information and data.

2.2 Able to increase learning capacity independently.

2.3 Able to manage, develop and maintain networks with colleagues and peers in scientific institutions or organizations.

All of courses offered in the Master Program in Pharmacy graduates from the Faculty of Pharmacy Unpad is based on the profiles of graduates and mastery of skills in each Concentration/Field.

The following steps are taken:

1. determining matrix of courses to the general and spesific learning outcomes in each Concentration/Field
2. identifying the courses based on general compulsory and elective courses in each Concentration/Field

Table 1.1 Matrix of courses to the general and spesific learning outcomes in Pharmaceutical Analysis and Medicinal Chemistry Concentration/Field

No	General Learning outcome	Specialized Learning outcome	Courses names
1	Able to carry out drug research and development in the context of drug discovery and product development	Able to List and explain the psychochemical properties of solute and solvent that affect solubility, stability, and other bio pharmaceutical properties in drug dosage forms development.	Physicochemical Analysis, Cell and Molecular Biology, Development of Pharmaceutical Dosage Forms, Drug Discovery and Development, Scientific Paper, Radiopharmaceuticals, Development of Radiopharmaceutical Preparations, Analysis of Toxic Compounds, Validation and Regulatory Issues in Industry, Computational Chemistry and Molecular Modeling, Molecular Based Analysis, Cosmetics and Household Health Supplies Analysis, Biomedical Analysis, Drug Stability, Drug Synthesis & Therapeutic Evaluation, Therapeutic and Diagnostic Agents, Instrumentation and In Vitro Testing in Radiopharmaceuticals, Nuclear Medicine Applications
		Able to explain important factors for design, development and evaluation of different dosage form and drug delivery system	Physicochemical Analysis

		Able to Present the ability to interpret and analyze data	Physicochemical Analysis, Cell and Molecular Biology, Development of Pharmaceutical Dosage Forms, Drug Discovery and Development, Pharmacokinetics, Scientific Paper, journal reading and review, Seminar of Research Proposal, Progress Report 1 and 2, Seminar of Research Result, Magister Comprehensive Defense, Drug and Food Analysis, Analysis Method Development, Separation and Purification Methods, Radiopharmaceuticals, Development of Radiopharmaceutical Preparations, Analysis of Toxic Compounds, Validation and Regulatory Issues in Industry, Computational Chemistry and Molecular Modeling, Molecular Based Analysis, Cosmetics and Household Health Supplies Analysis, Biomedical Analysis, Drug Stability, Drug Synthesis & Therapeutic Evaluation, Therapeutic and Diagnostic Agents, Instrumentation and In Vitro Testing in Radiopharmaceuticals, Nuclear Medicine Applications
		Able to Present the ability to interpret and analyze data	Development of Pharmaceutical Dosage Forms, Drug Discovery and Development, Development of Radiopharmaceutical Preparations, Drug Stability, Therapeutic and Diagnostic Agents

2	Able to carry out quality assurance tests for drug dosage form	Able to Develop, validate and apply different instrumental analytical technique in drug analysis on various drug dosage form	Physicochemical Analysis, Pharmacokinetics, Drug and Food Analysis, Analysis Method Development, Separation and Purification Methods, Radiopharmaceuticals, Development of Radiopharmaceutical Preparations, Analysis of Toxic Compounds, Validation and Regulatory Issues in Industry, Molecular Based Analysis, Cosmetics and Household Health Supplies Analysis, Biomedical Analysis, Drug Stability, Drug Synthesis & Therapeutic Evaluation, Therapeutic and Diagnostic Agents, Instrumentation and In Vitro Testing in Radiopharmaceuticals, Nuclear Medicine Applications
		Able to Characterize and evaluate the psychochemical properties of pharmaceutical ingredients	Physicochemical Analysis, Pharmacokinetics, Drug and Food Analysis, Analysis Method Development, Separation and Purification Methods, Radiopharmaceuticals, Development of Radiopharmaceutical Preparations, Analysis of Toxic Compounds, Validation and Regulatory Issues in Industry, Computational Chemistry and Molecular Modeling, Drug Stability, Drug Synthesis & Therapeutic Evaluation
3	Able to implement their knowledge in the teaching and learning process in higher education in the field of pharmaceutical analysis and medicinal chemistry	Able to Present organized information orally, persuasively yet logical manner using documentations and supporting tool	Phylosophy of Science, Cell and Molecular Biology, journal reading and review, Scientific Paper, Drug and Food Analysis, Analysis Method Development, Separation and Purification Methods,

		Able to Show contributions in individual or group project.	Phylosophy of Science, Physicochemical Analysis, Development of Pharmaceutical Dosage Forms, Drug Discovery and Development, Pharmacokinetics, Drug and Food Analysis, Analysis Method Development, Separation and Purification Methods, Radiopharmaceuticals, Development of Radiopharmaceutical Preparations, Analysis of Toxic Compounds, Validation and Regulatory Issues in Industry, Computational Chemistry and Molecular Modeling, Molecular Based Analysis, Cosmetics and Household Health Supplies Analysis, Biomedical Analysis, Drug Stability, Drug Synthesis & Therapeutic Evaluation, Therapeutic and Diagnostic Agents, Instrumentation and In Vitro Testing in Radiopharmaceuticals, Nuclear Medicine Applications
4	Communicate scientific information effectively both orally and in writing in seminars / conferences or scientific journals to inform and educate professional colleagues and peer reviews	Able to Analyze and interpret data	Phylosophy of Science, Research Methodology, Biostatistics, Cell and Molecular Biology, Development of Pharmaceutical Dosage Forms, Drug Discovery and Development, Scientific Paper, journal reading and review, Seminar of Research Proposal, Progress Report 1 and 2, Seminar of Research Result, Magister Comprehensive Defense
		Able to Present organized information orally, persuasively yet logical manner using documentations and supporting tool	Phylosophy of Science, Scientific Paper, journal reading and review, Seminar of Research Proposal, Progress Report 1 and 2, Seminar of Research Result, Magister Comprehensive Defense

Table 1.2 Matrix of courses to the general and spesific learning outcomes in Pharmaceutics and Pharmaceutical Technology Concentration/Field

No	General Learning outcome	Specialized Learning outcome	Courses names
1	Able to develop an understanding of knowledge about basic concepts in pharmaceutical science, especially in the manufacture of pharmaceutical products / industry	Able to List and explain the psychochemical properties of solute and solvent that affect solubility, stability, and other bio-pharmaceutical properties in drug dosage forms development of drugs, herbal medicine & supplement, and cosmetics	Cell and Molecular Biology, Pharmacokinetics, Magister Comprehensive Defense, New Drug Delivery System, Pharmacogenomics, Biopharmacy, Physical chemistry of solids and interfaces, Drug Stability
		Able to explain important factors for design, development and evaluation of different dosage form and drug delivery system	Development of Pharmaceutical Dosage Forms, Drug Discovery and Development, Magister Comprehensive Defense, New Drug Delivery System, Decorative Cosmetics and Cosmeceuticals, Dermatology and Skin Care Products, Formulations and Technology for natural products preparations, Development and Characteristics of Raw Materials and Pharmaceutical Excipients, Pharmaceutical Engineering, Development of cosmetic preparations, Biopharmacy, Physical chemistry of solids and interfaces, Drug Stability
		Able to Develop, validate and apply different instrumental analytical technique in drug analysis on various drug dosage form	Physicochemical Analysis, Development of Pharmaceutical Dosage Forms, Drug Discovery and Development, Biopharmacy, Drug Stability
		Able to Identify and elaborate drug absorption, distribution, metabolism and excretion principles along with factors that influence the process	Physicochemical Analysis, Cell and Molecular Biology, pharmacokinetics, New Drug Delivery System, , Biopharmacy, Drug Stability

2	Integrating advanced knowledge and concepts in pharmaceutical science, especially Pharmaceutics and pharmaceutical technology	Able to Analyze and interpret data	Phylosophy of Science, Biostatistics, Physicochemical Analysis, Development of Pharmaceutical Dosage Forms, Drug Discovery and Development, Magister Comprehensive Defense, New Drug Delivery System, Unit Process, Pharmaceutical Engineering, Pharmacogenomics, Biopharmacy, Physical chemistry of solids and interfaces, Drug Stability
		Able to explain critical factors in designing, production and evaluation various drug dosage form and other drug delivery system	Development of Pharmaceutical Dosage Forms, Drug Discovery and Development, Magister Comprehensive Defense, New Drug Delivery System, Unit Process, Formulations and Technology for natural products preparations, , Development and Characteristics of Raw Materials and Pharmaceutical Excipients, Pharmaceutical Engineering, Development of cosmetic preparations, Biopharmacy, Drug Stability
		Able to Characterize and evaluate physicochemical properties of pharmaceutical ingredients	Physicochemical Analysis, Development of Pharmaceutical Dosage Forms, Drug Discovery and Development, Magister Comprehensive Defense, New Drug Delivery System, Unit Process, Formulations and Technology for natural products preparations, , Development and Characteristics of Raw Materials and Pharmaceutical Excipients, Pharmaceutical Engineering, Development of cosmetic preparations, Biopharmacy, Drug Stability

3	Able to develop group dynamics and teamwork skills in the field of pharmaceutics and pharmaceutical technology	Show contributions in individual or group project	Phylosophy of Science, Research Methodology, Biostatistics, Pharmacokinetics, journal reading and review, New Drug Delivery System, Unit Process, Decorative Cosmetics and Cosmeceuticals, Dermatology and Skin Care Products, Formulations and Technology for natural products preparations, , Development and Characteristics of Raw Materials and Pharmaceutical Excipients, Pharmacogenomics, Pharmaceutical Engineering, Development of cosmetic preparations, Physical chemistry of solids and interfaces, Biopharmacy, Drug Stability
		Able to Summarize information and communicate its development obtained from group experience	Phylosophy of Science, Biostatistics, Pharmacokinetics, journal reading and review, New Drug Delivery System, Magister Comprehensive Defense, Unit Process, Unit Process, Decorative Cosmetics and Cosmeceuticals, Dermatology and Skin Care Products, Formulations and Technology for natural products preparations, , Development and Characteristics of Raw Materials and Pharmaceutical Excipients, Pharmacogenomics, Pharmaceutical Engineering, Development of cosmetic preparations, Physical chemistry of solids and interfaces, Biopharmacy, Drug Stability
4	Communicate scientific information effectively both orally and in writing in seminars / conferences or scientific journals to inform and educate professional	Able to Collect, analyze and interpret scientific literature and disseminated the information orally or in writing	Phylosophy of Science, Research Methodology, Biostatistics, Scientific Paper, journal reading and review, Seminar of Research Proposal, Progress Report 1 and 2, Seminar of Research Result, Magister Comprehensive Defense

	colleagues and peer reviews	Able to Present organized information orally, persuasively yet logical manner using documentations and supporting tools	Phylosophy of Science, Research Methodology, Biostatistics, Scientific Paper, journal reading and review, Seminar of Research Proposal, Progress Report 1 and 2, Seminar of Research Result, Magister Comprehensive Defense
		well organized and able to make technical and analytical document with relevant content	Research Methodology, Seminar of Research Proposal, Progress Report 1 and 2, Seminar of Research Result, Magister Comprehensive Defense

Table 1.3 matrix of courses to the general and spesific learning outcomes in Pharmaceutical Biology Concentration/Field

No	General Learning outcome	Specialized Learning outcome	Courses names
1	Able to carry out drug research and development in the context of drug discovery and product development	Able to explain the psychochemical properties of solute and solvent that affect solubility, stability, and other bio-pharmaceutical properties in drug dosage forms development of herbal medicine	Cell and Molecular Biology, Pharmacokinetics, Magister Comprehensive Defense, Natural Product Compound Separation Methods, TDNA and Protein Recombinant Technology, Molecular Based Biomedical Analysis
		Able to explain and apply mechanism of certain drug in molecular and cellular level	Drug Discovery and Development, Magister Comprehensive Defense, Pharmacogenomics and Pharmacogenetics, Plant Tissue Culture, Microbial Pathogenicity, TDNA and Protein Recombinant Technology, Molecular Based Biomedical Analysis
		Able to Present the ability to interpret and analyze data	Physicochemical Analysis, Drug Discovery and Development,

		Apply different instrumental analytical techniques in herbal drug analysis for drug's pharmacological effect evaluation	Ethnopharmacy, Microbial Pathogenicity, Molecular Based Biomedical Analysis
		Able to design, produced and evaluation different herbal dosage form and its delivery system	Phytotherapy, Herbal Supplements
2	Integrating advanced knowledge and concepts in pharmaceutical science, especially pharmacy biology	Able to Analyze and interpret data	Phylosophy of Science, Physicochemical Analysis, Drug Discovery and Development, journal reading and review, Seminar of Research Proposal, Scientific Paper, Standardization of Natural Medicine, Aromatherapy and Hydrotherapy
		Able to characterize and evaluate physicochemical properties of active compound from natural product	Drug Discovery and Development, Magister Comprehensive Defense, Standardization of Natural Medicine), Natural Product Compound Separation Methods
		Able to Apply different separation techniques from natural product for isolation of marker and active compound	Physicochemical Analysis, Drug Discovery and Development, Standardization of Natural Medicine), Natural Product Compound Separation Methods

3	able to develop group dynamics and teamwork skills in the field of pharmaceutical biology	Able to Show contributions in individual or group project	Phylosophy of Science, Research Methodology, Biostatistics, journal reading and review, Phytotherapy, Ethnopharmacy, Aromatherapy and Hydrotherapy, Herbal Supplements, Plant Tissue Culture, Natural Product Compound Separation Methods, Microbial Pathogenicity, Applied Microbiology, TDNA and Protein Recombinant Technology, Molecular Based Biomedical Analysis
		Able to Summarize information and communicate its development obtained from group experience	Phylosophy of Science, journal reading and review, Magister Comprehensive Defense, Scientific Paper, Phytotherapy, Ethnopharmacy, Aromatherapy and Hydrotherapy, Herbal Supplements, Plant Tissue Culture, Natural Product Compound Separation Methods, Microbial Pathogenicity, Applied Microbiology, TDNA and Protein Recombinant Technology, Molecular Based Biomedical Analysis
4	Communicate scientific information effectively both orally and in writing in seminars / conferences or scientific journals to inform and educate professional colleagues and peer reviews	Able to Collect, analyze and interpret scientific literature and disseminated the information orally or in writing	Phylosophy of Science, Research Methodology, Biostatistics, journal reading and review, Seminar of Research Proposal, Progress Report 1 dan 2, Seminar of Research Result, Magister Comprehensive Defense, Scientific Paper
		Able to Present organized information orally, persuasively yet logical manner using documentations and supporting tools	Phylosophy of Science, Research Methodology, journal reading and review, Seminar of Research Proposal, Progress Report 1 dan 2, Seminar of Research Result, Magister Comprehensive Defense, Scientific Paper

		well organized and able to make technical and analytical document with relevant content	Research Methodology, Seminar of Research Proposal, Progress Report 1 dan 2, Seminar of Research Result, Magister Comprehensive Defense, Scientific Paper

Table 1.4 matrix of courses to the general and spesific learning outcomes in Pharmacology concentration/Field

No	General Learning outcome	Specialized Learning outcome	Courses names
1	Able to carry out drug research and development in the context of drug discovery and product development	List and explain the psychochemical properties of solute and solvent that affect solubility, stability, and other bio pharmaceutical properties in drug dosage forms development	Physicochemical Analysis, Development of Pharmaceutical Dosage Forms, Drug Discovery and Development
		Able to explain and apply mechanism of certain drug in molecular, cellular and organ system	Cell and Molecular Biology, Pharmacotherapy, Molecular Immunology, Molecular Pharmacology
		Able to Analyze and interpret data	Drug Discovery and Development, journal reading and review
		Able to Apply different instrumental analytical techniques in drug analysis for drug's pharmacological effect evaluation	Physicochemical Analysis, Pharmacology-Toxicology Methodology
		Able to asses and evaluate therapy outcome based on knowledge how drug enter to targeting receptor	Pharmacokinetics

2	Able to apply pharmacokinetic knowledge and processes and principles of pharmacodynamics to discuss therapeutic and toxic outcomes of medicinal compounds	Able to apply pharmacokinetic process related to absorption, distribution, metabolism and drug excretion	Pharmacokinetics, Drug Discovery and Development, Pharmacodynamics, Chemotherapeutics, Molecular Immunology, Pharmacology-Toxicology Methodology, Drug Interactions
		Able to evaluate impact of pharmacokinetic process of drug action	Chemotherapeutics, Pharmacotherapy, Molecular Pharmacology
		Able to use pharmacodynamic principle to discuss drug action mechanism and clinical outcome	Pharmacodynamics, Pharmacotherapy, Molecular Pharmacology, ,Drug Interactions
3	Able to implement their knowledge in analyzing, interpreting and criticizing scientific literature in the field of pharmacology	Able to Present organized information orally, persuasively yet logical manner using documentations and supporting tool	Biostatistics, journal reading and review, Seminar of Research Proposal, Progress Report 1 dan 2, Seminar of Research Result, Magister Comprehensive Defense, Scientific Paper
		Able to Show contributions both in individual or group project	Biostatistics, Physicochemical Analysis, journal reading and review, Seminar of Research Proposal, Progress Report 1 dan 2, Seminar of Research Result, Magister Comprehensive Defense, Scientific Paper, Pharmacodynamics, Chemotherapeutics, Pharmacotherapy, Molecular Immunology, Molecular Pharmacology, Pharmacology-Toxicology Methodology, Drug Interactions
		Able to do literature study independently using database and publication related to pharmacology to solved problem in pharmacology field	Research Methodology, Cell and Molecular Biology, journal reading and review, Seminar of Research Proposal, Progress Report 1 dan 2, Seminar of Research Result, Magister Comprehensive Defense, Scientific Paper, Pharmacodynamics, Chemotherapeutics,

			Pharmacotherapy, Molecular Immunology, Molecular Pharmacology, Pharmacology-Toxicology Methodology, Drug Interactions
4	Communicate scientific information effectively both orally and in writing in seminars / conferences or scientific journals to inform and educate professional colleagues and peer reviews	Able to Analyze and interpret data	Research Methodology, Biostatistics, journal reading and review, Seminar of Research Proposal, Progress Report 1 dan 2, Seminar of Research Result, Magister Comprehensive Defense, Scientific Paper
		Able to Analyze, interpret and criticize about study design, data interpretation and compatibility conclusion of the scientific literature	Phylosophy of Science, journal reading and review, Seminar of Research Proposal, Progress Report 1 dan 2, Seminar of Research Result, Magister Comprehensive Defense, Scientific Paper
		Able to Collect, analyze and interpret scientific literature and disseminated the information orally or in writing	Phylosophy of Science, Research Methodology, journal reading and review, Seminar of Research Proposal, Progress Report 1 dan 2, Seminar of Research Result, Magister Comprehensive Defense, Scientific Paper

1.5 Competence Analysis

Master program in Pharmacy consists of four concentrations i.e., Pharmaceutical Analysis and Medicinal Chemistry, Pharmaceutics and Pharmaceutical Technology, Pharmaceutical Biology, and Pharmacology concentrations. Students have to complete 42-43 credits for each field, divided into general compulsory 30 credit (69.77-71.43%) and elective courses 12-13 credit (28.57-30.23%). To be graduated from Master Program in Pharmacy, students must be registered for basic science supporting materials in the first semester (11 credits), practicing basic pharmaceutical sciences through case-based learning in the second semester (9 credits). Besides that, students free to choose 4-6 credits courses as advanced pharmaceutical sciences related to each Concentration/Field. in the third and fourth semester, students will have valuable time for doing their research guided by the advisor team.

and finally after passed Magister Comprehensive Defense with scientific paper as research output, they will become a pharmacist expert in each Concentration/Field

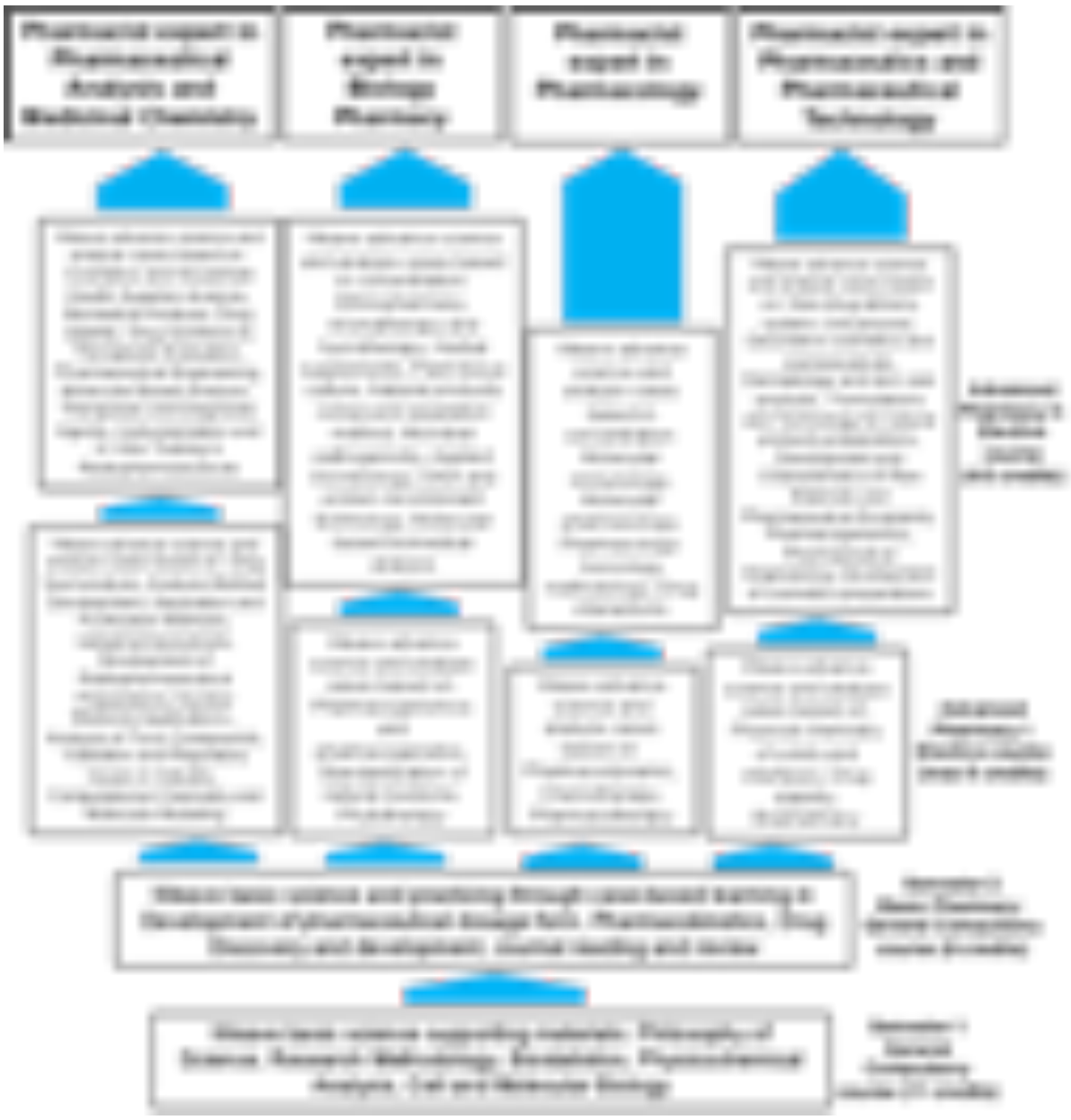

Figure 1.1 Competence Analysis of Master program in Pharmacy

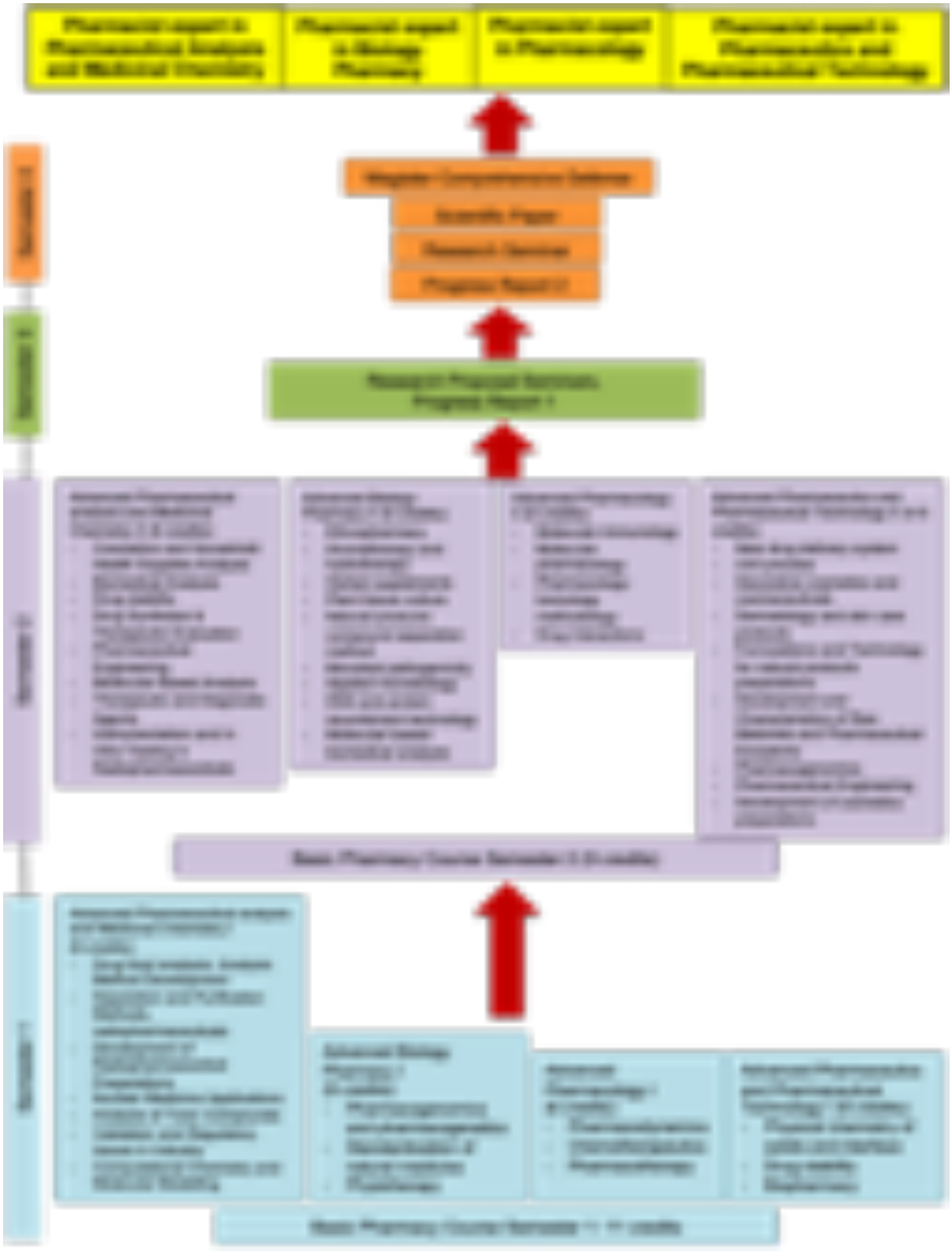

Figure 1.2 Material Organization of Master program in Pharmacy

CHAPTER 2
CURRICULUM AND COST STRUCTURE OF STUDY

Curriculum structure of magister program in Pharmacy are listed in Table 2.1 (Pharmaceutics and Pharmaceutical Technology concentration), Table 2.2 (Pharmacology concentration), Table 2.3 (Biology Pharmacy concentration) and Table 2.4 (Pharmaceutical Analysis and Medicinal Chemistry concentration). The study load are consist of academic and profession. The learning activities (Table 2.5-2.8) consist of 3 methods of delivery, 1) Lectures, 2) Tutorial in the form of discussions, presentation, task cases, scientific journal reading and review, and 3) Practice in the form of project assistant, therapy guided practice, drug monitoring and evaluation, and independent practice.

Table 2.1 Outline of Study Load Academic of Pharmaceutics and Pharmaceutical Technology Concentration

Semester and Stages		Study Load (ECTS)		Amount (ECTS)
		Academic	Profession	
Semester 1	Compulsory Course	Academic package 1: 17	0	17
	Compulsary in concentration Course	9	0	9
Subtotal		26	0	26
Semester 2	Compulsory Course	Academic package 1: 14	0	14
	Elective Course	9	0	9
Subtotal		23	0	23
Semester 3	Compulsory Course	27	0	27
	Elective Course	0	0	0
Subtotal		27		27
Semester 4	Compulsory Course	50	0	50
	Elective Course	0	0	0
Subtotal		50	0	50
Amount		125	0	125

Table 2.2 Outline of Study Load Academic of Pharmacology Concentration

Semester and Stages		Study Load (ECTS)		Amount (ECTS)
		Academic	Profession	
Semester 1	Compulsory Course	Academic package 1: 17	0	17
	Elective Course	9	0	9
Subtotal		26	0	26
Semester 2	Compulsory Course	Academic package 2: 14	0	14
	Elective Course	9	0	9

Subtotal		23	0	23
Semester 3	Compulsory Course	27	0	27
	Elective Course	0	0	0
Subtotal		27	0	27
Semester 4	Compulsory Course	50	0	50
	Elective Course	0	0	0
Subtotal		50	0	50
Amount		125	0	125

Table 2.3 Outline of Study Load Academic of Pharmaceutical Analysis and Medicinal Chemistry Concentration

Semester and Stages		Study Load (ECTS)		Amount (ECTS)
		Academic	Profession	
Semester 1	Compulsory Course	Academic package 1: 17	0	17
	Elective Course	9	0,00	9
Subtotal		26	0	26
Semester 2	Compulsory Course	Academic package 2: 14	0	14
	Elective Course	9	0	9
Subtotal		23	0	23
Semester 3	Compulsory Course	27	0	27
	Elective Course	0	0	0
Subtotal		27	0	27
Semester 4	Compulsory Course	50	0	50
	Elective Course	0	0	0
Subtotal		50	0	50
Amount		125	0	125

Table 2.4 Outline of Study Load Academic of Pharmacy Biology Concentration

Semester and Stages		Study Load (ECTS)		Amount (ECTS)
		Academic	Profession	
Semester 1	Compulsory Course	Academic package 1: 17	0	17
	Elective Course	9	0	9
Subtotal		26	0	26
Semester 2	Compulsory Course	Academic package 2: 14	0	14
	Elective Course	9	0	9
Subtotal		23	0	23
Semester 3	Compulsory Course	27	0	27
	Elective Course	0	0	0

Subtotal		27	0	27
Semester 4	Compulsory Course	50	0	50
	Elective Course	0	0	0
Subtotal		50	0	50
Amount		125	0	125

Table 2.5 Curriculum Structure Studies of Pharmaceutics and Pharmaceutical Technology Concentration

No.	Subjects		No. Module	Study Load on Activities (ECTS)				Elements of Competence	Type Competence
	Code	Name		Lecture	Tutorial	Practice	Tot		
1	2	3	4	5	6	7	8	9	10
Semester 1 : Basic Course			1						
1	P20.01001	Philosophy of Science		3	-	-	3	MPK	Main
2	P20.01002	Research Methodology		3	-	-	3	MKK	Main
3	P20.01003	Biostatistics		3	-	-	3	MKK	Main
4	P20.01004	Physicochemical Analysis		3	-	-	3	MKK	Main
5	P20.01005	Cell and Molecular Biology		5	-	-	5	MKK	Main
6	P20.01006	Physical chemistry of solids and interfaces		3	-	-	3	MKK	Support
7	P20.01007	Drug Stability		3	-	-	3	MKK	Support
8	P20.01008	Biopharmacy		3	-	-	3	MKK	Support
Burden Studies in Semester 1				26			26		
Semester 2:			2						
7	P20.02001	Development of Pharmaceutical Dosage Forms		3	-	-	3	MKK	Main
8	P20.02002	Pharmacokinetics		3	-	-	3	MKK	Main
9	P20.02003	Drug Discovery and Development		5	-	-	5	MKK	Main
10	P20.02004	Journal Reading and Review		1	-	2	3	MKK, MKB	Main
11	P20.02005	New Drug Delivery System		3	-	-	6	MKK	Support
12	P20.02006	Unit Process		3	-	-		MKK	Support
13	P20.02007	Decorative Cosmetics and Cosmeceuticals		3	-	-		MKK	Support
14	P20.02008	Dermatology and Skin Care Products		5	-	-		MKK	Support
15	P20.02009	Formulations and Technology for natural products preparations		3			3	MKK	Support
16	P20.02010	Development and Characteristics of Raw Materials and Pharmaceutical Excipients		3				MKK	Support
17	P20.02011	Pharmacogenomics		3				MKK	Support
18	P20.02012	Pharmaceutical Engineering		3				MKK	Support
19	P20.02013	Development of cosmetic preparations		3				MKK	Support
	Burden Studies in Semester 2			21	0	2	23		
Semester 3			3						
20	P20.03001	Research Proposal Seminars			15		15	MKK, MKB	Main

21	P20.03002	Progress Report 1			12		12	MKK, MKB	Main
	Burden Studies in Semeseter 3			0,00	27	0,00	27		
Semester 4			4						
22	P20B.04033	Progress Report 2		-	11		11	MKK, MKB	Main
23	P20B.04034	Research Seminar		-	14		14	MKK, MKB	Main
24	P20B.04003	Magister Comprehensive Defense		-	14		14	MKK, MKB	Main
25	P20B.04035	Scientific Paper		-	12		12	MKK, MKB	Main
	Burden Studies in Semester 4				50	0	50		

Table 2.6 Curriculum Structure Studies of Pharmacology Concentration

No.	Subjects		No. Module	Study Load on Activities (ECTs)				Elements of Competence	Type Competence
	Code	Name		Lecture	Tutorial	Practice	Tot		
1	2	3	4	5,00	6,00	7,00	8,00	9	10
Semester 1 : Basic Course			1						
1	P20.01001	Philosophy of Science		3	-	-	3	MPK	Main
2	P20.01002	Research Methodology		3	-	-	3	MKK	Main
3	P20.01003	Biostatistics		3	-	-	3	MKK	Main
4	P20.01004	Physicochemical Analysis		3	-	-	3	MKK	Main
5	P20.01005	Cell and Molecular Biology		5	-	-	5	MKK	Main
6	P20.01021	Pharmacodynamics		3			3	MKK	Support
7	P20.01022	Chemotherapeutics		3			3	MKK	Support
8	P20.01023	Pharmacotherapy		3			3	MKK	Support
Burden Studies in Semester 1				26	-	-	26		
Semester 2			2						
9	P20.02001	Development of Pharmaceutical Dosage Forms		3	-	-	3	MKK	Main
10	P20.02002	Pharmacokinetics		3	-	-	3	MKK	Main
11	P20.02003	Drug Discovery and Development		5	-	-	5	MKK	Main
12	P20.02004	Journal Reading and Review		1	-	2	3	MKK	Main
13	P20.02031	Molecular Immunology		5	-	-	9	MKK	Support
14	P20.02034	Molecular Pharmacology		3	-	-		MKK	Support
15	P20.02032	Pharmacology-Toxicology Methodology		3	-	-		MKK	Support
16	P20.02033	Drug Interactions		3				MKK	Support
	Burden Studies in Semester 2			21		2	23		
Semester 3			3						
14	P20.03001	Research Proposal Seminars			15		15	MKK, MKB	Main
15	P20.03002	Progress Report 1			12		12	MKK, MKB	Main
	Burden Studies in Semeseter 3				27		27		
Semester 4			4						

17	P20B.04033	Progress Report 2		-	11	-	11	MKK, MKB	Main
18	P20B.04034	Research Seminar		-	14	-	14	MKK, MKB	Main
19	P20B.04003	Magister Comprehensive Defense		-	14	-	14	MKK, MKB	Main
20	P20B.04035	Scientific Paper		-	12		12	MKK, MKB	Main
	Burden Studies in Semester 4				50		50		

Table 2.7 Curriculum Structure Studies of Pharmaceutical Analysis and Medicinal Chemistry Concentration

No.	Subjects		No. Module	Study Load on Activities (ECTs)				Elements of Competence	Type Competence
	Code	Name		Lecture	Tutorial	Practice	Tot		
1	2	3	4	5	6	7	8	9	10
Semester 1 : Basic Course			1						
1	P20.01001	Philosophy of Science		3	-	-	3	MPK	Main
2	P20.01002	Research Methodology		3	-	-	3	MKK	Main
3	P20.01003	Biostatistics		3	-	-	3	MKK	Main
4	P20.01004	Physicochemical Analysis		3	-	-	3	MKK	Main
5	P20.01005	Cell and Molecular Biology		5	-	-	5	MKK	Main
6	P20.01012	Drug and Food Analysis		3			9	MKK	Support
7	P20.01013	Analysis Method Development		3				MKK	Support
8	P20.01014	Separation and Purification Methods		3				MKK	Support
9	P20.01015	Radiopharmaceuticals		3					Support
10	P20.01016	Development of Radiopharmaceutical Preparations		3					Support
11	P20.01017	Nuclear Medicine Applications		3					Support
12	P20.01018	Analysis of Toxic Compounds		3					Support
13	P20.01019	Validation and Regulatory Issues in Industry		3					Support
14	P20.01020	Computational Chemistry and Molecular Modeling		3					Support
Burden Studies in Semester 1				26	-	-	26		
Semester 2			2						
15	P20.02001	Development of Pharmaceutical Dosage Forms		3	-	-	3	MKK	Main
16	P20.02002	Pharmacokinetics		3	-	-	3	MKK	Main
17	P20.02003	Drug Discovery and Development		5	-	-	5	MKK	Main
18	P20.02004	Journal Reading and Review		1	-	2	3	MKK	Main
19	P20.02023	Cosmetics and household health supplies analysis		3	-	-	9	MKK	Support
20	P20.02024	Biomedical Analysis		3	-	-		MKK	Support
21	P20.02025	Drug Stability		5				MKK	Support
22	P20.02026	Drug Synthesis & Therapeutic Evaluation		3				MKK	Support
23	P20.02027	Pharmaceutical Engineering		3				MKK	Support
24	P20.02028	Molecular Based Analysis		5	-	-		MKK	Support
25	P20.02029	Therapeutic and Diagnostic Agents		3				MKK	

No.	Subjects		No. Module	Study Load on Activities (ECTs)				Elements of Competence	Type Competence
	Code	Name		Lecture	Tutorial	Practice	Tot		
1	2	3	4	5	6	7	8	9	10
26	P20.02030	Instrumentation and In Vitro Testing in Radiopharmaceuticals		3				MKK	Support
	Burden Studies in Semester 2			21		2	23		
Semester 3			3						
27	P20.03001	Research Proposal Seminars			15		15	MKK, MKB	Main
28	P20.03002	Progress Report 1			12		12	MKK, MKB	Main
	Burden Studies in Semeseter 3				27		27		
Semester 4			4						
29	P20B.04033	Progress Report 2		-	11	-	11	MKK, MKB	Main
30	P20B.04034	Research Seminar		-	14	-	14	MKK, MKB	Main
31	P20B.04003	Magister Comprehensive Defense		-	14	-	14	MKK, MKB	Main
32	P20B.04035	Scientific Paper		-	12	-	12	MKK, MKB	Main
	Burden Studies in Semester 4				50		50		

Table 2.8 Curriculum Structure Studies of Pharmaceutical Biology Concentration

No.	Subjects		No. Module	Study Load on Activities (ECTs)				Elements of Competence	Type Competence
	Code	Name		Lecture	Tutorial	Practice	Tot		
1	2	3	4	5	6	7	8	9	10
Semester 1 : Basic Course			1						
1	P20.01001	Philosophy of Science		3	-	-	3	MPK	Main
2	P20.01002	Research Methodology		3	-	-	3	MKK	Main
3	P20.01003	Biostatistics		3	-	-	3	MKK	Main
4	P20.01004	Physicochemical Analysis		3	-	-	3	MKK	Main
5	P20.01005	Cell and Molecular Biology		5	-	-	5	MKK	Main
6	P20.01009	Pharmacogenomics and Pharmacogenetics		3			3	MKK	Support
7	P20.01010	Standardization of Natural Medicine		3			3	MKK	Support
8	P20.01011	Phytotherapy		3			3	MKK	Support
Burden Studies in Semester 1				26	-	-	26		
Semester 2:			2						
9	P20.02001	Development of Pharmaceutical Dosage Forms		3	-	-	3	MKK	Main
10	P20.02002	Pharmacokinetics		3	-	-	3	MKK	Main
11	P20.02003	Drug Discovery and Development		5	-	-	5	MKK	Main
12	P20.02004	Journal Reading and Review		1	-	2	3	MKK	Main
13	P20.02014	Ethnopharmacy		3	-	-	9	MKK	Support
14	P20.02015	Aromatherapy and Hydrotherapy		3	-	-		MKK	Support
15	P20.02016	Herbal Supplements		3	-	-		MKK	Support
16	P20.02017	Plant Tissue Culture		3				MKK	Support
17	P20.02018	Natural Product Compound Separation Methods		3				MKK	Support

