



UNIVERSITAS
GADJAH MADA

BACHELOR IN PHARMACY

FACULTY OF PHARMACY

MODULE HANDBOOK



Cell Biology - Microbiology (6,68 ECTS/4(1) CSU)

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| Code/ Status | : FAF 1171/Compulsory |
| Module level | : Undergraduate |
| Semester | : 1 |
| Module Coordinators/ Lecturers | : Puji Astuti Indah Purwantini Sylvia Utami Tunjung Pratiwi Djoko Santosa |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Classroom lectures, 150 minutes/week Practical works, 120 minutes/week |
| Workload | : 150 minutes of in-class lectures, 180 minutes of structured activities, 180 minutes of weekly self-study, 120 minutes laboratory work, 50 minutes report preparation |
| Credit points | : 6,68 ECTS/4(1) CSU |
| Pre-Requisite | : - |
| Learning goals/ Course Outcomes | : Students are able to determine the correct method in evaluating the microbiological quality of pharmaceutical preparations; to demonstrate theoretical concepts about medicine, the human body, and the mechanism of action of drugs; and are able to critically study scientific journals about cells and microorganisms in the pharmaceutical field to improve and expand knowledge of science. |
| Content | : This course discusses the scope and benefits of studying pharmaceutical microbiology, cell biology and parasitology in the field of pharmacy in particular and health in general, which includes the basic concepts of cell biology for prokaryotic and eukaryotic organisms, subcellular structures and functions that occur within cell organelles, how the cellular system can be targeted as antimicrobial action, cell division process and its application in the discovery of antimicrobial drugs and the occurrence of disease. The types of microbes and parasites, pathogenicity and control both physically and chemically, the model of the mechanism of antibiotic action and its resistance, and the tests and biases that are commonly needed in pharmaceutical microbiology also discussed. At the end of this course a case study that integrates previous lecture materials is given in the form of a discussion group forum. |
| Study/exam achievements | : A-E, 8% Quiz, 10% Tasks, 2% Pretest, 12% Practical report, 10% Discussion, 10% Practical test, 24% Midterm, 24% Final exam |
| Forms of media | : Face to face instruction, Slides, Board, Internet |



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- Literatures
1. Alberts, B., Bray, D., Lewis, J., Raff, M., Roberts, K., Watson, J.D., 1994, *Molecular Biology of The Cell*, Third Ed., Garland Publishing Inc., New York, USA.
 2. Avers, C.J., 1982, *Basic Cell Biology*, 2nd Edition, Willard Grant Press, Boston.
 3. Becker, W.M., Kleinsmith, L.J., and Hardin, J., 2000, *The World of The Cell*, 4th Edition, The Benjamin/Cummings Publishing Co., San Fransisco.
 4. Campbell, N.A., 1996, *Biology*, 4th Edition, The Benjamin/Cummings Publishing Co., California, USA .
 5. Karp, G., 1999, *Cell and Molecular Biology: Concepts and Experiments*, 2nd Edititon, John Willey and Sons, New York.
 6. Knox, B., Ladiges, P., Evans, N., 1999, *Biology*, 4th Edition, WCB,/McGraw-Hill Publishers, Australia.
 7. Prescott, L.M., Harley, J.P., Klein, D.A., 1993, *Microbiology*, 2nd Edition, Wm.C. Brown Publishers, USA.
 8. Anonim, 2002, *The Biologi Project*, The university of Arizona, USA, available [online] http://www.biology.arizona.edu/cell_bio/tutorials.html, 24 Juni 2004.
 9. Anonim, 2004, The Difference Between Prokaryotic and Eukaryotic Cells, available [online], <http://www.trentu.ca/academic/biology/101/2.html#prokaryotic>, 26 Juni 2004.
 10. Farabee, M.J., 2001, *Photosynthesis*, available [online] <http://www.emc.maricopa.edu/faculty/farabee/BIOBK/BioBookPS.html>, 24 Juni 2004.
 11. Gwen V. Childs, Ph.D., 1998, *Lysosome*, tersedia [online] <http://cellbio.utmb.edu/cellbio/lysosome.htm>, 26 Juni 2004.
 12. Thorpe, N.O., 1984, *Cell Biology*, John Willey and Sons, New York.
 13. Vanderschaegen, P., 1995. *Golgi Apparatus*, available [online], <http://www.winterwren.com/apbio/cellorganelles/golgi.html>, 26 Juni 2004.
 14. Weaver R.F and Hendrick, P.W., 1992, *Genetics*, 2nd Edititon, W.m.C., Brown Publishers, USA.
Wolfe, S.L., 1993, *Molecular and Cellular Biology*, Wadsworth Publishing Company, Bekmont, California.
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Pharmaceutics I (3,34 ECTS/2(0) CSU)