No.	Subjects		No. Module	Study Load on Activities (ECTs)				Elements of Competence	Type Competence
	Code	Name		Lecture	Tutorial	Practice	Tot		
18	P20.02019	Microbial Pathogenicity		3				MKK	Support
19	P20.02020	Applied Microbiology		3				MKK	Support
20	P20.02021	DNA and Protein Recombinant Technology		5				MKK	Support
21	P20.02022	Molecular Based Biomedical Analysis		3				MKK	Support
	Burden Studies in Semester 2			21		2	23		
Semester 3			3						
14	P20.03001	Research Proposal Seminars			15		15	MKK, MKB	Main
15	P20.03002	Progress Report 1			12		12	MKK, MKB	Main
	Burden Studies in Semeseter 3				27		27		
Semester 4			4						
17	P20B.04033	Progress Report 2		-	11	-	11	MKK, MKB	Main
18	P20B.04034	Research Seminar		-	14	-	14	MKK, MKB	Main
19	P20B.04003	Magister Comprehensive Defense		-	14	-	14	MKK, MKB	Main
20	P20B.04035	Scientific Paper		-	12	-	12	MKK, MKB	Main
	Burden Studies in Semester 4				50		50		

Table 2.9 Percentage Study Load (ECTS) on the type of Competence in Pharmaceutics and Pharmaceutical Technology Concentration

No.	Semester	Expenses Research and Competence			Amount
		Main	Support	Special	
1	1st Semester	14	12	0	26
2	2nd Semester	9	14	0	23
3	3rd Semester	27	0	0	27
4	4th Semester	50	0	0	50
Amount		100 ECTS	26 ECTS	0 ECTS	125 ECTS
		80%	20%	0%	
Requirements		(40-80%)	(20-40%)	(0-30%)	

Table 2.10 Percentage Study Load (ECTS) on the type of Competence in Pharmacology Concentration

No.	Semester	Expenses Research and Competence			Amount
		Main	Support	Special	
1	1st Semester	14	12	0	26
2	2nd Semester	9	14	0	23
3	3rd Semester	27	0	0	27
4	4th Semester	50	0	0	50

No.	Semester	Expenses Research and Competence			Amount
		Main	Support	Special	
Amount		100 ECTS	26 ECTS	0 ECTS	125 ECTS
		80%	20%	0%	
Requirements		(40-80%)	(20-40%)	(0-30%)	

Table 2.11 Percentage Study Load (ECTS) on the type of Competence in Pharmaceutical Analysis and Medicinal Chemistry Concentration

No.	Semester	Expenses Research and Competence			Amount
		Main	Support	Special	
1	1st Semester	14	12	0	26
2	2nd Semester	9	14	0	23
3	3rd Semester	27	0	0	27
4	4th Semester	50	0	0	50
Amount		100 ECTS	26 ECTS	0 ECTS	125 ECTS
		80%	20%	0%	
Requirements		(40-80%)	(20-40%)	(0-30%)	

Table 2.12 Percentage Study Load (ECTS) on the type of Competence in Pharmaceutical Biology Concentration

No.	Semester	Expenses Research and Competence			Amount
		Main	Support	Special	
1	1st Semester	14	12	0	26
2	2nd Semester	9	14	0	23
3	3rd Semester	27	0	0	27
4	4th Semester	50	0	0	50
Amount		100 ECTS	26 ECTS	0 ECTS	125 ECTS
		80%	20%	0%	
Requirements		(40-80%)	(20-40%)	(0-30%)	

Table 2.13 Percentage Study Load (ECTS) on Learning Activity in Pharmaceutics and Pharmaceutical Technology Concentration

No.	Semester	Burden Study on Learning			Amount
		Lecture	Tutorial	Practice	
1	1st Semester	26	0	0	26
2	2nd Semester	21	0	2	23

No.	Semester	Burden Study on Learning			Amount
		Lecture	Tutorial	Practice	
3	3rd Semester	0	27	0	27
4	4th Semester	0	50	0	50
Amount		47 ECTS	77 ECTS	2 ECTS	125 ECTS

Table 2.14 Percentage Study Load (ECTS) on Learning Activity in Pharmacology Concentration

No.	Semester	Burden Study on Learning			Amount
		Lecture	Tutorial	Practice	
1	1st Semester	26	0	0	26
2	2nd Semester	21	0	2	23
3	3rd Semester	0	27	0	27
4	4th Semester	0	50	0	50
Amount		47 ECTS	77 ECTS	2 ECTS	125 ECTS

Table 2.15 Percentage Study Load (ECTS) on Learning Activity in Pharmaceutical Analysis and Medicinal Chemistry Concentration

No.	Semester	Burden Study on Learning			Amount
		Lecture	Tutorial	Practice	
1	1st Semester	26	0	0	26
2	2nd Semester	21	0	2	23
3	3rd Semester	0	27	0	27
4	4th Semester	0	50	0	50
Amount		47 ECTS	77 ECTS	2 ECTS	125 ECTS

Table 2.16 Percentage Study Load (ECTS) on Learning Activity in Pharmaceutical Biology Concentration

No.	Semester	Burden Study on Learning			Amount
		Lecture	Tutorial	Practice	
1	1st Semester	26	0	0	26
2	2nd Semester	21	0	2	23
3	3rd Semester	0	27	0	27

No.	Semester	Burden Study on Learning			Amount
		Lecture	Tutorial	Practice	
4	4th Semester	0	50	0	50
Amount		47 ECTS	77 ECTS	2 ECTS	125 ECTS

Table 2.17 Relationships Elements of Competency and Learning Outcomes in Pharmaceutics and Pharmaceutical Technology Concentration

No.	Element of Competency	Sub-Learning Achievement	Eyes Festive/Modules
1	Competency Element Personality Development (MPK)	Number 2; 4; 5	· Philosophy of Science
2	Elements of scientific competence and skills (MKK)	Number 1.1; 1.2; 2.1; 2.2;2.3; 2.4; 2.6;3.1;4.1;4.2;5.2; 5.3; 5.4; 5.5;6.1;7.1;7.3;7.3;8.2	· Research Methodology · Biostatitics · Physicochemical Analysis · Cell and Molecular Biology · Physicochemical Analysis · Cell and Molecular Biology · Physical chemistry of solids and interfaces · Drug Stability · Biopharmacy · Development of Pharmaceutical Dosage Forms · Pharmacokinetics · Drug Discovery and Development · Journal Reading and Review · New Drug Delivery System · Unit Process · Decorative Cosmetics and Cosmeceuticals · Dermatology and Skin Care Products · Formulations and Technology for natural products preparations · Development and Characteristics of Raw Materials and Pharmaceutical Excipients · Pharmacogenomics · Pharmaceutical Engineering · Development of cosmetic preparations · Research Proposal Seminars · Progress Report 1 · Progress Report 2 · Research Seminar · Magister Comprehensive Defense · Scientific Paper
3	Work Skills Competencey Element (MKB)	Number 1.2; 2.3; 2.4;2.5; 2.6;3.2;4.1;5.1;6.1;7.2;8.1;8.2	· Journal Reading and Review · Progress Report · Research Proposal Seminars · Progress Report 1 · Progress Report 2 · Research Seminar

No.	Element of Competency	Sub-Learning Achievement	Eyes Festive/Modules
			Magister Comprehensive Defense Scientific Paper

Table 2.18 Relationships Elements of Competency and Learning Outcomes in Pharmacology Concentration

No.	Element of Competency	Sub-Learning Achievement	Eyes Festive/Modules
1	Competency Element Personality Development (MPK)	Number 2; 4; 5	· Philosophy of Science
2	Elements of scientific competence and skills (MKK)	Number 1.1; 1.2; 2.1; 2.2;2.3; 2.4; 2.6;3.1;4.1;4.2;5.2; 5.3; 5.4; 5.5;6.1;7.1;7.3;7.3;8.2	· Research Methodology · Biostatitics · Physicochemical Analysis · Cell and Molecular Biology · Pharmacodynamics · Chemotherapeutics · Pharmacotherapy · Development of Pharmaceutical Dosage Forms · Pharmacokinetics · Drug Discovery and Development · Journal Reading and Review · Molecular Immunology · Molecular Pharmacology · Pharmacology-Toxicology Methodology · Drug Interactions · Research Proposal Seminars · Progress Report 1 · Progress Report 2 · Research Seminar · Magister Comprehensive Defense · Scientific Paper
3	Work Skills Competencey Element (MKB)	Number 1.2; 2.3; 2.4;2.5; 2.6;3.2;4.1;5.1;6.1;7.2;8.1;8.2	Journal Reading and Review Progress Report Research Proposal Seminars Progress Report 1 Progress Report 2 Research Seminar Magister Comprehensive Defense Scientific Paper

Table 2.19 Relationships Elements of Competency and Learning Outcomes in Pharmaceutical Analysis and Medicinal Chemistry Concentration

No.	Element of Competency	Sub-Learning Achievement	Eyes Festive/Modules
1	Competency Element Personality Development (MPK)	Number 2; 4; 5	· Philosophy of Science

No.	Element of Competency	Sub-Learning Achievement	Eyes Festive/Modules
2	Elements of scientific competence and skills (MKK)	Number 1.1; 1.2; 2.1; 2.2;2.3; 2.4; 2.6;3.1;4.1;4.2;5.2; 5.3; 5.4; 5.5;6.1;7.1;7.3;7.3;8.2	· Research Methodology · Biostatitics · Physicochemical Analysis · Cell and Molecular Biology · Drug and Food Analysis · Analysis Method Development · Separation and Purification Methods · Radiopharmaceuticals · Development of Radiopharmaceutical Preparations · Nuclear Medicine Applications · Analysis of Toxic Compounds · Validation and Regulatory Issues in Industry · Computational Chemistry and Molecular Modeling · Development of Pharmaceutical Dosage Forms · Pharmacokinetics · Drug Discovery and Development · Journal Reading and Review · Cosmetics and household health supplies analysis · Biomedical Analysis · Drug Stability · Drug Synthesis & Therapeutic Evaluation · Pharmaceutical Engineering · Molecular Based Analysis · Therapeutic and Diagnostic Agents · Instrumentation and In Vitro Testing in Radiopharmaceuticals · Research Proposal Seminars · Progress Report 1 · Progress Report 2 · Research Seminar · Magister Comprehensive Defense · Scientific Paper
3	Work Skills Competencey Element (MKB)	Number 1.2; 2.3; 2.4;2.5; 2.6;3.2;4.1;5.1;6.1;7.2;8.1;8.2	Journal Reading and Review Progress Report Research Proposal Seminars Progress Report 1 Progress Report 2 Research Seminar Magister Comprehensive Defense Scientific Paper

Table 2.20 Relationships Elements of Competency and Learning Outcomes in Pharmacy Biology Concentration

No.	Element of Competency	Sub-Learning Achievement	Eyes Festive/Modules
1	Competency Element Personality Development (MPK)	Number 2; 4; 5	· Philosophy of Science
2	Elements of scientific competence and skills (MKK)	Number 1.1; 1.2; 2.1; 2.2;2.3; 2.4; 2.6;3.1;4.1;4.2;5.2; 5.3; 5.4; 5.5;6.1;7.1;7.3;7.3;8.2	· Research Methodology · Biostatitics · Physicochemical Analysis · Cell and Molecular Biology · Pharmacogenomics and Pharmacogenetics · Standardization of Natural Medicine · Phytotherapy · Development of Pharmaceutical Dosage Forms · Pharmacokinetics · Drug Discovery and Development · Journal Reading and Review · Ethnopharmacy · Aromatherapy and Hydrotherapy · Herbal Supplements · Plant Tissue Culture · Microbial Pathogenicity · Applied Microbiology · DNA and Protein Recombinant Technology · Molecular Based Biomedical Analysis · Research Proposal Seminars · Progress Report 1 · Progress Report 2 · Research Seminar · Magister Comprehensive Defense · Scientific Paper
3	Work Skills Competencey Element (MKB)	Number 1.2; 2.3; 2.4;2.5; 2.6;3.2;4.1;5.1;6.1;7.2;8.1;8.2	Journal Reading and Review Progress Report Research Proposal Seminars Progress Report 1 Progress Report 2 Research Seminar Magister Comprehensive Defense Scientific Paper

CHAPTER 3
CONTENT CURRICULUM

The curriculum content or description of subjects on Magister Program in Pharmacy are listed in sub chapter 3.1 – 3.4

3.1 Pharmaceutics and Pharmaceutical Technology Concentration

1. Description Module Philosophy of Science

1	Module name	Philosophy of Science
2	Courses code	P20.01001
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study hour per semester : 64 Total workload : 91
4	Semester	First Semester
5	Precondition	None
6	Competence	Philosophy of science explores the nature of science and the source of knowledge. Students will learn about the introduction of science, history and development of science, the foundation of knowledge, fundamental structures, logic and reasoning, research method paradigm, moral ethics and science, and metaphysics
7	Elements of competency	MPK
8	Type competency	Main Competence
9	Syllabus	1. Introduction; 2. History and Development of Science Philosophy; 3. Base of Science Philosophy; 4. Base of Science Epistemology; 5. History and Development of Science Philosophy: Aristotle's Theory of Truth; 6. History and Development of Science Philosophy: Contemporary philosophy; 7. Source of Knowledge; 8. Midterm Examination; 9. Science Philosophy Introduction: Essence of Science Philosophy; 10. History of Science Philosophy; 11. Fundamental Structure of Science Philosophy; 12. Logic and Reasoning of Science Philosophy; 13. Research Method Paradigm; 14. Ethics and Moral in Science; 15. Metaphysics; 16. Final Examination
10	Attribute to soft skills	ethics. awareness, discipline
11	Learning methods	Lectures and Discussion
12	Learning media	LCD Projector

13	Appraisal	Written Examination and Presentation
14	Lecturer	Prof. apt. Dr. Moleyono, M.S. Prof. Dr. dr. Johanes Cornelius Mose Sp.OG.,
15	References	1. Joseph Vidal-Rosset. 2018. Book Review : The Philosophy of Science – A Companion. Oxford University Press, Pp. 768 2. Lars-Göran Johansson. 2016. Philosophy of Science for Scientists. Springer Undergrad. Texts Philosophy. Springer, Cham 3. Martiningsih Wahyu. 2012. Philosophers from Plato to Ibn Bajjah. Yogyakarta : IRCiSod. 4. Sumarna, Cecep. 2020. Philosophy of Science. Rosda 5. Susanto A. 2011. Philosophy of Science, A Study in Ontological, Epistemological and Axiological Dimensions. Jakarta: Bumi Aksara

2. Description Module Research Methodology

1	Module name	Research Methodology
2	Courses code	P20.01002
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study hour per semester : 64 Total workload : 91
4	Semester	First Semester
5	Precondition	None
6	Competence	After attending this course, students will be able to make their research ideas into research with quality results, including dissertation proposals, presentations, proposals for research projects, research assistance, or journal articles
7	Elements of competency	MKK
8	Type competency	Main Competence
9	Syllabus	1. Research philosophy; develop problems into interesting research and answer the questions "Why and How?"; 2. Research process and flow; 3. Research design; 4. Research variable; 5. Research proposal; 6. Scientific papers; 7. Writing Strategies (Tenses in writing scientific articles); 8. Mid-term examination; 9. Strategy for Writing Scientific Papers; 10. Scientific Writing Application; 11. Research proposal

		writing; 12. Plagiarism; 13. Research Ethics in humans and animals; 14. Clinical Trial; 15. Informed consent; 16. Final Exam
10	Attribute to soft skills	creativity, communication skill, discipline, awareness
11	Learning methods	Lectures and discussion
12	Learning media	LCD projector
13	Appraisal	Written examination and presentation
14	Lecturer	Prof. apt. Anas Subarnas, M.Sc. apt. Rizky Abdulah, Ph.D. apt. Muchtaridi, Ph.D.
15	References	1. Petter Laake, Haakon Breien Benestad, Bjorn Reino Olsen. 2007. Research Methodology in the Medical and Biological Sciences. 2. A M Novikov; D A Novikov. 2013. Research methodology: from philosophy of science to research design. 3. Sarah Philpot, Lesley Curnick, Liz Soars, John Soars. 2011. New Headway Academic Skills: Student's Book Level 3: Reading, Writing, and Study Skills. 4. Rinaldi, S.F and Mujianto B. 2017.Research Methodology and statistic. Human research education center of ministry health of republic od Indonesia 5. Debbie Epstein, Jane Kenway, Rebecca Boden. 2017. Writing for Publication (The Academic's Support Kit).

3. Description Module Biostatistics

1	Module name	Biostatistics
2	Courses code	P20.01003
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study hour per semester : 64 Total workload : 91
4	Semester	First Semester
5	Precondition	None
6	Competence	After attending this course, students will be able to apply statistical method in clinical study
7	Elements of competency	MKK

8	Type competency	main competence
9	Syllabus	1. Biostatistical Analysis; 2. Data Analysis; 3. Descriptive Statistics; 4. Hypothesis; 5. Nonparametric Statistics 1&2; 6. Analysis of Variance (ANOVA); 7. Sampling Techniques; 8. Midterm examination; 9. Introduction to Applied Biostatistics in Medical and Clinical Research; 10. Descriptive Analysis; 11. Differential Analysis Between Groups; 12. Correlation and Regression Analysis (Univariate); 13. Regression Analysis (Multivariate); 14. Survival Analysis; 15. Case Study Analysis Exercise. 16 final examination
10	Attribute to soft skills	hard work, discipline, awareness
11	Learning methods	Lectures and Discussion
12	Learning media	LCD
13	Appraisal	Written Examination and Presentation
14	Lecturer	Hadyana, M.Sc., Ph.D. apt. Neily Zakiyah, M.Sc., Ph.D
15	References	1. Statistics in Medicine, 4th edition. Riffenburgh, RH. Elsevier. 2012. 2. Fundamental of Biostatistics, 8th edition. Rosner, B. Cengage Learning. 2015

4. Description Module Physicochemical Analysis

1	Module name	Physicochemical Analysis
2	Courses code	P20.01004
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study hour per semester : 64 Total workload : 91
4	Semester	First Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: • List and explain the psychochemical properties of solute and solvent that affect solubility, stability, and other bio-pharmaceutical properties in drug dosage forms development of drugs, herbal medicine & supplement, and cosmetics • Present the ability to interpret and analyze data • Develop, validate and apply different instrumental analytical technique in drug analysis on various drug dosage form • Characterize and evaluate the psychochemical properties of pharmaceutical ingredients

		• Identify and elaborate drug absorption, distribution, metabolism and excretion principles along with factors that influence the process • Apply different instrumental analytical techniques in drug analysis for drug's pharmacological effect evaluation • Show contributions both in individual or group project • Apply different separation techniques from natural product for isolation of marker and active compound
7	Elements of competency	MKK
8	Type competency	main competence
9	Syllabus	1. Introduction; 2. Simultaneous UV Spectrophotometry and derivatives; 3. Atomic Absorption Spectrophotometry; 4. Fluorometry; 5. Infrared Spectrophotometry; 6. Mass Spectroscopy; 7. X ray spectroscopy; 8. Midterm Examination; 9. NMR; 10. Electrophoresis; 11-12. Chromatography technique (gas chromatography and HPLC); 13-15. Project with the chosen analysis method
10	Attribute to soft skills	communication skill, discipline, ethics, awareness
11	Learning methods	Content-Based learning, Project-based
12	Learning media	LCD
13	Appraisal	Answer individual questions and essays, presentations and discussions
14	Lecturer	Mutakin Ph.D Dr. Aliya Nur Hasanah
15	References	1. Jurgen H.Gross, Mass Spectrometry, a textbook, 3rd edition, 2017 2. Principles of instrumental analysis, Douglas A.Skoog, F.James Holler, Stanley R Crouch, 2017, ISBN 1337468037 3. a practical guide to instrumental analysis, Erno Pungor, G. Horvai, CRC Press, 2020 4. Handbook of Green Analytical Chemistry, Miguel De La Guardia, Salvador Garrigues, 2012, ISBN 0470972017

5. Description Module Cell and Molecular Biology

1	Module name	Cell and Molecular Biology
2	Courses code	P20.01005
3	Study loads	3 credits ECTS amount : 5 ECTS Contact hour per semester: 40 Independent study hour per semester : 96 Total workload : 136
4	Semester	First Semester

5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. List and explain the physical and chemical properties of solvents and solutes that affect solubility and other properties of other bio-pharmaceuticals in the development of drug dosage forms. 2. Analyze and interpret data. 3. Present organized information orally, persuasively yet logical manner using documentations and supporting tools. 4. List and explain the physical and chemical properties of solvents and solutes that affect solubility and other properties of other bio-pharmaceuticals in the development of drug, bio-pharmaceutical, traditional medicine & supplement and cosmetics. 5. Identification and explain principles that are involved in the absorption, distribution, metabolism, and excretion of medicinal substances and factors that influence these processes. 6. Explain and apply mechanism acting of the drug at the molecular, cellular and organ system
7	Elements of competency	MKK
8	Type competency	main competence
9	Syllabus	1-3. Introduction, How cells read the genome: from DNA to protein, Genetic switch; 4-6. Cell membrane, Membrane transport, Mechanism of cell communication; 7-8. Cell signaling, Cell signaling: G protein-coupled receptor (GPCR); 9. Midterm Examination; 10-11. Cell signaling : Receptor Tyrosine Kinase, Cell signaling: Receptor guanylyl cyclase; 12-13. Cell signaling: gated ion chanel and adhesion receptor, Cell signaling: Nuclear receptor; 14-15. Cell cycle, Cell signaling and Cancer; 16. Final Examination
10	Attribute to soft skills	ethics, discipline, awareness
11	Learning methods	Lecture and Discussion
12	Learning media	LCD
13	Appraisal	Presentation Mid-term test Final test
14	Lecturer	Apt. Melisa Intan Barliana, Dr.Med.Sc. Dr. Apt. Tiana Milanda, M.Si. Dr. Apt. Tina Rostinawati, M.Si. Apt. Rizky Abdulah, Ph.D.
15	References	1. Alberts, B., Johnson, A., Lewis, J., Morgan, D., Raff, M., Roberts, K., ... & Hunt, T. (2017). *Molecular biology of the cell*. WW Norton & Company. 2. Mercadante, A. A., Dimri, M., & Mohiuddin, S. S. (2019). Biochemistry, replication and transcription. PMID: 30986011, Bookshelf ID: NBK540152 3. Katritch, V., Cherezov, V., & Stevens, R. C. (2013). Structure-function of the G protein–coupled receptor superfamily. *Annual review of pharmacology and toxicology*, *53*, 531-556.

		4. Wagener, C., Stocking, C., & Müller, O. (2016). *Cancer Signaling: from molecular biology to targeted therapy*. John Wiley & Sons.

6. Description Module Physical chemistry of solids and interfaces

1	Module name	Physical chemistry of solids and interfaces
2	Courses code	P20.01006
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study hour per semester : 64 Total workload : 91
4	Semester	First Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. List and explain the psychochemical properties of solute and solvent that affect solubility, stability, and other bio-pharmaceutical properties in drug dosage forms development of drugs, herbal medicine & supplement, and cosmetics 2. Present the ability to interpret and analyze data 3. Explain critical factors in designing, production and evaluation various drug dosage form and other drug delivery system 4. Characterize and evaluate physicochemical properties of pharmaceutical ingredients 5. Show contributions both in individual or group project 6. Conclude attained information from group discussion and communicate the development
7	Elements of competency	MKK
8	Type competency	supporting competence
9	Syllabus	1. Introduction; 2. Surfaces Thermodynamics; 3. Solid Micrometric; 4. Thermodynamic Diffusion Permeability; 5. Surface Tension Interfaces; 6. Power Solid Suspension Characterization; 7. Surface Tension Percentage; 8. Mid-Term Exam; 9. Surfactant; 10. Bio-surfactant; 11. Dissolution and diffusion; 12. In Vitro Dissolution Testing Model; 13. Molecular and Crude Dispersion; 14. Crystallography; 15. Crystal Forming Techniques; 16. Final Exam
10	Attribute to soft skills	ethics, awareness, discpline
11	Learning methods	Lecture and Discussion
12	Learning media	LCD

13	Appraisal	Written Test
14	Lecturer	Nasrul Wathoni, Ph.D., S.Si., Apt. Prof. Dr. Marline Abdassah, M.S., Apt.
15	References	1. Remington, 2013, An Introduction to Pharmacy, Royal Pharmaceutical Society, Pharmaceutical press, Great Britain. 2. Iyan Sopyan *et al,* 2018*,* Karakterisasi sediaan Padat Farmasi, Deepublish, Yogyakarta. 3. Nasrul Wathoni *et al,* 2018, Karakterisasi sediaan cair farmasi, Deepublish, Yogyakarta 4. PATRICK J. SINKO, PhD, RPh, 2011, MARTIN'S PHYSICAL PHARMACY AND PHARMACEUTICAL SCIENCES, Physical Chemical and Biopharmaceutical Principles in the Pharmaceutical Sciences, 5. Michael E. Aulton, 2018, Aulton's Pharmaceutics The Design and Manufacture of Medicines,fifth edition, elsevier

7. Description Module Drug Stability

1	Module name	Drug Stability
2	Courses code	P20.01007
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study hour per semester : 64 Total workload : 91
4	Semester	First Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. List and explain the physical and chemical properties of solvents and solutes that affect solubility and other properties of other bio-pharmaceuticals in the development of drug, bio-pharmaceutical, traditional medicine & supplement and cosmetics. 2. Explain the important factors required for the design, manufacture and evaluation of various dosage forms and other drug delivery systems. 3. Develop, validate and apply different instrumental methods to the analysis of medicinal substances in various dosage forms. 4. Identify and explain the principles that are involved in the absorption, distribution, metabolism and excretion of medicinal substances, and the factors that influence these processes. 5. Analyze and interpret data. 6. Design, manufacture and evaluate dosage forms and other drug delivery systems. 7. Characterize and evaluate physicochemical properties of pharmaceutical ingredients.Show contributions in individual or group projects.

		8. Summarize information and communicate its development obtained from group experience.
7	Elements of competency	MKK
8	Type competency	supporting competence
9	Syllabus	1. Introduction; 2. Introduction to the solid state; 3-4. Solid state stability; 5. Stability Analysis in Solid Dosage Forms; 6. Drug Stability Calculations; 7. Drug Stability from the Effect of Chemical Substances and Enzymes; 8. Mid-Term Exam; 9. Catalysis against Drug Stability; 10. Drug Kinetics; 11. Solid state; 12. Solid state Instability; 13. DSC PXRD SEM; 14. Factors Affecting the Reaction; 15. Quiseri parallel calculations; 16. Final Exam
10	Attribute to soft skills	ethics, awareness, discipline
11	Learning methods	Lecture and Discussion
12	Learning media	LCD
13	Appraisal	Written Test
14	Lecturer	Dr. rer. nat Apt. Anis Yohana Chaerunisa, M.Si. Prof. Apt. Muchtaridi, Ph.D.
15	References	1. Carstensen, Jens T., et al, Drug Stability : Principles and practices, Marcel Dekker, 2000 2. Yoshioka, Sumie and Stella, Valentino J., Stability of Drugs and Dosage forms, Kluwer academic, 2002 3. Tonnesen, Hanne H., Photostability of Drugs and Drug Formulations, CRC Press, 2004 4. Aulton, Michael E., Pharmaceutics : The Science of Dosage Form Design, W.B. Saunders Company, 2003 5. Piechocki, Joseph T., and Thoma, Karl, Pharmaceutical Photostability and Stabilization Technology, Informa Health, 2007.Kim Huynh-Ba, Handbook of Stability Testing in Pharmaceutical Development : Regulations, Methodologies and Best Practices, Springer Science, 2009 6. Brittain, Harry G., Polymorphism in Pharmaceutical Solids, Informa Health, 2009. 7. Sinko, Patrick J., and Singh Yashveer, Martin's Physical Pharmacy and Pharmaceutical Sciences : Physical Chemical and Biopharmaceutical Principles in the Pharmaceutical Sciences, Wolters Kluwer, 2011 8. Loftsson, Thorsteinn, Drug Stability for Pharmaceutical Scientists, Elsevier, 2014

8. Description Module Biopharmacy

1	Module name	Biopharmacy
2	Courses code	P20.01008
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study hour per semester : 64 Total workload : 91
4	Semester	First Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. List and explain the psychochemical properties of solute and solvent that affect solubility, stability, and other bio-pharmaceutical properties in drug dosage forms development of drugs, herbal medicine & supplement, and cosmetics 2. Explain various factors involved in design, production and evaluation of multiple drug dosage forms and other drug delivery system 3. Develop, validate and apply different analytic instrument technique for drug analysis in various drug dosage form 4. Present the ability to interpret and analyze data 5. Design, produce and evaluate drug dosage forms and other drug delivery system 6. Characterize and evaluate the psychochemical properties of pharmaceutical ingredients 7. Show contributions both in individual or group project 8. Summarize the information collected from the group and communicate the development of the topic
7	Elements of competency	MKK
8	Type competency	supporting competence
9	Syllabus	1. Introduction : Biopharmaceutics role in drug development process; 2. Molecular and psychochemical properties of active ingredient that affect the release and absorption of drug; 3. Biological factor (physiologic and patological factor) that affect drug performance; 4. Dissolution principle and dissolution testing; 5. Fundamentals of drug absorption; 6. Evaluation of oral drug absorption in humans; 7. Permeability evaluation and P-glicoprotein interaction; 8. Mid-Term Exam; 9. Excipients as absorption enhancers; 10. Intestinal transporter-associated drug absorption; 11. Bioavaibility and Bioequivalence; 12. BCS : *Biopharmaceutical Classification System;* 13. *Biowaiver*; 14. IVIVIC; 15. IVIVIC cases; 16. Final Exam

10	Attribute to soft skills	ethics, discipline, awareness
11	Learning methods	Lecture and Discussion
12	Learning media	LCD
13	Appraisal	Presentation result, review article and group discussion
14	Lecturer	Dr. Taofik Rusdiana, M.Si., Apt
15	References	1. Shargel, L. and Yu, A., Applied Biopharmaceutics & Pharmacokinetics, 7th ed., Appleton & Lange, New York, 2017 2. T Hannah Batchelor, 2013, Biopharmaceutics: From Fundamentals to Industrial Practice (Advances in Pharmaceutical Technology), Wiley, UK. 3. R.Krishna and L. Yu, Springer, 2008, Biopharmaceutics Application in Drug Development.

9. Description Module Development of Pharmaceutical Dosage Forms

1	Module name	Development of Pharmaceutical Dosage Forms
2	Courses code	P20.02001
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study hour per semester : 64 Total workload : 91
4	Semester	Second Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. List and explain the physical and chemical properties of solvents and solutes that affect the solubility, stability, and other bio pharmaceutical properties in drug dosage forms development. 2. Describe the critical factors required for the design, manufacture and evaluation of various dosage forms and other drug delivery systems 3. Develop, validate and apply different instrumental analytical techniques to the analysis of medicinal substances in various dosage forms 4. Analyze and interpret data. 5. Design, manufacture and evaluate various drugs dosage forms. 6. Characterize and evaluate physicochemical properties of pharmaceutical substances 7. Show contributions in individual or group projects.
7	Elements of competency	MKK

8	Type competency	supporting compentece
9	Syllabus	1. Introduction: Early stage development (Product design); 2. Preformulation as a product design tool; 3. Biopharmaceutical aspects in formulation development; 4. Product Optimization; 5. Parenteral Dosage Form; 6. Inhalation Dosage Form; 7. Oral Solid Dosage Form; 8.Midterm Exam; 9. Ophthalmic Dosage Form; 10. Aqueous Nasal Dosage Form; 11. Topical and Transdermal Delivery; 12-15. Drug design 1-4 cases; 16. Final exam
10	Attribute to soft skills	ethics, hardworking, communication skill
11	Learning methods	Lecture and Discussion
12	Learning media	LCD
13	Appraisal	Presentations, paper review and group discussion
14	Lecturer	Dr. Taofik Rusdiana, M.Si., Apt
15	References	1. Mark Gibson, Pharmaceutical Preformulation and Formulation, Informa Health, 2016 2. L. Shargel and I. Kanfer, Generic Drug Product Development Solid Oral Dosage Forms, CRC Press, 2014. 3. Y. Qiu, et al, Developing Solid Oral Dosage Forms, Pharmaceutical Theory and Practice, Elsevier-Academic Press, 2017

10. Description Module Pharmacokinetics

1	Module name	Pharmacokinetics
2	Courses code	P20.02002
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study hour per semester : 64 Total workload : 91
4	Semester	Second Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. List and explain the psychochemical properties of solute and solvent that affect solubility, stability, and other bio-pharmaceutical properties of drug dosage forms development in drugs, herbal medicine & supplement, and cosmetics 2. Describe the physical and chemical properties of the compound that affect solubility, stability and other biopharmaceutical properties of drug dosage forms development 3. Present the ability to interpret and analyze data

		4. Develop, validate and apply different analytic instrument technique for drug analysis in various drug dosage form 5. Measure and evaluate the therapeutic outcome based on drug to target knowledge 6. Evaluate the impact of pharmacokinetics process in drug action
7	Elements of competency	MKK
8	Type competency	supporting competence
9	Syllabus	1-3. Introduction, One and Two Compartment Intravenous Pharmacokinetic Model; 4-5. One and Two Compartment Oral Pharmacokinetic; 6-7. Pharmacokinetics of Infusion, Multiple Dose IV Administration and Oral Dual Dose Administration; 8. Mid-term Exam; 9-12. Clearance Concept, Non-Linear Pharmacokinetics, Pharmacokinetics study design and data interpretation, also PK-PD Relation; 13-15. Drug pharmacokinetics study's review article- Group 1-3; 16. Final exam
10	Attribute to soft skills	ethics, communication skill, discipline
11	Learning methods	● Lecture ● Discussion ● Audio visual learning ● Presentation ● Review article writing ability
12	Learning media	LCD
13	Appraisal	● Discussion (students dialogue) ● Quiz
14	Lecturer	Dr. Apt. Taofik Rusdiana, M.Si. Dr. Apt. Ahmad Muhtadi, M.S. Dr. Apt. Sri Adi Sumiwi, M.S
15	References	1. Shargel, L., & Yu, A. B. C. (2017). *Applied biopharmaceutics and pharmacokinetics*. Norwalk, Conn: Appleton & Lange. 2. Jambhekar, Sunil S., (2012), Basic pharmacokinetics, 2nd ed., London ; Philadelphia : Pharmaceutical Press 3. Paul Beringer PharmD, 2017, Winter's Basic Clinical Pharmacokinetics, Wolter Kluwer

11. Description Module Drug Discovery and Development

1	Module name	Drug Discovery and Development
2	Courses code	P20.02003
3	Study loads	3 credits ECTS amount : 5 ECTS Contact hour per semester: 40 Independent study hour per semester : 96

		Total workload : 136
4	Semester	Second Semester
5	Precondition	None
6	Competence	1. Upon completion of this course, students are expected to be able to: 2. List and explain the psychochemical properties of solute and solvent that affect solubility, stability, and other biopharmaceutical properties in drug dosage forms development. 3. Analyze and interpret data. 4. Design, manufacture and evaluate dosage forms and other drug delivery systems. 5. Able to explain and apply the mechanism of certain drugs at molecular and cellular levels 6. Characterize and evaluate physicochemical properties of the active compounds of natural ingredients 7. Applying separation techniques of natural substances to isolate the active substances and markers. 8. Apply pharmacokinetic processes related to absorption, distribution, metabolism and excretion of drugs 9. Able to explain the important factors required for the design, manufacturing and evaluation of various dosage forms and other drug delivery systems 10. Develop, validate and apply different instrumental analytical techniques to the analysis of medicinal substances in various dosage forms 11. Show contributions in individual or group projects.
7	Elements of competency	MKK
8	Type competency	supporting competence
9	Syllabus	1. Molecular identification and validation of disease targets; 2-3. Finding Lead Compound from Natural Materials; 4-5. Computer-aided drug design (lead compound discovery); 6-7. Identification and optimization of target interactions and pharmacokinetics optimization; 8. Mid-term Exam; 9-10. Toxicology and safety tests and In vivo and in Vitro tests; 11-12. Pre-formulations and formulations; 13-14. Pre-clinical and clinical trial; 15. Registration and Commercialization
10	Attribute to soft skills	discipline, communication skill, ethics
11	Learning methods	● Discussion ● Audio visual learning
12	Learning media	LCD
13	Appraisal	● Presentation ● Quiz
14	Lecturer	Apt. Muchtaridi, Ph.D. Prof. Dr. Apt. Moelyono, M.S. Dr. Apt. Keri Lestari, M.Si Apt. Taofik Rusdiana, PhD.

15	References	1. Raymond G Hill, Humphrey P. Rang. (2021). Drug Discovery and Development. 3rd Edition. Elsevier 2. Donald J. Abraham, Michael Myers. 2021. Burger's Medicinal Chemistry, Drug Discovery and Development, Volumes 1 - 8, 8th Edition. Wiley-Interscience 3. Dev Bukhsh Singh. 2020. Computer Aided Drug Design. 1th edition. SPRINGER 4. Benjamin Blass. 2015. Basic Principles of Drug Discovery and Development. 1th edition. Elsevier-Academic Press 5. Graham Patrick L. 2017. An Introduction to Medicinal Chemistry. 6th edition. Oxford University Press 6. J. Andrew Williams, Richard Lalonde, Jeffrey R. Koup, David D. Christ, Sean Ekins. (2012). Predictive Approaches in Drug Discovery and Development: Biomarkers and In Vitro / In Vivo Correlations (Wiley Series on Technologies for the Pharmaceutical Industry). 7. Bente Steffansen, Yuichi Sugiyama, Bente Steffansen. (2013). Transporters in Drug Development: Discovery, Optimization, Clinical Study and Regulation 8. Camille Georges W., David Aldous, Didier Rognan, Pierre Raboisson. (2015). The Practice of Medicinal Chemistry, Fourth Edition

12. Description Module Journal Reading and Review

1	Module name	Journal Reading and Review
2	Courses code	P20.02004
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	Second Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: ● Present the ability to interpret and analyze data ● Present organized information orally, persuasively yet logical using proper documentation and supported tools ● Analyze, interpret and criticize the study design, data interpretation and the suitability of conclusion from the scientific literature. ● Take, analyze, and interpret scientific literature to provide information to be disseminated orally or in writing ● Show contributions both in individual or group project ● Summarize the information collected from the group and communicate the development of the topic

		● Conduct independent literature studies using databases and pharmacology-related publications to solve problems related to the pharmacology field
7	Elements of competency	MKK
8	Type competency	main competence
9	Syllabus	1. Learning contract and How to review a journal; 2. How to Present a paper in a scientific meeting; 3-4. How to make a review article; 5-14. Presentation of a journal paper in front of other students and lecturer; 15-16. Writing a review articles with supervisors
10	Attribute to soft skills	ethics, hardworking, discipline
11	Learning methods	Lecture, interactive learning, paper presentation
12	Learning media	LCD
13	Appraisal	Paper publicity
14	Lecturer	Dr. apt. Aliya Nur Hasanah M.Si. Dr. apt. Nyi Mekar Saptarini, M.Si. Dr. apt. Sriwidodo, M.Si. Dr. apt. Tiana Milanda M.Si. Dr. apt. Eli Halimah, M.Si.
15	References	1. Winiharti M, Herawati A, Rahayu E. Reading Journal As A Way To Improve Students' Comprehension Toward A Textbook Reading Material. Lingua Cultura. 2014: 8 (2): 101-109. 2. Weir, R. 2011. "It's Not Harry Potter" Inside Higher Ed. http://www.insidehighered.com/advice/instant_mentor/essay_on_teaching_students_to_read_journal_articles#ixzz2W75q1Gqg Accessed 6/13/2013 3. Subramanyam RV. Art of reading a journal article: Methodically and effectively. J Oral Maxillofac Pathol 2013;17:65-70.