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| Code/ Status | : FAF 1371/Compulsory |
| Module level | : Undergraduate |
| Semester | : 1 |
| Module Coordinators/ Lecturers | : Marchaban Chairun Wiedyaningsih Septimawanto Dwi Prasetyo Niken Nur Widyakusuma |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Classroom lectures, 100 minutes/week |
| Workload | : 100 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study |
| Credit points | : 3,34 ECTS/2(0) CSU |
| Pre-Requisite | : - |
| Learning goals/ Course Outcomes | : Students are able to understand the history of the development of pharmaceutical science, medicine, and pharmacists, able to explain the purpose of Latin in prescription, copies of prescription, and recognize semisolid, solid, and liquid pharmaceutical dosage forms |
| Content | : Pharmaceutics I discuss about the history of pharmacy and pharmacists, drugs and drug classification, general rules of Indonesian Pharmacopoeia, use of Latin in prescriptions and copies of prescriptions, introduction of dosage forms and methods of administration: pulvis, pulveres, capsules, tablets, pills, pasta, cremores, gel, suppository, unguentum, enema, solution, suspension, emulsion, eye drops, injection, vaccine, immunoserum, and special preparations |
| Study/exam achievements | : A-E, 50% Midterm and 50% Final exam |
| Forms of media | : Face to face instruction, Slides, Board, Internet |
| Literatures | : 1. Anonim, 1995, <i>Farmakope Indonesia</i> , Edisi IV, Departemen Kesehatan RI, Jakarta. 2. Ansel, H. C., Popovich, N.G., Allen, L.V., 2005, <i>Pharmaceutical Dosage Forms and Drug Delivery Systems</i> , 8 th Ed., Williams & Wilkins, Philadelphia. 3. Hanes, J.R., 1962, <i>Latin Grammar Simplified</i> , Coles Publishing Company, Limited, Toronto. 4. Langley, C., Belcher, D., 2008, <i>Pharmaceutical Compounding and Dispensing</i> , Pharmaceutical Press, London. 5. Allen, L.V, 2013, <i>Remington: The Science and Practice of Pharmacy</i> , 22 th Ed., Pharmaceutical Press and University of Sciences, Philadelphia. 6. Aulton, M.E., and Taylor K.M.G., 2013, <i>Aulton's Pharmaceutics: The design and manufacture of medicines</i> , 4th Ed, Elsevier, Edinburgh. |



Pharmaceutics II (3,34 ECTS/2(1) CSU)

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| Code/ Status | : FAF 1372/Compulsory |
| Module level | : Undergraduate |
| Semester | : 2 |
| Module Coordinators/ Lecturers | : Chairun Wiedyaningsih Septimawanto Dwi Prasetyo Bondan Ardiningtyas Niken Nur Widyakusuma |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Classroom lectures, 50 minutes/week Practical works, 120 minutes/week |
| Workload | : 50 minutes of in-class lectures, 60 minutes of structured activities, 60 minutes of weekly self-study, 120 minutes laboratory work, 50 minutes report preparation |
| Credit points | : 3,34 ECTS/2(0) CSU |
| Pre-Requisite | : Pharmaceutics I (FAF 1371) |
| Learning goals/ Course Outcomes | : Students are able to explain the general requirements and requirements for dispensing drugs: facilities, infrastructure, personnel, and compounding guidelines as well as examples of their application in standard prescriptions, make copies of prescriptions and explain cases of incompatibility with pharmaceutical preparations, resolve calculation problems in compounding pharmaceutical preparations and dosage calculations, explain pharmaceutical preparation compounding preparation methods, drug storage, expired date, and beyond use date, compounding pharmaceutical preparations according to prescription |
| Content | : The course and practice of Pharmaceutics II discusses aspects of drug compounding on a small scale (pharmacy) so that it is able to become a basis for development on a large scale (industry). The contents of the lectures on Pharmaceutics II include general rules and requirements for dispensing medicines: facilities, infrastructure, personnel, procedure of standard operation (including measuring weight), calculation of formulas / calculations in drug compounding, etiquette, changes in dosage forms, getting to know a variety of prescription standards for drugs and drugs outside, preparation methods for solid, semisolid and liquid preparations, incompatibility in compounding drugs, drug storage, expired date and beyond use date. The contents of practicum Pharmaceutics II consist of making solid, semi-solid, and liquid pharmaceutical preparations (pulvis, pulveres, capsulae, pillulae, kremores, unguentum, pastae, suppositoria, solutio, mixtura, infusio, and saturatio) |
| Study/exam achievements | : A-E, 25% Midterm (CBT), 25% Final exam (CBT), and 50% practice |
| Forms of media | : Face to face instruction, Slides, Board, internet |