13. Description Module New Drug Delivery System

1	Module name	New Drug Delivery System
2	Courses code	P20.02005
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	Second Semester
5	Precondition	None

6	Competence	Upon completion of this course, students are expected to be able to: 1. List and explain the psychochemical properties of solute and solvent that affect solubility, stability, and other biopharmaceutical properties used in the development of pharmaceutical & biopharmaceutical dosage forms, traditional medicines & supplements, and cosmetics. 2. Explain the important factors required for the design, manufacture and evaluation of various dosage forms and other drug delivery systems. 3. Identify and explain the drug absorption, distribution, metabolism and excretion principles, and the factors that influence these processes. 4. Design, manufacture and evaluate drug dosage forms and other drug delivery systems. 5. Present organized information orally, persuasively yet logical manner using documentations and supporting tools. 6. Show contributions in individual or group projects. 7. Summarize information and communicate its development obtained from group experience.
7	Elements of competency	MKK
8	Type competency	supporting competence
9	Syllabus	1. Prodrug Science Polymers and Drug Carrier Systems; 2. Drug Dosage Forms and Product Design; 3. Nano Suppression; 4-5. Microencapsulation; 6. Liposome Prodrug; 7. Drug Delivery System; 8. Mid-term exam; 9. Implant; 10. Controlled Release Drug Delivery System; 11. Extrusion; 12. Transdermal Patch; 13. Biodegradable Polymers; 14. Chemical Penetration Enhancer; 15. Protein Drug Delivery; 16. Final exam
10	Attribute to soft skills	discipline, communication skill, ethics
11	Learning methods	Lectures and Discussion
12	Learning media	LCD
13	Appraisal	Written Test
14	Lecturer	Prof. Dr. Dra. Apt. Marline Abdassah, M.S. Dr. rer. nat. Apt. Anis Yohana, M.Si.
15	References	1. Ansel's Pharmaceutical Dosage Forms and Drug Delivery Systems Tenth Edition, Howard C. Ansel, Wolters Kluwer business, 2014 2. DOSAGE FORM DESIGN CONSIDERATIONS, RAKESH K. TEKADE, Academic Press, 2018 3. Oral Dispersible Tablet: A Popular Growing Technology, Harsh Vora, Darshan Modi, Vikram Pandya, Praful Bharadia, Asian Journal of Pharmaceutical Research and Development, Desember 2013 4. Techniques and approaches based on the metamorphose of liquid nanoemulsion to semisolid and solid intend for lipid based formulations, Am. J. Pharm Health Res 2013;1(8)

14. Description Module Unit Process

1	Module name	Unit Process
2	Courses code	P20.02006
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	Second Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. Present the ability to interpret and analyze data 2. Design, produce and evaluate drug dosage forms and other drug delivery system 3. Show contributions both in individual or group project 4. Summarize the information collected from the group and communicate the development of the topic
7	Elements of competency	MKK
8	Type competency	supporting competence
9	Syllabus	1. Introduction and Learning Contract; 2. Granulation Mixing; 3. Comminution Slugging; 4. Pre-formulation; 5. Granulation Technology; 6. Tablet Coating; 7. Tablet Compaction; 8. Mid-term Exam; 9. Coating Parameter; 10. Scale Up Mixing; 11. Scale Up Case Studies; 12. Encapsulation; 13. Normal Lines Liquid Semisolid Process; 14. Drug Registration; 15. Cosmetics Registration; 16. Final exam
10	Attribute to soft skills	discipline, communication skill, ethics
11	Learning methods	Lectures and Discussion
12	Learning media	LCD
13	Appraisal	Written Test
14	Lecturer	Dr. rer. nat. Apt. Anis Yohana, M.Si. Prof. Dr. Dra. Apt. Marline Abdassah, M.S.
15	References	1. DOSAGE FORM DESIGN CONSIDERATIONS, RAKESH K. TEKADE, Academic Press, 2018 2. Aulton's Pharmaceutics The Design and Manufacture of Medicines, Michael E. Aulton, Elsevier, 2018 3. Ansel's Pharmaceutical Dosage Forms and Drug Delivery Systems Tenth Edition, Howard C. Ansel, Wolters Kluwer business, 2014 4. Remington, Essentials of Pharmaceutics, Linda A Felton, Pharmaceutical Press, 2012, Handbook of Pharmaceutical Manufacturing Formulations, Second Edition, Sarfaraz K. Niazi, Informa Health Care, 2010

		5. Modified-Release Drug Delivery Technology, Michael J. Rathbone, Marcel Dekker, 2009 6. PHARMACEUTICAL MANUFACTURING HANDBOOK, Production and Process, Shayne Cox Gad, Wiley InterScience, 2010

15. Description Module Decorative Cosmetics and Cosmeceuticals

1	Module name	Decorative Cosmetics and Cosmeceuticals
2	Courses code	P20.02007
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	Second Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. Present the ability to interpret and analyze data 2. Design, produce and evaluate drug dosage forms and other drug delivery system 3. Show contributions both in individual or group project 4. Summarize the information collected from the group and communicate the development of the topic
7	Elements of competency	MKK
8	Type competency	supporting competence
9	Syllabus	1. Introduction and Learning Contract; 2. Granulation Mixing; 3. Comminution Slugging; 4. Pre-formulation; 5. Granulation Technology; 6. Tablet Coating; 7. Tablet Compaction; 8. Mid-term Exam; 9. Coating Parameter; 10. Scale Up Mixing; 11. Scale Up Case Studies; 12. Encapsulation; 13. Normal Lines Liquid Semisolid Process; 14. Drug Registration; 15. Cosmetics Registration; 16. Final exam
10	Attribute to soft skills	discipline, communication skill, ethics
11	Learning methods	Lectures and Discussion
12	Learning media	LCD
13	Appraisal	Written Test
14	Lecturer	Dr. rer. nat. Apt. Anis Yohana, M.Si. Prof. Dr. Dra. Apt. Marline Abdassah, M.S.
15	References	1. Gabriella Baki, Kenneth S. Alexander (2015), Introduction to Cosmetic Formulation and Technology, Willey

		2. André O. Barel, Marc Paye, Howard I. Maibach (2014), Handbook of Cosmetic Science and Technology, Fourth Edition, CRC Press **3.** Rohini P.Gawadl et al (2020), Polymers in cosmetics : Polymer Science and Innovative Applications, Science Direct 4. Heather A.E. Benson et al (2019), Cosmetic Formulation: Principles and Practice, CRC Press

16. Description Module Dermatology and Skin Care Products

1	Module name	Dermatology and Skin Care Products
2	Courses code	P20.02008
3	Study loads	3 credits ECTS amount : 5 ECTS Contact hour per semester: 40 Independent study per semester: 96 Total workload: 136
4	Semester	Second Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. Explain various factors involved in design, production and evaluation of multiple drug dosage forms and other drug delivery system 2. Characterize and evaluate the psychochemical properties of pharmaceutical ingredients 3. Show contributions both in individual or group project 4. Summarize the information collected from the group and communicate the development of the topic
7	Elements of competency	MKK
8	Type competency	supporting competence
9	Syllabus	1. Anatomy and physiology; 2. Skin type and skin conditions; 3. Keratinization; 4. Melanosis and Melasma; 5. Sunscreen and sunblock; 6. Skin moisturizing cosmetics; 7. Absorption and permeation; 8. Mid-term exam; 9. Enhancers and formulation strategies for permeation modulation; 10. Anti aging; 11. Anti-oxidant; 12. Brightening agent; 13. Herbal cosmetics for skin care; 14. Cosmetics dosage form with special formulation technology; 15. Cosmetics with a special active ingredient; 16. Final Exam
10	Attribute to soft skills	discipline, communication skill, ethics
11	Learning methods	Lectures and Project based learning
12	Learning media	LCD
13	Appraisal	Written Test, Discussion

14	Lecturer	Dr. rer. nat. Anis Yohana Chaerunisaa, M.Si Prof. Endang Suteja Soraya Ratnawulan Mita, M.Si
15	References	1. Robert Baran and Howard I. Maibach (2017),Textbook of Cosmetic Dermatology, 5th Edition, CRC Press 2. Heather A.E. Benson et al (2019), Cosmetic Formulation: Principles and Practice, CRC Press 3. Maury M (2020), Natural Homemade Skin Care: 60 Cleansers, Toners, Moisturizers and More Made from Whole Food Ingredients, Page Street Publishing 4. Nazarali, S (2021), The use of a novel low irritancy nutraceutical compound to treat moderately severe facial acne and acne scarring : Journal of Cosmetic Dermatology

17. Description Module Formulations and Technology for natural products preparations

1	Module name	Formulations and Technology for natural products preparations
2	Courses code	P20.02009
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	Second Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. Explain the important factors for design, manufacture and evaluation of various drug dosage forms and other delivery systems. 2. Design, manufacture and evaluate drug dosage forms and other drug delivery systems. 3. Characterize and evaluate physicochemical properties of the pharmaceutical substances 4. Show contributions in individual or group projects. 5. Summarize information and communicate its development obtained from group experience
7	Elements of competency	MKK
8	Type competency	supporting competence
9	Syllabus	1-7. Manufacturing of extracts to tablet, cream, facial wash, repellent, emulsion, gel, and peel off mask; 8. Mid-term exam; 9-13. Herbal pharmaceutical technology;m14-15. Extraction; 16. Final Exam
10	Attribute to soft skills	Creativity in discussions, making resumes, presentations, discipline in submitting assignments, presentations, class participation, etc
11	Learning methods	Active learning: Presentation, Case Study

12	Learning media	LCD
13	Appraisal	Written Test, Discussion
14	Lecturer	Prof. Dr. apt. Marline Abdassah MS. Prof. Dr. apt. Moelyono MW MS.
15	References	1. Dayan, N., and L. Kromidas, 2011, *Formulating, Packaging, And Marketing Of Natural Cosmetic Products.* John Wiley & Sons 2. Shayne Cox Gad,2008, *Pharmaceutical Manufacturing Handbook:Production and Processes*, John Wiley & Sons 3. The National Agency for Drug and Food Control of Indonesia, 2003, Decree No HK.00.05.4.3870: Guidelines For Making Good Cosmetics 4. The National Agency for Drug and Food Control of Indonesia, 2005, Decree No HK.00.05.4.1380: Guidelines For Making Good Traditional Medicine

18. Description Module Development and Characteristics of Raw Materials and Pharmaceutical Excipients

1	Module name	Development and Characteristics of Raw Materials and Pharmaceutical Excipients
2	Courses code	P20.02010
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	Second Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. State the physicochemical properties of medicinal raw materials and excipients 2. Explain the terms in Indonesia Pharmacopeia, USP, WHO and other pharmacopeias 3. State the importance of basic knowledge in the development of medicinal raw materials and excipients 4. State, define and identify physicochemical properties of medicinal raw materials and excipients in safety and stability requirements.
7	Elements of competency	MKK
8	Type competency	supporting competence
9	Syllabus	1. Drug Discovery and Development; 2. Pre-formulation Study; 3. Active Pharmaceutical Ingredients; 4. Pharmaceutical Excipients; 5. Pre-formulation Criteria; 6. Drug dosage forms consideration in formulation; 7. Early Drug Development: Product Design; 8. Mid-term

		exam; 9. Discovery of medicinal raw materials, active pharmaceutical ingredients (API); 10. Processing of medicinal raw materials, API; 11. Independent Development of medicinal raw materials, API; 12. Development of medicinal raw materials, API; 13-15 Development of medicinal raw materials, API in pharmaceutical dosage forms: Solid and semisolid, Liquid and parenteral, Ophthalmic and other preparations; 16. Final Exam
10	Attribute to soft skills	Creativity in discussions, making resumes, presentations, discipline in submitting assignments, presentations, class participation, etc
11	Learning methods	Active learning: Presentation, Case Study
12	Learning media	the LCD viewer, laptop, white board and "online" (Google Meet)
13	Appraisal	Written test: Individual task 10%; Mid-term Exam 30%, Final Exam 40%, Soft Skill 20%
14	Lecturer	Prof. Dr. apt. Marline Abdassah, MS (PIC) Dr.apt. Dolih Gozali,MS.
15	References	1. Stanley Nusim, 2016, Active *Pharmaceutical Ingredients Development, Manufacturing, and Regulation*, Second Edition, Publisher: CRC Press; 2. Anthony J. Burke, Carolina Silva Marques, Nicholas J. Turner , Gesine J. Hermann, 2018, *Active Pharmaceutical Ingredients in Synthesis*: Catalytic Processes in Research and Development 1st Ed., Publisher: Wiley. 3. David J. AM Ende Mary T. AM ENDE, 2019*, Chemical Engineering in Therapeutical Industry, Active Pharmaceutical Ingredients*, Second Edition, Edited Engineering Services, Inc. 4. Augsburger LL, Zellhofer MJ., 2006, *Tablet formulation*. In: Swarbrick J, Boylan JC, editors. Encyclopedia of pharmaceutical technology. 3rd ed. New York: Marcel Dekker. 5. Martindale: *The complete drug reference*. 37th ed. London: Pharmaceutical Press; 2011. (electronic and hard copy available) 6. International Excipients Certification Project: minimize risks - maximize benefits. 2009, London: Pharmaceutical Quality Group. 7. Armstrong NA. Tablet manufacture. In: Swarbrick J, Boylan JC, editors. *Encyclopedia of pharmaceutical technolog*y. 3rd ed. New York: Marcel Dekker; 2006.

19. Description Module Pharmacogenomics

1	Module name	Pharmacogenomics
2	Courses code	P20.02011
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91

4	Semester	Second Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. List and explain the psychochemical properties of solute and solvent that affect solubility, stability, and other biopharmaceutical properties used in the development of pharmaceutical & biopharmaceutical dosage forms, traditional medicines & supplements, and cosmetics 2. Show contributions in individual or group projects. 3. Summarize information and communicate its development obtained from group experience
7	Elements of competency	MKK
8	Type competency	supporting competence
9	Syllabus	1-2. Introduction to Pharmacogenomics and pharmacogenetics, as well as genotyping methods; 3-5. Pharmacogenetics and race / ethnicity, pharmacogenetic Adverse Drug Reactions, Potential of social, ethical, and legal issues of pharmacogenetic development; 6-7. Pharmacogenetics and oncology, pharmacogenetics and infectious diseases; 8. Mid-term exam; 9-10. Polymorphisms in the treatment of cardiovascular and respiratory diseases, pharmacogenetics and metabolic diseases; 11-14. Pharmacogenomics of human p-glycoproteins, drug transporters, drug metabolizing enzymes, and drug targeting enzymes; 15. Case study discussion: Pharmacogenomic contribution to drug therapy: Warfarin, Clopidogrel,: Irinotecan, Aspirin etc; 16. Final Exam
10	Attribute to soft skills	Creativity in discussions, making resumes, presentations, discipline in submitting assignments
11	Learning methods	Lectures and Discussion
12	Learning media	the LCD viewer, laptop, white board and "online" (Google Meet)
13	Appraisal	Presentation Midterm Exam Final Exam
14	Lecturer	Apt. Melisa Intan Barliana, Dr.Med.Sc.. Dr. Apt. Tina Rostinawati, M.Si. Apt, Taofik Rosdiana, Ph.D.
15	references	1. Pharmacogenomics in Ethnobridging and Pharmacovigilance,Editor(s): Y. W. Francis Lam, Stuart A. Scott,Pharmacogenomics (Second Edition), Academic Press, 2019, Pages 289-327, ISBN 9780128126264,https://doi.org/10.1016/B978-0-12-812626-4.00011-5. (https://www.sciencedirect.com/science/article/pii/B9780128126264000115) Keywords: Data applicability; Ethnicity; Ethnobridging; Genetic gradients; Global drug development; Pharmacogenomics; Pharmacovigilance; Variability in drug response 2. Bertino J.S., Jr, & DeVane C, & Fuhr U, & Kashuba A.D., & Ma J.D.(Eds.), (2013). *Pharmacogenomics: An Introduction and*

		Clinical Perspective. McGraw Hill. https://accesspharmacy.mhmedical.com/content.aspx?bookid=511&sectionid=40849364 3. Fleeman, N., Martín Saborido, C., Payne, K., Boland, A., Dickson, R., Dundar, Y., ... & Walley, T. (2011). The clinical effectiveness and cost-effectiveness of genotyping for CYP2D6 for the management of women with breast cancer treated with tamoxifen: a systematic review 4. Aniel W. Nebert, Ge Zhang,16 - Pharmacogenomics,Editor(s): Reed E. Pyeritz, Bruce R. Korf, Wayne W. Grody,Emery and Rimoin's Principles and Practice of Medical Genetics and Genomics (Seventh Edition),Academic Press,2019,Pages 445-486. 5. Pratt, V. M., McLeod, H. L., Rubinstein, W. S., Scott, S. A., Dean, L. C., Kattman, B. L., & Malheiro, A. J. (2012). Medical genetics summaries [https://pubmed.ncbi.nlm.nih.gov/28520340/]

20. Description Module Pharmaceutical Engineering

1	Module name	Pharmaceutical Engineering
2	Courses code	P20.02012
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	Second Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. Explain various factors involved in design, production and evaluation of multiple drug dosage forms and other drug delivery system 2. Present the ability to interpret and analyze data 3. Design, produce and evaluate drug dosage forms and other drug delivery system 4. Characterize and evaluate the psychochemical properties of pharmaceutical ingredients 5. Show contributions both in individual or group project 6. Summarize the information collected from the group and communicate the development of the topic
7	Elements of competency	MKK
8	Type competency	supporting competence
9	Syllabus	1-3. Introduction to Pharmaceutical engineering, CPP (Critical Process Parameter) relation to QTPP (Quality Target Product Profile), Introduction to Technology Transfer; 4-7. Mass Transfer, Momentum Transfer, Heat Transfer, Crystallization; 8. Mid-term exam; 9. Powder Handling; 10. Scale up; 11-14. Scale up on Pharmaceutical material, solid, liquid and semisolid preparations and biotechnology products; 15. Quality related risk management; 16. Final Exam

10	Attribute to soft skills	making resume, discipline, ethics, awareness
11	Learning methods	● Lecture ● Discussion ● Audio visual Learning ● Presentation
12	Learning media	the LCD viewer, laptop, white board and "online" (Google Meet)
13	Appraisal	● Discussion ● Quiz
14	Lecturer	Dr. Apt. Yoga Windhu Wardhana, M.Si. Dr. Apt. Dolih Ghozali, M.S.
15	References	1. Dengale, S.J., Grohganz, H., Rades, T., L¨obmann, K., 2016. Recent advances in co- amorphous drug formulations. Adv. Drug Deliv. Rev. 100, 116–125. https://doi.org/ 10.1016/j.addr.2015.12.009. 2. Dengale, S.J., Ranjan, O.P., Hussen, S.S., Krishna, B.S.M., Musmade, P.B., Gautham Shenoy, G., Bhat, K., 2014. Preparation and characterization of co-amorphous ritonavir-indomethacin systems by solvent evaporation technique: Improved dissolution behavior and physical stability without evidence of intermolecular interactions. Eur. J. Pharm. Sci. 62, 57–64. https://doi.org/10.1016/j. ejps.2014.05.015. 3. Dening, T.J., Taylor, L.S., 2018. Supersaturation potential of ordered mesoporous silica delivery systems. Part 1: Dissolution performance and drug membrane transport rates. Mol. Pharm. 15, 3489–3501. https://doi.org/10.1021/acs. molpharmaceut.8b00488. 4. Dening, T.J., Zemlyanov, D., Taylor, L.S., 2019. Application of an adsorption isotherm to explain incomplete drug release from ordered mesoporous silica materials under supersaturating conditions. J. Control. Release 307, 186–199. https://doi.org/ 10.1016/j.jconrel.2019.06.028. 5. Skorupska, E., Jeziorna, A., Potrzebowski, M.J., 2016. Thermal solvent-free method of loading of pharmaceutical cocrystals into the pores of silica particles: A case of naproxen/picolinamide cocrystal. J. Phys. Chem. C 120, 13169–13180. https://doi. org/10.1021/acs.jpcc.6b05302. 6. Skorupska, E., Ka´zmierski, S., Potrzebowski, M.J., 2017. Solid state NMR characterization of ibuprofen:nicotinamide cocrystals and new idea for controlling release of drugs embedded into mesoporous silica particles. Mol. Pharm. 14, 1800–1810. https://doi.org/10.1021/acs.molpharmaceut.7b00092. 7. Skorupska, E., Paluch, P., Jeziorna, A., Potrzebowski, M.J., 2015. NMR study of BA/FBA cocrystal confined within mesoporous silica nanoparticles employing thermal solid phase transformation. J. Phys. Chem. C 119, 8652–8661. https://doi.org/10.1021/ jp5123008. 8. Zhao Z, Katai H, Higashi K, Ueda K, Kawakami K, Moribe K. Cryo-TEM and AFM observation of the time-dependent evolution of amorphous probucol nanoparticles formed by the aqueous dispersion of ternary solid dispersions. Molecular pharmaceutics. 2019 Mar 29;16(5):2184-98. 9. Sunazuka Y, Ueda K, Higashi K, Tanaka Y, Moribe K. Combined effects of the drug distribution and mucus diffusion properties of

		self-microemulsifying drug delivery systems on the oral absorption of fenofibrate. International journal of pharmaceutics. 2018 Jul 30;546(1-2):263-71.

21. Description Module Development of cosmetic preparations

1	Module name	Development of cosmetic preparations
2	Courses code	P20.02013
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	Second Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. Describes the critical factors required for the design, manufacture and evaluation of various dosage forms and other drug delivery systems 2. Design, manufacture and evaluate drug dosage forms and other drug delivery systems. 3. Characterize and evaluate physicochemical properties of the pharmaceutical substances 4. Show contributions in individual or group projects. 5. Summarize information and communicate its development obtained from group experience
7	Elements of competency	MKK
8	Type competency	supporting competence
9	Syllabus	1. Introduction: Early stage development (Cosmetic design); 2. Preformulation as a cosmetic product design tools; 3. Biopharmaceutical aspects in the development of cosmetic formulations; 4. Optimization of Cosmetics Products; 5. Solid Dosage Form; 6. Semisolid Dosage Form; 7. Liquid Dosage Form; 8. Mid-term exam; 9. Herbal cosmetics; 10-11. Cosmetic journal reviews; 12. Cosmetic liquid product design; 13. Cosmetic solid product design; 14. Cosmetic semi solid product design; 15. Herbal cosmetic product design; 16. Final Exam
10	Attribute to soft skills	discipline, active participation, communication skill
11	Learning methods	Lecture, Discussion, Group/Individual Presentation
12	Learning media	the LCD viewer, laptop, white board and "online" (Google Meet)
13	Appraisal	Presentation, paper reviews and group discussions

14	Lecturer	Apt. Nasrul Wathoni, Ph.D.
15	References	1. united States Pharmacopeial Convention, Inc. The United States Pharmacopeia (USP 26). Rockville, Maryland, USA, 2013. 2. Martin A. Physical Pharmacy. 4th ed. Baltimore: Williams & Wilkins, 2014, pp. 212–251 3. Chulia D, Deleuil M, Pourelot Y. Powder Technology and Pharmaceutical Processes.Amsterdam: Elsevier Science, 2010.

22. Description Module Seminar of Research Proposal

1	Module name	Seminar of Research Proposal
2	Courses code	P20.03001
3	Study loads	2 credits ECTS amount : 15 ECTS Contact hour per semester: 53 Independent study per semester: 400 Total workload: 453
4	Semester	Third Semester
5	Precondition	pass research methodology course
6	Competence	Research Proposal Seminar (RPS) is Master students thesis research proposal. in research proposal seminar students are expected to be able to: ● Present the ability to interpret and analyze data ● Deliver information orally in an organized, persuasive, and logical manner using documentation and supporting visual aids ● Take, analyze, and interpret scientific literature to provide information to be shared orally or in writing ● Creating documents that are technical, analytical, relevant in content and well managed ● Show contributions both in individual or group project ● Conduct independent literature studies using databases and pharmacology-related publications to solve problems related to the field of pharmacology ● Analyze, interpret, criticize scientific literature related to study design, interpretation data and suitability of conclusions
7	Elements of competency	MKB, MKK
8	Type competency	main competence
9	Syllabus	The students should have research proposal manuscripts that has been wrapped in blue soft cover.
10	Attribute to soft skills	discipline, communication skill, awareness
11	Learning methods	an open seminar that can be attended by students and lecturers. Technical implementation:

<table>
<tr><td></td><td></td><td>The students present their research proposal for 15 minutes followed by a question and answer session by discussants, each discussant is given 10 minutes to ask questions</td></tr>
<tr><td>12</td><td>Learning media</td><td>the LCD viewer, laptop, white board and "online" (Google Meet)</td></tr>
<tr><td>13</td><td>Appraisal</td><td>discussants evaluate the accountability of students for questions that are critical and clarify towards the topics with percentage scoring:
Significance of background research and/or research focus and Objectives, 15% (fifteen percent);
Relevance and updating of literature review, 25% (twenty five percent);
Accuracy of the objectives and research proportion/hypothesis, 10% (ten percent);
Suitability of research methods, 10% (ten percent);
Scientific writing ability, 20% (twenty percent);
Communication ability in oral exam, 20% (twenty percent);
Total 100% (one hundred percent) can be added with assessment 10% (ten percent).
Final Score:
Students are declared “PASS” if they get an average score of ≥ 68
Students are declared “NOT PASS” if they get an average score of < 68
Converting FS into Grade and Score using the following guidelines:<table><tr><th>Final Score (FS)</th><th>Grade</th><th>Score</th></tr><tr><td>80 ≤ FS ≤ 100</td><td>A</td><td>4</td></tr><tr><td>68 ≤ FS < 80</td><td>B</td><td>3</td></tr><tr><td>56 ≤ FS < 68</td><td>C</td><td>2</td></tr><tr><td>45 ≤ FS < 56</td><td>D</td><td>1</td></tr><tr><td>FS < 45</td><td>E</td><td>0</td></tr></table></td></tr>
<tr><td>14</td><td>Lecturer</td><td>Thesis adviser team and examiner team</td></tr>
<tr><td>15</td><td>References</td><td>Unpad Rector Regulation No. 50 of 2016 concerning Guidelines for Masters and Doctoral Education in the Padjadjaran University Environment
Academic Guidelines for Master’s Program in Pharmacy</td></tr>
</table>

23. Description Module Progress Report 1

1	Module name	Progress Report 1
2	Courses code	P20.03002
3	Study loads	1 credits ECTS amount : 12 ECTS Contact hour per semester: 27 Independent study per semester: 320 Total workload: 347
4	Semester	Third Semester

5	Precondition	a. Registered as active students b. Student has conducted a research proposal seminar and passed c. Enrolled in the Progress Report course (1 or 2)
6	Competence	Progress Report Seminar is held to assess the Masters students thesis research progress, students are expected to be able to: ● Present the ability to interpret and analyze data ● Deliver information orally in an organized, persuasive, and logical manner using documentation and supporting visual aids ● Take, analyze, and interpret scientific literature to provide information to be shared orally or in writing ● Creating documents that are technical, analytical, relevant in content and well managed ● Show contributions both in individual or group project ● Conduct independent literature studies using databases and pharmacology-related publications to solve problems related to the field of pharmacology ● Analyze, interpret, criticize scientific literature related to study design, interpretation data and suitability of conclusions
7	Elements of competency	MKB, MKK
8	Type competency	main competence
9	Syllabus	Implementation of this module: a. Conducted in each department according to the concentration / specialization taken by students b. Students independently present the progress of thesis research carried out, in front of lecturers in the Department (at least the Head of the Department and 1 other Lecturer in the Department). c. The detailed presentation mechanism and schedule were regulated by the Head of the Department
10	Attribute to soft skills	self confidence, discipline, communication
11	Learning methods	an open seminar that can be attended by students and lecturers. Technical implementation: The students present their research progress followed by a question and answer session
12	Learning media	the LCD viewer, laptop, white board and "online" (Google Meet)
13	Appraisal	The components assessed in the progress seminar include: Methodology comprehension Knowledge comprehension Reasoning comprehension Ability to communicate ideas Research progress percentage Final Score: students are considered pass if the seminar average score is at least B
14	Lecturer	Thesis adviser team, Head of the Department and other Lecturer in the Department

15	References	1. Unpad Rector Regulation No. 50 of 2016 concerning Guidelines for Masters and Doctoral Education in the Padjadjaran University Environment 2. Academic Guidelines for Master's Program in Pharmacy

24. Description Module Progress Report 2

1	Module name	Progress Report 2
2	Courses code	P20.04001
3	Study loads	1 credits ECTS amount : 11 ECTS Contact hour per semester: 27 Independent study per semester: 289 Total workload: 315
4	Semester	Fourth Semester
5	Precondition	a. Registered as active students b. Student has conducted a research proposal seminar and passed c. Enrolled in the Progress Report course (1 or 2)
6	Competence	Progress Report Seminar is held to assess the Masters students thesis research progress, students are expected to be able to: ● Present the ability to interpret and analyze data ● Deliver information orally in an organized, persuasive, and logical manner using documentation and supporting visual aids ● Take, analyze, and interpret scientific literature to provide information to be shared orally or in writing ● Creating documents that are technical, analytical, relevant in content and well managed ● Show contributions both in individual or group project ● Conduct independent literature studies using databases and pharmacology-related publications to solve problems related to the field of pharmacology ● Analyze, interpret, criticize scientific literature related to study design, interpretation data and suitability of conclusions
7	Elements of competency	MKB, MKK
8	Type competency	main competence
9	Syllabus	Implementation of this module: a. Conducted in each department according to the concentration / specialization taken by students b. Students independently present the progress of thesis research carried out, in front of lecturers in the Department (at least the Head of the Department and 1 other Lecturer in the Department). c. The detailed presentation mechanism and schedule were regulated by the Head of the Department
10	Attribute to soft skills	self confidence, discipline, communication

11	Learning methods	an open seminar that can be attended by students and lecturers. Technical implementation: The students present their research progress followed by a question and answer session
12	Learning media	the LCD viewer, laptop, white board and "online" (Google Meet)
13	Appraisal	The components assessed in the progress seminar include: Methodology comprehension Knowledge comprehension Reasoning comprehension Ability to communicate ideas Research progress percentage Final Score: students are considered pass if the seminar average score is at least B
14	Lecturer	Thesis adviser team, Head of the Department and other Lecturer in the Department
15	References	1. Unpad Rector Regulation No. 50 of 2016 concerning Guidelines for Masters and Doctoral Education in the Padjadjaran University Environment 2. Academic Guidelines for Master's Program in Pharmacy

25. Description Module Seminar of Research Result

1	Module name	Seminar of Research Result
2	Courses code	P20.04002
3	Study loads	2 credits ECTS amount : 14 ECTS Contact hour per semester: 53 Independent study per semester: 354 Total workload: 408
4	Semester	Fourth Semester
5	Precondition	passed research proposal
6	Competence	Seminar of research result is held to assess the Masters students thesis research result, students are expected to be able to: ● Present the ability to interpret and analyze data ● Deliver information orally in an organized, persuasive, and logical manner using documentation and supporting visual aids ● Take, analyze, and interpret scientific literature to provide information to be shared orally or in writing ● Creating documents that are technical, analytical, relevant in content and well managed ● Show contributions in individual project

<table>
<tr><td></td><td></td><td>● Conduct independent literature studies using databases and pharmacology-related publications to solve problems related to the field of pharmacology
● Analyze, interpret, criticize scientific literature related to study design, interpretation data and suitability of conclusions</td></tr>
<tr><td>7</td><td>Elements of competency</td><td>MKB, MKK</td></tr>
<tr><td>8</td><td>Type competency</td><td>main competence</td></tr>
<tr><td>9</td><td>Syllabus</td><td>The Student should have research result manuscripts that have been wrapped in yellow soft cover</td></tr>
<tr><td>10</td><td>Attribute to soft skills</td><td>communication skill</td></tr>
<tr><td>11</td><td>Learning methods</td><td>an open seminar that can be attended by students and lecturers.

Technical implementation:
The students present their research proposal for 15 minutes followed by a question and answer session by discussants, each discussant is given 10 minutes to ask questions</td></tr>
<tr><td>12</td><td>Learning media</td><td>the LCD viewer, laptop, white board and "online" (Google Meet)</td></tr>
<tr><td>13</td><td>Appraisal</td><td>discussants evaluate the accountability of students for questions that are critical and clarify towards the topics with percentage scoring:
● Significance of background research and/or research focus and Objectives, 15% (fifteen percent);
● Relevance and updating of literature review, 25% (twenty five percent);
● Accuracy of the objectives and research proportion/hypothesis, 10% (ten percent);
● Suitability of research methods, 10% (ten percent);
● Scientific writing ability, 20% (twenty percent);
● Communication ability in oral exam, 20% (twenty percent);
● Total 100% (one hundred percent) can be added with assessment 10% (ten percent).
The score of discussants is added up with other discussants score with ratio 60% of adviser team, 40% of examiner team as final score, without converting into grade in advanced.

Final Score:
● Students are declared “PASS” if they get an average score of ≥ 68
● Students are declared “NOT PASS” if they get an average score of < 68
Converting FS into Grade and Score using the following guidelines:
<table>
<tr><th>Final Score (FS)</th><th>Grade</th><th>Score</th></tr>
<tr><td>80 ≤ FS ≤ 100</td><td>A</td><td>4</td></tr>
<tr><td>68 ≤ FS < 80</td><td>B</td><td>3</td></tr>
<tr><td>56 ≤ FS < 68</td><td>C</td><td>2</td></tr>
<tr><td>45 ≤ FS < 56</td><td>D</td><td>1</td></tr>
<tr><td>FS < 45</td><td>E</td><td>0</td></tr>
</table></td></tr>
<tr><td>14</td><td>Lecturer</td><td>Thesis adviser team and examiner team</td></tr>
</table>

15	References	1. Unpad Rector Regulation No. 50 of 2016 concerning Guidelines for Masters and Doctoral Education in the Padjadjaran University Environment 2. Academic Guidelines for Master's Program in Pharmacy

26. Description Module Magister Comprehensive Defense

1	Module name	Magister Comprehensive Defense
2	Courses code	P20.04003
3	Study loads	3 credits ECTS amount : 14 ECTS Contact hour per semester: 80 Independent study per semester: 340 Total workload: 420
4	Semester	Fourth Semester
5	Precondition	Thesis Defence Form (LS 1, LS 2) : 1 Copy LS4 Form/ UNT Revision Form : 1 Page Proof of Academic Fee Payment Photocopy : 1 Page Thesis Draft (Yellow Soft Cover) : 7 Copies Thesis Statement Form : 1 Page KPA (Academic Achievement Card) Signed by The Program Study Head : 1 Page Library Book Free Form of Faculty of Pharmacy, Unpad Postgraduate, and Unpad Cisral : 1 page
6	Competence	The students are expected to be able to : ● Present the ability to interpret and analyze data ● Deliver information orally in an organized, persuasive, and logical manner using documentation and supporting visual aids ● Define the psychochemical properties of solute and solvent that affect solubility, stability, and other bio-pharmaceutical properties in drug dosage forms development of herbal medicine. ● Define and apply the mechanism of certain drug on molecular and cellular levels ● Characterize and evaluate physicochemical properties of pharmaceutical natural ingredients. ● Take, analyze, and interpret scientific literature to provide information to be shared orally or in writing. ● Creating documents that are technical, analytical, relevant in content and well managed ● Summarize the information collected from the group and communicate the development of the topic. ● List and explain the psychochemical properties of solute and solvent that affect solubility, stability, and other bio-pharmaceutical properties in drugs, biopharmaceutical, traditional medicine & supplements, and cosmetics development.

<table>
<tr><td></td><td></td><td>

Define important factors which are used in design, manufacture and evaluation of various dosage forms and other drug delivery systems
Design, manufacture and evaluate dosage forms and other drug delivery systems
Show contributions both in individual or group project
Conduct independent literature studies using databases and pharmacology-related publications to solve problems related to the field of pharmacology
Analyze, interpret, criticize scientific literature related to study design, interpretation data and suitability of conclusions

</td></tr>
<tr><td>7</td><td>Elements of competency</td><td>MKB, MKK</td></tr>
<tr><td>8</td><td>Type competency</td><td>main competence</td></tr>
<tr><td>9</td><td>Syllabus</td><td>Comprehensive Examination is the final examination for Masters in Pharmacy education in the form of a comprehensive oral exam, regarding the theories and principles related to the research.

Implementation of this module:
a. Conducted once per semester
b. At the appointed time, student is tested orally in closed session in front of 3 (three) examiners and a team of supervisors
c. The mechanism and schedule of the examination in more detail are regulated by the Head of The Pharmacy Masters Study Program
d. Examination is held for 90 minutes
e. Each examiner asked for 15 minutes
f. Each supervisor asked for a maximum of 15 minutes
g. At least 60% of the total number of examiners and supervisors attended the examination</td></tr>
<tr><td>10</td><td>Attribute to soft skills</td><td>communication skill</td></tr>
<tr><td>11</td><td>Learning methods</td><td>The students present their research results in brief followed by a question and answer session</td></tr>
<tr><td>12</td><td>Learning media</td><td>the LCD viewer, laptop, white board and "online" (Google Meet)</td></tr>
<tr><td>13</td><td>Appraisal</td><td>The components assessed in the examination are the academic abilities in the field / concentration related to research by master students.

<u>Passing Criteria</u>
a. The examination participants are declared to have passed if the average score is at least B.
b. For those who do not pass, they must repeat at least 1 (one) month after the announcement
Final Score:
● Students are declared “PASS” if they get an average score of ≥ 68
● Students are declared “NOT PASS” if they get an average score of < 68

Converting FS into Grade and Score using the following guidelines:
<table>
<tr><th>Final Score (FS)</th><th>Grade</th><th>Score</th></tr>
<tr><td>80 ≤ FS ≤ 100</td><td>A</td><td>4</td></tr>
</table>
</td></tr>
</table>

		68 ≤ FS < 80	B	3
		56 ≤ FS < 68	C	2
		45 ≤ FS < 56	D	1
		FS < 45	E	0
14	Lecturer	Thesis adviser team and examiner team. a. Examiners must hold a Doctorate (Dr.) with a minimum academic position as Lector and/or Professor b. The number of examiners is 3 (three) people		
15	References	1. Unpad Rector Regulation No. 50 of 2016 concerning Guidelines for Masters and Doctoral Education in the Padjadjaran University Environment 2. Academic Guidelines for Master's Program in Pharmacy		

27. Description Module Scientific paper

1	Module name	Scientific paper
2	Courses code	P20.04004
3	Study loads	1 credits ECTS amount : 12 ECTS Contact hour per semester: 0 Independent study per semester: 369 Total workload: 369
4	Semester	Fourth Semester
5	Precondition	a. Registered as active students b. Has thesis adviser team. c. Scientific article is part of the thesis
6	Competence	The students are expected to be able to : ○ Find a knowledge of basic concepts in pharmaceutical science in one's area of expertise ○ Integrating science, knowledge, technology and advanced concepts in pharmaceutical sciences ○ Design, conduct and maintain original research in one's area of expertise through international publication and research dissemination through seminars ○ Successfully perform analysis, synthesis and antithesis by applying analytical and critical thinking in reviewing scientific literature and evaluating research findings
7	Elements of competency	MKB, MKK
8	Type competency	main competence
9	Syllabus	Scientific articles that are accepted to be published in a national journal accredited by at least Sinta 3 or an international journal through the approval of the thesis adviser who will act as co-authors, by listing UNPAD as the student's first affiliation.

10	Attribute to soft skills	writing ability
11	Learning methods	Writing and publication
12	Appraisal	Final score is depend by the journal criteria, at least in review
13	Lecturer	Thesis adviser team and The Program Study Head
14	References	1. Unpad Rector Regulation No. 50 of 2016 concerning Guidelines for Masters and Doctoral Education in the Padjadjaran University Environment 2. Academic Guidelines for Master's Program in Pharmacy

3.2 Pharmacology Concentration

1. Description Module Philosophy of Science

1	Module name	Philosophy of Science
2	Courses code	P20.01001
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	First Semester
5	Precondition	None
6	Competence	Philosophy of science explores the nature of science and the source of knowledge. Students will learn about the introduction of science, history and development of science, the foundation of knowledge, fundamental structures, logic and reasoning, research method paradigm, moral ethics and science, and metaphysics
7	Elements of competency	MPK
8	Type competency	Main Competence
9	Syllabus	2. Introduction; 2. History and Development of Science Philosophy; 3. Base of Science Philosophy; 4. Base of Science Epistemology; 5. History and Development of Science Philosophy: Aristotle's Theory of Truth; 6. History and Development of Science Philosophy: Contemporary philosophy; 7. Source of Knowledge; 8. Midterm Examination; 9. Science Philosophy Introduction: Essence of Science Philosophy; 10. History of Science Philosophy; 11. Fundamental Structure of Science Philosophy; 12. Logic and Reasoning of Science Philosophy; 13.

		Research Method Paradigm; 14. Ethics and Moral in Science; 15. Metaphysics; 16. Final Examination
10	Attribute to soft skills	ethics. awareness, discipline
11	Learning methods	Lectures and Discussion
12	Learning media	LCD Projector
13	Appraisal	Written Examination and Presentation
14	Lecturer	Prof. apt. Dr. Moleyono, M.S. Prof. Dr. dr. Johanes Cornelius Mose Sp.OG.,
15	References	1. Joseph Vidal-Rosset. 2018. Book Review : The Philosophy of Science – A Companion. Oxford University Press, Pp. 768 2. Lars-Göran Johansson. 2016. Philosophy of Science for Scientists. Springer Undergrad. Texts Philosophy. Springer, Cham 3. Martiningsih Wahyu. 2012. Para Filsuf dari Plato sampai Ibn Bajjah. Jogjakarta : IRCiSod. 4. Sumarna, Cecep. 2020. Filsafat Ilmu. Rosda 5. Susanto A. 2011. Filsafat Ilmu, Suatu Kajian dalam Dimensi Ontologis, Epistimologis dan Aksiologis. Jakarta: Bumi Aksara.

2. Description Module Research Methodology

1	Module name	Research Methodology
2	Courses code	P20.01002
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	First Semester
5	Precondition	None
6	Competence	After attending this course, students will be able to make their research ideas into research with quality results, including dissertation proposals, presentations, proposals for research projects, research assistance, or journal articles
7	Elements of competency	MKK
8	Type competency	Main Competence
9	Syllabus	2. Research philosophy; develop problems into interesting research and answer the questions "Why and How?"; 2. Research process and flow;

		3. Research design; 4. Research variable; 5. Research proposal; 6. Scientific papers; 7. Writing Strategies (Tenses in writing scientific articles); 8. Mid-term examination; 9. Strategy for Writing Scientific Papers; 10. Scientific Writing Application; 11. Research proposal writing; 12. Plagiarism; 13. Research Ethics in humans and animals; 14. Clinical Trial; 15. Informed consent; 16. Final Exam
10	Attribute to soft skills	creativity, communication skill, discipline, awareness
11	Learning methods	Lectures and discussion
12	Learning media	LCD projector
13	Appraisal	Written examination and presentation
14	Lecturer	Prof. apt. Anas Subarnas, M.Sc. apt. Rizky Abdulah, Ph.D. apt. Muchtaridi, Ph.D.
15	References	1. Petter Laake, Haakon Breien Benestad, Bjorn Reino Olsen. 2007. Research Methodology in the Medical and Biological Sciences. 2. A M Novikov; D A Novikov. 2013. Research methodology: from philosophy of science to research design. 3. Sarah Philpot, Lesley Curnick, Liz Soars, John Soars. 2007. New Headway Academic Skills: Student's Book Level 3: Reading, Writing, and Study Skills. 4. Rinaldi, S.F and Mujianto B. 2017.Research Methodology and statistic. Human research education center of ministry health of republic od Indonesia 5. Debbie Epstein, Jane Kenway, Rebecca Boden. 2007. Writing for Publication (The Academic's Support Kit).

3. Description Module Biostatistics

1	Module name	Biostatistics
2	Courses code	P20.01003
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	First Semester
5	Precondition	None
6	Competence	After attending this course, students will be able to apply statistical method in clinical study

7	Elements of competency	MKK
8	Type competency	main competence
9	Syllabus	2. Biostatistical Analysis; 2. Data Analysis; 3. Descriptive Statistics; 4. Hypothesis; 5. Nonparametric Statistics 1&2; 6. Analysis of Variance (ANOVA); 7. Sampling Techniques; 8. Midterm examination; 9. Introduction to Applied Biostatistics in Medical and Clinical Research; 10. Descriptive Analysis; 11. Differential Analysis Between Groups; 12. Correlation and Regression Analysis (Univariate); 13. Regression Analysis (Multivariate); 14. Survival Analysis; 15. Case Study Analysis Exercise. 16 final examination
10	Attribute to soft skills	hard work, discipline, awareness
11	Learning methods	Lectures and Discussion
12	Learning media	LCD
13	Appraisal	Written Examination and Presentation
14	Lecturer	Hadyana, M.Sc., Ph.D. apt. Neily Zakiyah, M.Sc., Ph.D
`5	References	1. Statistics in Medicine, 4th edition. Riffenburgh, RH. Elsevier. 2012. 2. Fundamental of Biostatistics, 8th edition. Rosner, B. Cengage Learning. 2015

4. Description Module Physicochemical Analysis

1	Module name	Physicochemical Analysis
2	Courses code	P20.01004
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	First Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. List and explain the psychochemical properties of solute and solvent that affect solubility, stability, and other bio-pharmaceutical properties in drug dosage forms development of drugs, herbal medicine & supplement, and cosmetics 2. Present the ability to interpret and analyze data 3. Develop, validate and apply different instrumental analytical technique in drug analysis on various drug dosage form 4. Characterize and evaluate the psychochemical properties of pharmaceutical ingredients

		5. Identify and elaborate drug absorption, distribution, metabolism and excretion principles along with factors that influence the process 6. Apply different instrumental analytical techniques in drug analysis for drug's pharmacological effect evaluation 7. Show contributions both in individual or group project 8. Apply different separation techniques from natural product for isolation of marker and active compound
7	Elements of competency	MKK
8	Type competency	main competence
9	Syllabus	1.Introduction; 2. Simultaneous UV Spectrophotometry and derivatives; 3. Atomic Absorption Spectrophotometry; 4. Fluorometry; 5. Infrared Spectrophotometry; 6. Mass Spectroscopy; 7. X ray spectroscopy; 8. Midterm Examination; 9. NMR; 10. Electrophoresis; 11-12. Chromatography technique (gas chromatography and HPLC); 13-15. Project with the chosen analysis method
10	Attribute to soft skills	communication skill, discipline, ethics, awareness
11	Learning methods	Content-Based learning, Project-based
12	Learning media	LCD
13	Appraisal	Answer individual questions and essays, presentations and discussions
14	Lecturer	Mutakin Ph.D Dr. Aliya Nur Hasanah
15	References	1. Jurgen H.Gross, Mass Spectrometry, a textbook, 3rd edition, 2017 2. Principles of instrumental analysis, Douglas A.Skoog, F.James Holler, Stanley R Crouch, 2017, ISBN 1337468037 3. a practical guide to instrumental analysis, Erno Pungor, G. Horvai, CRC Press, 2020 4. Handbook of Green Analytical Chemistry, Miguel De La Guardia, Salvador Garrigues, 2012, ISBN 0470972017

5. Description Module Cell and Molecular Biology

1	Module name	Cell and Molecular Biology
2	Courses code	P20.01005
3	Study loads	3 credits ECTS amount : 5 ECTS Contact hour per semester: 40 Independent study per semester: 96

		Total workload: 136
4	Semester	First Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. List and explain the physical and chemical properties of solvents and solutes that affect solubility and other properties of other bio-pharmaceuticals in the development of drug dosage forms. 2. Analyze and interpret data. 3. Present organized information orally, persuasively yet logical manner using documentations and supporting tools. 4. List and explain the physical and chemical properties of solvents and solutes that affect solubility and other properties of other bio-pharmaceuticals in the development of drug, bio-pharmaceutical, traditional medicine & supplement and cosmetics. 7. Identification and explain principles that are involved in the absorption, distribution, metabolism, and excretion of medicinal substances and factors that influence these processes. 8. Explain and apply mechanism acting of the drug at the molecular, cellular and organ system
7	Elements of competency	MKK
8	Type competency	main competence
9	Syllabus	1-3. Introduction, How cells read the genome: from DNA to protein, Genetic switch; 4-6. Cell membrane, Membrane transport, Mechanism of cell communication; 7-8. Cell signaling, Cell signaling: G protein-coupled receptor (GPCR); 9. Midterm Examination; 10-11. Cell signaling : Receptor Tyrosine Kinase, Cell signaling: Receptor guanylyl cyclase; 12-13. Cell signaling: gated ion channel and adhesion receptor, Cell signaling: Nuclear receptor; 14-15. Cell cycle, Cell signaling and Cancer; 16. Final Examination
10	Attribute to soft skills	ethics, discipline, awareness
11	Learning methods	Lecture and Discussion
12	Learning media	LCD
13	Appraisal	Presentation Mid-term test Final test
14	Lecturer	Apt. Melisa Intan Barliana, Dr.Med.Sc. Dr. Apt. Tiana Milanda, M.Si. Dr. Apt. Tina Rostinawati, M.Si. Apt. Rizky Abdulah, Ph.D.
15	References	1. Alberts, B., Johnson, A., Lewis, J., Morgan, D., Raff, M., Roberts, K., ... & Hunt, T. (2017). *Molecular biology of the cell*. WW Norton & Company.

		2. Mercadante, A. A., Dimri, M., & Mohiuddin, S. S. (2019). Biochemistry, replication and transcription. PMID: 30986011, Bookshelf ID: NBK540152 3. Katritch, V., Cherezov, V., & Stevens, R. C. (2013). Structure-function of the G protein–coupled receptor superfamily. *Annual review of pharmacology and toxicology*, *53*, 531-556. 4. Wagener, C., Stocking, C., & Müller, O. (2016). *Cancer Signaling: from molecular biology to targeted therapy*. John Wiley & Sons.

6. Description Module Pharmacodynamics

1	Module name	Pharmacodynamics
2	Courses code	P20.01021
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	First Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. Apply pharmacokinetics process related to absorption, distribution, metabolism and excretion of drugs 2. Apply pharmacodynamic principles to discuss the mechanism of action of drugs and clinical outcomes 3. Show contributions in individual or group projects. 4. Conduct literature studies independently using databases and pharmacology-related publications to solve problems related to the field of pharmacology
7	Elements of competency	MKK
8	Type competency	supporting competence
9	Syllabus	1. introduction and definition of pharmacodynamic; 2. Aspects of pharmacodynamic; 3. Application of pharmacodynamics and therapy; 4. Agonist and Antagonist; 5. Adrenergic and Cholinergic; 6. Histamine dan Serotonin; 7. Endocrine system; 8. Mid-term Exam; 9. Pharmacodynamics in central nervous system medication; 10. Pharmacodynamics in anti depression; 11. Pharmacodynamics in schizophrenia medication; 12. Pharmacodynamics in antidiabetic medication; 13. Pharmacodynamics in obesity medication; 14. Pharmacodynamics in antihyperlipidemic medication; 15. Pharmacodynamics in antihypertensive medication; 16. Final Examination
10	Attribute to soft skills	ethics, awareness, communication skill

11	Learning methods	Lecture and Discussion
12	Learning media	LCD
13	Appraisal	Written test Mid-term test Final test
14	Lecturer	Dr. Apt. Sri Adi Sumiwi, M.Si. Prof. Dr. Apt. Jutti Levita, M.Si
15	References	1. Basic Pharmacokinetics and Pharmacodynamics. Rosenbaum SE. Wiley, 2016. 2. Clinical Pharmacokinetics and Pharmacodynamics. Rowland M, Tozer TN. 4th ed. 2018. (e-book)

7. Description Module Chemotherapeutics

1	Module name	Chemotherapeutics
2	Courses code	P20.01022
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	First Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. Apply pharmacokinetics process related to absorption, distribution, metabolism and excretion of drugs 2. Show contributions both in individual or group project 3. Conduct independent literature studies using databases and pharmacology-related publications to solve problems related to the pharmacology field
7	Elements of competency	MKK
8	Type competency	supporting competence
9	Syllabus	1. Introduction and Understanding of Chemotherapeutics; 2. Fundamentals of Chemotherapeutics; 3. Infection and the Body's Defense System; 4. Correct application of anti-infection drugs; 5. Use of antibiotics in special conditions; 6. Antibiotic Resistance; 7. Bacteria, Viruses, Fungi, and Protozoa Innovations on the human body; 8. Mid-term Exam; 9. Anti-Cancer drugs; 10. Anti Tuberculosis and Anti Leprosy drugs; 11. AntiViral Drugs; 12. Antifungal Drugs; 13. Antimalarial Drugs; 14. Anthelmintic Drugs; 15. Anti-amoebic drugs; 16. Final Examination

10	Attribute to soft skills	ethics, discipline, awareness
11	Learning methods	Lecture and Discussion
12	Learning media	LCD
13	Appraisal	Written test Mid-term test Final test
14	Lecturer	Dr. Apt. Eli Halimah, M.Si. Prof. Dr. Apt. Ajeng Diantini, M.Si.
15	References	1. Anderson, Rosaleen J, Paul W. Groundwater, and Adam Todd. Antibacterial Agents: Chemistry, Mode of Action, Mechanisms of Resistance, and Clinical Applications. Chichester, West Sussex: John Wiley & Sons, 2012. 2. Davey P, Wilcox MH, Irving W, Thwaites G. *Antimicrobial Chemotherapy*. 7 ed. ed. Oxford, UK: Oxford University Press; 2015. 3. Verhoef, J., van Kessel, K., and H. Snippe. 2019. Immune Response in Human Pathology: Infections Caused by Bacteria, Viruses, Fungi, and Parasites. Nijkamp and Parnham's Principles of Immunopharmacology 4. Douglas L. Mayers, Jack D. Sobel, Marc Ouellette, Keith S. Kaye, Dror Marchaim. 2017. Antimicrobial Drug Resistance : Mechanisms of Drug Resistance, Volume 1 5. John C. Rotschafer, David R. Andes, Keith A. Rodvold. 2016. Antibiotic Pharmacodynamics (Methods in Pharmacology and Toxicology) 1st ed. 2016.

8. Description Module Pharmacotherapy

1	Module name	Pharmacotherapy
2	Courses code	P20.01023
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	First Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. Describe and apply the mechanisms of a particular drug at the molecular, cellular, and organ system levels. 2. Evaluate the impact of the drugs pharmacokinetics. 3. Use pharmacodynamic principles to discuss the mechanism of action of drugs and clinical outcomes.

		4. Shows individual contributions to a project or group assignment 5. Conducting independent literature studies using databases and pharmacology-related publications to solve problems related to the field of pharmacology
7	Elements of competency	MKK
8	Type competency	supporting competence
9	Syllabus	1. Pharmacotherapy of Cardiovascular Disorders; 2. Pharmacotherapy of Respiratory Disorders; 3. Pharmacotherapy of Neurological Disorders - Psychiatry; 4. Pharmacotherapy of Gastrointestinal Disorders; 5. Farmakoterapi Gangguan Saluran Kemih & Ginekologi Pharmacotherapy of Urinary Tract Disorders & Gynecology; 6. Pharmacotherapy of Endocrine System Disorders; 7. Pharmacotherapy of Eye, Ear, Nose & Throat Disorders; 8. Mid-term Exam; 9. Pharmacotherapy of Blood Disorders; 10. Pharmacotherapy of Immune system Disorders; 11. Pharmacotherapy for Bone & Joint Disorders; 12. Pharmacotherapy for Skin Disease; 13. Pharmacotherapy of Oncologic and Infectious Diseases; 14. Pharmacotherapy for Liver and Kidney Disorders; 15. Pharmacotherapy of Nutritional Disorders and Emergency medicine; 16. Final Examination
10	Attribute to soft skills	discipline, ethics, awareness
11	Learning methods	Lecture and Discussion
12	Learning media	LCD
13	Appraisal	Written test Mid-term test Final test
14	Lecturer	Prof. Dr. Apt. Ahmad Muhtadi, M.Si. Dr. Apt. Rini Hendriani, M.Si.
15	References	1. Pharmacotherapy: A Pathophysiologic Approach, 11th ed. DiPiro JT, Talbert RL, Yee GC, Matzke GR, Wells BG, Posey ML, eds. New York, NY: McGraw-Hill, 2020. 2. Pharmacotherapy Casebook: A Patient-Focused Approach, 10th ed. Schwinghammer TL, Koehler JM, eds. New York, NY: McGraw-Hill, 2017. 3. Pharmacotherapy Handbook, Eighth Edition. Wells B., DiPiro JT, New York, NY: McGraw-Hill, 2011.

9. Description Module Development of Pharmaceutical Dosage Forms

1	Module name	Development of Pharmaceutical Dosage Forms
2	Courses code	P20.02001
3	Study loads	2 credits ECTS amount : 3 ECTS

		Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	Second Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. List and explain the physical and chemical properties of solvents and solutes that affect the solubility, stability, and other bio pharmaceutical properties in drug dosage forms development. 2. Describe the critical factors required for the design, manufacture and evaluation of various dosage forms and other drug delivery systems 3. Develop, validate and apply different instrumental analytical techniques to the analysis of medicinal substances in various dosage forms 4. Analyze and interpret data. 5. Design, manufacture and evaluate various drugs dosage forms. 6. Characterize and evaluate physicochemical properties of pharmaceutical substances 7. Show contributions in individual or group projects.
7	Elements of competency	MKK
8	Type competency	supporting competence
9	Syllabus	1. Introduction: Early stage development (Product design); 2. Preformulation as a product design tool; 3. Biopharmaceutical aspects in formulation development; 4. Product Optimization; 5. Parenteral Dosage Form; 6. Inhalation Dosage Form; 7. Oral Solid Dosage Form; 8.Midterm Exam; 9. Ophthalmic Dosage Form; 10. Aqueous Nasal Dosage Form; 11. Topical and Transdermal Delivery; 12-15. Drug design 1-4 cases; 16. Final exam
10	Attribute to soft skills	ethics, hardworking, communication skill
11	Learning methods	Lecture and Discussion
12	Learning media	LCD
13	Appraisal	Presentations, paper review and group discussion
14	Lecturer	Dr. Taofik Rusdiana, M.Si., Apt
15	References	1. Mark Gibson, Pharmaceutical Preformulation and Formulation, Informa Health, 2016 2. L. Shargel and I. Kanfer, Generic Drug Product Development Solid Oral Dosage Forms, CRC Press, 2014. 3. Y. Qiu, et al, Developing Solid Oral Dosage Forms, Pharmaceutical Theory and Practice, Elsevier-Academic Press, 2017

10. Description Module Pharmacokinetics

1	Module name	Pharmacokinetics
2	Courses code	P20.02002
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	Second Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. List and explain the psychochemical properties of solute and solvent that affect solubility, stability, and other bio-pharmaceutical properties of drug dosage forms development in drugs, herbal medicine & supplement, and cosmetics 2. Describe the physical and chemical properties of the compound that affect solubility, stability and other biopharmaceutical properties of drug dosage forms development 3. Present the ability to interpret and analyze data 4. Develop, validate and apply different analytic instrument technique for drug analysis in various drug dosage form 5. Measure and evaluate the therapeutic outcome based on drug to target knowledge 6. Evaluate the impact of pharmacokinetics process in drug action
7	Elements of competency	MKK
8	Type competency	supporting competence
9	Syllabus	1-3. Introduction, One and Two Compartment Intravenous Pharmacokinetic Model; 4-5. One and Two Compartment Oral Pharmacokinetic; 6-7. Pharmacokinetics of Infusion, Multiple Dose IV Administration and Oral Dual Dose Administration; 8. Mid-term Exam; 9-12. Clearance Concept, Non-Linear Pharmacokinetics, Pharmacokinetics study design and data interpretation, also PK-PD Relation; 13-15. Drug pharmacokinetics study's review article- Group 1-3; 16. Final exam
10	Attribute to soft skills	ethics, communication skill, discipline
11	Learning methods	● Lecture ● Discussion ● Audio visual learning ● Presentation ● Review article writing ability
12	Learning media	LCD

13	Appraisal	● Discussion (students dialogue) ● Quiz
14	Lecturer	Dr. Apt. Taofik Rusdiana, M.Si. Dr. Apt. Ahmad Muhtadi, M.S. Dr. Apt. Sri Adi Sumiwi, M.S
15	References	1. Shargel, L., & Yu, A. B. C. (2017). *Applied biopharmaceutics and pharmacokinetics*. Norwalk, Conn: Appleton & Lange. 2. Jambhekar, Sunil S., (2012), Basic pharmacokinetics, 2nd ed., London ; Philadelphia : Pharmaceutical Press 3. Paul Beringer PharmD, 2017, Winter's Basic Clinical Pharmacokinetics, Wolter Kluwer

11. Description Module Drug Discovery and Development

1	Module name	Drug Discovery and Development
2	Courses code	P20.02003
3	Study loads	3 credits ECTS amount : 5 ECTS Contact hour per semester: 40 Independent study per semester: 96 Total workload: 136
4	Semester	Second Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. List and explain the psychochemical properties of solute and solvent that affect solubility, stability, and other biopharmaceutical properties in drug dosage forms development. 2. Analyze and interpret data. 3. Design, manufacture and evaluate dosage forms and other drug delivery systems. 4. Able to explain and apply the mechanism of certain drugs at molecular and cellular levels 5. Characterize and evaluate physicochemical properties of the active compounds of natural ingredients 6. Applying separation techniques of natural substances to isolate the active substances and markers. 7. Apply pharmacokinetic processes related to absorption, distribution, metabolism and excretion of drugs 8. Able to explain the important factors required for the design, manufacturing and evaluation of various dosage forms and other drug delivery systems 9. Develop, validate and apply different instrumental analytical techniques to the analysis of medicinal substances in various dosage forms 10. Show contributions in individual or group projects.

7	Elements of competency	MKK
8	Type competency	supporting competence
9	Syllabus	1. Molecular identification and validation of disease targets; 2-3. Finding Lead Compound from Natural Materials; 4-5. Computer-aided drug design (lead compound discovery); 6-7. Identification and optimization of target interactions and pharmacokinetics optimization; 8. Mid-term Exam; 9-10. Toxicology and safety tests and In vivo and in Vitro tests; 11-12. Pre-formulations and formulations; 13-14. Pre-clinical and clinical trial; 15. Registration and Commercialization
10	Attribute to soft skills	discipline, communication skill, ethics
11	Learning methods	● Discussion ● Audio visual learning
12	Learning media	LCD
13	Appraisal	● Presentation ● Quiz
14	Lecturer	Apt. Muchtaridi, Ph.D. Prof. Dr. Apt. Moelyono, M.S. Dr. Apt. Keri Lestari, M.Si Apt. Taofik Rusdiana, PhD.
15	References	1. Raymond G Hill, Humphrey P. Rang. (2021). Drug Discovery and Development. 3rd Edition. Elsevier 2. Donald J. Abraham, Michael Myers. 2021. Burger's Medicinal Chemistry, Drug Discovery and Development, Volumes 1 - 8, 8th Edition. Wiley-Interscience 3. Dev Bukhsh Singh. 2020. Computer Aided Drug Design. 1th edition. SPRINGER 4. Benjamin Blass. 2015. Basic Principles of Drug Discovery and Development. 1th edition. Elsevier-Academic Press 5. Graham Patrick L. 2017. An Introduction to Medicinal Chemistry. 6th edition. Oxford University Press 6. J. Andrew Williams, Richard Lalonde, Jeffrey R. Koup, David D. Christ, Sean Ekins. (2012). Predictive Approaches in Drug Discovery and Development: Biomarkers and In Vitro / In Vivo Correlations (Wiley Series on Technologies for the Pharmaceutical Industry). 7. Bente Steffansen, Yuichi Sugiyama, Bente Steffansen. (2013). Transporters in Drug Development: Discovery, Optimization, Clinical Study and Regulation 8. Camille Georges W., David Aldous, Didier Rognan, Pierre Raboisson. (2015). The Practice of Medicinal Chemistry, Fourth Edition.

12. Description Module Journal Reading and Review

1	Module name	Journal Reading and Review
2	Courses code	P20.02004
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	Second Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: ● Present the ability to interpret and analyze data ● Present organized information orally, persuasively yet logical using proper documentation and supported tools ● Analyze, interpret and criticize the study design, data interpretation and the suitability of conclusion from the scientific literature. ● Take, analyze, and interpret scientific literature to provide information to be disseminated orally or in writing ● Show contributions both in individual or group project ● Summarize the information collected from the group and communicate the development of the topic ● Conduct independent literature studies using databases and pharmacology-related publications to solve problems related to the pharmacology field
7	Elements of competency	MKK
8	Type competency	main competence
9	Syllabus	1. Learning contract and How to review a journal; 2. How to Present a paper in scientific meeting; 3-4. How to make a review articles; 5-14. Presentation a journal paper in front of other students and lecturer; 15-16. Writing a review articles with supervisors
10	Attribute to soft skills	ethics, hardworking, discipline
11	Learning methods	Lecture, interactive learning, paper presentation
12	Learning media	LCD
13	Appraisal	Paper publicity
14	Lecturer	Dr. apt. Aliya Nur Hasanah M.Si. Dr. apt. Nyi Mekar Saptarini, M.Si.

		Dr. apt. Sriwidodo, M.Si. Dr. apt. Tiana Milanda M.Si. Dr. apt. Eli Halimah, M.Si.
15	References	1. Winiharti M, Herawati A, Rahayu E. Reading Journal As A Way To Improve Students' Comprehension Toward A Textbook Reading Material. Lingua Cultura. 2014: 8 (2): 101-109. 2. Weir, R. 2011. "It's Not Harry Potter" Inside Higher Ed. http://www.insidehighered.com/advice/instant_mentor/essay_on_teaching_students_to_read_journal_articles#ix zz2W75q1Gqg Accessed 6/13/2013 3. Subramanyam RV. Art of reading a journal article: Methodically and effectively. J Oral Maxillofac Pathol 2013;17:65-70.

13. Description Module Molecular Immunology

1	Module name	Molecular Immunology
2	Courses code	P20.02031
3	Study loads	2 credit ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	Second Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. Describe and apply the mechanisms of a particular drug at the molecular, cellular, and organ system levels. 2. Apply pharmacokinetics processes related to absorption, distribution, metabolism and excretion of drugs. 3. Show contributions in individual or group projects. 4. Conducting independent literature studies using databases and pharmacology-related publications to solve problems related to the field of pharmacology.
7	Elements of competency	MKK
8	Type competency	supporting competence
9	Syllabus	1-2. Review: Innate Immunity, Review: Adaptive Immunity; 3-4. Signal transduction in immune system; 5-6. Immune system in gastrointestinal, skin, mucosal tissue and other tissues; 7-8. Immune tolerance, autoimmune, and transplantation; 9. Mid-term Exam; 10-15. Immune response to microbes, tumour, hypersensitivity, immunodeficiency, diabetes mellitus, obesity and other diseases; 16. Final Exam
10	Attribute to soft skills	ethics, communication skill, awareness, discipline

11	Learning methods	Lecture, discussion
12	Learning media	LCD
13	Appraisal	Presentation Midterm test Final Test
14	Lecturer	Apt. Melisa Intan Barliana, Dr.Med.Sc. Apt. IrmaMelyaniPuspitasari, Ph.D. Dr.Apt. Tiana Milanda, M.Si.
15	References	1. Abbas AK, Lichtman AH, Pillai S, 2012, Cellular and molecular immunology 7thed, Philadelphia, Elsevier sounders. 2. Doan, T., Melvold, R., Viselli, S., & Valtenbaugh, C. (2012). *Immunology*. Lippincott Williams & Wilkins. 3. Doan T, Melvold R, Viselli S, Waltenbaugh C, 2008, Lippincott's illustrated reviews: Immunology, Philadelphia, Wolters 4. Kluwer-Lippincott Williams and Wilkins 5. Abbas, A. K., Lichtman, A., & Pillai, S. (2019). *Basic Immunology: Functions and Disorders of the Immune System, 6e: Sae-E-Book*. Elsevier India.

14. Description Module Molecular Pharmacology

1	Module name	Molecular Pharmacology
2	Courses code	P20.02034
3	Study loads	3 credit ECTS amount : 5 ECTS Contact hour per semester: 40 Independent study per semester: 96 Total workload: 136
4	Semester	Second Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. Define and apply specific drug mechanisms on molecular, cellular and system organ level 2. Evaluate the impact from pharmacokinetics process of drugs 3. Utilize pharmacodynamics principles to discuss the mechanism of action from drug and clinical outcome 4. Show contributions both in individual or group project 5. Conduct independent literature studies using databases and pharmacology-related publications to solve problems related to the pharmacology field
7	Elements of competency	MKK

8	Type competency	supporting competence
9	Syllabus	1. Learning contract and Introduction; 2-3. Introduction to Drug Targets and Molecular Pharmacology; 4-5. Molecular Cloning of Drug Targets; 6-7. Drug-Receptor Interaction and Enzyme-Substrate Complex; 8. Mid-term Exam; 9-10. G Protein-coupled Receptors as drug targets; 11-12. Ion Channels as drug targets; 13-14. Protein Transporters as drug targets; 15. Immunotherapeutics; 16. Final Exam
10	Attribute to soft skills	ethics, communication skill, awareness, discipline
11	Learning methods	Lecture and interactive learning
12	Learning media	LCD
13	Appraisal	Presentation Midterm test Final Test
14	Lecturer	Prof. Apt. Anas Subarnas, M.Sc., Ph.D. Prof. Apt. Dr. Jutti Levita, M.Si.
15	References	1. General and Molecular Pharmacology: Principles of Drug Action. Clementi F (Editor), Fumagalli G (Editor). Wiley, 2015. 2. Molecular Pharmacology: From DNA to Drug Discovery. Dickenson J, Freeman F, Mills CL, Thode C, Sivasubramaniam S. Wiley-Blackwell, 2013. 3. Molecular and Cellular Signaling. 1st ed. Beckerman M. New York. Springer Science Inc., 2005.

15. Description Module Pharmacology-Toxicology Methodology

1	Module name	Pharmacology-Toxicology Methodology
2	Courses code	P20.02032
3	Study loads	2 credit ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	Second Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. Apply a different analytical instrument for drug analysis evaluate pharmacological effect

		2. Apply pharmacokinetics process related to absorption, distribution, metabolism and excretion of drugs 3. Show contributions both in individual or group project 4. Conduct independent literature studies using databases and pharmacology-related publications to solve problems related to the pharmacology field
7	Elements of competency	MKK
8	Type competency	supporting competence
9	Syllabus	1. Pharmacological and toxicological methods overview; 2. Test animal ethics and its use in pharmacological and toxicological methods; 3. Antidiabetic activity test; 4. Antihyperlipidemic activity test; 5. Antioxidant activity testing; 6. Antihypertensive activity testing; 7. Antidiuretic activity testing; 8. Mid-term Exam; 9. anti-gout activity testing; 10. Toxicity testing; 11. anticancer activity test; 12. Antimalarial activity testing; 13. anti-inflammatory activity test; 14. Hepatoprotector activity test; 15. antibacterial / antiviral activity test; 16. Final Exam
10	Attribute to soft skills	ethics, communication skill, awareness, discipline
11	Learning methods	Lectures, Presentation and Discussion
12	Learning media	LCD
13	Appraisal	Written test Midterm test Final Test
14	Lecturer	Prof. Dr. Apt. Ahmad Muhtadi, M.S. Dr. Apt. Rini Hendriani, M.Si.
15	References	1. Pharmacotherapy: A Pathophysiologic Approach, 11th ed. DiPiro JT, Talbert RL, Yee GC, Matzke GR, Wells BG, Posey ML, eds. New York, NY: McGraw-Hill, 2020. 2. Pharmacotherapy Casebook: A Patient-Focused Approach, 10th ed. Schwinghammer TL, Koehler JM, eds. New York, NY: McGraw-Hill, 2017. 3. Pharmacotherapy Handbook, Eighth Edition. Wells B., DiPiro JT, New York, NY: McGraw-Hill, 2011.

16. Description Module Drug Interactions

1	Module name	Drug Interactions
2	Courses code	P20.02033
3	Study loads	2 credit ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91

4	Semester	Second Semester
5	Precondition	there is no
6	Competence	Upon completion of this course, students are expected to be able to: 1. Apply pharmacokinetics process related to absorption, distribution, metabolism and excretion of drugs 2. Apply pharmacodynamic principles to discuss the mechanism of action of drugs and clinical outcomes 3. Show contributions in individual or group projects. 4. Conduct literature studies independently using databases and pharmacology-related publications to solve problems related to the field of pharmacology
7	Elements of competency	MKK
8	Type competency	supporting competence
9	Syllabus	1. Basic overview of drug interactions; 2. Drug – birth control drugs interactions; 3. Drug – gastrointestinal drug interactions; 4. Drug – anticonvulsant drug interactions; 5. Drug – antihypertensive and cardiovascular drug interactions; 6. Drug – anticoagulant drug interactions; 7. Drug – antihyperlipidemic drug interactions; 8. Mid-term Exam; 9. Drug – antidiabetic drug interactions; 10. Drug – bronchodilator drug and corticosteroid interactions; 11. Drug – antibiotics and antituberculosis drug interactions; 12. Drug – antiviral and anticancer drug interactions; 13. Drug – food/drink interactions; 14. Drug –herbal medicines interactions; 15. Interaction between drugs and disease and laboratory test results; 16. Final Exam
10	Attribute to soft skills	ethics, communication skill, awareness, discipline
11	Learning methods	Lectures, Presentation and Discussion
12	Learning media	LCD
13	Appraisal	Written test Midterm test Final Test
14	Lecturer	Dr. Apt. Eli Halimah, M.S. Dr. Apt. Rini Hendriani, M.Si.
15	References	1. Grannell L. Stockley's Drug Interactions. 11th ed.. Aust Prescr 2016 2. Katzung BG. eds. *Basic & Clinical Pharmacology, 14e*. McGraw Hill; 2017. 3. Tatro, David S. Drug Interaction Facts 2015: The Authority on Drug Interactions. , 2014. 4. Williamson, E., Driver, S., Baxter, K., 2013, *Stockley's Herbal Medicines Interactions*, Pharmaceutical Press, London. 5. Boullata, J. I. and Armenti, V. T. 2010, *Handbook of Drug–Nutrient Interactions,* Humana Press Inc., New Jersey. 6. *Drug interactions checker*, such as: http://www.drugs.com/drug_interactions.html,

		http:/www.healthtools.aarp.org/goldcontent http:/www.medscape.com/drug_interactions.html https://www.micromedexsolutions.com/

17. Description Module Seminar of Research Proposal

1	Module name	Seminar of Research Proposal
2	Courses code	P20.03001
3	Study loads	2 credits ECTS amount : 15 ECTS Contact hour per semester: 53 Independent study per semester: 400 Total workload: 453
4	Semester	Third Semester
5	Precondition	pass research methodology course
6	Competence	Research Proposal Seminar (RPS) is Master students thesis research progress students are expected to be able to: ● Present the ability to interpret and analyze data ● Deliver information orally in an organized, persuasive, and logical manner using documentation and supporting visual aids ● Take, analyze, and interpret scientific literature to provide information to be shared orally or in writing ● Creating documents that are technical, analytical, relevant in content and well managed ● Show contributions both in individual or group project ● Conduct independent literature studies using databases and pharmacology-related publications to solve problems related to the field of pharmacology ● Analyze, interpret, criticize scientific literature related to study design, interpretation data and suitability of conclusions
7	Elements of competency	MKB, MKK
8	Type competency	main competence
9	Syllabus	The students should have research proposal manuscripts that has been wrapped in blue soft cover.
10	Attribute to soft skills	discipline, communication skill, awareness
11	Learning methods	an open seminar that can be attended by students and lecturers. Technical implementation:

<table>
<tr><td></td><td></td><td>The students present their research proposal for 15 minutes followed by a question and answer session by discussants, each discussant is given 10 minutes to ask questions</td></tr>
<tr><td>12</td><td>Learning media</td><td>the LCD viewer, laptop, white board and "online" (Google Meet)</td></tr>
<tr><td>13</td><td>Appraisal</td><td>discussants evaluate the accountability of students for questions that are critical and clarify towards the topics with percentage scoring:
1. Significance of background research and/or research focus and Objectives, 15% (fifteen percent);
2. Relevance and updating of literature review, 25% (twenty five percent);
3. Accuracy of the objectives and research proportion/hypothesis, 10% (ten percent);
4. Suitability of research methods, 10% (ten percent);
5. Scientific writing ability, 20% (twenty percent);
6. Communication ability in oral exam, 20% (twenty percent);
7. Total 100% (one hundred percent) can be added with assessment 10% (ten percent).

Final Score:
● Students are declared “PASS” if they get an average score of ≥ 68
● Students are declared “NOT PASS” if they get an average score of < 68
Converting FS into Grade and Score using the following guidelines:
<table>
<tr><th>Final Score (FS)</th><th>Grade</th><th>Score</th></tr>
<tr><td>80 ≤ FS ≤ 100</td><td>A</td><td>4</td></tr>
<tr><td>68 ≤ FS < 80</td><td>B</td><td>3</td></tr>
<tr><td>56 ≤ FS < 68</td><td>C</td><td>2</td></tr>
<tr><td>45 ≤ FS < 56</td><td>D</td><td>1</td></tr>
<tr><td>FS < 45</td><td>E</td><td>0</td></tr>
</table>
</td></tr>
<tr><td>14</td><td>Lecturer</td><td>Thesis adviser team and examiner team</td></tr>
<tr><td>15</td><td>References</td><td>1. Unpad Rector Regulation No. 50 of 2016 concerning Guidelines for Masters and Doctoral Education in the Padjadjaran University Environment
2. Academic Guidelines for Master’s Program in Pharmacy</td></tr>
</table>

18. Description Module Progress Report 1

1	Module name	Progress Report 1
2	Courses code	P20.03002
3	Study loads	1 credits ECTS amount : 12 ECTS Contact hour per semester: 27 Independent study per semester: 320

		Total workload: 347
4	Semester	Third Semester
5	Precondition	a. Registered as active students b. Student has conducted a research proposal seminar and passed c. Enrolled in the Progress Report course (1 or 2)
6	Competence	Progress Report Seminar is held to assess the Masters students thesis research progress, students are expected to be able to: 1. Present the ability to interpret and analyze data 2. Deliver information orally in an organized, persuasive, and logical manner using documentation and supporting visual aids 3. Take, analyze, and interpret scientific literature to provide information to be shared orally or in writing 4. Creating documents that are technical, analytical, relevant in content and well managed 5. Show contributions both in individual or group project 6. Conduct independent literature studies using databases and pharmacology-related publications to solve problems related to the field of pharmacology 7. Analyze, interpret, criticize scientific literature related to study design, interpretation data and suitability of conclusions
7	Elements of competency	MKB, MKK
8	Type competency	main competence
9	Syllabus	Implementation of this module: a. Conducted in each department according to the concentration / specialization taken by students b. Students independently present the progress of thesis research carried out, in front of lecturers in the Department (at least the Head of the Department and 1 other Lecturer in the Department). c. The detailed presentation mechanism and schedule were regulated by the Head of the Department
10	Attribute to soft skills	Communication skill
11	Learning methods	an open seminar that can be attended by students and lecturers. Technical implementation: The students present their research progress followed by a question and answer session
12	Learning media	the LCD viewer, laptop, white board and "online" (Google Meet)
13	Appraisal	The components assessed in the progress seminar include: Methodology comprehension Knowledge comprehension Reasoning comprehension Ability to communicate ideas Research progress percentage Final Score: students are considered pass if the seminar average score is at least B

14	Lecturer	Thesis adviser team, Head of the Department and other Lecturer in the Department
15	References	1. Unpad Rector Regulation No. 50 of 2016 concerning Guidelines for Masters and Doctoral Education in the Padjadjaran University Environment 2. Academic Guidelines for Master's Program in Pharmacy

19. Description Module Progress Report 2

1	Module name	Progress Report 2
2	Courses code	P20.04001
3	Study loads	1 credits ECTS amount : 11 ECTS Contact hour per semester: 27 Independent study per semester: 289 Total workload: 315
4	Semester	Fourth Semester
5	Precondition	a. Registered as active students b. Student has conducted a research proposal seminar and passed c. Enrolled in the Progress Report course (1 or 2)
6	Competence	Progress Report Seminar is held to assess the Masters students thesis research progress, students are expected to be able to: 8. Present the ability to interpret and analyze data 9. Deliver information orally in an organized, persuasive, and logical manner using documentation and supporting visual aids 10. Take, analyze, and interpret scientific literature to provide information to be shared orally or in writing 11. Creating documents that are technical, analytical, relevant in content and well managed 12. Show contributions both in individual or group project 13. Conduct independent literature studies using databases and pharmacology-related publications to solve problems related to the field of pharmacology 14. Analyze, interpret, criticize scientific literature related to study design, interpretation data and suitability of conclusions
7	Elements of competency	MKB, MKK
8	Type competency	main competence
9	Syllabus	Implementation of this module: a. Conducted in each department according to the concentration / specialization taken by students b. Students independently present the progress of thesis research carried out, in front of lecturers in the Department (at least the Head of the Department and 1 other Lecturer in the Department). c. The detailed presentation mechanism and schedule were regulated by the Head of the Department
10	Attribute to soft skills	Communication skill

11	Learning methods	an open seminar that can be attended by students and lecturers. Technical implementation: The students present their research progress followed by a question and answer session
12	Learning media	the LCD viewer, laptop, white board and "online" (Google Meet)
13	Appraisal	The components assessed in the progress seminar include: Methodology comprehension Knowledge comprehension Reasoning comprehension Ability to communicate ideas Research progress percentage Final Score: students are considered pass if the seminar average score is at least B
14	Lecturer	Thesis adviser team, Head of the Department and other Lecturer in the Department
15	References	1. Unpad Rector Regulation No. 50 of 2016 concerning Guidelines for Masters and Doctoral Education in the Padjadjaran University Environment 2. Academic Guidelines for Master's Program in Pharmacy

20. Description Module Seminar of Research Result

1	Module name	Seminar of Research Result
2	Courses code	P20.04002
3	Study loads	2 credits ECTS amount : 14 ECTS Contact hour per semester: 53 Independent study per semester: 354 Total workload: 408
4	Semester	Fourth Semester
5	Precondition	a. Registered as active students b. Student has conducted a research proposal seminar and passed c. Enrolled in the Progress Report course (1 or 2)
6	Competence	Progress Report Seminar is held to assess the Masters students thesis research progress, students are expected to be able to: ● Present the ability to interpret and analyze data ● Deliver information orally in an organized, persuasive, and logical manner using documentation and supporting visual aids ● Take, analyze, and interpret scientific literature to provide information to be shared orally or in writing ● Creating documents that are technical, analytical, relevant in content and well managed

<table>
<tr><td></td><td></td><td>● Show contributions both in individual or group project
● Conduct independent literature studies using databases and pharmacology-related publications to solve problems related to the field of pharmacology
● Analyze, interpret, criticize scientific literature related to study design, interpretation data and suitability of conclusions</td></tr>
<tr><td>7</td><td>Elements of competency</td><td>MKB, MKK</td></tr>
<tr><td>8</td><td>Type competency</td><td>main competence</td></tr>
<tr><td>9</td><td>Syllabus</td><td>The Student should have research proposal manuscripts that have been wrapped in yellow soft cover</td></tr>
<tr><td>10</td><td>Attribute to soft skills</td><td>communication skill</td></tr>
<tr><td>11</td><td>Learning methods</td><td>an open seminar that can be attended by students and lecturers.

Technical implementation:
The students present their research proposal for 15 minutes followed by a question and answer session by discussants, each discussant is given 10 minutes to ask questions</td></tr>
<tr><td>12</td><td>Learning media</td><td>the LCD viewer, laptop, white board and "online" (Google Meet)</td></tr>
<tr><td>13</td><td>Appraisal</td><td>discussants evaluate the accountability of students for questions that are critical and clarify towards the topics with percentage scoring:
● Significance of background research and/or research focus and Objectives, 15% (fifteen percent);
● Relevance and updating of literature review, 25% (twenty five percent);
● Accuracy of the objectives and research proportion/hypothesis, 10% (ten percent);
● Suitability of research methods, 10% (ten percent);
● Scientific writing ability, 20% (twenty percent);
● Communication ability in oral exam, 20% (twenty percent);
● Total 100% (one hundred percent) can be added with assessment 10% (ten percent).
The score of discussants is added up with other discussants score with ratio 60% of adviser team, 40% of examiner team as final score, without converting into grade in advanced.