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- Literatures : 1. Banker, G.S., Rhodes, C.T., 1996, *Modern Pharmaceutics*, 3rd Ed., Marcel Dekker, Inc., New York
2. Dipiro, J.T., Talbert, R.L., Yee., G.C., et al., eds 2002, *Pharmacotherapy: A Patophysiologic Approach*, 5th Ed., Mc Graw-Hill, New York.
3. Florence, A.T., Salole, E.G., 1990, *Formulations Factors in Adverse Reactions*, Wright, London.
4. Rowland, M., Tozer, TN., 1995 *Clinical Pharmacokinetics, Concepts and Applications*, 3rd Ed., Lippincott, Williams & Wilkins.
5. Rodrigues, AD 2002, *Drug-Drug Interactions*, Marcel Dekker, Inc.
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Social Behaviour Science for Pharmacy (3,34 ECTS/2(0) CSU)

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| Code/ Status | : FAF 1373/Compulsory |
| Module level | : Undergraduate |
| Semester | : 2 |
| Module Coordinators/ Lecturers | : Marlita Putri Ekasari Susi Ari Kristina Chairun Wiedyaningsih Niken Nur Widyakusuma |
| Language | : Indonesian |
| The format/class hours per week during the Semester | : Classroom lectures, 100 minutes/week |
| Workload | : 100 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study |
| Credit points | : 3,34 ECTS/2(0) CSU |
| Pre-Requisite | : - |
| Learning goals/ Course Outcomes | : Students are able to understand concept and definition of health behaviour, behaviour theory, and behaviour changes and its applications in pharmaceutical care; to interpret patient behaviour changing factors, outline patient trust issues which affects comprehensive treatment success; to relate social phenomena relatable situation such as stigma and medical pluralism; to apply social determinant of health concept to explain observation result in community setting; and are able to utilize social behaviour theory approaching with medical team in patient treatment. |
| Content | : This course discusses the concept, methods and socio-psychology theory and its application in pharmaceutical care. Application and methods of social behaviour are applied in pharmaceutical care to patient in biopsychosocial approach, rational reciping behaviour, health promotion, and suitable health seeking behaviour with effective communication. Up- to-date case studies are given to support professionalism and holistic and optimum pharmaceutical care. |
| Study/exam Achievements | : A-E, 15% Discussion, 15% Task, 35% Midterm, 35% Final exam |
| Forms of media | : Face to face instruction, Computer, Gadget, Slides, Internet |
| Literatures | : 1. Donyai, P, 2012, <i>Social and Cognitive Pharmacy, Theories, and Case Studies</i> , Pharmaceutical Press, London. 2. Glanz, K, et al, 2008, <i>Health Behaviour and Health Education 5th Edition</i> , Jossey-Bass, San Fransisco. 3. Griffin, E, 2006, <i>A First Look at Communication Theory 6th Edition</i> , McGraw-Hill, New York. |



Physical Pharmacy I (3,34 ECTS/2(0) CSU)