Final Score:
● Students are declared “PASS” if they get an average score of ≥ 68
● Students are declared “NOT PASS” if they get an average score of < 68
Converting FS into Grade and Score using the following guidelines:
<table>
<tr><th>Final Score (FS)</th><th>Grade</th><th>Score</th></tr>
<tr><td>80 ≤ FS ≤ 100</td><td>A</td><td>4</td></tr>
<tr><td>68 ≤ FS < 80</td><td>B</td><td>3</td></tr>
<tr><td>56 ≤ FS < 68</td><td>C</td><td>2</td></tr>
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<tr><td>FS < 45</td><td>E</td><td>0</td></tr>
</table></td></tr>
<tr><td>14</td><td>Lecturer</td><td>Thesis adviser team and examiner team</td></tr>
</table>

15	References	1. Unpad Rector Regulation No. 50 of 2016 concerning Guidelines for Masters and Doctoral Education in the Padjadjaran University Environment 2. Academic Guidelines for Master's Program in Pharmacy

21. Description Module Magister Comprehensive Defense

1	Module name	Magister Comprehensive Defense
2	Courses code	P20.04003
3	Study loads	3 credits ECTS amount : 14 ECTS Contact hour per semester: 80 Independent study per semester: 340 Total workload: 420
4	Semester	Fourth Semester
5	Precondition	Thesis Defence Form (LS 1, LS 2) : 1 Copy LS4 Form/ UNT Revision Form : 1 Page Proof of Academic Fee Payment Photocopy : 1 Page Thesis Draft (Yellow Soft Cover) : 7 Copies Thesis Statement Form : 1 Page KPA (Academic Achievement Card) Signed by The Program Study Head : 1 Page Library Book Free Form of Faculty of Pharmacy, Unpad Postgraduate, and Unpad Cisral : 1 page
6	Competence	The students are expected to be able to : ● Present the ability to interpret and analyze data ● Deliver information orally in an organized, persuasive, and logical manner using documentation and supporting visual aids ● Define the psychochemical properties of solute and solvent that affect solubility, stability, and other bio-pharmaceutical properties in drug dosage forms development of herbal medicine. ● Define and apply the mechanism of certain drug on molecular and cellular levels ● Characterize and evaluate physicochemical properties of pharmaceutical natural ingredients. ● Take, analyze, and interpret scientific literature to provide information to be shared orally or in writing. ● Creating documents that are technical, analytical, relevant in content and well managed ● Summarize the information collected from the group and communicate the development of the topic. ● List and explain the psychochemical properties of solute and solvent that affect solubility, stability, and other bio-pharmaceutical properties in drugs, biopharmaceutical, traditional medicine & supplements, and cosmetics development.

<table>
<tr><td></td><td></td><td>

Define important factors which are used in design, manufacture and evaluation of various dosage forms and other drug delivery systems
Design, manufacture and evaluate dosage forms and other drug delivery systems
Show contributions both in individual or group project
Conduct independent literature studies using databases and pharmacology-related publications to solve problems related to the field of pharmacology
Analyze, interpret, criticize scientific literature related to study design, interpretation data and suitability of conclusions

</td></tr>
<tr><td>7</td><td>Elements of competency</td><td>MKB, MKK</td></tr>
<tr><td>8</td><td>Type competency</td><td>main competence</td></tr>
<tr><td>9</td><td>Syllabus</td><td>Comprehensive Examination is the final examination for Masters in Pharmacy education in the form of a comprehensive oral exam, regarding the theories and principles related to the research.

Implementation of this module:

Conducted once per semester
At the appointed time, student is tested orally in closed session in front of 3 (three) examiners and a team of supervisors
The mechanism and schedule of the examination in more detail are regulated by the Head of The Pharmacy Masters Study Program
Examination is held for 90 minutes
Each examiner asked for 15 minutes
Each supervisor asked for a maximum of 15 minutes
At least 60% of the total number of examiners and supervisors attended the examination

</td></tr>
<tr><td>10</td><td>Attribute to soft skills</td><td>communication skill</td></tr>
<tr><td>11</td><td>Learning methods</td><td>The students present their research results in brief followed by a question and answer session</td></tr>
<tr><td>12</td><td>Learning media</td><td>the LCD viewer, laptop, white board and "online" (Google Meet)</td></tr>
<tr><td>13</td><td>Appraisal</td><td>The components assessed in the examination are the academic abilities in the field / concentration related to research by master students.

<u>Passing Criteria</u>
a. The examination participants are declared to have passed if the average score is at least B.
b. For those who do not pass, they must repeat at least 1 (one) month after the announcement
Final Score:

Students are declared “PASS” if they get an average score of ≥ 68
Students are declared “NOT PASS” if they get an average score of < 68

Converting FS into Grade and Score using the following guidelines:
<table>
<tr><th>Final Score (FS)</th><th>Grade</th><th>Score</th></tr>
<tr><td>80 ≤ FS ≤ 100</td><td>A</td><td>4</td></tr>
</table>
</td></tr>
</table>

		68 ≤ FS < 80	B	3
		56 ≤ FS < 68	C	2
		45 ≤ FS < 56	D	1
		FS < 45	E	0
14	Lecturer	Thesis adviser team and examiner team. a. Examiners must hold a Doctorate (Dr.) with a minimum academic position as Lector and/or Professor b. The number of examiners is 3 (three) people		
15	References	1. Unpad Rector Regulation No. 50 of 2016 concerning Guidelines for Masters and Doctoral Education in the Padjadjaran University Environment 2. Academic Guidelines for Master's Program in Pharmacy		

22. Description Module Scientific paper

1	Module name	Scientific paper
2	Courses code	P20.04004
3	Study loads	1 credits ECTS amount : 12 ECTS Contact hour per semester: 0 Independent study per semester: 369 Total workload: 369
4	Semester	Fourth Semester
5	Precondition	a. Registered as active students b. Has thesis adviser team. c. Scientific article is part of the thesis
6	Competence	The students are expected to be able to : ○ Find a knowledge of basic concepts in pharmaceutical science in one's area of expertise ○ Integrating science, knowledge, technology and advanced concepts in pharmaceutical sciences ○ Design, conduct and maintain original research in one's area of expertise through international publication and research dissemination through seminars ○ Successfully perform analysis, synthesis and antithesis by applying analytical and critical thinking in reviewing scientific literature and evaluating research findings
7	Elements of competency	MKB, MKK
8	Type competency	main competence
9	Syllabus	Scientific articles that are accepted to be published in a national journal accredited by at least Sinta 3 or an international journal through the

		approval of the thesis adviser who will act as co-authors, by listing UNPAD as the student's first affiliation.
10	Attribute to soft skills	writing ability
11	Learning methods	Writing and publication
12	Appraisal	Final score is depend by the journal criteria, at least in review
13	Lecturer	Thesis adviser team and The Program Study Head
14	References	1. Unpad Rector Regulation No. 50 of 2016 concerning Guidelines for Masters and Doctoral Education in the Padjadjaran University Environment 2. Academic Guidelines for Master's Program in Pharmacy

3.3 Pharmaceutical Analysis and Medicinal Chemistry Concentration

1. Description Module Philosophy of Science

1	Module name	Philosophy of Science
2	Courses code	P20.01001
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	First Semester
5	Precondition	None
6	Competence	Philosophy of science explores the nature of science and the source of knowledge. Students will learn about the introduction of science, history and development of science, the foundation of knowledge, fundamental structures, logic and reasoning, research method paradigm, moral ethics and science, and metaphysics
7	Elements of competency	MPK
8	Type competency	Main Competence
9	Syllabus	3. Introduction; 2. History and Development of Science Philosophy; 3. Base of Science Philosophy; 4. Base of Science Epistemology; 5. History and Development of Science Philosophy: Aristotle's Theory of Truth; 6. History and Development of Science Philosophy: Contemporary philosophy; 7. Source of Knowledge; 8. Midterm Examination; 9.

		Science Philosophy Introduction: Essence of Science Philosophy; 10. History of Science Philosophy; 11. Fundamental Structure of Science Philosophy; 12. Logic and Reasoning of Science Philosophy; 13. Research Method Paradigm; 14. Ethics and Moral in Science; 15. Metaphysics; 16. Final Examination
10	Attribute to soft skills	ethics. awareness, discipline
11	Learning methods	Lectures and Discussion
12	Learning media	LCD Projector
13	Appraisal	Written Examination and Presentation
14	Lecturer	Prof. apt. Dr. Moleyono, M.S. Prof. Dr. dr. Johanes Cornelius Mose Sp.OG.,
15	References	1. Joseph Vidal-Rosset. 2018. Book Review : The Philosophy of Science – A Companion. Oxford University Press, Pp. 768 2. Lars-Göran Johansson. 2016. Philosophy of Science for Scientists. Springer Undergrad. Texts Philosophy. Springer, Cham 3. Martiningsih Wahyu. 2012. Para Filsuf dari Plato sampai Ibn Bajjah. Jogjakarta : IRCiSod. 4. Sumarna, Cecep. 2020. Filsafat Ilmu. Rosda 5. Susanto A. 2011. Filsafat Ilmu, Suatu Kajian dalam Dimensi Ontologis, Epistimologis dan Aksiologis. Jakarta: Bumi Aksara.

2. Description Module Research Methodology

1	Module name	Research Methodology
2	Courses code	P20.01002
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	First Semester
5	Precondition	None
6	Competence	After attending this course, students will be able to make their research ideas into research with quality results, including dissertation proposals, presentations, proposals for research projects, research assistance, or journal articles

7	Elements of competency	MKK
8	Type competency	Main Competence
9	Syllabus	3. Research philosophy; develop problems into interesting research and answer the questions "Why and How?"; 2. Research process and flow; 3. Research design; 4. Research variable; 5. Research proposal; 6. Scientific papers; 7. Writing Strategies (Tenses in writing scientific articles); 8. Mid-term examination; 9. Strategy for Writing Scientific Papers; 10. Scientific Writing Application; 11. Research proposal writing; 12. Plagiarism; 13. Research Ethics in humans and animals; 14. Clinical Trial; 15. Informed consent; 16. Final Exam
10	Attribute to soft skills	creativity, communication skill, discipline, awareness
11	Learning methods	Lectures and discussion
12	Learning media	LCD projector
13	Appraisal	Written examination and presentation
14	Lecturer	Prof. apt. Anas Subarnas, M.Sc. apt. Rizky Abdulah, Ph.D. apt. Muchtaridi, Ph.D.
15	References	1. Petter Laake, Haakon Breien Benestad, Bjorn Reino Olsen. 2007. Research Methodology in the Medical and Biological Sciences. 2. A M Novikov; D A Novikov. 2013. Research methodology: from philosophy of science to research design. 3. Sarah Philpot, Lesley Curnick, Liz Soars, John Soars. 2007. New Headway Academic Skills: Student's Book Level 3: Reading, Writing, and Study Skills. 4. Rinaldi, S.F and Mujianto B. 2017.Research Methodology and statistic. Human research education center of ministry health of republic od Indonesia 5. Debbie Epstein, Jane Kenway, Rebecca Boden. 2007. Writing for Publication (The Academic's Support Kit).

3. Description Module Biostatistics

1	Module name	Biostatistics
2	Courses code	P20.01003
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91

4	Semester	First Semester
5	Precondition	None
6	Competence	After attending this course, students will be able to apply statistical method in clinical study
7	Elements of competency	MKK
8	Type competency	main competence
9	Syllabus	3. Biostatistical Analysis; 2. Data Analysis; 3. Descriptive Statistics; 4. Hypothesis; 5. Nonparametric Statistics 1&2; 6. Analysis of Variance (ANOVA); 7. Sampling Techniques; 8. Midterm examination; 9. Introduction to Applied Biostatistics in Medical and Clinical Research; 10. Descriptive Analysis; 11. Differential Analysis Between Groups; 12. Correlation and Regression Analysis (Univariate); 13. Regression Analysis (Multivariate); 14. Survival Analysis; 15. Case Study Analysis Exercise. 16 final examination
10	Attribute to soft skills	hard work, discipline, awareness
11	Learning methods	Lectures and Discussion
12	Learning media	LCD
13	Appraisal	Written Examination and Presentation
14	Lecturer	Hadyana, M.Sc., Ph.D. apt. Neily Zakiyah, M.Sc., Ph.D
15	References	1. Statistics in Medicine, 4th edition. Riffenburgh, RH. Elsevier. 2012. 2. Fundamental of Biostatistics, 8th edition. Rosner, B. Cengage Learning. 2015

4. Description Module Physicochemical Analysis

1	Module name	Physicochemical Analysis
2	Courses code	P20.01004
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	First Semester

5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: • List and explain the psychochemical properties of solute and solvent that affect solubility, stability, and other bio-pharmaceutical properties in drug dosage forms development of drugs, herbal medicine & supplement, and cosmetics • Present the ability to interpret and analyze data • Develop, validate and apply different instrumental analytical technique in drug analysis on various drug dosage form • Characterize and evaluate the psychochemical properties of pharmaceutical ingredients • Identify and elaborate drug absorption, distribution, metabolism and excretion principles along with factors that influence the process • Apply different instrumental analytical techniques in drug analysis for drug's pharmacological effect evaluation • Show contributions both in individual or group project • Apply different separation techniques from natural product for isolation of marker and active compound
7	Elements of competency	MKK
8	Type competency	main competence
9	Syllabus	1.Introduction; 2. Simultaneous UV Spectrophotometry and derivatives; 3. Atomic Absorption Spectrophotometry; 4. Fluorometry; 5. Infrared Spectrophotometry; 6. Mass Spectroscopy; 7. X ray spectroscopy; 8. Midterm Examination; 9. NMR; 10. Electrophoresis; 11-12. Chromatography technique (gas chromatography and HPLC); 13-15. Project with the chosen analysis method
10	Attribute to soft skills	communication skill, discipline, ethics, awareness
11	Learning methods	Content-Based learning, Project-based
12	Learning media	LCD
13	Appraisal	Answer individual questions and essays, presentations and discussions
14	Lecturer	Mutakin Ph.D Dr. Aliya Nur Hasanah
15	References	1. Jurgen H.Gross, Mass Spectrometry, a textbook, 3rd edition, 2017 2. Principles of instrumental analysis, Douglas A.Skoog, F.James Holler, Stanley R Crouch, 2017, ISBN 1337468037 3. a practical guide to instrumental analysis, Erno Pungor, G. Horvai, CRC Press, 2020 4. Handbook of Green Analytical Chemistry, Miguel De La Guardia, Salvador Garrigues, 2012, ISBN 0470972017

5. Description Module Cell and Molecular Biology

1	Module name	Cell and Molecular Biology
2	Courses code	P20.01005
3	Study loads	3 credits ECTS amount : 5 ECTS Contact hour per semester: 40 Independent study per semester: 96 Total workload: 136
4	Semester	First Semester
5	Precondition	None
6	Competence	● Upon completion of this course, students are expected to be able to: ● List and explain the physical and chemical properties of solvents and solutes that affect solubility and other properties of other bio-pharmaceuticals in the development of drug dosage forms. ● Analyze and interpret data. ● Present organized information orally, persuasively yet logical manner using documentations and supporting tools. ● List and explain the physical and chemical properties of solvents and solutes that affect solubility and other properties of other bio-pharmaceuticals in the development of drug, bio-pharmaceutical, traditional medicine & supplement and cosmetics. ● Identification and explain principles that are involved in the absorption, distribution, metabolism, and excretion of medicinal substances and factors that influence these processes. ● Explain and apply mechanism acting of the drug at the molecular, cellular and organ system
7	Elements of competency	MKK
8	Type competency	main competence
9	Syllabus	1-3. Introduction, How cells read the genome: from DNA to protein, Genetic switch; 4-6. Cell membrane, Membrane transport, Mechanism of cell communication; 7-8. Cell signaling, Cell signaling: G protein-coupled receptor (GPCR); 9. Midterm Examination; 10-11. Cell signaling : Receptor Tyrosine Kinase, Cell signaling: Receptor guanylyl cyclase; 12-13. Cell signaling: gated ion chanel and adhesion receptor, Cell signaling: Nuclear receptor; 14-15. Cell cycle, Cell signaling and Cancer; 16. Final Examination
10	Attribute to soft skills	ethics, discipline, awareness
11	Learning methods	Lecture and Discussion

12	Learning media	LCD
13	Appraisal	Presentation Mid-term test Final test
14	Lecturer	Apt. Melisa Intan Barliana, Dr.Med.Sc. Dr. Apt. Tiana Milanda, M.Si. Dr. Apt. Tina Rostinawati, M.Si. Apt. Rizky Abdulah, Ph.D.
15	References	1. Alberts, B., Johnson, A., Lewis, J., Morgan, D., Raff, M., Roberts, K., ... & Hunt, T. (2017). *Molecular biology of the cell*. WW Norton & Company. 2. Mercadante, A. A., Dimri, M., & Mohiuddin, S. S. (2019). Biochemistry, replication and transcription. PMID: 30986011, Bookshelf ID: NBK540152 3. Katritch, V., Cherezov, V., & Stevens, R. C. (2013). Structure-function of the G protein–coupled receptor superfamily. *Annual review of pharmacology and toxicology*, *53*, 531-556. 4. Wagener, C., Stocking, C., & Müller, O. (2016). *Cancer Signaling: from molecular biology to targeted therapy*. John Wiley & Sons.

6. Description Module Drug and Food Analysis

1	Module name	Drug and Food Analysis
2	Courses code	P20.01012
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	First Semester
5	Precondition	there is no
6	Competence	Upon completion of this course, students are expected to be able to: 1. Develop, validate and apply different instrumental analytical technique in drug analysis on various drug dosage form 2. Present the ability to interpret and analyze data 3. Characterize and evaluate physicochemical properties of pharmaceutical ingredients 4. Present organized information orally, persuasively yet logical using proper documentation and supported tools. 5. Show contributions both in individual or group project
7	Elements of competency	MKK
8	Type competency	Supporting competence
9	Syllabus	1.Introduction to drug abuse, food safety nutraceuticals and functional food; 2. Drug abuse (narcotics, psychotropic, and

		precursors); 3. Drug abuse of New Psychoactive Substance (NPS); 4. Psychotropic drugs analysis; 5. Volatile Compound Analysis; 6. Compounds/Doping Drug Analysis; 7. Case Study:Analytical method development for new drug compound and additives compound; 8. Midterm Examination; 9-12. Nutrients, additives and non-additives substance analysis; 13. Contaminant analysis; 14-15. Case Study; 16. Final Examination
10	Attribute to soft skills	communication skill, ethics, discipline
11	Learning methods	Lecture, Tutorial, Assignment and Discussion
12	Learning media	LCD
13	Appraisal	Presentation, Written Test
14	Lecturer	Dr. Ida Musfiroh, M.Si.,Apt Driyanti Rahayu, MT.
15	References	1. Osamu Suzuki, Kanako Watanabe (Editors). Drugs and Poisons in Humans: A Handbook of Practical Analysis. Springer-Verlag Berlin Heidelberg New York. 2010. 2. Gail Cooper, Adam Negrusz. Carke's Analytical Forensic Toxicology. Pharmaceutical Press. 2013 3. NiyatiBorkar, SS Saurabh, KS Rathore, Ashlesha Pandit, KR Khandelwa. An Insight on Nutraceuticals. PharmaTutor; 2015; 3(8); 13-23. file:///Users/idamusfiroh/Downloads/Vol.3Issue8August2015PharmaTutorPaper-1.pdf 4. AOAC, Officials Methods of Analysis of The Association of Analytical Chemist, 21st Edition (2019)

7. Description Module Analysis Method Development

1	Module name	Analysis Method Development
2	Courses code	P20.01013
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	First Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. Interpret and analyze data

		2. Develop, validate and apply different instrumental analytical techniques to the analysis of medicine substances 3. Characterize and evaluate physicochemical properties of pharmaceutical substances 4. Present organized information orally, persuasively yet logical manner using documentations and supporting tools. 5. Show contributions in individual or group projects
7	Elements of competency	MKK
8	Type competency	Supporting competence
9	Syllabus	1.Introduction analytical methods development; 2. Measurement errors; 3. Sampling Methods; 4. Validation Parameters; 5-6. Method development: investigation of single and multivariate variables; 7. Statistical validation; 8. Midterm Examination; 9-15. Application of analytical methods development: analytical problems, selecting analysis methods, Analytical Performance Characteristics, optimization method and validation; 16. Final Examination
10	Attribute to soft skills	communication skill, ethics, discipline
11	Learning methods	Active Learning: Lectures, Discussions and Q & A
12	Learning media	LCD
13	Appraisal	Oral Test
14	Lecturer	Apt. Mutakin, M.Si, Ph.D Dr. Apt. Nyi Mekar Saptarini, M.Si
15	References	1. Swartz ME, Krull IS. Analytical method development and validation. CRC Press. 2018. 2. Snyder LR, Kirkland JJ, Glajch. Practical HPLC method development. Wiley-Interscience. 2012. 3. Swartz ME, Krull IS. HPLC Method Development and Optimization with Validation in Mind from: Handbook of Analytical Validation CRC Press. 2012. 4. Little TA. Design of Experiments for Analytical Method Development and Validation. 2014.

8. Description Module Separation and Purification Methods

1	Module name	Separation and Purification Methods
2	Courses code	P20.01014
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64

		Total workload: 91
4	Semester	First Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. Present the ability to interpret and analyze data 2. Develop, validate and apply different instrumental analytical technique in drug analysis on various drug dosage form 3. Characterize and evaluate the psychochemical properties of pharmaceutical ingredients 4. Present organized information orally, persuasively yet logical using proper documentation and supported tools 5. Show contributions both in individual or group project
7	Elements of competency	MKK
8	Type competency	Supporting competence
9	Syllabus	1. Sample pre-treatment; 2-3. concepts in the separation process: equilibrium, reflux, mass transport, 4-6. distribution theory : extraction, adsorption and precipitation/crystallization; 7. Midterm Examination; 8-12. chromatography: basic theory of chromatography, gas chromatography, preparative liquid chromatography, liquid chromatography supercritical; 13-15. Project : Separation method for gas, liquid and semisolid sample; 16. Final Examination
10	Attribute to soft skills	communication skill, ethics, discipline
11	Learning methods	Active learning: Project presentation, project result discussion and Quiz
12	Learning media	LCD
13	Appraisal	Oral test (Final Exam), Presentation and accuracy of the answers during discussion session Correct answers in mid-term exam
14	Lecturer	Mutakin Ph.D Aliya Nur Hasanah M.Si
15	References	1. Janusz Pawlisyn, Comprehensive sampling and sample preparation, Elsevier, 2012, ISBN: 9780123813749 2. Francisco Pena Pereira, Miniaturization in sample preparation, De gruyter, 2015, ISBN B0138NB6SK 3. Teresa Kowalska, Chromatographic techniques in the forensic analysis of designer drugs, 1st edition, 2018 4. R. Andrew Shalliker, Hyphenated and alternative methods of detection in chromatography, 2011, ISBN-13: 978-0849390777

9. Description Module Radiopharmaceuticals

1	Module name	Radiopharmaceuticals
2	Courses code	P20.01015
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	First Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. List and explain the psychochemical properties of solute and solvent that affect solubility, stability, and other bio pharmaceutical properties in drug dosage forms development. 2. Capable of analyzing and interpreting data. 3. Develop, validate and apply different instrumental methods to the analysis of medicinal substances in various dosage forms 4. Characterize and evaluate physicochemical properties of pharmaceutical substances **5.** Show contributions in individual or group projects
7	Elements of competency	MKK
8	Type competency	Supporting competence
9	Syllabus	1. Radioactive Decay; 2. Instruments to Detect and Measure the Radiation; 3. Radionuclide production; 4. Radionuclide Generator; 5-6. Radiopharmaceutical dosage forms and radiolabeling methods; 7. Midterm Examination; 8. Quality Control of Radiopharmaceutical dosages forms; 9-10. Internal radiation dosimetry; 11-13. Regulation, protection and usage of radiation; 14-15. Radiopharmaceuticals as nuclear medicine; 16. Final Examination
10	Attribute to soft skills	communication skill, ethics, discipline
11	Learning methods	Discussions, video, and Presentations
12	Learning media	LCD
13	Appraisal	Performance and level of understanding at the time of project presentation The accuracy of the answer
14	Lecturer	Prof. Apt. Muchtaridi, Ph.D. Apt. Holis Abd Holik, M.Si., Ph.D Apt. Danni Ramdhani, M.Si

15	References	1. Michael R. Kilbourn, Handbook of Radiopharmaceuticals: Methodology and Applications, Second Edition, 2021 John Willey and Sons Ltd. 2. Richard J. Kowalsky. 2020. Radiopharmaceuticals in Nuclear Pharmacy and Nuclear Medicine, 4rd edition. American Pharmacists Association (APhA). 3. Michael J. Welch, Carol S. Redvanly. 2003. Handbook of Radiopharmaceuticals: Radiochemistry and Applications. John Willey and Sons Ltd. 4. Quality Control in Production of radiopharmaceuticals, IAEA-1856, 2018 5. Farmakope Indonesia, Direktorat Jenderal Kefarmasian Edisi VI, 2020

10. Description Module Development of Radiopharmaceutical Preparations

1	Module name	Development of Radiopharmaceutical Preparations
2	Courses code	P20.01016
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	First Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. List and explain the psychochemical properties of solute and solvent that affect solubility, stability, and other bio-pharmaceutical properties in drug dosage forms development of drugs, herbal medicine & supplement, and cosmetics 2. Present the ability to interpret and analyze data 3. Design, construct and evaluate various drug dosage form 4. Apply different instrumental analytical techniques in drug analysis for drug's pharmacological effect evaluation 5. Characterize and evaluate the psychochemical properties of pharmaceutical ingredients 6. Show contributions both in individual or group project
7	Elements of competency	MKK
8	Type competency	Supporting competence
9	Syllabus	1. Radiopharmaceutical and its ideal characteristics; 2-3. Radiopharmaceutical design; 4-5. Commonly used radioisotope production in radiopharmaceutical; 6. Radioisotope generator production; 7. Midterm Examination; 8. Radiopharmaceutical Kit ; 9. Aspects of Quality Assurance and Radiopharmaceutical Good Manufacturing Practice ; 10. Radiopharmaceutical dosage

		consideration ; 11-13. Quality control and analysis; 14-15. Radiopharmaceutical production simulation; 16. Final Examination
10	Attribute to soft skills	ethics, discipline, awareness
11	Learning methods	Discussion, Case Study, Simulation in Laboratory
12	Learning media	LCD
13	Appraisal	Quiz and presentation
14	Lecturer	Prof. Apt. Muchtaridi, Ph.D. Abdul Mutalib, Ph.D. Martalena, Ph.D
15	References	1. Michael R. Kilbourn, Handbook of Radiopharmaceuticals: Methodology and Applications, Second Edition, 2021 John Willey and Sons Ltd. 2. Richard J. Kowalsky. 2020. Radiopharmaceuticals in Nuclear Pharmacy and Nuclear Medicine, 4rd edition. American Pharmacists Association (APhA). 3. Quality Control in Production of radiopharmaceuticals, IAEA-1856, 2018 4. Farmakope Indonesia, Direktorat Jenderal Kefarmasian Edisi VI, 2020

11. Description Module Nuclear Medicine Applications

1	Module name	Nuclear Medicine Applications
2	Courses code	P20.01017
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	First Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. List and explain the psychochemical properties of solute and solvent that affect solubility, stability, and other bio-pharmaceutical properties in drug dosage forms development of drugs 2. Present the ability to interpret and analyze data 3. Develop, validate and apply different analytic instrument technique for drug analysis in various drug dosage form 4. Show contributions both in individual or group project
7	Elements of competency	MKK

8	Type competency	Supporting competence
9	Syllabus	1. Introduction; 2-3. Radioactive and Nuclear Transformation; 4-6. Radionuclide and Radiopharmaceutical Production; ; 7. Midterm Examination; 8-10. Imaging Techniques; 11-13. Radioisotope Applications in treatment; 14-15. Case Study: Conduct evaluation and discussion of nuclear medicine applications which is used in Disease; 16. Final Examination
10	Attribute to soft skills	discipline, awareness, communication skill
11	Learning methods	Lecture, Discussion, Group Project
12	Learning media	LCD
13	Appraisal	Written test, Quiz and presentation
14	Lecturer	Prof. Dr. Apt. Resmi Mustarichie M.Sc. Apt. Holis A.Holik, Ph.D
15	References	1. Sonia Marta Moriguchi, Kátia Hiromoto Koga, Paulo Henrique Alves Togni and Marcelo José dos Santos. Clinical Applications of Nuclear Medicine, Medical Imaging in Clinical Practice chapter 3. DOI: 10.5772/53029 2. Jennifer Prekeges, Nuclear Medicine Textbook: Methodology and Clinical Applications [1st ed. 2019] 978-3-319-95563-6, 978-3-319-95564-3 3. Duccio Volterrani, Paola Anna Erba, Ignasi Carrió, H. William Strauss, Giuliano Mariani.Nuclear Medicine Textbook Methodology and Clinical Applications. Springer, 2019 **4.** K. Bethge, G. Kraft, P. Kreisler, G. Walter. Medical Applications of Nuclear Physics, Sringer, 2013 5. **A**lberto Signore. Nuclear Medicine and Molecular Imaging. Elsevier, 2022

12. Description Module Analysis of Toxic Compounds

1	Module name	Analysis of Toxic Compounds
2	Courses code	P20.01018
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	First Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. List and explain the psychochemical properties of solute and solvent that affect solubility, stability, and other bio-

		pharmaceutical properties in drug dosage forms development of drugs 2. Present the ability to interpret and analyze data 3. Develop, validate and apply different analytic instrument technique for drug analysis in various drug dosage form 4. Characterize and evaluate the psychochemical properties of pharmaceutical ingredients 5. Show contributions both in individual or group project
7	Elements of competency	MKK
8	Type competency	Supporting competence
9	Syllabus	1. Learning Contract and Toxic compounds understanding; 2. Basic Drug Analysis; 3. Natural toxin and alkaloid analysis; 4. Pesticide; 5. Metal and Anion; 6. Alcohol, drug, driving interaction; 7. Alternative specimen; 8. Midterm Examination; 9. Post mortem toxicology; 10. Bioremediation; 11. Immunochemical-based toxicological analysis; 12. Chemical methods for handling hazardous compounds; 13-15. Article Reading; 16. Final Examination
10	Attribute to soft skills	ethics, discipline, communication skill
11	Learning methods	Tutorial and discussion Project Presentation and discussion
12	Learning media	LCD
13	Appraisal	Project Presentation Cases Analysis
14	Lecturer	Prof. Apt, Muchtaridi, Ph.D. Apt. Holis Abd Holik, M.Si., Ph.D
15	References	1. Robert J. Flanagan, Eva Cuypers, Hans H. Maurer, Robin Whelpton. 2020. Fundamentals of Analytical Toxicology: Clinical and Forensic, Second Edition, John Wiley & Sons, Ltd 2. Thomas E. Higgins, Jayanti A. Sachdev, Stephen A. Engleman. 2017. Toxic Chemicals Risk Prevention Through Use Reduction. CRC Press 3. Negrusz, Adam; Cooper, Gail. 2013. Clarke's Analytical Forensic Toxicology. 2nd edition. Pharmaceutical Press.Negrusz, Adam; Cooper, Gail. 2013. Clarke's Analytical Forensic Toxicology. 2nd edition. Pharmaceutical Press. 4. Anthony C Moffat, M David Osselton and Brian Widdop. 2011. Clarke's Analysis of Drugs and Poisons, 4th Edition, Pharmaceutical Press. London. 5. Osamuki, Kanako Watanabe (Editors). 2005. Drugs and Poisons in Humans: A Handbook of Practical Analysis. Springer-Verlag Berlin Heidelberg New York. 6. Sue Jickells, Adam Negrusz (Editors). Carke's Analytical Forensic Toxicology. Pharmaceutical Press. 2008

13. Description Module Validation and Regulatory Issues in Industry

1	Module name	Validation and Regulatory Issues in Industry

2	Courses code	P20.01019
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	First Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. List and explain the psychochemical properties of solute and solvent that affect solubility, stability, and other bio pharmaceutical properties in drug dosage forms development. 2. Analyze and interpret data. 3. Develop, validate and apply different instrumental methods to the analysis of medicinal substances in various dosage forms. 4. Characterize and evaluate physicochemical properties of pharmaceutical ingredients. 5. Show contributions in individual or group projects
7	Elements of competency	MKK
8	Type competency	Supporting competence
9	Syllabus	1. Study contract; 2. Validation of analytical methods; 3. HPLC method validation; 4. Dissolution method validation; 5. Heavy metals limit test; 6. Bioanalytical method validation; 7. Qualification and calibration of analytical instruments; 8. Midterm Examination; 9. Performance verification in UV-Vis Spectroscopy; 10. Performance verification in HPLC; 11. Latest regulations in pharmaceutical industry about labelling; 12. Latest regulations in pharmaceutical industry about halal labelling; 13. Latest regulations in pharmaceutical industry about BABE; 14. Protocol of analytical methods validation;15. BABE protocol; 16. Final Examination
10	Attribute to soft skills	discipline, ethics
11	Learning methods	Project-based and Content-Based learning
12	Learning media	LCD
13	Appraisal	Answer question individually in multiple choices and essay, presentation and discussions
14	Lecturer	Apt. Mutakin, M.Si P.hD Dr. Apt. Ida Musfiroh, M.Si Dr. Apt. Aliya Nur Hasanah, M.Si
15	References	1. Chung Chow Chan, Y.C. Lee, Herman Lam, Xue-Ming Zhang (editors), Analytical Method Validation and Instrument Performance Verification, Wiley-Interscience, 2004.

		2. Analytical and Bioanalytical chemistry, 2020, 412 (3) ; 531-532, Bioanalytical method validation : How much should we do and how should we document 3. USP 34, 2011 4. Analytical Procedures and methods validation for drug and biologics, guidance for industry, US Department of Health and Human Services, FDA, 2015 5. IOSR Journal of Pharmacy, A review on step by step analytical method validation, volume 5(10), 2015, pp 7-19 6. FDA, Bioanalytical Method Validation: Guidance for Industry, 2018 7. Susan R. Mikkelsen, Eduardo Corton, Bioanalytical Chemistry, Wiley Interscience, 2004. 8. Chief regulatory of The National Agency for Drug and Food Control of Indonesia No HK.03.1.23.12.11.10217 year 2010: Bioequivalence Test

14. Description Module Computational Chemistry and Molecular Modeling

1	Module name	Computational Chemistry and Molecular Modeling
2	Courses code	P20.01020
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	First Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. List and explain the psychochemical properties of solute and solvent that affect solubility, stability, and other bio-pharmaceutical properties of drug dosage forms in drug development 2. Present the ability to interpret and analyze data 3. Characterize and evaluate the psychochemical properties of pharmaceutical ingredients 4. Show contributions both in individual or group project
7	Elements of competency	MKK
8	Type competency	Supporting competence
9	Syllabus	1. Molecular Docking; 2. Receptor Assembling; 3. Ligand Assembling; 4. Docking; 5. Admet; 6. Molecular Modelling; Molecular Modelling Article; 8. Midterm Examination; 9. Drug Receptor Interaction; 10. *Ab Initio* Methods; 11. Semi Empirical Methods; 12.

		Density Functional Theory; 13. Molecular Mechanics; 14. Molecular Dynamics And Montecarlo Simulations; 15. Predicting Molecular Geometry; 16. Final Examination
10	Attribute to soft skills	discipline, awareness
11	Learning methods	Lecture and computational practice
12	Learning media	LCD
13	Appraisal	Answer question individually in multiple choices and essay, presentation and discussions
14	Lecturer	Prof. Dr. Apt. Resmi Mustarichie M.Sc. Dr. Apt. Sandra Megantara, M.Farm.
15	References	1. Singh, D. B. (2020). *Computer-Aided Drug Design*. Springer Singapore. 2. Petitjean, M., & Camproux, A.-C. (2016). In Silico Medicinal Chemistry: Computational Methods to Support Drug Design. Edited by Nathan Brown. In *ChemMedChem* (Vol. 11, Issue 13). Royal Society of Chemistry. 3. Wade, R. C., & Salo-Ahen, O. M. H. (2019). Molecular modeling in drug design. In *Molecules* (Vol. 24, Issue 2). MDPI AG. 4. Sehgal, S. A., Tahir, R. A., & Waqas, M. (2021). Quick Guideline for Computational Drug Design (Revised Edition). In *Quick Guideline for Computational Drug Design (Revised Edition)*. Bentham Science Publishers. 5. Singh, S., Bani Baker, Q., & Singh, D. B. (2022). Molecular docking and molecular dynamics simulation. In *Bioinformatics*. IntechOpen. 6. Genheden, S., Reymer, A., Saenz-Méndez, P., & Eriksson, L. A. (2017). *Chapter 1. Computational Chemistry and Molecular Modelling Basics* (pp. 1–38).

15. Description Module Development of Pharmaceutical Dosage Forms

1	Module name	Development of Pharmaceutical Dosage Forms
2	Courses code	P20.02001
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	Second Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to:

		1. List and explain the physical and chemical properties of solvents and solutes that affect the solubility, stability, and other bio pharmaceutical properties in drug dosage forms development. 2. Describe the critical factors required for the design, manufacture and evaluation of various dosage forms and other drug delivery systems 3. Develop, validate and apply different instrumental analytical techniques to the analysis of medicinal substances in various dosage forms 4. Analyze and interpret data. 5. Design, manufacture and evaluate various drugs dosage forms. 6. Characterize and evaluate physicochemical properties of pharmaceutical substances 7. Show contributions in individual or group projects.
7	Elements of competency	MKK
8	Type competency	supporting competence
9	Syllabus	1. Introduction: Early stage development (Product design); 2. Preformulation as a product design tool; 3. Biopharmaceutical aspects in formulation development; 4. Product Optimization; 5. Parenteral Dosage Form; 6. Inhalation Dosage Form; 7. Oral Solid Dosage Form; 8.Midterm Exam; 9. Ophthalmic Dosage Form; 10. Aqueous Nasal Dosage Form; 11. Topical and Transdermal Delivery; 12-15. Drug design 1-4 cases; 16. Final exam
10	Attribute to soft skills	ethics, hardworking, communication skill
11	Learning methods	Lecture and Discussion
12	Learning media	LCD
13	Appraisal	Presentations, paper review and group discussion
14	Lecturer	Dr. Taofik Rusdiana, M.Si., Apt
15	References	1. Mark Gibson, Pharmaceutical Preformulation and Formulation, Informa Health, 2016 2. L. Shargel and I. Kanfer, Generic Drug Product Development Solid Oral Dosage Forms, CRC Press, 2014. 3. Y. Qiu, et al, Developing Solid Oral Dosage Forms, Pharmaceutical Theory and Practice, Elsevier-Academic Press, 2017

16. Description Module Pharmacokinetics

1	Module name	Pharmacokinetics
2	Courses code	P20.02002
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64

		Total workload: 91
4	Semester	Second Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. List and explain the psychochemical properties of solute and solvent that affect solubility, stability, and other bio-pharmaceutical properties of drug dosage forms development in drugs, herbal medicine & supplement, and cosmetics 2. Describe the physical and chemical properties of the compound that affect solubility, stability and other biopharmaceutical properties of drug dosage forms development 3. Present the ability to interpret and analyze data 4. Develop, validate and apply different analytic instrument technique for drug analysis in various drug dosage form 5. Measure and evaluate the therapeutic outcome based on drug to target knowledge 6. Evaluate the impact of pharmacokinetics process in drug action
7	Elements of competency	MKK
8	Type competency	supporting competence
9	Syllabus	1-3. Introduction, One and Two Compartment Intravenous Pharmacokinetic Model; 4-5. One and Two Compartment Oral Pharmacokinetic; 6-7. Pharmacokinetics of Infusion, Multiple Dose IV Administration and Oral Dual Dose Administration; 8. Mid-term Exam; 9-12. Clearance Concept, Non-Linear Pharmacokinetics, Pharmacokinetics study design and data interpretation, also PK-PD Relation; 13-15. Drug pharmacokinetics study's review article- Group 1-3; 16. Final exam
10	Attribute to soft skills	ethics, communication skill, discipline
11	Learning methods	● Lecture ● Discussion ● Audio visual learning ● Presentation ● Review article writing ability
12	Learning media	LCD
13	Appraisal	● Discussion (students dialogue) ● Quiz
14	Lecturer	Dr. Apt. Taofik Rusdiana, M.Si. Dr. Apt. Ahmad Muhtadi, M.S. Dr. Apt. Sri Adi Sumiwi, M.S

15	References	1. Shargel, L., & Yu, A. B. C. (2017). *Applied biopharmaceutics and pharmacokinetics*. Norwalk, Conn: Appleton & Lange. 2. Jambhekar, Sunil S., (2012), Basic pharmacokinetics, 2nd ed., London ; Philadelphia : Pharmaceutical Press 3. Paul Beringer PharmD, 2017, Winter's Basic Clinical Pharmacokinetics, Wolter Kluwer

17. Description Module Drug Discovery and Development

1	Module name	Drug Discovery and Development
2	Courses code	P20.02003
3	Study loads	3 credits ECTS amount : 5 ECTS Contact hour per semester: 40 Independent study per semester: 96 Total workload: 136
4	Semester	Second Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: ● List and explain the psychochemical properties of solute and solvent that affect solubility, stability, and other biopharmaceutical properties in drug dosage forms development. ● Analyze and interpret data. ● Design, manufacture and evaluate dosage forms and other drug delivery systems. ● Able to explain and apply the mechanism of certain drugs at molecular and cellular levels ● Characterize and evaluate physicochemical properties of the active compounds of natural ingredients ● Applying separation techniques of natural substances to isolate the active substances and markers. ● Apply pharmacokinetic processes related to absorption, distribution, metabolism and excretion of drugs ● Able to explain the important factors required for the design, manufacturing and evaluation of various dosage forms and other drug delivery systems ● Develop, validate and apply different instrumental analytical techniques to the analysis of medicinal substances in various dosage forms ● Show contributions in individual or group projects.
7	Elements of competency	MKK
8	Type competency	supporting competence
9	Syllabus	Molecular identification and validation of disease targets; 2-3. Finding Lead Compound from Natural Materials; 4-5. Computer-aided drug

		design (lead compound discovery); 6-7. Identification and optimization of target interactions and pharmacokinetics optimization; 8. Mid-term Exam; 9-10. Toxicology and safety tests and In vivo and in Vitro tests; 11-12. Pre-formulations and formulations; 13-14. Pre-clinical and clinical trial; 15. Registration and Commercialization
10	Attribute to soft skills	discipline, communication skill, ethics
11	Learning methods	● Discussion ● Audio visual learning
12	Learning media	LCD
13	Appraisal	● Presentation ● Quiz
14	Lecturer	Apt. Muchtaridi, Ph.D. Prof. Dr. Apt. Moelyono, M.S. Dr. Apt. Keri Lestari, M.Si Apt. Taofik Rusdiana, PhD.
15	References	1. Raymond G Hill, Humphrey P. Rang. (2021). Drug Discovery and Development. 3rd Edition. Elsevier 2. Donald J. Abraham, Michael Myers. 2021. Burger's Medicinal Chemistry, Drug Discovery and Development, Volumes 1 - 8, 8th Edition. Wiley-Interscience 3. Dev Bukhsh Singh. 2020. Computer Aided Drug Design. 1th edition. SPRINGER 4. Benjamin Blass. 2015. Basic Principles of Drug Discovery and Development. 1th edition. Elsevier-Academic Press 5. Graham Patrick L. 2017. An Introduction to Medicinal Chemistry. 6th edition. Oxford University Press 6. J. Andrew Williams, Richard Lalonde, Jeffrey R. Koup, David D. Christ, Sean Ekins. (2012). Predictive Approaches in Drug Discovery and Development: Biomarkers and In Vitro / In Vivo Correlations (Wiley Series on Technologies for the Pharmaceutical Industry). 7. Bente Steffansen, Yuichi Sugiyama, Bente Steffansen. (2013). Transporters in Drug Development: Discovery, Optimization, Clinical Study and Regulation 8. Camille Georges W., David Aldous, Didier Rognan, Pierre Raboisson. (2015). The Practice of Medicinal Chemistry, Fourth Edition.

18. Description Module Journal Reading and Review

1	Module name	Journal Reading and Review
2	Courses code	P20.02004
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 40

		Independent study per semester: 96 Total workload: 136
4	Semester	Second Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: ● Present the ability to interpret and analyze data ● Present organized information orally, persuasively yet logical using proper documentation and supported tools ● Analyze, interpret and criticize the study design, data interpretation and the suitability of conclusion from the scientific literature. ● Take, analyze, and interpret scientific literature to provide information to be disseminated orally or in writing ● Show contributions both in individual or group project ● Summarize the information collected from the group and communicate the development of the topic ● Conduct independent literature studies using databases and pharmacology-related publications to solve problems related to the pharmacology field
7	Elements of competency	MKK
8	Type competency	main competence
9	Syllabus	1. Learning contract and How to review a journal; 2. How to Present a paper in scientific meeting; 3-4. How to make a review articles; 5-14. Presentation a journal paper in front of other students and lecturer; 15-16. Writing a review articles with supervisors
10	Attribute to soft skills	ethics, hardworking, discipline
11	Learning methods	Lecture, interactive learning, paper presentation
12	Learning media	LCD
13	Appraisal	Paper publicity
14	Lecturer	Dr. apt. Aliya Nur Hasanah M.Si. Dr. apt. Nyi Mekar Saptarini, M.Si. Dr. apt. Sriwidodo, M.Si. Dr. apt. Tiana Milanda M.Si. Dr. apt. Eli Halimah, M.Si.
15	References	1. Winiharti M, Herawati A, Rahayu E. Reading Journal As A Way To Improve Students' Comprehension Toward A Textbook Reading Material. Lingua Cultura. 2014: 8 (2): 101-109. 2. Weir, R. 2011. "It's Not Harry Potter" Inside Higher Ed. http://www.insidehighered.com/advice/instant_mentor/essay_on_teaching_students_to_read_journal_articles#ixzz2W75q1Gqg Accessed 6/13/2013 3. Subramanyam RV. Art of reading a journal article: Methodically and effectively. J Oral Maxillofac Pathol 2013;17:65-70.

19. Description Module Cosmetics and Household Health Supplies Analysis

1	Module name	Cosmetics and Household Health Supplies Analysis
2	Courses code	P20.02023
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	Second Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. List and explain the psychochemical properties of solute and solvent that affect solubility, stability, and other bio pharmaceutical properties in drug dosage forms development. 2. Analyze and interpret data. 3. Develop, validate and apply different instrumental analytical techniques to the analysis of medicinal substances in various dosage forms 4. Show contributions in individual or group projects.
7	Elements of competency	MKK
8	Type competency	supporting competence
9	Syllabus	1. Learning contract 2. Cosmetics, PKRT, and regulations; 3. Chemical analysis methods in soap preparations; 4. Chemical analysis methods in shampoo preparations; 5. Chemical analysis methods in powder preparations; 6. Cosmetics analysis methods on antiperspirant and deodorant preparations; 7. Method of cosmetic analysis on skin care and skin whitening preparations; 8. Mid-Term Exam; 9. Classification of medical devices and PKRT; 10. Chemical analysis methods in cotton and sanitary pads; 11. Chemical analysis methods in toothpaste and preparations for washing (detergents); 12. Methods of chemical analysis of disinfectant, and repellent chemicals; 13. Examples of dye analysis methods in cosmetics; 14. Examples of a method of analyzing bleaching agents in cotton; 15. Examples of a whitening agents analysis method in cosmetic preparations; 16. Final Exam
10	Attribute to soft skills	communication skill, discipline, ethics, awareness
11	Learning methods	Project-based and Content-Based learning
12	Learning media	LCD
13	Appraisal	Answer questions individually either in essay or multiple choices.

14	Lecturer	Mutakin Ph.D Dr. Ida Musfiroh, M.Si.,Apt Dr. apt. Aliya Nur Hasanah M.Si.
15	References	1. Amparo Salvador, Alberto Chisvert. Analysis of Cosmetic Products. Second Edition. Elsevier. 2017. 2. Bruna Galdorfini Chiari, Maria Gabriela José de Almeida, Marcos Antonio Corrêa and Vera Lucia Borges Isaac. Cosmetics' Quality Control. Intech Open Science. 2012.https://cdn.intechopen.com/pdfs/41063/intech-cosmetics_quality_control.pdf 3. Viorica POPESCU, Alina SOCEANU and Simona DOBRINAS. The quality control of some dermo-cosmetic products. De Gruyter Open. Ovidius University Press. 2014 4. REGULATION OF THE MINISTER OF HEALTH OF THE REPUBLIC OF INDONESIA NUMBER 62 OF 2017 ON PRODUCT LICENSE OF MEDICAL DEVICES, IN VITRO DIAGNOSTIC MEDICAL DEVICES AND HOUSEHOLD HEALTH PRODUCTS. http://regalkes.kemkes.go.id/informasi_alkes/Regulasi%20Lisensi%20Produk.pdf 5. GUIDELINES FOR HOUSEHOLD-HEALTH PRODUCTS (PEDOMAN PELAYANAN IZIN EDAR MARKETING AUTHORIZATION SERVICES). KEMENTERIAN KESEHATAN REPUBLIK INDONESI. 2016. https://bikinpabrik.id/wp-content/uploads/2019/03/014.-Pedoman-Pelayanan-Izin-Edar-PKRT-Bilingual.pdf

20. Description Module Biomedical Analysis

1	Module name	Biomedical Analysis
2	Courses code	P20.02024
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	Second Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. List and explain the psychochemical properties of solute and solvent that affect solubility, stability, and other bio-pharmaceutical properties in drug dosage forms development. 2. Present the ability to interpret and analyze data. 3. Develop, validate and apply different instrumental analytical techniques in drug analysis on various drug dosage forms. 4. Show contributions both in individual or group projects.
7	Elements of competency	MKK
8	Type competency	supporting competence
9	Syllabus	1. Introduction; 2. DNA replication and PCR; 3. DNA, RNA dan SNP identification; 4. Protein content determination by Bioassay (Immunoassay); 5. Hybridization, Sequencing dan Microarray (Presentation); 6. Computational biomedicine; 7. Prepare a Primer; 8. Mid-Term Exam; 9. Introduction: protein; 10. Protein: Basic Theory, Properties, Stability, Biological Activities. Hydrophilicity Determination, Stability (pH, Temperature, Pressure, etc.), dan Protein Biological Activities; 11. Protein Quantitative Determination (Kjeldahl, Biuret,

		Lowry, Bradford, BCA Test, etc.); 12-13. Protein Purification and Characterization; 14-15. Protein Sequencing (Basic and Modern Methods). Protein Sequence Determination, Protease Cutting Site, Protein Size, Protein Charge; 16. Final Exam
10	Attribute to soft skills	communication skill, discipline, ethics, awareness
11	Learning methods	Tutorial and discussion Presentation and discussion
12	Learning media	LCD
13	Appraisal	Presentation Case analysis
14	Lecturer	Apt. Melisa Intan Barliana, Dr.Med.Sc. Rina FaJri Nuwardah, S.Si., M.Sc.
15	References	1. Ye, S. Q. (Ed.). (2016). *Big data analysis for bioinformatics and biomedical discoveries*. CRC Press. 2. Walsh, G. (2013). *Pharmaceutical biotechnology: concepts and applications*. John Wiley & Sons. 3. Kayser, O., & Warzecha, H. (Eds.). (2012). *Pharmaceutical biotechnology: drug discovery and clinical applications*. John Wiley & Sons. 4. R. Andrew Shalliker, Hyphenated and alternative methods of detection in chromatography, 2011, ISBN-13: 978-0849390777 5. Pawliszyn, J. (2012). *Comprehensive sampling and sample preparation: Analytical techniques for scientists*. Academic Press. Elsevier, 2012, ISBN: 9780123813749 6. Wilson, K., Hofmann, A., Walker, J. M., & Clokie, S. (Eds.). (2018). *Wilson and Walker's principles and techniques of biochemistry and molecular biology*. Cambridge University Press.

21. Description Module Drug Stability

1	Module name	Drug Stability
2	Courses code	P20.02025
3	Study loads	3 credits ECTS amount : 5 ECTS Contact hour per semester: 40 Independent study per semester: 96 Total workload: 136
4	Semester	Second Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. List and explain the physical and chemical properties of solvents and solutes that affect solubility and other properties of other bio-pharmaceuticals in the development of drug, bio-pharmaceutical, traditional medicine & supplement and cosmetics. 2. Explain the important factors required for the design, manufacture and evaluation of various dosage forms and other drug delivery systems.

		3. Develop, validate and apply different instrumental methods to the analysis of medicinal substances in various dosage forms. 4. Identify and explain the principles that are involved in the absorption, distribution, metabolism and excretion of medicinal substances, and the factors that influence these processes. 5. Analyze and interpret data. 6. Design, manufacture and evaluate dosage forms and other drug delivery systems. 7. Characterize and evaluate physicochemical properties of pharmaceutical ingredients.Show contributions in individual or group projects. 8. Summarize information and communicate its development obtained from group experience.
7	Elements of competency	MKK
8	Type competency	supporting competence
9	Syllabus	1. Introduction; 2. Introduction to the solid state; 3-4. Solid state stability; 5. Stability Analysis in Solid Dosage Forms; 6. Drug Stability Calculations; 7. Drug Stability from the Effect of Chemical Substances and Enzymes; 8. Mid-Term Exam; 9. Catalysis against Drug Stability; 10. Drug Kinetics; 11. Solid state; 12. Solid state Instability; 13. DSC PXRD SEM; 14. Factors Affecting the Reaction; 15. Quiseri parallel calculations; 16. Final Exam
10	Attribute to soft skills	communication skill, discipline, ethics, awareness
11	Learning methods	Lecture and Discussion
12	Learning media	LCD
13	Appraisal	Written Test
14	Lecturer	Dr. rer. nat Apt. Anis Yohana Chaerunisa, M.Si. Prof. Apt. Muchtaridi, Ph.D.
15	References	1. Carstensen, Jens T., et al, Drug Stability : Principles and practices, Marcel Dekker, 2000 2. Yoshioka, Sumie and Stella, Valentino J., Stability of Drugs and Dosage forms, Kluwer academic, 2002 3. Tonnesen, Hanne H., Photostability of Drugs and Drug Formulations, CRC Press, 2004 4. Aulton, Michael E., Pharmaceutics : The Science of Dosage Form Design, W.B. Saunders Company, 2003 5. Piechocki, Joseph T., and Thoma, Karl, Pharmaceutical Photostability and Stabilization Technology, Informa Health, 2007.Kim Huynh-Ba, Handbook of Stability Testing in Pharmaceutical Development : Regulations, Methodologies and Best Practices, Springer Science, 2009 6. Brittain, Harry G., Polymorphism in Pharmaceutical Solids, Informa Health, 2009. 7. Sinko, Patrick J., and Singh Yashveer, Martin's Physical Pharmacy and Pharmaceutical Sciences : Physical Chemical and Biopharmaceutical Principles in the Pharmaceutical Sciences, Wolters Kluwer, 2011 8. Loftsson, Thorsteinn, Drug Stability for Pharmaceutical Scientists, Elsevier, 2014

22. Description Module Drug Synthesis & Therapeutic Evaluation

1	Module name	Drug Synthesis & Therapeutic Evaluation

2	Courses code	P20.02026
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	Second Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. List and explain the psychochemical properties of solute and solvent that affect solubility, stability, and other bio-pharmaceutical properties in drug dosage forms development. 2. Present the ability to interpret and analyze data. 3. Develop, validate and apply different instrumental analytical techniques in drug analysis on various drug dosage forms. 4. Characterize and evaluate physicochemical properties of pharmaceutical ingredients. 5. Show contributions both in individual or group projects.
7	Elements of competency	MKK
8	Type competency	supporting competence
9	Syllabus	1. Introduction and Organic Chemical Synthesis Experiments at Micro Scale; 2. Role of Drug Synthesis and Therapeutic Testing in Drug Discovery; 3-4. Introduction to Drug Synthesis and its Therapeutic Testing Methods; 5. Purification, Isolation, and Characterization; 6-7. Drugs Synthesis and Therapeutic Testing : Narcotics and Psychotropic; 8. Mid-Term Exam; 9-10. Drug Synthesis and Therapeutic Testing : antipyretic analgesics, anti-inflammatory; 11-15. Drug Synthesis and Therapeutic Testing: Antivirals, Antibiotics and Sulfonamides, Antidiabetics, Cardiac and Anticancer Drugs. 16. Final Exam
10	Attribute to soft skills	communication skill, discipline, ethics, awareness
11	Learning methods	Lectures and Discussions, Journal Resume Presentation
12	Learning media	LCD
13	Appraisal	Presentation score, resume assignment and written test
14	Lecturer	Dr. Apt. Ida Musfiroh, M.Si. Dr. Apt. Sandra Megantara, M.Farm.
15	References	1. Carstensen, Jens T., et al, Drug Stability : Principles and practices, Marcel Dekker, 2000 2. Yoshioka, Sumie and Stella, Valentino J., Stability of Drugs and Dosage forms, Kluwer academic, 2002 3. Tonnesen, Hanne H., Photostability of Drugs and Drug

		Formulations, CRC Press, 2004 4. Aulton, Michael E., Pharmaceutics : The Science of Dosage Form Design, W.B. Saunders Company, 2003 5. Piechocki, Joseph T., and Thoma, Karl, Pharmaceutical Photostability and Stabilization Technology, Informa Health, 2007.Kim Huynh-Ba, Handbook of Stability Testing in Pharmaceutical Development : Regulations, Methodologies and Best Practices, Springer Science, 2009 6. Brittain, Harry G., Polymorphism in Pharmaceutical Solids, Informa Health, 2009. 7. Sinko, Patrick J., and Singh Yashveer, Martin's Physical Pharmacy and Pharmaceutical Sciences : Physical Chemical and Biopharmaceutical Principles in the Pharmaceutical Sciences, Wolters Kluwer, 2011 8. Loftsson, Thorsteinn, Drug Stability for Pharmaceutical Scientists, Elsevier, 2014

23. Description Module Pharmaceutical Engineering

1	Module name	Pharmaceutical Engineering
2	Courses code	P20.02027
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	Second Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. Explain various factors involved in design, production and evaluation of multiple drug dosage forms and other drug delivery system 2. Present the ability to interpret and analyze data 3. Design, produce and evaluate drug dosage forms and other drug delivery system 4. Characterize and evaluate the psychochemical properties of pharmaceutical ingredients 5. Show contributions both in individual or group project 6. Summarize the information collected from the group and communicate the development of the topic
7	Elements of competency	MKK
8	Type competency	supporting competence
9	Syllabus	1-3. Introduction to Pharmaceutical engineering, CPP (Critical Process Parameter) relation to QTPP (Quality Targeted Product Profile), Introduction to Technology Transfer; 4-7. Mass Transfer, Momentum Transfer, Heat Transfer, Cristalization; 8. Mid-term exam; 9. Powder Handling; 10. Scale up; 11-14. Scale up on Pharmaceutical material,

		solid, liquid and semisolid preparations and biotechnology product; 15. Quality related risk management; 16. Final Exam
10	Attribute to soft skills	communication skill, discipline, ethics, awareness
11	Learning methods	● Lecture ● Discussion ● Audio visual Learning ● Presentation
12	Learning media	the LCD viewer, laptop, white board and "online" (Google Meet)
13	Appraisal	● Discussion ● Quiz
14	Lecturer	Dr. Apt. Yoga Windhu Wardhana, M.Si. Dr. Apt. Dolih Ghozali, M.S.
15	References	1. Dengale, S.J., Grohganz, H., Rades, T., L¨obmann, K., 2016. Recent advances in co- amorphous drug formulations. Adv. Drug Deliv. Rev. 100, 116–125. https://doi.org/ 10.1016/j.addr.2015.12.009. 2. Dengale, S.J., Ranjan, O.P., Hussen, S.S., Krishna, B.S.M., Musmade, P.B., Gautham Shenoy, G., Bhat, K., 2014. Preparation and characterization of co-amorphous ritonavir-indomethacin systems by solvent evaporation technique: Improved dissolution behavior and physical stability without evidence of intermolecular interactions. Eur. J. Pharm. Sci. 62, 57–64. https://doi.org/10.1016/j. ejps.2014.05.015. 3. Dening, T.J., Taylor, L.S., 2018. Supersaturation potential of ordered mesoporous silica delivery systems. Part 1: Dissolution performance and drug membrane transport rates. Mol. Pharm. 15, 3489–3501. https://doi.org/10.1021/acs. molpharmaceut.8b00488. 4. Dening, T.J., Zemlyanov, D., Taylor, L.S., 2019. Application of an adsorption isotherm to explain incomplete drug release from ordered mesoporous silica materials under supersaturating conditions. J. Control. Release 307, 186–199. https://doi.org/ 10.1016/j.jconrel.2019.06.028. 5. Skorupska, E., Jeziorna, A., Potrzebowski, M.J., 2016. Thermal solvent-free method of loading of pharmaceutical cocrystals into the pores of silica particles: A case of naproxen/picolinamide cocrystal. J. Phys. Chem. C 120, 13169–13180. https://doi. org/10.1021/acs.jpcc.6b05302. 6. Skorupska, E., Ka´zmierski, S., Potrzebowski, M.J., 2017. Solid state NMR characterization of ibuprofen:nicotinamide cocrystals and new idea for controlling release of drugs embedded into mesoporous silica particles. Mol. Pharm. 14, 1800–1810. https://doi.org/10.1021/acs.molpharmaceut.7b00092. 7. Skorupska, E., Paluch, P., Jeziorna, A., Potrzebowski, M.J., 2015. NMR study of BA/FBA cocrystal confined within mesoporous silica nanoparticles employing thermal solid phase transformation. J. Phys. Chem. C 119, 8652–8661. https://doi.org/10.1021/ jp5123008. 8. Zhao Z, Katai H, Higashi K, Ueda K, Kawakami K, Moribe K. Cryo-TEM and AFM observation of the time-dependent evolution of amorphous probucol nanoparticles formed by the aqueous dispersion of ternary solid dispersions. Molecular

		pharmaceutics. 2019 Mar 29;16(5):2184-98. 9. Sunazuka Y, Ueda K, Higashi K, Tanaka Y, Moribe K. Combined effects of the drug distribution and mucus diffusion properties of self-microemulsifying drug delivery systems on the oral absorption of fenofibrate. International journal of pharmaceutics. 2018 Jul 30;546(1-2):263-71.

24. Description Module Molecular Based Analysis

1	Module name	Molecular Based Analysis
2	Courses code	P20.02028
3	Study loads	3 credits ECTS amount : 5 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	Second Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. Define the psychochemical properties of solute and solvent that affect solubility, stability, and other bio-pharmaceutical properties in drug dosage forms development of herbal medicine. 2. Define and apply the mechanism of certain drug on molecular and cellular levels. 3. Apply different instrumental analytical techniques in herbal medicine analysis for herbal its pharmacological effect evaluation 4. List and explain the psychochemical properties of solute and solvent that affect solubility, stability, and other bio-pharmaceutical properties in drug dosage forms development. 5. Present the ability to interpret and analyze data. 6. Develop, validate and apply different instrumental analytical technique in drug analysis on various drug dosage forms. 7. Show contributions both in individual or group project. 8. Summarize the information collected from the group and communicate the development of the topic.
7	Elements of competency	MKK
8	Type competency	supporting competence
9	Syllabus	1-2. DNA based molecular analysis methods; 3-4. Bioinformatics; 5. Protein structures and functions; 6-7 Protein isolation methods. 8. Mid-term exam; 9. Protein purification; 10. Protein quantification; 11-12. Protein characterization; 13. Immunohistochemical techniques; 14-15. Characterization of protein activity with bioassay method; 16. Final Exam

10	Attribute to soft skills	communication skill, discipline, ethics, awareness
11	Learning methods	Tutorial and discussion Presentation and discussion
12	Learning media	the LCD viewer and white board or laptop, and "online" (Google Meet)
13	Appraisal	Presentation Case analysis
14	Lecturer	Dr. apt. Nyi Mekar Saptarini, M.Si. Apt. Melisa Intan Barliana, Dr.Med.Sc.
15	References	1. Crommelin DJA, Sindelar RD, Meibohm B. Pharmaceutical biotechnology: Fundamentals and application. 5th ed. Springer. 2019. 2. Bhatia S, Goli D. Introduction to Pharmaceutical Biotechnology: basic tachniques and concepts. Vol 1. IOP publishing Ltd. 2018. 3. Clark DP, Pazdernik NJ. Biotechnology. Amsterdam: Elsevier/Academic Cell Press, 2016.

25. Description Module Therapeutic and Diagnostic Agents

1	Module name	Therapeutic and Diagnostic Agents
2	Courses code	P20.02029
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	Second Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. Lists and describes the physical and chemical properties of solvents and solutes that affect the solubility, stability, and properties / behavior of other biopharmaceuticals used in the development of medicinal dosage forms. 2. Analyze and interpret data. 3. Develop, validate and apply different instrumental analytical techniques to the analysis of medicinal substances in various dosage forms. 4. Show contributions in individual or group projects.
7	Elements of competency	MKK
8	Type competency	supporting competence
9	Syllabus	1.What is therapeutic compound and diagnostic agent; 2. Medicinal Use of inorganic compounds; 3-4. Diagnostic agent – types and

		applications; 5-7. Radiopharmaceuticals as therapeutic and diagnostic agent; 8. Mid-term exam; 9-10. Radiopharmaceuticals in nuclear pharmacy and nuclear medicines ; 11. Evaluaton; 12. Utilization of radioisotope technology in the treatment and diagnosis of disease; 13. Therapeutic and diagnostic agent in Indonesia ; 14-15. Production therapeutic compounds and diagnostic agent by BATAN; 16. Final Exam
10	Attribute to soft skills	ethics, discipline, awareness
11	Learning methods	Lecturer and discussion
12	Learning media	the LCD viewer and white board or laptop, and "online" (Google Meet)
13	Appraisal	Written test
14	Lecturer	Prof. Dr. Apt. Resmi Mustarichie, M.Sc. Batan team teaching
15	References	1. James E. Turner, Atoms, Radiation, and Radiation Protection, Wiley, 2007 2. Adrian D. Nunn. Radiopharmaceuticals Chemistry and Pharmacology, 2014 3. Gopal B. Saha . Fundamentals of Nuclear Pharmacy, 6th Ed, Springer. 2010

26. Description Module Instrumentation and In Vitro Testing in Radiopharmaceuticals

1	Module name	Instrumentation and In Vitro Testing in Radiopharmaceuticals
2	Courses code	P20.02030
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	Second Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. List and explain the psychochemical properties of solute and solvent that affect solubility, stability, and other bio-pharmaceutical properties in drug dosage forms development of drugs 2. Present the ability to interpret and analyze data 3. Develop, validate and apply different analytic instrument technique for drug analysis in various drug dosage form 4. Show contributions both in individual or group project
7	Elements of competency	MKK

8	Type competency	supporting competence
9	Syllabus	1. introduction of Good Radiopharmacy Practice (GRP) 8. Mid-term exam;2-4. GRP; 5. Type 1 radioactive laboratory; 6-7. EQUIPMENT in Radio pharmacy Physicochemical instruments and in-vitro analysis connection; 8. Physicochemical instruments evaluation; 9. Radiolabel method for radiopharmaceutical compounds; 10-11. Characterization of Radiopharmaceutical compounds; 12-13. Radiopharmaceutical compound activity test; 14-15. PET and SPECT; 16. Final Exam
10	Attribute to soft skills	discipline, awareness
11	Learning methods	Lecturer and discussion
12	Learning media	the LCD viewer and white board or laptop, and "online" (Google Meet)
13	Appraisal	Written test
14	Lecturer	Prof. Apt. Muchtaridi PhD. Apt. Holis A.Holik, Ph.D.
15	References	1. Richard J. Kowalsky. 2019. Radiopharmaceuticals in Nuclear Pharmacy and Nuclear Medicine, 4rd edition. American Pharmacists Association (APhA). 2. Radiation Safety of Accelerator Based Radioisotope Production Facilities, IAEA Specific Safety Guide No. SSG-59, 2019 3. Quality Control in Production of radiopharmaceuticals, IAEA-1856, 2018

27. Description Module Seminar of Research Proposal

1	Module name	Seminar of Research Proposal
2	Courses code	P20.03001
3	Study loads	2 credits ECTS amount : 15 ECTS Contact hour per semester: 53 Independent study per semester: 400 Total workload: 453
4	Semester	Third Semester
5	Precondition	pass research methodology course
6	Competence	Research Proposal Seminar (RPS) is Master students thesis research progress students are expected to be able to: ● Present the ability to interpret and analyze data ● Deliver information orally in an organized, persuasive, and logical manner using documentation and supporting visual aids ● Take, analyze, and interpret scientific literature to provide information to be shared orally or in writing

<table>
<tr><td></td><td></td><td>

Creating documents that are technical, analytical, relevant in content and well managed
Show contributions both in individual or group project
Conduct independent literature studies using databases and pharmacology-related publications to solve problems related to the field of pharmacology
Analyze, interpret, criticize scientific literature related to study design, interpretation data and suitability of conclusions

</td></tr>
<tr><td>7</td><td>Elements of competency</td><td>MKB, MKK</td></tr>
<tr><td>8</td><td>Type competency</td><td>main competence</td></tr>
<tr><td>9</td><td>Syllabus</td><td>The students should have research proposal manuscripts that has been wrapped in blue soft cover.</td></tr>
<tr><td>10</td><td>Attribute to soft skills</td><td>discipline, communication skill, awareness</td></tr>
<tr><td>11</td><td>Learning methods</td><td>an open seminar that can be attended by students and lecturers.

Technical implementation:
The students present their research proposal for 15 minutes followed by a question and answer session by discussants, each discussant is given 10 minutes to ask questions</td></tr>
<tr><td>12</td><td>Learning media</td><td>the LCD viewer, laptop, white board and "online" (Google Meet)</td></tr>
<tr><td>13</td><td>Appraisal</td><td>discussants evaluate the accountability of students for questions that are critical and clarify towards the topics with percentage scoring:

Significance of background research and/or research focus and Objectives, 15% (fifteen percent);
Relevance and updating of literature review, 25% (twenty five percent);
Accuracy of the objectives and research proportion/hypothesis, 10% (ten percent);
Suitability of research methods, 10% (ten percent);
Scientific writing ability, 20% (twenty percent);
Communication ability in oral exam, 20% (twenty percent);
Total 100% (one hundred percent) can be added with assessment 10% (ten percent).

Final Score:

Students are declared “PASS” if they get an average score of ≥ 68
Students are declared “NOT PASS” if they get an average score of < 68

Converting FS into Grade and Score using the following guidelines:
<table>
<tr><th>Final Score (FS)</th><th>Grade</th><th>Score</th></tr>
<tr><td>80 ≤ FS ≤ 100</td><td>A</td><td>4</td></tr>
<tr><td>68 ≤ FS < 80</td><td>B</td><td>3</td></tr>
<tr><td>56 ≤ FS < 68</td><td>C</td><td>2</td></tr>
<tr><td>45 ≤ FS < 56</td><td>D</td><td>1</td></tr>
<tr><td>FS < 45</td><td>E</td><td>0</td></tr>
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14	Lecturer	Thesis adviser team and examiner team
15	References	1. Unpad Rector Regulation No. 50 of 2016 concerning Guidelines for Masters and Doctoral Education in the Padjadjaran University Environment 2. Academic Guidelines for Master's Program in Clinical Pharmacy

28. Description Module Progress Report 1

1	Module name	Progress Report 1
2	Courses code	P20.03002
3	Study loads	1 credit ECTS amount : 12 ECTS Contact hour per semester: 27 Independent study per semester: 320 Total workload: 347
4	Semester	Third Semester
5	Precondition	a. Registered as active students b. Student has conducted a research proposal seminar and passed c. Enrolled in the Progress Report course (1 or 2)
6	Competence	Progress Report Seminar is held to assess the Masters students thesis research progress, students are expected to be able to: ● Present the ability to interpret and analyze data ● Deliver information orally in an organized, persuasive, and logical manner using documentation and supporting visual aids ● Take, analyze, and interpret scientific literature to provide information to be shared orally or in writing ● Creating documents that are technical, analytical, relevant in content and well managed ● Show contributions both in individual or group project ● Conduct independent literature studies using databases and pharmacology-related publications to solve problems related to the field of pharmacology ● Analyze, interpret, criticize scientific literature related to study design, interpretation data and suitability of conclusions
7	Elements of competency	MKB, MKK
8	Type competency	main competence
9	Syllabus	Implementation of this module: a. Conducted in each department according to the concentration / specialization taken by students b. Students independently present the progress of thesis research carried out, in front of lecturers in the Department (at least the Head of the Department and 1 other Lecturer in the Department). c. The detailed presentation mechanism and schedule were regulated by the Head of the Department

10	Attribute to soft skills	communication skill
11	Learning methods	an open seminar that can be attended by students and lecturers. Technical implementation: The students present their research progress followed by a question and answer session
12	Learning media	the LCD viewer, laptop, white board and "online" (Google Meet)
13	Appraisal	The components assessed in the progress seminar include: Methodology comprehension Knowledge comprehension Reasoning comprehension Ability to communicate ideas Research progress percentage Final Score: students are considered pass if the seminar average score is at least B
14	Lecturer	Thesis adviser team, Head of the Department and other Lecturer in the Department
15	References	1. Peraturan Rektor Universitas Padjadjaran No. 50 Tahun Unpad Rector Regulation No. 50 of 2016 concerning Guidelines for Masters and Doctoral Education in the Padjadjaran University Environment 2. Academic Guidelines for Master's Program in Clinical Pharmacy

29. Description Module Progress Report 2

1	Module name	Progress Report 2
2	Courses code	P20.04001
3	Study loads	1 credit ECTS amount : 11 ECTS Contact hour per semester: 27 Independent study per semester: 289 Total workload: 315
4	Semester	Third Semester
5	Precondition	a. Registered as active students b. Student has conducted a research proposal seminar and passed c. Enrolled in the Progress Report course (1 or 2)
6	Competence	Progress Report Seminar is held to assess the Masters students thesis research progress, students are expected to be able to: ● Present the ability to interpret and analyze data ● Deliver information orally in an organized, persuasive, and logical manner using documentation and supporting visual aids

		● Take, analyze, and interpret scientific literature to provide information to be shared orally or in writing ● Creating documents that are technical, analytical, relevant in content and well managed ● Show contributions both in individual or group project ● Conduct independent literature studies using databases and pharmacology-related publications to solve problems related to the field of pharmacology ● Analyze, interpret, criticize scientific literature related to study design, interpretation data and suitability of conclusions
7	Elements of competency	MKB, MKK
8	Type competency	main competence
9	Syllabus	Implementation of this module: a. Conducted in each department according to the concentration / specialization taken by students b. Students independently present the progress of thesis research carried out, in front of lecturers in the Department (at least the Head of the Department and 1 other Lecturer in the Department). c. The detailed presentation mechanism and schedule were regulated by the Head of the Department
10	Attribute to soft skills	communication skill
11	Learning methods	an open seminar that can be attended by students and lecturers. Technical implementation: The students present their research progress followed by a question and answer session
12	Learning media	the LCD viewer, laptop, white board and "online" (Google Meet)
13	Appraisal	The components assessed in the progress seminar include: Methodology comprehension Knowledge comprehension Reasoning comprehension Ability to communicate ideas Research progress percentage Final Score: students are considered pass if the seminar average score is at least B
14	Lecturer	Thesis adviser team, Head of the Department and other Lecturer in the Department
15	References	1. Peraturan Rektor Universitas Padjadjaran No. 50 Tahun Unpad Rector Regulation No. 50 of 2016 concerning Guidelines for Masters and Doctoral Education in the Padjadjaran University Environment 2. Academic Guidelines for Master's Program in Clinical Pharmacy

30. Description Module Seminar of Research Result

1	Module name	Seminar of Research Result
2	Courses code	P20.04002
3	Study loads	2 credits ECTS amount : 14 ECTS Contact hour per semester: 53 Independent study per semester: 354 Total workload: 408
4	Semester	Fourth Semester
5	Precondition	pass research proposal
6	Competence	Progress Report Seminar is held to assess the Masters students thesis research progress, students are expected to be able to: ● Present the ability to interpret and analyze data ● Deliver information orally in an organized, persuasive, and logical manner using documentation and supporting visual aids ● Take, analyze, and interpret scientific literature to provide information to be shared orally or in writing ● Creating documents that are technical, analytical, relevant in content and well managed ● Show contributions both in individual or group project ● Conduct independent literature studies using databases and pharmacology-related publications to solve problems related to the field of pharmacology ● Analyze, interpret, criticize scientific literature related to study design, interpretation data and suitability of conclusions
7	Elements of competency	MKB, MKK
8	Type competency	main competence
9	Syllabus	The Student should have research proposal manuscripts that have been wrapped in yellow soft cover
10	Attribute to soft skills	communication skill, writing skill
11	Learning methods	an open seminar that can be attended by students and lecturers. Technical implementation: The students present their research proposal for 15 minutes followed by a question and answer session by discussants, each discussant is given 10 minutes to ask questions
12	Learning media	the LCD viewer, laptop, white board and "online" (Google Meet)
13	Appraisal	discussants evaluate the accountability of students for questions that are critical and clarify towards the topics with percentage scoring: ● Significance of background research and/or research focus and Objectives, 15% (fifteen percent); ● Relevance and updating of literature review, 25% (twenty five percent); ● Accuracy of the objectives and research proportion/hypothesis, 10% (ten percent);

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Suitability of research methods, 10% (ten percent);
Scientific writing ability, 20% (twenty percent);
Communication ability in oral exam, 20% (twenty percent);
Total 100% (one hundred percent) can be added with assessment 10% (ten percent).

The score of discussants is added up with other discussants score with ratio 60% of adviser team, 40% of examiner team as final score, without converting into grade in advanced.

Final Score:

Students are declared “PASS” if they get an average score of ≥ 68
Students are declared “NOT PASS” if they get an average score of < 68

Converting FS into Grade and Score using the following guidelines:
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<tr><th>Final Score (FS)</th><th>Grade</th><th>Score</th></tr>
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<tr><td>FS < 45</td><td>E</td><td>0</td></tr>
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</td></tr>
<tr><td>14</td><td>Lecturer</td><td>Thesis adviser team and examiner team</td></tr>
<tr><td>15</td><td>References</td><td>

Peraturan Rektor Universitas Padjadjaran No. 50 Tahun Un pad Rector Regulation No. 50 of 2016 concerning Guidelines for Masters and Doctoral Education in the Padjadjaran University Environment
Academic Guidelines for Master’s Program in Clinical Pharmacy

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30. Description Module Magister Comprehensive Defense

1	Module name	Magister Comprehensive Defense
2	Courses code	P20.04003
3	Study loads	3 credits ECTS amount : 14 ECTS Contact hour per semester: 80 Independent study per semester: 340 Total workload: 420
4	Semester	Fourth Semester
5	Precondition	Thesis Defence Form (LS 1, LS 2) : 1 Copy LS4 Form/ UNT Revision Form : 1 Page Proof of Academic Fee Payment Photocopy : 1 Page Thesis Draft (Yellow Soft Cover) : 7 Copies Thesis Statement Form : 1 Page KPA (Academic Achievement Card) Signed by The Program Study Head : 1 Page Library Book Free Form of Faculty of Pharmacy, Unpad Postgraduate, and Unpad Cisral : 1 page

6	Competence	The students are expected to be able to : ● Present the ability to interpret and analyze data ● Deliver information orally in an organized, persuasive, and logical manner using documentation and supporting visual aids ● Define the psychochemical properties of solute and solvent that affect solubility, stability, and other bio-pharmaceutical properties in drug dosage forms development of herbal medicine. ● Define and apply the mechanism of certain drug on molecular and cellular levels ● Characterize and evaluate physicochemical properties of pharmaceutical natural ingredients. ● Take, analyze, and interpret scientific literature to provide information to be shared orally or in writing. ● Creating documents that are technical, analytical, relevant in content and well managed ● Summarize the information collected from the group and communicate the development of the topic. ● List and explain the psychochemical properties of solute and solvent that affect solubility, stability, and other bio-pharmaceutical properties in drugs, biopharmaceutical, traditional medicine & supplements, and cosmetics development. ● Define important factors which are used in design, manufacture and evaluation of various dosage forms and other drug delivery systems ● Design, manufacture and evaluate dosage forms and other drug delivery systems ● Show contributions both in individual or group project ● Conduct independent literature studies using databases and pharmacology-related publications to solve problems related to the field of pharmacology ● Analyze, interpret, criticize scientific literature related to study design, interpretation data and suitability of conclusions
7	Elements of competency	MKB, MKK
8	Type competency	main competence
9	Syllabus	Comprehensive Examination is the final examination for Masters in Pharmacy education in the form of a comprehensive oral exam, regarding the theories and principles related to the research. Implementation of this module: a. Conducted once per semester b. At the appointed time, student is tested orally in closed session in front of 3 (three) examiners and a team of supervisors c. The mechanism and schedule of the examination in more detail are regulated by the Head of The Pharmacy Masters Study Program d. Examination is held for 90 minutes e. Each examiner asked for 15 minutes f. Each supervisor asked for a maximum of 15 minutes g. At least 60% of the total number of examiners and supervisors attended the examination

<table>
<tr><td>10</td><td>Attribute to soft skills</td><td>communication skill</td></tr>
<tr><td>11</td><td>Learning methods</td><td>The students present their research results in brief followed by a question and answer session</td></tr>
<tr><td>12</td><td>Learning media</td><td>the LCD viewer, laptop, white board and "online" (Google Meet)</td></tr>
<tr><td>13</td><td>Appraisal</td><td>The components assessed in the examination are the academic abilities in the field / concentration related to research by master students.