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| Code/ Status | : FAF 1471/Compulsory |
| Module level | : Undergraduate |
| Semester | : 1 |
| Module Coordinators/ Lecturers | : Abdul Karim Zulkarnain Akhmad Kharis Nugroho Adhyatmika |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Classroom lectures, 100 minutes/week |
| Workload | : 100 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study |
| Credit points | : 3,34 ECTS/2(0) CSU |
| Pre-Requisite | : - |
| Learning goals/ Course Outcomes | : Students are able to understand the phase rules and the causes of phase changes, the relation of thermodynamic with pharmacy, explain the physical properties of drug molecules, explain the concepts of solution, buffer, tonicity and prediction of the solubility of drug compounds, understand the basic principles of determining drug stability/expiration time, apply the principles of dissolution in drug dosage formulations, both as a basis for preparation, design, and quality control. |
| Content | : Physical pharmacy I discusses the subject matter of phase and phase rules, the relation of thermodynamic and pharmacy, physical properties of drug molecules, reaction kinetics, concept of solution and solubility, ionic balance (review), buffer composition and buffer solution, tonicity in isotonic pH. |
| Study/exam achievements | : A-E, 20% task, 5% discussion, 5% SCL, 10% quiz, 30% midterm, 30% final exam |
| Forms of media | : Face to face instruction, Slides, Board, Internet |
| Literatures | : 1. Allen, T., 2003, Powder Sampling and Particle Size Determination, Elsevier, Amsterdam. 2. Aulton, M.E. (Ed.), 2004, Pharmaceutics: The Science of Dosage Form Design, 2nd Ed., ELBS, Hongkong. 3. Banher, G.S., Rhodes, C.T., 2002, Modern Pharmaceutics, 4th Ed., Marcel Dekker, New York. 4. Florence, A.T. & Attwood D., 2006, Physicochemical Principles of Pharmacy, 4th Ed., Pharmaceutical Press, London. 5. Kim, C.J., 2004, Advanced Pharmaceutics, Physicochemical Principles, CRS Press, New York. 6. Sinko, P.J., 2011, Martin's Physical Pharmacy and Pharmaceutical Sciences, 6th Ed., Lippincott Williams & Wilkins, A Wolters Kluwer Co., Philadelphia. |



Physical Pharmacy II (3,34 ECTS/2(1) CSU)

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| Code/ Status | : FAF 1472/Compulsory |
| Module level | : Undergraduate |
| Semester | : 2 |
| Module Coordinators/ Lecturers | : Abdul Karim Zulkarnain Akhmad Kharis Nugroho Adhyatmika |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Classroom lectures, 50 minutes weekly Practical works, 120 minutes weekly |
| Workload | : 50 minutes of in-class lectures, 60 minutes of structured activities, 60 minutes of weekly self-study, 120 minutes laboratory work, 50 minutes report preparation |
| Credit points | : 3,34 ECTS/2(1) CSU |
| Pre-Requisite | : Physical Pharmacy I (FAF 1471) |
| Learning goals/ Course Outcomes | : Students are able to understand and apply the principle of face tension in pre-formulation of drug preparations, as well as drug adsorption on the interface in producing therapeutic effects, the process of formulation of drug preparations based on the properties of colloidal dispersions, suspensions, and emulsions, identify the effect of flow properties and particle properties for the basic pre-formulation of drug preparations, affecting hygroscopicity on the stability of preparations, apply the principle of diffusion in the preparation of drug dosage formulations, able to experimentally test the solubility and partition coefficient of a drug compound and its application in pharmacy. |
| Content | : Physical Pharmacy II course consists of learning through lectures (1 credit) and practical skill (1 credit). Overall the Physical Pharmacy II course contains material about the subject matter of the problem. The practical skill of Physical Pharmacy II studies and practices directly intrinsic solubility and total solubility, coefficient of drug partitioning, the average size of drug particles by sieving and microscopically, measurement of viscosity and rheology, as well as colloidal dispersion, interface phenomena, dispersion coefficient, adsorption coefficient at the interface, colloidal dispersion and its properties, rheology, coarse dispersion, micromeritics, hygroscopicity, diffusion and drug dissolution. |
| Study/exam achievements | : A-E, 5% Task, 12% discussion, 5% quiz, 18% practical skill, 10% practical skill test, 25% midterm, 25% final exam |
| Forms of media | : Face to face instruction, Slides, Board, Internet |
| Literatures | : 1. Allen, T., 2003, Powder Sampling and Particle Size Determination, Elsevier, Amsterdam. 2. Aulton, M.E. (Ed.), 2004, Pharmaceutics: The Science of Dosage Form Design, 2nd Ed., ELBS, Hongkong. 3. Banher, G.S., Rhodes, C.T., 2002, Modern Pharmaceutics, 4th Ed., Marcel Dekker, New York. 4. Florence, A.T. & Attwood D., 2006, Physiochemical Principles of Pharmacy, 4th Ed., Pharmaceutical Press, London. |