<u>Passing Criteria</u>
a. The examination participants are declared to have passed if the average score is at least B.
b. For those who do not pass, they must repeat at least 1 (one) month after the announcement
Final Score:
● Students are declared “PASS” if they get an average score of ≥ 68
● Students are declared “NOT PASS” if they get an average score of < 68
Converting FS into Grade and Score using the following guidelines:
<table>
<tr><th>Final Score (FS)</th><th>Grade</th><th>Score</th></tr>
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<tr><td>FS < 45</td><td>E</td><td>0</td></tr>
</table></td></tr>
<tr><td>14</td><td>Lecturer</td><td>Thesis adviser team and examiner team.
a. Examiners must hold a Doctorate (Dr.) with a minimum academic position as Lector and/or Professor
b. The number of examiners is 3 (three) people</td></tr>
<tr><td>15</td><td>References</td><td>1. Peraturan Rektor Universitas Padjadjaran No. 50 Tahun Unpad Rector Regulation No. 50 of 2016 concerning Guidelines for Masters and Doctoral Education in the Padjadjaran University Environment
2. Academic Guidelines for Master’s Program in Clinical Pharmacy</td></tr>
</table>

31. Description Module Scientific paper

1	Module name	Scientific paper
2	Courses code	P20.04004
3	Study loads	1 credits ECTS amount : 12 ECTS Contact hour per semester: 0 Independent study per semester: 369 Total workload: 369
4	Semester	Fourth Semester
5	Precondition	Registered as active students Has a thesis adviser team.

		Scientific article is part of the thesis
6	Competence	The students are expected to be able to : 1. Find a knowledge of basic concepts in pharmaceutical science in one's area of expertise 2. Integrating science, knowledge, technology and advanced concepts in pharmaceutical sciences 3. Design, conduct and maintain original research in one's area of expertise through international publication and research dissemination through seminars 4. Successfully perform analysis, synthesis and antithesis by applying analytical and critical thinking in reviewing scientific literature and evaluating research findings
7	Elements of competency	MKB, MKK
8	Type competency	main competence
9	Syllabus	Scientific articles that are accepted to be published in a national journal accredited by at least Sinta 3 or an international journal through the approval of the thesis adviser who will act as co-authors, by listing UNPAD as the student's first affiliation.
10	Attribute to soft skills	writing ability
11	Learning methods	Writing and publication
12	Appraisal	Final score is depend by the journal criteria, at least in review
13	Lecturer	Thesis adviser team and The Program Study Head
14	References	1. Peraturan Rektor Universitas Padjadjaran No. 50 Tahun Unpad Rector Regulation No. 50 of 2016 concerning Guidelines for Masters and Doctoral Education in the Padjadjaran University Environment 2. Academic Guidelines for Master's Program in Clinical Pharmacy

3.4 Pharmaceutical Biology Concentration

1. Description Module Philosophy of Science

1	Module name	Philosophy of Science
2	Courses code	P20.01001
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91

4	Semester	First Semester
5	Precondition	None
6	Competence	Philosophy of science explores the nature of science and the source of knowledge. Students will learn about the introduction of science, history and development of science, the foundation of knowledge, fundamental structures, logic and reasoning, research method paradigm, moral ethics and science, and metaphysics
7	Elements of competency	MPK
8	Type competency	Main Competence
9	Syllabus	Introduction; 2. History and Development of Science Philosophy; 3. Base of Science Philosophy; 4. Base of Science Epistemology; 5. History and Development of Science Philosophy: Aristotle's Theory of Truth; 6. History and Development of Science Philosophy: Contemporary philosophy; 7. Source of Knowledge; 8. Midterm Examination; 9. Science Philosophy Introduction: Essence of Science Philosophy; 10. History of Science Philosophy; 11. Fundamental Structure of Science Philosophy; 12. Logic and Reasoning of Science Philosophy; 13. Research Method Paradigm; 14. Ethics and Moral in Science; 15. Metaphysics; 16. Final Examination
10	Attribute to soft skills	ethics. awareness, discipline
11	Learning methods	Lectures and Discussion
12	Learning media	LCD Projector
13	Appraisal	Written Examination and Presentation
14	Lecturer	Prof. apt. Dr. Moleyono, M.S. Prof. Dr. dr. Johanes Cornelius Mose Sp.OG.,
15	References	1. Joseph Vidal-Rosset. 2018. Book Review : The Philosophy of Science – A Companion. Oxford University Press, Pp. 768 2. Lars-Göran Johansson. 2016. Philosophy of Science for Scientists. Springer Undergrad. Texts Philosophy. Springer, Cham 3. Martiningsih Wahyu. 2012. Philosophers from Plato to Ibn Bajjah. Yogyakarta : IRCiSod. 4. Sumarna, Cecep. 2020. Philosophy of Science. Rosda 5. Susanto A. 2011. Philosophy of Science, A Study in Ontological, Epistemological and Axiological Dimensions. Jakarta: Bumi Aksara

2. Description Module Research Methodology

1	Module name	Research Methodology
2	Courses code	P20.01002
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	First Semester
5	Precondition	None
6	Competence	After attending this course, students will be able to make their research ideas into research with quality results, including dissertation proposals, presentations, proposals for research projects, research assistance, or journal articles
7	Elements of competency	MKK
8	Type competency	Main Competence
9	Syllabus	Research philosophy; develop problems into interesting research and answer the questions "Why and How?"; 2. Research process and flow; 3. Research design; 4. Research variable; 5. Research proposal; 6. Scientific papers; 7. Writing Strategies (Tenses in writing scientific articles); 8. Mid-term examination; 9. Strategy for Writing Scientific Papers; 10. Scientific Writing Application; 11. Research proposal writing; 12. Plagiarism; 13. Research Ethics in humans and animals; 14. Clinical Trial; 15. Informed consent; 16. Final Exam
10	Attribute to soft skills	creativity, communication skill, discipline, awareness
11	Learning methods	Lectures and discussion
12	Learning media	LCD projector
13	Appraisal	Written examination and presentation
14	Lecturer	Prof. apt. Anas Subarnas, M.Sc. apt. Rizky Abdulah, Ph.D. apt. Muchtaridi, Ph.D.
15	References	1. Petter Laake, Haakon Breien Benestad, Bjorn Reino Olsen. 2007. Research Methodology in the Medical and Biological Sciences. 2. A M Novikov; D A Novikov. 2013. Research methodology: from philosophy of science to research design. 3. Sarah Philpot, Lesley Curnick, Liz Soars, John Soars. 2007. New Headway Academic Skills: Student's Book Level 3: Reading, Writing, and Study Skills.

		4. Rinaldi, S.F and Mujianto B. 2017.Research Methodology and statistic. Human research education center of ministry health of republic od Indonesia 5. Debbie Epstein, Jane Kenway, Rebecca Boden. 2007. Writing for Publication (The Academic's Support Kit).

3. Description Module Biostatistics

1	Module name	Biostatistics
2	Courses code	P20.01003
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	First Semester
5	Precondition	None
6	Competence	After attending this course, students will be able to apply statistical method in clinical study
7	Elements of competency	MKK
8	Type competency	main competence
9	Syllabus	Biostatistical Analysis; 2. Data Analysis; 3. Descriptive Statistics; 4. Hypothesis; 5. Nonparametric Statistics 1&2; 6. Analysis of Variance (ANOVA); 7. Sampling Techniques; 8. Midterm examination; 9. Introduction to Applied Biostatistics in Medical and Clinical Research; 10. Descriptive Analysis; 11. Differential Analysis Between Groups; 12. Correlation and Regression Analysis (Univariate); 13. Regression Analysis (Multivariate); 14. Survival Analysis; 15. Case Study Analysis Exercise. 16 final examination
10	Attribute to soft skills	hard work, discipline, awareness
11	Learning methods	Lectures and Discussion
12	Learning media	LCD
13	Appraisal	Written Examination and Presentation
14	Lecturer	Hadyana, M.Sc., Ph.D. apt. Neily Zakiyah, M.Sc., Ph.D

15	References	1. Statistics in Medicine, 4th edition. Riffenburgh, RH. Elsevier. 2012. 2. Fundamental of Biostatistics, 8th edition. Rosner, B. Cengage Learning. 2015

4. Description Module Physicochemical Analysis

1	Module name	Physicochemical Analysis
2	Courses code	P20.01004
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	First Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. List and explain the psychochemical properties of solute and solvent that affect solubility, stability, and other bio-pharmaceutical properties in drug dosage forms development of drugs, herbal medicine & supplement, and cosmetics 2. Present the ability to interpret and analyze data 3. Develop, validate and apply different instrumental analytical technique in drug analysis on various drug dosage form 4. Characterize and evaluate the psychochemical properties of pharmaceutical ingredients 5. Identify and elaborate drug absorption, distribution, metabolism and excretion principles along with factors that influence the process 6. Apply different instrumental analytical techniques in drug analysis for drug's pharmacological effect evaluation 7. Show contributions both in individual or group project 8. Apply different separation techniques from natural product for isolation of marker and active compound
7	Elements of competency	MKK
8	Type competency	main competence
9	Syllabus	1.Introduction; 2. Simultaneous UV Spectrophotometry and derivatives; 3. Atomic Absorption Spectrophotometry; 4. Fluorometry; 5. Infrared Spectrophotometry; 6. Mass Spectroscopy; 7. X ray spectroscopy; 8. Midterm Examination; 9. NMR; 10. Electrophoresis; 11-12. Chromatography technique (gas chromatography and HPLC); 13-15. Project with the chosen analysis method

10	Attribute to soft skills	communication skill, discipline, ethics, awareness
11	Learning methods	Content-Based learning, Project-based
12	Learning media	LCD
13	Appraisal	Answer individual questions and essays, presentations and discussions
14	Lecturer	Mutakin Ph.D Dr. Aliya Nur Hasanah
15	References	1. Jurgen H.Gross, Mass Spectrometry, a textbook, 3rd edition, 2017 2. Principles of instrumental analysis, Douglas A.Skoog, F.James Holler, Stanley R Crouch, 2017, ISBN 1337468037 3. a practical guide to instrumental analysis, Erno Pungor, G. Horvai, CRC Press, 2020 4. Handbook of Green Analytical Chemistry, Miguel De La Guardia, Salvador Garrigues, 2012, ISBN 0470972017

5. Description Module Cell and Molecular Biology

1	Module name	Cell and Molecular Biology
2	Courses code	P20.01005
3	Study loads	3 credits ECTS amount : 5 ECTS Contact hour per semester: 40 Independent study per semester: 96 Total workload: 136
4	Semester	First Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. List and explain the physical and chemical properties of solvents and solutes that affect solubility and other properties of other bio-pharmaceuticals in the development of drug dosage forms. 2. Analyze and interpret data. 3. Present organized information orally, persuasively yet logical manner using documentations and supporting tools. 4. List and explain the physical and chemical properties of solvents and solutes that affect solubility and other properties of other bio-pharmaceuticals in the development of drug, bio-pharmaceutical, traditional medicine & supplement and cosmetics. 5. Identification and explain principles that are involved in the absorption, distribution, metabolism, and excretion of medicinal substances and factors that influence these processes. 6. Explain and apply mechanism acting of the drug at the molecular, cellular and organ system

7	Elements of competency	MKK
8	Type competency	main competence
9	Syllabus	1-3. Introduction, How cells read the genome: from DNA to protein, Genetic switch; 4-6. Cell membrane, Membrane transport, Mechanism of cell communication; 7-8. Cell signaling, Cell signaling: G protein-coupled receptor (GPCR); 9. Midterm Examination; 10-11. Cell signaling : Receptor Tyrosine Kinase, Cell signaling: Receptor guanylyl cyclase; 12-13. Cell signaling: gated ion chanel and adhesion receptor, Cell signaling: Nuclear receptor; 14-15. Cell cycle, Cell signaling and Cancer; 16. Final Examination
10	Attribute to soft skills	ethics, discipline, awareness
11	Learning methods	Lecture and Discussion
12	Learning media	LCD
13	Appraisal	Presentation Mid-term test Final test
14	Lecturer	Apt. Melisa Intan Barliana, Dr.Med.Sc. Dr. Apt. Tiana Milanda, M.Si. Dr. Apt. Tina Rostinawati, M.Si. Apt. Rizky Abdulah, Ph.D.
15	References	1. Alberts, B., Johnson, A., Lewis, J., Morgan, D., Raff, M., Roberts, K., ... & Hunt, T. (2017). *Molecular biology of the cell*. WW Norton & Company. 2. Mercadante, A. A., Dimri, M., & Mohiuddin, S. S. (2019). Biochemistry, replication and transcription. PMID: 30986011, Bookshelf ID: NBK540152 3. Katritch, V., Cherezov, V., & Stevens, R. C. (2013). Structure-function of the G protein–coupled receptor superfamily. *Annual review of pharmacology and toxicology*, *53*, 531-556. 4. Wagener, C., Stocking, C., & Müller, O. (2016). *Cancer Signaling: from molecular biology to targeted therapy*. John Wiley & Sons.

6. Description Module Pharmacogenomics and Pharmacogenetics

1	Module name	Pharmacogenomics and Pharmacogenetics
2	Courses code	P20.01009
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91

4	Semester	First Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. List and explain the psychochemical properties of solute and solvent that affect solubility, stability, and other biopharmaceutical properties used in the development of pharmaceutical & biopharmaceutical dosage forms, traditional medicines & supplements, and cosmetics 2. Show contributions in individual or group projects. 3. Summarize information and communicate its development obtained from group experience
7	Elements of competency	MKK
8	Type competency	Supporting competence
9	Syllabus	1-2. Introduction to Pharmacogenomics and pharmacogenetics, as well as genotyping methods; 3-5. Pharmacogenetics and race / ethnicity, pharmacogenetic Adverse Drug Reactions, Potential of social, ethical, and legal issues of pharmacogenetic development; 6-7. Pharmacogenetics and oncology, pharmacogenetics and infectious diseases; 8. Mid-term exam; 9-10. Polymorphisms in the treatment of cardiovascular and respiratory diseases, pharmacogenetics and metabolic diseases; 11-14. Pharmacogenomics of human p-glycoproteins, drug transporters, drug metabolizing enzymes, and drug targeting enzymes; 15. Case study discussion: Pharmacogenomic contribution to drug therapy: Warfarin, Clopidogrel,: Irinotecan, Aspirin etc; 16. Final Exam
10	Attribute to soft skills	ethics, discipline, awareness
11	Learning methods	Lectures and Discussion
12	Learning media	the LCD viewer, lapto p, white board and "online" (Google Meet)
13	Appraisal	Presentation Midterm Exam Final Exam
14	Lecturer	Apt. Melisa Intan Barliana, Dr.Med.Sc.. Dr. Apt. Tina Rostinawati, M.Si. Apt, Taofik Rosdiana, Ph.D.
15	Referances	1. Pharmacogenomics in Ethnobridging and Pharmacovigilance,Editor(s): Y. W. Francis Lam, Stuart A. Scott,Pharmacogenomics (Second Edition), Academic Press, 2019, Pages 289-327, ISBN 9780128126264,https://doi.org/10.1016/B978-0-12-812626-4.00011-5. (https://www.sciencedirect.com/science/article/pii/B9780128126264000115) Keywords: Data applicability; Ethnicity; Ethnobridging; Genetic gradients; Global drug development;

		Pharmacogenomics; Pharmacovigilance; Variability in drug response 2. Bertino J.S., Jr, & DeVane C, & Fuhr U, & Kashuba A.D., & Ma J.D.(Eds.), (2013). *Pharmacogenomics: An Introduction and Clinical Perspective*. McGraw Hill. https://accesspharmacy.mhmedical.com/content.aspx?bookid=511&sectionid=40849364 3. Fleeman, N., Martín Saborido, C., Payne, K., Boland, A., Dickson, R., Dundar, Y., ... & Walley, T. (2011). The clinical effectiveness and cost-effectiveness of genotyping for CYP2D6 for the management of women with breast cancer treated with tamoxifen: a systematic review 4. Aniel W. Nebert, Ge Zhang,16 - Pharmacogenomics,Editor(s): Reed E. Pyeritz, Bruce R. Korf, Wayne W. Grody,Emery and Rimoin's Principles and Practice of Medical Genetics and Genomics (Seventh Edition),Academic Press,2019,Pages 445-486. 5. Pratt, V. M., McLeod, H. L., Rubinstein, W. S., Scott, S. A., Dean, L. C., Kattman, B. L., & Malheiro, A. J. (2012). Medical genetics summaries [https://pubmed.ncbi.nlm.nih.gov/28520340/]

7. Description Module Standardization of Natural Medicine

1	Module name	Standardization of Natural Medicine
2	Courses code	P20.01010
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	First Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. Present the ability to interpret and analyze data 2. Produce technical, analytical, relevant and well-constructed documents 3. Collect, analyze,and interpret scientific literature and share the information orally or written. 4. Characterize and evaluate psychochemical properties of herbal active ingredients 5. Present organized information orally, persuasively yet logical using proper documentation and supported tools.

		6. Apply compound separation techniques from medicinal plant for active compound and markers isolation
7	Elements of competency	MKK
8	Type competency	Supporting competence
9	Syllabus	1-2. Medicinal plant based drug standarization scope; 3. Traditional medicine development; 4. Traditional medicine classification; 5. Medicinal plant simplicia production; 6-7. Extract production; 8. Mid-term exam; 9-10. Extract standarization ; 11. Medicinal plant based drug standarization ; 12. Non-specific parameter of extract; 13. Specific parameter of extract ; 14. Good traditional medicine manufacturing practice; Individual/Group assignment; 16. Final Exam
10	Attribute to soft skills	ethics, discipline, awareness
11	Learning methods	Lectures and Discussion
12	Learning media	the LCD viewer, lapto p, white board and "online" (Google Meet)
13	Appraisal	Quiz, Assignments, Mid-Term Exam, Final Exam
14	Lecturer	Dr. Apt. Yoppi Iskandar, M.Si. Dr. Apt. Ade Zuhrotun,. M.Si.
15	References	1. Materia Medika Indonesia. 1st - 5th edition. Indonesian Ministry of Health. Jakarta. Indonesia 2. Farmakope Herbal Indonesia 2nd Edition. 2017. Indonesian Ministry of Health. Jakarta. Indonesia. 3. Shah B & Seth AK. 2020. Textbook of Pharmacognosy and Phytochemistry, 2nd Ed. CBS Publisher & Distributor. India. 4. Heinrich M, Barnes J, Gibbons S, Williamson EM. 2012. Fundamentals of Pharmacognosy and Phytochemistry. Elsevier Churchill Livingstone. UK. 5. WHO. 2020. Quality Control Methods for Medicinal Plant Materials. Geneva. Switzerland. 6. Badal S, Delgoda R. 2017. Pharmacognosy: Fundamentals, Applications, and Strategy. Academic Press Elsevier. UK. 7. The National Agency for Drug and Food Control of Indonesia. 2014. Quality Requirements for Traditional Medicine 8. Directorate General of The National Agency for Drug and Food Control of Indonesia. 2011. Guidelines for the Implementation of Good Traditional Medicine Manufacturing Practices 9. National Standardization Agents. 2016. Determination of heavy metal levels of mercury (Hg) in fishery products. National Standar no 2354.6:2016

8. Description Module Phytotherapy

1	Module name	Phytotherapy
2	Courses code	P20.01011
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27

		Independent study per semester: 64 Total workload: 91
4	Semester	First Semester
5	Precondition	Non
6	Competence	Upon completion of this course, students are expected to be able to: 1. Design, produce and evaluate dosage forms from natural ingredients and other drug delivery systems 2. Show contributions in individual or group projects. 3. Summarize information and communicate its development obtained from group experience.
7	Elements of competency	MKK
8	Type competency	Supporting competence
9	Syllabus	1. The role of herbal medicine in conventional medicine systems; 2. Classification of dosage forms of herbal medicine; 3. Medicinal plants for cardiovascular system; 4. Medicinal plants for hypotension and hypertension; 5. Medicinal plants for central nervous system; 6. Medicinal plants for respiratory system; 7. Medicinal plants for gastrointestinal system; 8. Mid-term exam; 9. Medicinal plants for diarrhea, constipation, hepatitis; 10. Medicinal plants for hormonal system; 11. Medicinal plants for urinary tract; 12. Medicinal plants as antiparasitic; 13. Medicinal plants as anti-inflammatory; 14. Medicinal plants as antioxidants, anti-tumor, anticancer; 15. Individual/Group presentation; 16. Final Exam
10	Attribute to soft skills	ethics, discipline, awareness
11	Learning methods	Lectures, Presentation and Discussion
12	Learning media	the LCD viewer, lapto p, white board and "online" (Google Meet)
13	Appraisal	Quiz, Assignments, Mid-Term Exam, Final Exam
14	Lecturer	Prof. Dr. Apt. Moelyono MW., M.S.
15	References	1. Mukhrejee PK. 2015. Evidence-Based Validation of Herbal Medicine. Elsevier Science 2. Sutrisna EM. 2016. Herbal Medicine: Suatu Tujuan Farmakologis. Muhammadiyah University Press. 3. Heinrich M, Barnes J, Gibbons S, Williamson EM. 2012. Fundamentals of Pharmacognosy and Phytotherapy. Elsevier Churchill Livingstone. UK.

9. Description Module Development of Pharmaceutical Dosage Forms

1	Module name	Development of Pharmaceutical Dosage Forms
2	Courses code	P20.02001
3	Study loads	2 credits ECTS amount : 3 ECTS

		Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	Second Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. List and explain the physical and chemical properties of solvents and solutes that affect the solubility, stability, and other bio pharmaceutical properties in drug dosage forms development. 2. Describe the critical factors required for the design, manufacture and evaluation of various dosage forms and other drug delivery systems 3. Develop, validate and apply different instrumental analytical techniques to the analysis of medicinal substances in various dosage forms 4. Analyze and interpret data. 5. Design, manufacture and evaluate various drugs dosage forms. 6. Characterize and evaluate physicochemical properties of pharmaceutical substances 7. Show contributions in individual or group projects.
7	Elements of competency	MKK
8	Type competency	supporting compentece
9	Syllabus	1. Introduction: Early stage development (Product design); 2. Preformulation as a product design tool; 3. Biopharmaceutical aspects in formulation development; 4. Product Optimization; 5. Parenteral Dosage Form; 6. Inhalation Dosage Form; 7. Oral Solid Dosage Form; 8.Midterm Exam; 9. Ophthalmic Dosage Form; 10. Aqueous Nasal Dosage Form; 11. Topical and Transdermal Delivery; 12-15. Drug design 1-4 cases; 16. Final exam
10	Attribute to soft skills	ethics, hardworking, communication skill
11	Learning methods	Lecture and Discussion
12	Learning media	LCD
13	Appraisal	Presentations, paper review and group discussion
14	Lecturer	Dr. Taofik Rusdiana, M.Si., Apt
15	References	1. Mark Gibson, Pharmaceutical Preformulation and Formulation, Informa Health, 2016 2. L. Shargel and I. Kanfer, Generic Drug Product Development Solid Oral Dosage Forms, CRC Press, 2014. 3. Y. Qiu, et al, Developing Solid Oral Dosage Forms, Pharmaceutical Theory and Practice, Elsevier-Academic Press, 2017

10. Description Module Pharmacokinetics

1	Module name	Pharmacokinetics
2	Courses code	P20.02002
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	Second Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 7. List and explain the psychochemical properties of solute and solvent that affect solubility, stability, and other bio-pharmaceutical properties of drug dosage forms development in drugs, herbal medicine & supplement, and cosmetics 8. Describe the physical and chemical properties of the compound that affect solubility, stability and other biopharmaceutical properties of drug dosage forms development 9. Present the ability to interpret and analyze data 10. Develop, validate and apply different analytic instrument technique for drug analysis in various drug dosage form 11. Measure and evaluate the therapeutic outcome based on drug to target knowledge 12. Evaluate the impact of pharmacokinetics process in drug action
7	Elements of competency	MKK
8	Type competency	supporting competence
9	Syllabus	1-3. Introduction, One and Two Compartment Intravenous Pharmacokinetic Model; 4-5. One and Two Compartment Oral Pharmacokinetic; 6-7. Pharmacokinetics of Infusion, Multiple Dose IV Administration and Oral Dual Dose Administration; 8. Mid-term Exam; 9-12. Clearance Concept, Non-Linear Pharmacokinetics, Pharmacokinetics study design and data interpretation, also PK-PD Relation; 13-15. Drug pharmacokinetics study's review article- Group 1-3; 16. Final exam
10	Attribute to soft skills	ethics, communication skill, discpline
11	Learning methods	● Lecture ● Discussion ● Audio visual learning ● Presentation ● Review article writing ability

12	Learning media	LCD
13	Appraisal	● Discussion (students dialogue) ● Quiz
14	Lecturer	Dr. Apt. Taofik Rusdiana, M.Si. Dr. Apt. Ahmad Muhtadi, M.S. Dr. Apt. Sri Adi Sumiwi, M.S
15	References	1. Shargel, L., & Yu, A. B. C. (2017). *Applied biopharmaceutics and pharmacokinetics*. Norwalk, Conn: Appleton & Lange. 2. Jambhekar, Sunil S., (2012), Basic pharmacokinetics, 2nd ed., London ; Philadelphia : Pharmaceutical Press 3. Paul Beringer PharmD, 2017, Winter's Basic Clinical Pharmacokinetics, Wolter Kluwer

11. Description Module Drug Discovery and Development

1	Module name	Drug Discovery and Development
2	Courses code	P20.02003
3	Study loads	3 credits ECTS amount : 5 ECTS Contact hour per semester: 40 Independent study per semester: 96 Total workload: 136
4	Semester	Second Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: List and explain the psychochemical properties of solute and solvent that affect solubility, stability, and other biopharmaceutical properties in drug dosage forms development. Analyze and interpret data. Design, manufacture and evaluate dosage forms and other drug delivery systems. Able to explain and apply the mechanism of certain drugs at molecular and cellular levels Characterize and evaluate physicochemical properties of the active compounds of natural ingredients Applying separation techniques of natural substances to isolate the active substances and markers. Apply pharmacokinetic processes related to absorption, distribution, metabolism and excretion of drugs Able to explain the important factors required for the design, manufacturing and evaluation of various dosage forms and other drug delivery systems Develop, validate and apply different instrumental analytical techniques to the analysis of medicinal substances in various dosage forms Show contributions in individual or group projects.

7	Elements of competency	MKK
8	Type competency	supporting competence
9	Syllabus	2. Molecular identification and validation of disease targets; 2-3. Finding Lead Compound from Natural Materials; 4-5. Computer-aided drug design (lead compound discovery); 6-7. Identification and optimization of target interactions and pharmacokinetics optimization; 8. Mid-term Exam; 9-10. Toxicology and safety tests and In vivo and in Vitro tests; 11-12. Pre-formulations and formulations; 13-14. Pre-clinical and clinical trial; 15. Registration and Commercialization
10	Attribute to soft skills	discipline, communication skill, ethics
11	Learning methods	● Discussion ● Audio visual learning
12	Learning media	LCD
13	Appraisal	● Presentation ● Quiz
14	Lecturer	Apt. Muchtaridi, Ph.D. Prof. Dr. Apt. Moelyono, M.S. Dr. Apt. Keri Lestari, M.Si Apt. Taofik Rusdiana, PhD.
15	References	1. Raymond G Hill, Humphrey P. Rang. (2021). Drug Discovery and Development. 3rd Edition. Elsevier 2. Donald J. Abraham, Michael Myers. 2021. Burger's Medicinal Chemistry, Drug Discovery and Development, Volumes 1 - 8, 8th Edition. Wiley-Interscience 3. Dev Bukhsh Singh. 2020. Computer Aided Drug Design. 1th edition. SPRINGER 4. Benjamin Blass. 2015. Basic Principles of Drug Discovery and Development. 1th edition. Elsevier-Academic Press 5. Graham Patrick L. 2017. An Introduction to Medicinal Chemistry. 6th edition. Oxford University Press 6. J. Andrew Williams, Richard Lalonde, Jeffrey R. Koup, David D. Christ, Sean Ekins. (2012). Predictive Approaches in Drug Discovery and Development: Biomarkers and In Vitro / In Vivo Correlations (Wiley Series on Technologies for the Pharmaceutical Industry). 7. Bente Steffansen, Yuichi Sugiyama, Bente Steffansen. (2013). Transporters in Drug Development: Discovery, Optimization, Clinical Study and Regulation 8. Camille Georges W., David Aldous, Didier Rognan, Pierre Raboisson. (2015). The Practice of Medicinal Chemistry, Fourth Edition.

12. Description Module Journal Reading and Review

1	Module name	Journal Reading and Review

2	Courses code	P20.02004
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	Second Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: ● Present the ability to interpret and analyze data ● Present organized information orally, persuasively yet logical using proper documentation and supported tools ● Analyze, interpret and criticize the study design, data interpretation and the suitability of conclusion from the scientific literature. ● Take, analyze, and interpret scientific literature to provide information to be disseminated orally or in writing ● Show contributions both in individual or group project ● Summarize the information collected from the group and communicate the development of the topic ● Conduct independent literature studies using databases and pharmacology-related publications to solve problems related to the pharmacology field
7	Elements of competency	MKK
8	Type competency	main competence
9	Syllabus	1. Learning contract and How to review a journal; 2. How to Present a paper in scientific meeting; 3-4. How to make a review articles; 5-14. Presentation a journal paper in front of other students and lecturer; 15-16. Writing a review articles with supervisors
10	Attribute to soft skills	ethics, hardworking, discipline
11	Learning methods	Lecture, interactive learning, paper presentation
12	Learning media	LCD
13	Appraisal	Paper publicity
14	Lecturer	Dr. apt. Aliya Nur Hasanah M.Si. Dr. apt. Nyi Mekar Saptarini, M.Si. Dr. apt. Sriwidodo, M.Si. Dr. apt. Tiana Milanda M.Si. Dr. apt. Eli Halimah, M.Si.
15	References	1. Winiharti M, Herawati A, Rahayu E. Reading Journal As A Way To Improve Students' Comprehension Toward A Textbook Reading Material. Lingua Cultura. 2014: 8 (2): 101-109.

		2. Weir, R. 2011. "It's Not Harry Potter" Inside Higher Ed. http://www.insidehighered.com/advice/instant_mentor/essay_on_teaching_students_to_read_journal_articles#ixzz2W75q1Gqg Accessed 6/13/2013 3. Subramanyam RV. Art of reading a journal article: Methodically and effectively. J Oral Maxillofac Pathol 2013;17:65-70.

13. Description Module Ethnopharmacy

1	Module name	Ethnopharmacy
2	Courses code	P20.02014
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	Second Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. Implement various instrumental analytical technique in herbal drug analysis to evaluate the pharmacological effect 2. Show contributions both in individual or group project 3. Summarize the information collected from the group and communicate the development of the topic
7	Elements of competency	MKK
8	Type competency	Supporting competence
9	Syllabus	1. Ethnopharmacy Concepts; 2. Health Anthropology; 3. Ethnopharmacy of Baduy people and Sunda Kasepuhan society; 4. Ethnopharmacy of Kampung Naga and Kampung Dukuh people; 5-6. Ethnopharmacy of Javanese people; 7. Mid-term Exam; 8-9.Ethnopharmacy of mentawai, orang rimba, and talang mamak people; 10. Ethnopharmacy of Bali Culture; 11-12. Ethnopharmacy of the sub-ethnic of dayak kendayan, dayak tunjung, and dayak kenyah; 13-14. Ethnopharmacy of the toraja, bugis, minahasa,sasak and samawa ethnics; 15. Ethnopharmacy of the togutil ethnic community, the Ternate ethnicity, the dani ethnicity, the Korowai ethnicity, the Asmat ethnic group; 16. Final Exam
10	Attribute to soft skills	communication skill, ethics, discipline
11	Learning methods	Lecture, Discussion, Individual Task and Presentation
12	Learning media	LCD
13	Appraisal	Written test

14	Lecturer	Prof.Dr. Apt. Moelyono MW, M.S. Dr. Apt. Ade Zuhrotun, M.Si.
15	References	1. Moelyono, 2014, Etnofarmasi, Edisi 1, Yogyakarta: Deepublish 2. Quinlan, Marsha. 2011. Ethnomedicine, in A Companion to Medical Anthropology. 10.1002/9781444395303.ch19. 3. Martinez JL, Muñoz-Acevedo A, Rai M. 2021. Ethnobotany Application of Medicinal Plants. ISBN 978036778068

14. Description Module Aromatherapy and Hydrotherapy

1	Module name	Aromatherapy and Hydrotherapy
2	Courses code	P20.02015
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	Second Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. Analyze and interpret data. 2. Show contributions in individual or group projects. 3. Summarize information gained from the group experience and communicate its development
7	Elements of competency	MKK
8	Type competency	Supporting competence
9	Syllabus	1. History of aromatherapy, basic ingredients of aromatherapy; 2. Essential oil; 3. Qualitative and quantitative analysis; 4. Essential oil strength level, top notes, middle notes, base notes; 5. Circulatory system, limbic system, inhalation; 6. Aromatherapy as sedatives; 7. Mid-term Exam; 8. Aromatherapy as hypnosis; 9. Aromatherapy as a passion enhancer; 10. Meaning, function of water for the body; 11-12. Hexagonal water structure, water crystal, alkaline water, dehydration effect; 13-14. Spa treatment, Spa waters, aromatherapy spas, diseases treatment by spa; 15. Group/individual Presentation; 16. Final Exam
10	Attribute to soft skills	communication skill, ethics, discipline
11	Learning methods	Lectures, Discussion, Individual Assignments and Presentation
12	Learning media	LCD
13	Appraisal	Written test
14	Lecturer	Prof.Dr. Apt. Moelyono MW, M.S. Dr. Apt. Yasmiwar, M.S.
15	References	1. Buttner A. 2017. *Springer Handbook of Odor*. Springer International Publishing.

		2. Bagetta G, Cosentino M, Sakurada T. 2016. Aromatherapy: Basic Mechanisms and Evidence-Based Clinical Use. CRC Press. 3. Baruch S. 2012. The Principles and Practice of Hydrotherapy: A Guide to the Application of Water in Disease, for Students and Practitioners of Medicine. Forgotten Books.

15. Description Module Herbal Supplements

1	Module name	Herbal Supplements
2	Courses code	P20.02016
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	Second Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. Design, produce and evaluate drug dosage forms and other drug delivery system 2. Show contributions both in individual or group project 3. Summarize the information collected from the group and communicate the development of the topic
7	Elements of competency	MKK
8	Type competency	Supporting competence
9	Syllabus	1. Herbal Supplement Scope; 2. Herbal supplements to improve nutritional quality; 3. Herbal supplements for lifestyle improvement; 4. Herbal supplements to reduce the risk of disease; 5. Herbal supplements to prevent premature aging; 7. Herbal supplements for restoration of metabolic function; 8. Mid-term Exam; 9. Herbal supplements for stamina and fitness; 10-11. Adaptogenic; 12-13. Immunity; 14-15. Stimulant analeptics; 16. Final Exam
10	Attribute to soft skills	communication skill, ethics, discipline
11	Learning methods	Lectures, Discussion, Individual Assignments and Presentation
12	Learning media	LCD
13	Appraisal	Quiz 10% Assignment 20% Mid-Term Exam 35% Final Exam 35%
14	Lecturer	Dr. Apt. Yoppi Iskandar, M.Si. Dr. Apt. Ade Zuhrotun, M.Si.

15	References	1. The National Agency for Drug and Food Control of Indonesia. 2014. Reference for Herbal Preparations, Volume 8 Volume 1 (covering several volumes and volumes) 2. The ministry of Health of Republic of Indonesia. Indonesian Basic Health Research Results in 2018 3. The ministry of Health of Republic of Indonesia. 2017. Implementation of the Healthy Living Community Movement (GERMAS) in the Context of Realizing Healthy of government employees 4. The ministry of Health of Republic of Indonesia. 2016. Rule No 6: Formulary of Original Indonesian Herbal Medicines 5. The ministry of Health of Republic of Indonesia.2017. Rule No 187: Formulary of Indonesian Traditional Medicine Herb 6. Mills, S., Bone, K., 2013, Principles and Practice of Phytotherapy, Modern Herbal Medicine, 2nd Edition, Churchill Livingstone 7. Merrily A. Kuhn, David Winston. 2017. Winston & Kuhn's Herbal Therapy and Supplements_ A Scientific and Traditional Approach (2007, Lippincott Williams & Wilkins) 8. Dasgupta, A. and Hammet-Stabler, C.A. 2011. Herbal Supplements_ Efficacy, Toxicity, Interactions with Western Drugs, and Effects on Clinical Laboratory Tests 9. S.J. Enna, Stata Norton. 2012. Herbal Supplements and the Brain_ Understanding Their Health Benefits and Hazards-FT Press 10. http://cekbpom.pom.go.id

16. Description Module Plant Tissue Culture

1	Module name	Plant Tissue Culture
2	Courses code	P20.02017
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	Second Semester
5	Precondition	None

6	Competence	Upon completion of this course, students are expected to be able to: 1. Describe and apply the mechanism of certain drugs at molecular and cellular levels 2. Show contributions in individual or group projects. 3. Summarize information gained from the group experience and communicate its development
7	Elements of competency	MKK
8	Type competency	Supporting competence
9	Syllabus	1. Learning rules and Introduction; 2. Factors affecting tissue culture; 3. Tissue culture media; 4. Types of plants growth regulator; 5. Tissue culture methods; 6. Factors affecting tissue culture success; 7. Sterilization techniques in tissue culture; 8. Mid-term Exam; 9-10. Explant sources; 11-12. Tissue culture application (literature study); 13. Secondary metabolites in medicinal plants and its biosynthesis pathway; 14. Production of secondary metabolites and ways of analysis; 15. Individual/group discussion; 16. Final Exam
10	Attribute to soft skills	communication skill, ethics, discipline
11	Learning methods	Introductory lectures, and discussions
12	Learning media	LCD/projector, White board and Hand out
13	Appraisal	Essay
14	Lecturer	Dr. Apt. Yasmiwar Susilawati, M.Si., Apt. Dr. rer nat. Suseno Amin, Intan Timur , PhD
15	References	1. Trigiano, R. N.; Gray, Dennis J., 2011, *Plant Tissue Culture, Development and Biotechnology*, CRC Press. 2. Karl-Hermann Neumann, Ashwani Kumar, Jafargholi Imani, 2009, *Plant Cell and Tissue Culture: A Tool in Biotechnology, Basics and Application*, Springer. 3. Roberta H. Smith, 2012, *Plant Tissue Culture: Techniques and Experiments*, Elsevier Inc., https://doi.org/10.1016/C2011-0-04367-3. 4. Saurabh Bhatia, Kiran Sharma, Randir Dahiya, Tanmoy Bera, 2015, *Modern Application of Plant Biotechnology in Pharmaceutical Sciences*, Elsevier Science.

17. Description Module Natural Product Compound Separation Methods

1	Module name	Natural Product Compound Separation Methods
2	Courses code	P20.02018
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64

		Total workload: 91
4	Semester	Second Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. Explain the psychochemical properties of chemical compound that affect solubility, stability, and other bio-pharmaceutical properties in drug dosage forms development of herbal medicine 2. Characterize and evaluate the psychochemical properties of natural ingredients 3. Apply various separation technique from natural compound to isolate active compound and marker 4. how contributions both in individual or group project 5. Summarize the information collected from the group and communicate the development of the topic
7	Elements of competency	MKK
8	Type competency	Supporting competence
9	Syllabus	1. Separation methods of natural compounds; 2. Separation method; 3. Extraction; 4. Chromatography principles; 5. Gas chromatography; 6. Flat liquid chromatography; 7. Conventional liquid chromatography; 8. Mid-term Exam; 9. High pressure liquid chromatography; 10. Size exclusion chromatography; 11. Ion exchange chromatography, ion affinity chromatography; 12. Countercurrent liquid chromatography; 13. Preparative liquid chromatography, electrophoresis; 14-15. Individual/group assignment; 16. Final Exam
10	Attribute to soft skills	communication skill, ethics, discipline
11	Learning methods	Lecture. Presentation, and Discussion
12	Learning media	LCD/projector, White board and Hand out
13	Appraisal	Quiz Assignment Mid-Term Exam Final Exam
14	Lecturer	Dr. Apt. Yoppi Iskandar, M.Si. Dr. Apt. Ade Zuhrotun, M.Si.
15	References	1. Shah B & Seth AK. 2020. *Textbook of Pharmacognosy and Phytochemistry, 2nd Ed*. CBS Publisher & Distributor. India. 2. Heinrich M, Barnes J, Gibbons S, Williamson EM. 2012. *Fundamentals of Pharmacognosy and Phytochemistry*. Elsevier Churchill Livingstone. UK. 3. Watson RR. 2018. *Polyphenols in Plants: Isolation, Purification and Extract Preparation*. Elsevier Science. 4. Sarker SD, Nahar L. 2012. *Natural Products Isolation*. Humana Press Springer Protocols. 5. Sicker D, Zeller KP, Siehl HU, Berger S. 2019. *Natural Products: Isolation, Structure Elucidation, History*. Willey-VCH.

		6. Darcy C Burns, William F Reynolds, 2018, Optimizing NMR Methods for Structure Elucidation: Characterizing Natural Products and Other Organic Compounds, Royal Society of Chemistry, London. 7. Maria Magdalena, Jorge Bravo, 2015, Structure Elucidation in Organic Chemistry: The Search for the Right Tools, Wiley-VCH, New York.

18. Description Module Microbial Pathogenicity

1	Module name	Microbial Pathogenicity
2	Courses code	P20.02019
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	Second Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. Describe and apply the mechanisms of a particular drug at the molecular and cellular levels 2. Apply different instrumental method of analysis to analyze herbal drugs for the evaluation of their pharmacological effects 3. Show contributions in individual or group projects. 4. Summarize information and communicate its development obtained from group experience.
7	Elements of competency	MKK
8	Type competency	Supporting competence
9	Syllabus	1. Microbes and disease, measurement of infectivity and virulence, molecular approaches to diagnose and characterization of bacterial infections; 2. First and second defense against (antibodies and cytotoxic cells); 3. Invasion strategy and bacterial defense against the body's immune; 4. Antimicrobial mechanism of action and resistance; 5. Pathogenesis of tuberculosis, treatment of TB and resistant strains; 6. Pathogenesis of *Pseudomonas aeruginosa*, treatment of wild types and resistant strains; 7. Pathogenesis of *Staphylococcus aureus*, treatment of wild types and resistant strains; 8. Mid-term Exam; 9. Virus structure, type of DNA/ RNA virus and attack strategy against host cells; 10. Viral pathogenesis includes: viral strategy against body's immune, infection patterns, viral transformation and oncogenesis; 11. Mechanism of action of antivirals, viral vaccines and viral infections control ; 12. Pathogenesis of retrovirus (HIV) and its treatment; 13. Pathogenesis of Hepadnavirus (Hepatitis) and its treatment; 14. Pathogenesis of Orthomyxovirus (Influenza A) and its treatment ; 15. Papillomavirus pathogenesis and its treatment; 16. Final Exam

10	Attribute to soft skills	ethics, discipline
11	Learning methods	Lecture and Discussion
12	Learning media	LCD/projector, White board and Hand out
13	Appraisal	Quiz Assignment Mid-Term Exam Final Exam
14	Lecturer	Dr. Apt. Tina Rostinawati, M.Si. Dr. Apt. Tiana Milanda, M.Si. Apt. Sri Agung Fitrikusumah, M.Si.
15	References	1. Wilson BA, Winkler M, Ho BT. Bacterial Pathogenesis: A Molecular Approach. 4th Ed. ASM Press: Washington DC. 2019. 2. Ryu WS. Molecular Virology of Human Pathogenic Viruses. 1st ed. Academic Press: USA. 2016.

19. Description Module Applied Microbiology

1	Module name	Applied Microbiology
2	Courses code	P20.02020
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	Second Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. Define the psychochemical properties of solute and solvent that affect solubility, stability, and other bio-pharmaceutical properties in drug dosage forms development of herbal medicine. 2. Define and apply the mechanism of certain drug on molecular and cellular levels. 3. Apply different instrumental analytical techniques in herbal medicine analysis for herbal its pharmacological effect evaluation 4. List and explain the psychochemical properties of solute and solvent that affect solubility, stability, and other bio-pharmaceutical properties in drug dosage forms development. 5. Present the ability to interpret and analyze data. 6. Develop, validate and apply different instrumental analytical technique in drug analysis on various drug dosage forms.

		7. Show contributions both in individual or group project. 8. Summarize the information collected from the group and communicate the development of the topi
7	Elements of competency	MKK
8	Type competency	Supporting competence
9	Syllabus	1.Introduction of Microbial Technology and Biotechnology, 2. Fermentation Technology, 3. Environment and Microbes, 4. Microbes in the Food Industry; 5. Microbes in Production of Commodity Chemicals; 6-7. Microbes in Production of Fine Chemicals (Antibiotics, Drugs, others); 8. Mid-term Exam; 9. Strategies of Strain Improvement of Industrial Microbes; 10. Vaccines and Their Production; 11.Immobilisation and Biosensors; 12. Microbial Interactions; 13.Computational approaches in Microbiology; 14. Production in Green Algae; 15. a case study in Microbiology application; 16. Final Exam
10	Attribute to soft skills	ethics discipline, awareness, communication skill
11	Learning methods	Lecture and Discussion
12	Learning media	LCD/projector, White board and Hand out
13	Appraisal	written test
14	Lecturer	Apt. Melisa Intan Barliana, Dr.Med.Sc., Dr. Tiana Milanda, Dr Tina Rostinawati
15	References	1. Allen I. Laskin, Geoffrey M. Gadd, Sima Sariaslani. 2011. Advances in Applied Microbiology, Volume 75 [1 ed.]. Academic Press 2. Pratyoosh Shukla (eds.).2017. Recent advances in Applied Microbiology [1 ed.]. Springer Singapore 3. Sanjai Saxena,2015, Applied Microbiology, Springer New Delhi

20, Description Module DNA and Protein Recombinant Technology

1	Module name	DNA and Protein Recombinant Technology
2	Courses code	P20.02021
3	Study loads	3 credits ECTS amount : 5 ECTS Contact hour per semester: 40 Independent study per semester: 96 Total workload: 136
4	Semester	Second Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 1. describe the physical and chemical properties of compounds that affect solubility, stability, and other biopharmaceutical properties

		/ behaviors used in the development of drug dosage form from natural ingredients 2. describes and applies the mechanism of a particular drug at the molecular and cellular levels 3. Apply different instrumental analytical techniques to the analysis of natural drugs for the evaluation of their pharmacological effects 4. Shows individual contributions to a project or group assignment 5. Summarize information gained from the group experience and communicate its development
7	Elements of competency	MKK
8	Type competency	Supporting competence
9	Syllabus	1. Prokaryotes and eukaryotes genetic information flow; 2. plasmids and vectors including the type of plasmids/ vector, genetics and the function of the plasmids/ vectors; 3. Regulation of recombinant gene expression in prokaryotes: components of transcription and translation and mechanisms of gene regulation; 4. Target DNA preparation: genome isolation, primer design, and DNA amplification by PCR; 5. Preparation of target DNA with synthetic gene design; 6. Gene cloning includes: target DNA ligation with vectors, transformation of recombinant plasmids and characterization of recombinant clones; 7. DNA target construction -vector expression, gene over-expression and protein overproduction; 8. Mid-term Exam; 9. Recombinant protein purification and characterization; 10. Amino acids and peptides: fundamental components of protein, the chemical properties of polypeptides and the acids-bases properties of amino acids; 11. Protein: protein structure, protein folding and protein structural motif; 12. Prediction of protein structure: homologous protein, prediction of tertiary structure and threading method; 13. Protein engineering: engineering for protein stabilization, enzymatic activity and specificity; 14. Mutagenesis: site-directed and random mutagenesis methods; 15. Mutant protein: design mutant protein with site-directed mutagenesis; 16. Final Exam
10	Attribute to soft skills	ethics, discipline, awareness, communication skill
11	Learning methods	Lecture and Discussion
12	Learning media	LCD/projector, White board and Hand out
13	Appraisal	Written Test and Presentation
14	Lecturer	Dr. Apt.Tina Rostinawati, M.Si. Dr. Apt. Tiana Milanda, M.Si. Apt. Arif Satria, M.Si.
15	References	1. Crommelin DJA, Sindelar RD, Meibohm B. Pharmaceutical biotechnology: Fundamentals and application. 5th ed. Springer. 2019. 2. Bhatia S, Goli D. Introduction to Pharmaceutical Biotechnology: basic tachniques and concepts. Vol 1. IOP publishing Ltd. 2018.

		3. Clark DP, Pazdernik NJ. Biotechnology. Amsterdam: Elsevier/Academic Cell Press, 2016.

21. Description Module Molecular Based Biomedical Analysis

1	Module name	Molecular Based Biomedical Analysis
2	Courses code	P20.02022
3	Study loads	2 credits ECTS amount : 3 ECTS Contact hour per semester: 27 Independent study per semester: 64 Total workload: 91
4	Semester	Second Semester
5	Precondition	None
6	Competence	Upon completion of this course, students are expected to be able to: 9. Define the psychochemical properties of solute and solvent that affect solubility, stability, and other bio-pharmaceutical properties in drug dosage forms development of herbal medicine. 10. Define and apply the mechanism of certain drug on molecular and cellular levels. 11. Apply different instrumental analytical techniques in herbal medicine analysis for herbal its pharmacological effect evaluation 12. List and explain the psychochemical properties of solute and solvent that affect solubility, stability, and other bio-pharmaceutical properties in drug dosage forms development. 13. Present the ability to interpret and analyze data. 14. Develop, validate and apply different instrumental analytical technique in drug analysis on various drug dosage forms. 15. Show contributions both in individual or group project. 16. Summarize the information collected from the group and communicate the development of the topic.
7	Elements of competency	MKK
8	Type competency	Supporting competence
9	Syllabus	1-2. DNA based molecular analysis methods; 3-4. Bioinformatics; 5. Protein structures and functions; 6-7 Protein isolation methods. 8. Mid-term exam; 9. Protein purification; 10. Protein quantification; 11-12. Protein characterization; 13. Immunohistochemical techniques; 14-15. Characterization of protein activity with bioassay method; 16. Final Exam
10	Attribute to soft skills	communication skill, discipline, awareness
11	Learning methods	Tutorial and discussion, Presentation and discussion
12	Learning media	the LCD viewer and white board or laptop, and "online" (Google Meet)

13	Appraisal	Presentation, Case analysis
14	Lecturer	Dr. apt. Nyi Mekar Saptarini, M.Si. Apt. Melisa Intan Barliana, Dr.Med.Sc.
15	References	1. Crommelin DJA, Sindelar RD, Meibohm B. Pharmaceutical biotechnology: Fundamentals and application. 5th ed. Springer. 2019. 2. Bhatia S, Goli D. Introduction to Pharmaceutical Biotechnology: basic tachniques and concepts. Vol 1. IOP publishing Ltd. 2018. 3. Clark DP, Pazdernik NJ. Biotechnology. Amsterdam: Elsevier/Academic Cell Press, 2016.

22. Description Module Seminar of Research Proposal

1	Module name	Seminar of Research Proposal
2	Courses code	P20.03001
3	Study loads	2 credits ECTS amount : 15 ECTS Contact hour per semester: 53 Independent study per semester: 400 Total workload: 453
4	Semester	Third Semester
5	Precondition	pass research methodology course
6	Competence	Research Proposal Seminar (RPS) is Master students thesis research progress students are expected to be able to: ● Present the ability to interpret and analyze data ● Deliver information orally in an organized, persuasive, and logical manner using documentation and supporting visual aids ● Take, analyze, and interpret scientific literature to provide information to be shared orally or in writing ● Creating documents that are technical, analytical, relevant in content and well managed ● Show contributions both in individual or group project ● Conduct independent literature studies using databases and pharmacology-related publications to solve problems related to the field of pharmacology ● Analyze, interpret, criticize scientific literature related to study design, interpretation data and suitability of conclusions
7	Elements of competency	MKB, MKK
8	Type competency	main competence
9	Syllabus	The students should have research proposal manuscripts that has been wrapped in blue soft cover.
10	Attribute to soft skills	discipline, communication skill, awareness
11	Learning methods	an open seminar that can be attended by students and lecturers.

<table>
<tr><td></td><td></td><td>Technical implementation:
The students present their research proposal for 15 minutes followed by a question and answer session by discussants, each discussant is given 10 minutes to ask questions</td></tr>
<tr><td>12</td><td>Learning media</td><td>the LCD viewer, laptop, white board and "online" (Google Meet)</td></tr>
<tr><td>13</td><td>Appraisal</td><td>discussants evaluate the accountability of students for questions that are critical and clarify towards the topics with percentage scoring:
Significance of background research and/or research focus and Objectives, 15% (fifteen percent);
Relevance and updating of literature review, 25% (twenty five percent);
Accuracy of the objectives and research proportion/hypothesis, 10% (ten percent);
Suitability of research methods, 10% (ten percent);
Scientific writing ability, 20% (twenty percent);
Communication ability in oral exam, 20% (twenty percent);
Total 100% (one hundred percent) can be added with assessment 10% (ten percent).
Final Score:
Students are declared “PASS” if they get an average score of ≥ 68
Students are declared “NOT PASS” if they get an average score of < 68
Converting FS into Grade and Score using the following guidelines:<table><tr><th>Final Score (FS)</th><th>Grade</th><th>Score</th></tr><tr><td>80 ≤ FS ≤ 100</td><td>A</td><td>4</td></tr><tr><td>68 ≤ FS < 80</td><td>B</td><td>3</td></tr><tr><td>56 ≤ FS < 68</td><td>C</td><td>2</td></tr><tr><td>45 ≤ FS < 56</td><td>D</td><td>1</td></tr><tr><td>FS < 45</td><td>E</td><td>0</td></tr></table></td></tr>
<tr><td>14</td><td>Lecturer</td><td>Thesis adviser team and examiner team</td></tr>
<tr><td>15</td><td>References</td><td>1. Unpad Rector Regulation No. 50 of 2016 concerning Guidelines for Masters and Doctoral Education in the Padjadjaran University Environment
2. Academic Guidelines for Master’s Program in Clinical Pharmacy</td></tr>
</table>

23. Description Module Progress Report 1

1	Module name	Progress Report 1
2	Courses code	P20.03002
3	Study loads	1 credits ECTS amount : 12 ECTS Contact hour per semester: 27 Independent study per semester: 320 Total workload: 347

4	Semester	Third Semester
5	Precondition	a. Registered as active students b. Student has conducted a research proposal seminar and passed c. Enrolled in the Progress Report course (1 or 2)
6	Competence	Progress Report Seminar is held to assess the Masters students thesis research progress, students are expected to be able to: ● Present the ability to interpret and analyze data ● Deliver information orally in an organized, persuasive, and logical manner using documentation and supporting visual aids ● Take, analyze, and interpret scientific literature to provide information to be shared orally or in writing ● Creating documents that are technical, analytical, relevant in content and well managed ● Show contributions both in individual or group project ● Conduct independent literature studies using databases and pharmacology-related publications to solve problems related to the field of pharmacology ● Analyze, interpret, criticize scientific literature related to study design, interpretation data and suitability of conclusions
7	Elements of competency	MKB, MKK
8	Type competency	main competence
9	Syllabus	Implementation of this module: a. Conducted in each department according to the concentration / specialization taken by students b. Students independently present the progress of thesis research carried out, in front of lecturers in the Department (at least the Head of the Department and 1 other Lecturer in the Department). c. The detailed presentation mechanism and schedule were regulated by the Head of the Department
10	Attribute to soft skills	communication skill
11	Learning methods	an open seminar that can be attended by students and lecturers. Technical implementation: The students present their research progress followed by a question and answer session
12	Learning media	the LCD viewer, laptop, white board and "online" (Google Meet)
13	Appraisal	The components assessed in the progress seminar include: Methodology comprehension Knowledge comprehension Reasoning comprehension Ability to communicate ideas Research progress percentage Final Score: students are considered pass if the seminar average score is at least B

14	Lecturer	Thesis adviser team, Head of the Department and other Lecturer in the Department
15	References	1. Unpad Rector Regulation No. 50 of 2016 concerning Guidelines for Masters and Doctoral Education in the Padjadjaran University Environment 2. Academic Guidelines for Master's Program in Clinical Pharmacy

24. Description Module Progress Report 2

1	Module name	Progress Report 2
2	Courses code	P20.04001
3	Study loads	1 credits ECTS amount : 11 ECTS Contact hour per semester: 27 Independent study per semester: 289 Total workload: 315
4	Semester	Fourth Semester
5	Precondition	a. Registered as active students b. Student has conducted a research proposal seminar and passed c. Enrolled in the Progress Report course (1 or 2)
6	Competence	Progress Report Seminar is held to assess the Masters students thesis research progress, students are expected to be able to: ● Present the ability to interpret and analyze data ● Deliver information orally in an organized, persuasive, and logical manner using documentation and supporting visual aids ● Take, analyze, and interpret scientific literature to provide information to be shared orally or in writing ● Creating documents that are technical, analytical, relevant in content and well managed ● Show contributions both in individual or group project ● Conduct independent literature studies using databases and pharmacology-related publications to solve problems related to the field of pharmacology ● Analyze, interpret, criticize scientific literature related to study design, interpretation data and suitability of conclusions
7	Elements of competency	MKB, MKK
8	Type competency	main competence
9	Syllabus	Implementation of this module: a. Conducted in each department according to the concentration / specialization taken by students b. Students independently present the progress of thesis research carried out, in front of lecturers in the Department (at least the Head of the Department and 1 other Lecturer in the Department). c. The detailed presentation mechanism and schedule were regulated by the Head of the Department

10	Attribute to soft skills	communication skill
11	Learning methods	an open seminar that can be attended by students and lecturers. Technical implementation: The students present their research progress followed by a question and answer session
12	Learning media	the LCD viewer, laptop, white board and "online" (Google Meet)
13	Appraisal	The components assessed in the progress seminar include: Methodology comprehension Knowledge comprehension Reasoning comprehension Ability to communicate ideas Research progress percentage Final Score: students are considered pass if the seminar average score is at least B
14	Lecturer	Thesis adviser team, Head of the Department and other Lecturer in the Department
15	References	1. Unpad Rector Regulation No. 50 of 2016 concerning Guidelines for Masters and Doctoral Education in the Padjadjaran University Environment 2. Academic Guidelines for Master's Program in Clinical Pharmacy

24. Description Module Seminar of Research Result

1	Module name	Seminar of Research Result
2	Courses code	P20.04002
3	Study loads	2 credits ECTS amount : 14 ECTS Contact hour per semester: 53 Independent study per semester: 354 Total workload: 408
4	Semester	Fourth Semester
5	Precondition	a. Registered as active students b. Student has conducted a research proposal seminar and passed c. Enrolled in the Progress Report course (1 or 2)
6	Competence	Progress Report Seminar is held to assess the Masters students thesis research progress, students are expected to be able to: ● Present the ability to interpret and analyze data ● Deliver information orally in an organized, persuasive, and logical manner using documentation and supporting visual aids

<table>
<tr><td></td><td></td><td>

Take, analyze, and interpret scientific literature to provide information to be shared orally or in writing
Creating documents that are technical, analytical, relevant in content and well managed
Show contributions both in individual or group project
Conduct independent literature studies using databases and pharmacology-related publications to solve problems related to the field of pharmacology
Analyze, interpret, criticize scientific literature related to study design, interpretation data and suitability of conclusions

</td></tr>
<tr><td>7</td><td>Elements of competency</td><td>MKB, MKK</td></tr>
<tr><td>8</td><td>Type competency</td><td>main competence</td></tr>
<tr><td>9</td><td>Syllabus</td><td>The Student should have research proposal manuscripts that have been wrapped in yellow soft cover</td></tr>
<tr><td>10</td><td>Attribute to soft skills</td><td></td></tr>
<tr><td>11</td><td>Learning methods</td><td>an open seminar that can be attended by students and lecturers.

Technical implementation:
The students present their research proposal for 15 minutes followed by a question and answer session by discussants, each discussant is given 10 minutes to ask questions</td></tr>
<tr><td>12</td><td>Learning media</td><td>the LCD viewer, laptop, white board and "online" (Google Meet)</td></tr>
<tr><td>13</td><td>Appraisal</td><td>discussants evaluate the accountability of students for questions that are critical and clarify towards the topics with percentage scoring:

Significance of background research and/or research focus and Objectives, 15% (fifteen percent);
Relevance and updating of literature review, 25% (twenty five percent);
Accuracy of the objectives and research proportion/hypothesis, 10% (ten percent);
Suitability of research methods, 10% (ten percent);
Scientific writing ability, 20% (twenty percent);
Communication ability in oral exam, 20% (twenty percent);
Total 100% (one hundred percent) can be added with assessment 10% (ten percent).

The score of discussants is added up with other discussants score with ratio 60% of adviser team, 40% of examiner team as final score, without converting into grade in advanced.

Final Score:

Students are declared “PASS” if they get an average score of ≥ 68
Students are declared “NOT PASS” if they get an average score of < 68

Converting FS into Grade and Score using the following guidelines:
<table>
<tr><th>Final Score (FS)</th><th>Grade</th><th>Score</th></tr>
<tr><td>80 ≤ FS ≤ 100</td><td>A</td><td>4</td></tr>
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<tr><td>45 ≤ FS < 56</td><td>D</td><td>1</td></tr>
</table>
</td></tr>
</table>

		FS < 45	E	0
14	Lecturer	Thesis adviser team and examiner team		
15	References	1. Unpad Rector Regulation No. 50 of 2016 concerning Guidelines for Masters and Doctoral Education in the Padjadjaran University Environment 2. Academic Guidelines for Master's Program in Clinical Pharmacy		

25. Description Module Magister Comprehensive Defense

1	Module name	Magister Comprehensive Defense
2	Courses code	P20.04003
3	Study loads	3 credits ECTS amount : 14 ECTS Contact hour per semester: 80 Independent study per semester: 340 Total workload: 420
4	Semester	Fourth Semester
5	Precondition	Thesis Defence Form (LS 1, LS 2) : 1 Copy LS4 Form/ UNT Revision Form : 1 Page Proof of Academic Fee Payment Photocopy : 1 Page Thesis Draft (Yellow Soft Cover) : 7 Copies Thesis Statement Form : 1 Page KPA (Academic Achievement Card) Signed by The Program Study Head : 1 Page Library Book Free Form of Faculty of Pharmacy, Unpad Postgraduate, and Unpad Cisral : 1 page
6	Competence	The students are expected to be able to : ● Present the ability to interpret and analyze data ● Deliver information orally in an organized, persuasive, and logical manner using documentation and supporting visual aids ● Define the psychochemical properties of solute and solvent that affect solubility, stability, and other bio-pharmaceutical properties in drug dosage forms development of herbal medicine. ● Define and apply the mechanism of certain drug on molecular and cellular levels ● Characterize and evaluate physicochemical properties of pharmaceutical natural ingredients. ● Take, analyze, and interpret scientific literature to provide information to be shared orally or in writing. ● Creating documents that are technical, analytical, relevant in content and well managed ● Summarize the information collected from the group and communicate the development of the topic. ● List and explain the psychochemical properties of solute and solvent that affect solubility, stability, and other bio-pharmaceutical properties in drugs, biopharmaceutical,

<table>
<tr><td></td><td></td><td>traditional medicine & supplements, and cosmetics development.
● Define important factors which are used in design, manufacture and evaluation of various dosage forms and other drug delivery systems
● Design, manufacture and evaluate dosage forms and other drug delivery systems
● Show contributions both in individual or group project
● Conduct independent literature studies using databases and pharmacology-related publications to solve problems related to the field of pharmacology
● Analyze, interpret, criticize scientific literature related to study design, interpretation data and suitability of conclusions</td></tr>
<tr><td>7</td><td>Elements of competency</td><td>MKB, MKK</td></tr>
<tr><td>8</td><td>Type competency</td><td>main competence</td></tr>
<tr><td>9</td><td>Syllabus</td><td>Comprehensive Examination is the final examination for Masters in Pharmacy education in the form of a comprehensive oral exam, regarding the theories and principles related to the research.

Implementation of this module:
a. Conducted once per semester
b. At the appointed time, student is tested orally in closed session in front of 3 (three) examiners and a team of supervisors
c. The mechanism and schedule of the examination in more detail are regulated by the Head of The Pharmacy Masters Study Program
d. Examination is held for 90 minutes
e. Each examiner asked for 15 minutes
f. Each supervisor asked for a maximum of 15 minutes
g. At least 60% of the total number of examiners and supervisors attended the examination</td></tr>
<tr><td>10</td><td>Attribute to soft skills</td><td>communication skill</td></tr>
<tr><td>11</td><td>Learning methods</td><td>The students present their research results in brief followed by a question and answer session</td></tr>
<tr><td>12</td><td>Learning media</td><td>the LCD viewer, laptop, white board and "online" (Google Meet)</td></tr>
<tr><td>13</td><td>Appraisal</td><td>The components assessed in the examination are the academic abilities in the field / concentration related to research by master students.

<u>Passing Criteria</u>
a. The examination participants are declared to have passed if the average score is at least B.
b. For those who do not pass, they must repeat at least 1 (one) month after the announcement
Final Score:
● Students are declared “PASS” if they get an average score of ≥ 68
● Students are declared “NOT PASS” if they get an average score of < 68
Converting FS into Grade and Score using the following guidelines:
<table>
<tr><th>Final Score (FS)</th><th>Grade</th><th>Score</th></tr>
<tr><td>80 ≤ FS ≤ 100</td><td>A</td><td>4</td></tr>
</table>
</td></tr>
</table>

		68 ≤ FS < 80	B	3
		56 ≤ FS < 68	C	2
		45 ≤ FS < 56	D	1
		FS < 45	E	0
14	Lecturer	Thesis adviser team and examiner team. a. Examiners must hold a Doctorate (Dr.) with a minimum academic position as Lector and/or Professor b. The number of examiners is 3 (three) people		
15	References	1. Unpad Rector Regulation No. 50 of 2016 concerning Guidelines for Masters and Doctoral Education in the Padjadjaran University Environment 2. Academic Guidelines for Master's Program in Clinical Pharmacy		

26. Description Module Scientific paper

1	Module name	Scientific paper
2	Courses code	P20.04004
3	Study loads	1 credits ECTS amount : 12 ECTS Contact hour per semester: 0 Independent study per semester: 369 Total workload: 369
4	Semester	Fourth Semester
5	Precondition	a. Registered as active student b. Has thesis adviser team. c. Scientific article is part of the thesis
6	Competence	The students are expected to be able to : o Find a knowledge of basic concepts in pharmaceutical science in one's area of expertise o Integrating science, knowledge, technology and advanced concepts in pharmaceutical sciences o Design, conduct and maintain original research in one's area of expertise through international publication and research dissemination through seminars o Successfully perform analysis, synthesis and antithesis by applying analytical and critical thinking in reviewing scientific literature and evaluating research findings
7	Elements of competency	MKB, MKK
8	Type competency	main competence
9	Syllabus	Scientific articles that are accepted to be published in a national journal accredited by at least Sinta 3 or an international journal through the approval of the thesis adviser who will act as co-authors, by listing UNPAD as the student's first affiliation.

10	Attribute to soft skills	writing ability
11	Learning methods	Writing and publication
12	Appraisal	Final score is depend by the journal criteria, at least in review
13	Lecturer	Thesis adviser team and The Program Study Head
14	References	1. Unpad Rector Regulation No. 50 of 2016 concerning Guidelines for Masters and Doctoral Education in the Padjadjaran University Environment 2. Academic Guidelines for Master's Program in Clinical Pharmacy

CHAPTER 4

LEARNING STRATEGIES

4.1 Learning Methods

Education in the field of pharmacy oriented to achieve learning outcome which student have ability carry out drug research and development in the context of drug discovery and product development, Able to develop, understanding, and integrate of basic and advance knowledge in pharmaceutical science, able to communicate, implement, and develop dynamic group about their knowledge in the teaching and learning process in higher education in the field of pharmaceutical science. Therefore, we conducted several learning methods to achieve the learning outcome of each module, such as lecturing/tutorial, scientific presentation, and case-based discussion.

1. Lecturing/Tutorial
   The lecture is an orally lighting on the learning material in a class group of learners to achieve specific learning objectives in a relatively large amount. This method is widely used in all semesters and is a package of compulsory and elective courses.

2. Scientific presentations
   Scientific presentations is a learning process which actively involves students in exposing cases of patients with particular analysis, the scientific theme, or study journal in a scientific forum before the supervisor or senior person in charge. The presentation can be in the form of discussion / case reports, reading assignments, presentations guidance of therapy and drug related problems.

3. Discussions
   Discussions are learning methods that involve students in active discussions on every area that addresses all cases, guidance of therapy, drug related problems, drug monitoring, health promotion, and patients counselling. Students undergo rotation in each division area according to the schedule set by the rotation of courses.

4. Research
   Students are required to do research to develop logical, critical, systematic, and creative thinking in clinical pharmacy field

5. Scientific paper
   Students are required to write at least one end of the scientific work in the form of a review article or original article. The final work has to be published in a national journal (at least indexed in Sinta 3) or a reputed international journal.

4.2 Learning Media

Learning media used in master programs in pharmacy has an important role in learning activities to increase learning outcome (Table 4.1).

No.	Media Group	Examples in Learning
1.	Audio visual	LCD
2.	Print	Books,Modules

CHAPTER 5
EVALUATION SYSTEM OF LEARNING

5.1 Evaluation and Monitoring System

Evaluation and monitoring system of the Master program in Pharmacy consists of the Mid-Semester Exam (UTS), and Final Exam (UAS). and Computer Based Test (CBT).

5.2 Exam Requirements

Students are allowed to take the exam if they have met the requirements below:

1. Registered as a student in the semester concerned.
2. Meet all administrative requirements set by the Faculty of Pharmacy.
3. Participating in at least 80% of lecture activities in real terms held in the semester concerned and/or participating in all activities (100%) of laboratory practicum, field work, clinical work, seminars, or similar activities.
4. To take a comprehensive trial, students must meet the following requirements:
   a. Pass all courses in the study program taken (meet the required cumulative study load).
   b. Has compiled and written a thesis and passed a research result seminar
   c. Has completed the administrative requirements set by the University and the Faculty of Pharmacy.

5.3 Thesis Writing

At the end of the Pharmacy Masters Study Program, students are required to make a thesis in the form of research which is divided into 2 credits (0-2) of research proposal 2 credits (0-2) of research and thesis paper examination (including thesis preparation), and 3 credits (0-3) of thesis examination.

1. Thesis is the final scientific work made by Master Study Program student, made based on the research results using applicable scientific methods and principles.
2. A thesis is a student's original scientific work which is indicated by a stamped statement regarding its authenticity.
3. It is hoped that the proof of the authenticity of the thesis will be done using anti-plagiarism software.
4. The thesis has the same position as other courses, but has a different form in the learning process, as well as the method of assessment.
5. The weight of the thesis is set at 9 (nine) credits which are divided into research proposal seminars, progress reports 1, research results seminars, progress reports 2 and comprehensive defense
6. Thesis writing as a final project at the Postgraduate level in Unpad is carried out based on these guidelines.
7. Thesis writing structure and style, such as outline, citation writing, notes (footnote or running note), bibliography, following thesis writing guidelines applicable at the Faculty of Pharmacy of Unpad.

5.4 Research Proposal Seminar (SUP)

Students can take the Research Proposal Seminar course, if:

1. Have a Student Identity Card (KTM) that is valid for the semester concerned.
2. Have a KRS that includes a Research Proposal Seminar as one of the courses.
3. Register to SBP by including research interests.

SUP is a student research plan for the preparation of a thesis, namely:

1. SUP can be implemented in the first semester on the condition that student has passed the research methodology course and it will be carried out no later than the end of semester III (three), if not or it has not been implemented then the student concerned is considered to have resigned.
2. The SUP Discussion Team consists of at least 2 (two) members of Advisor Team, 3 (three) members of Examination Team, and is led by 1 (one) SUP Leader.
3. Students take SUP at predetermined times, and the research proposal manuscripts (UP) must have been bound by transparent mica (white), and submitted to the SUP leader, Advisory Team and Examination Team at least 1 (one) week before SUP implementation.
4. SUP is carried out in a panel and attended by at least 3 (three) discussants, consisting of 1 (one) or 2 (two) Advisory Team and 1 (one) or 2 (two) Examination Team members plus 1 (one) SUP Leader.
5. Leader of SUP is the Head of the Masters Study Program or the Head of Supervisor, which is determined based on the Faculty Dean's Decree on behalf of the Rector
6. The leader of the SUP does not automatically act as a discussant, except in accordance with the student's field of science being tested or as the Head of the Advisory Team;
7. SUP is conducted openly and can be attended by students and lecturers.
8. Students who do not pass SUP, are given the opportunity to repeat SUP 1 (one) time, which is held no later than 3 (three) months after the first SUP. Study termination sanctions will be given, if the student is declared to have not passed SUP for the second time.
9. In SUP, discussants evaluate the contents of the research proposal, ask questions and evaluate the answers given by students, and provide suggestions for improvement of the research proposal.
10. Assessment on SUP is given in the form of a raw score in the range of 0-100.

In SUP, discussants evaluate the accountability of students for questions that are critical and clarify towards the research proposal material/substance with a weight of assessment :

a. Significance of Research Background and/or Research Focus, and Problem Formulation, weight 15% (fifteen percent);
b. Relevance and up-to-date of the Literature Review, weight 25% (twenty five percent);
c. The accuracy of the formulation of Thinking Framework and Research Proposition /Hypothesis, weight 10% (ten percent);
d. Suitability of Research Methods, weight 10% (ten percent);
e. Scientific writing skills, weight 20% (twenty percent);
f. Communication skills in oral examinations, weight 20% (twenty percent).

g. The weight of the 100% (one hundred percent) assessment above can be added to the weight of the assessment of 10% (ten percent)

At the end of the SUP, the discussant/reviewer gives the following assessment:

a. students are declared to have passed if they get an average score of ≥ 68;

b. students are deemed not to pass if they get an average value <68.

Final score (NA)	**HM**	(AM)
80 ≤ NA ≤ 100	A	4
68 ≤ NA < 80	B	3
56 ≤ NA < 68	C	2
45 ≤ NA < 56	D	1
NA < 45	E	0

Convert final score into HM and AM using the following guidelines:

5.5 Research Results Seminar (SHP)

Students can take the Research Results Seminar course if they have completed all the provisions in the Research Proposal Seminar course and progress reports.

If the research cannot be completed in one semester, then:

1. Students are still allowed to complete it in the following semester, by re-entering the Research Results Seminar course on KRS (research topic and supervisor remains the same).
2. At the end of the semester concerned, the subject is given the letter K, so it is not used for calculating GPA and final GPA.

If the thesis cannot be completed in two consecutive semesters, then:

1. The Research Result Seminar course is given the letter E, except in certain cases which can be accounted for academically.
2. Students are required to take the research again with a different title (supervisor can change or the same).

Examinations are carried out on research result material in a Research Results Seminar. The requirements for conducting research seminars are:

1. Submit a letter of recommendation from the supervisor
2. Submit proof of revisions to the research proposal draft in accordance with the suggestions from examiners and supervisors signed by the study program
3. Submit a scientific publication evidence sheet
4. Submit a thesis statement with a stamp of Rp. 6000
5. Submit academic achievement card that has been signed by the Head of Study Program
6. Library-free statement letter for Post Unpad library, Cisral Unpad and Faculty of Pharmacy
7. Laboratory free letter (for those who conduct research in the laboratory)
8. The latest TOEFL test result certificate that is still valid
9. Completing administrative requirements set by the faculty and university.

10. The research result seminar shall be held at least three months after the research proposal seminar.

In SHP, discussants evaluate the accountability of students for questions that are critical and clarify towards the research result material/substance with a weight of assessment :

a. Significance of Research Background and/or Research Focus, and Problem Formulation, weight 15% (fifteen percent);
b. Relevance and up-to-date of the Literature Review, weight 25% (twenty five percent);
c. The accuracy of the formulation of Thinking Framework and Research Proposition /Hypothesis, weight 10% (ten percent);
d. Suitability of Research Methods, weight 10% (ten percent);
e. Scientific writing skills, weight 20% (twenty percent);
f. Communication skills in oral examinations, weight 20% (twenty percent).
g. The weight of the 100% (one hundred percent) assessment above can be added to the weight of the assessment of 10% (ten percent)

Convert final score into HM and AM using the following guidelines:

Final Score (NA)	**HM**	**AM**
80 ≤ NA ≤ 100	A	4
68 ≤ NA < 80	B	3
56 ≤ NA < 68	C	2
45 ≤ NA < 56	D	1
NA < 45	E	0

At the end of the SHP, the discussant / reviewer gives the following assessment:

a. students are declared to have passed if they get an average score of ≥ 68;
b. students are deemed not to pass if they get an average value <68.

5.6 Research and Writing Scientific Articles

1. Research is carried out after students pass SUP and have made improvements to the research proposal and approved by the Advisory Team.
2. During the lecture period and after SUP, students write scientific papers according to the theme of SUP research as one of the requirements for graduation. The scientific works can be in the form of:
   a. Scientific articles in the form of writings that are part of the thesis, as the first author who must include the names of the supervisors who will act as co-authors, by including Unpad institutions, in reputable international journals or international journals with ISSN in accordance with applicable regulations in Unpad environment;
   b. Scientific articles in the form of writing that are part of the thesis, as the first author who must include the names of the supervisors who will act as co-authors, by including the Unpad institution, in accredited national journals at least Sinta 3 accredited in accordance with applicable regulations in the environment Unpad;

3. With the guidance and direction of the Advisory Team (Chairperson and Members), students write 1 (one) scientific article with a topic that is in accordance with thesis research (according to the research theme that has been tested in SUP) to be published in reputable international journals and/or an accredited national journal
4. Students who can submit their research results to international journals at least Q4 Scopus, obtain LoA (Letter of Acceptance), and submit proof of review no longer need to conduct research results seminars but still have to conduct a comprehensive trial.
5. Students submit scientific articles to reputable international scientific journals and/or accredited national journals with the approval of the supervisors who will act as co-authors, including the Unpad institution.
6. Especially for students whose 1 (one) scientific article is accepted or published in a reputable international journal of at least Q3 Scopus, as evidenced by a letter of acceptance from the reputable international journal publisher (written during their Masters Program and according to the research theme that has been tested in the SUP), in accordance with the applicable provisions in Unpad, the student concerned is given an assessment with the grade A for the research result seminar course while still being required to write a thesis that is adjusted to the scientific article.

Linkage of Thesis with Scientific Articles

a. Students write a thesis manuscript in accordance with UP and based on research results published as scientific articles;
b. One of the research sub-topics, produces 1 (one) scientific article with a certain “sub-topic / issue” that is in accordance with the research theme/topic during SUP;

1. Thesis research topic (X), consisting of (can be divided into) several sub-topics X1, and Xn;
2. Research sub-topics X1, producing scientific articles in reputable international journals/ accredited national journals/ ISSN national journals/seminar proceedings with “topics/issues” X1;
3. Xn research subtopics, producing scientific articles in reputable international journals/ accredited national journals/ISSN national journals / seminar proceedings with Xn "topics/issues";
4. The synthesis of the three researches can produce one scientific article in a reputable international journal/accredited national journal;
5. Written scientific articles (X1, Xn), their ideas are derivatives of the main ideas contained in X.

5.7 Thesis

1. General

a. Master Program students can take the examination in the form of a comprehensive trial according to their respective concentrations if they meet the following requirements:
   1) Has passed all courses with a final GPA of at least 3.00;
   2) Has implemented SUP and is declared passed; and the thesis paper has been tested in a research results seminar (SHP)
   3) The thesis paper has been approved by the Advisory Team;

4) Submit a Letter of evidence of published scientific articles (written while attending Masters Program)

b. Before the comprehensive trial, students must first pass the Research Results Seminar;

c. Before the trial, the Advisory Team evaluates the material/substance of the manuscript submitted through the Research Results Seminar (SHP) which is managed by the Study Program;

d. Thesis examination material is a comprehensive trial according to the student's research topic and the concentration of each student

e. The Head of the trial is the Head of the Masters Study Program or the Head of Advisor Team;

f. The trial discussion team consists of at least 2 (two) members of Advisory Teams and 3 (three) examiners;

g. Students attend the trial at the appointed time, and the thesis manuscript must be bound in yellow soft cover, and submitted to the Head of the trial, the Advisory Team and the Examining Team at least 1 (one) week before the implementation of the Thesis Examination (UT);

h. The Head of the trial does not automatically act as a discussant, except in accordance with the student's field of science being tested or as the Head of Advisor Team.

2. Thesis Examination (UT)

a. UT is carried out in a panel and attended by at least 3 (three) discussants, consisting of 1 (one) or 2 (two) members of Advisory Team and 1 (one) or 2 (two) members of Examination Team and added 1 (one) UT Leaders;

b. The Examination Team at the stipulated SHP time must be the same as the SUP Examination Team;

c. In UT, discussants evaluate the content of the thesis manuscript with a weight of assessment:

1) Significance of Research Background and/or Research Focus, and Problem Formulation, weight 10% (ten percent);

2) Relevance and up-to-date of Literature Review, weight 20% (twenty percent);

3) Accuracy of the formulation of Thinking Framework and Research Proposition/Hypothesis, weight 10% (ten percent);

4) Suitability of Research Methods, weight 10% (ten percent);

5) Sharpness of analysis and wholeness of thought, weight 20% (twenty percent);

6) Stability and quality of the conclusions, as well as the suggestions submitted, weight 10% (ten percent);

7) Scientific writing skills, weight 10% (ten percent);

8) Communication skills in the oral exam, weight 10% (ten percent).

The weight of the 100% (one hundred percent) assessment above can be added to the weight of the assessment of 10% (ten percent) assessment below, if students can show a contribution to the growth of science, technology, and developments.

d. Assessment on UT is given in the form of a raw score in the range of 0-100

e. At the end of the UT, the discussant gives the following assessment:

1) students are declared to have passed if they get an average score of ≥ 68;

2) students are deemed not to pass if they get an average value <68.

f. The score of the discussant is added up by the percentage of the Advisory Team of 60% (sixty percent) and the Examination Team 40% (forty percent) as NA, without first being converted into HM;

g. Conversion of final score into HM and AM using the following guidelines:

Final Score (NA)	HM	AM
80 ≤ NA ≤ 100	A	4
68 ≤ NA < 80	B	3
56 ≤ NA < 68	C	2
45 ≤ NA < 56	D	1
NA < 45	E	0

h. Students who do not pass UT, are given the opportunity to take 1 (one) SHP exam in the agreed time period, taking into account the study time limit;