Universitas Gadjah Mada

Faculty of Pharmacy

Undergraduate Program in Pharmacy

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5. Sinko, P.J., 2011, Martin's Physical Pharmacy and Pharmaceutical Sciences, 6th Ed., Lippincott Williams & Wilkins, A Wolters Kluwer Co., Philadelphia.
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Basic Pharmaceutical Chemistry (5,01 ECTS/3(1) CSU)

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| Code/ Status | : FAF 1671/Compulsory |
| Module level | : Undergraduate |
| Semester | : 1 |
| Module Coordinators/ Lecturers | : Ritmaleni B. Ari Sudarmanto Tatang Irianti Sudibyo Martono |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Classroom lectures, 100 minutes/week Practical works, 120 minutes/week |
| Workload | : 100 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study, 120 minutes laboratory work, 50 minutes report preparation |
| Credit points | : 5,01 ECTS/3(1) CSU |
| Pre-Requisite | : - |
| Learning goals/ Course Outcomes | : Students are able to understand the concepts of acid-base stoichiometry, redox and analysis of functional groups; the basic concepts and laws of thermodynamics; the basic concepts of qualitative and quantitative analysis using simple instruments; and the basic concepts of bond formation, functional groups, molecules and examples of their application to everyday life. |
| Content | : This course discusses the basic theory of Pharmaceutical Chemistry as a support for subjects related to the application of chemistry in the pharmaceutical field. This course includes the theory of the formation of organic molecules, chemical bonds, radioactivity, gases, chemical kinetics, thermochemistry, qualitative analysis of cations, anions and functional groups, acid-base, redox, gravimetric, thermal analysis methods, and electrochemical foundations. |
| Study/exam achievements | : A-E, 35% Midterm, 35% Final exam, 30 % Laboratory works |
| Forms of media | : Face to face instruction, Slides, Board, Internet |



Literatures

: Main References

1. Fessenden, R.J. dan Fessenden J.S., 1997, Kimia Organik, Edisi kedua, Alih bahasa A.H. Pudjaatmaka, Erlangga, Surabaya.
2. Brady, J.E. and Serese F., 2003, Chemistry, Matter and Its Changes, Fourth Edition, John Wiley and Sons Inc., New York

Supporting References

1. Cairns, D., 2008, Essentials of Pharmaceutical Chemistry, Pharmaceutical Press, London
 2. Chang, R. and Overby, J., 2011, General Chemistry, The Essential Concepts, Sixth Edition, McGraw-Hill, New York
 3. Christian, G.D., 2004, Analytical Chemistry, Sixth Edition, Brooks/Cole, USA
 4. Kimia Untuk Farmasi
 5. Craig, D.Q.M. and Reading, 2007, Thermal Analysis of Pharmaceuticals, CRC Press, London
 6. Hill, J.W., Petrucci, R.H., McCreary, T.W., Perry, S.S., 2005, General Chemistry, Fourth Edition, Pearson Prentice Hall, Upper Saddle River, New Jersey
 7. Masterton, W.L. and Hurley, C.N., 2009, Chemistry: Principle and Reaction, Sixth Edition, Brooks/Cole Cengage Learning, California
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Universitas Gadjah Mada
Faculty of Pharmacy
Undergraduate Program in Pharmacy

Analytical Chemistry I (3,34 ECTS/2(1) CSU)

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| Code/ Status | : FAF 1672/Compulsory |
| Module level | : Undergraduate |
| Semester | : 2 |
| Module Coordinators/ Lecturers | : Endang Lukitaningsih Sugeng Riyanto Sudibyo Martono Sardjiman Retno Sunarminingsih Edy Meiyanto Tatang Irianti Rumiyati Abdul Rohman Muthi' Ikawati Adam Hermawan Ratna Budhi Pebriana Novrizal Abdi Sahid Rohmad Yudi Utomo |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Classroom lectures, 50 minutes/week Practical works, 120 minutes/week |
| Workload | : 50 minutes of in-class lectures, 60 minutes of structured activities, 60 minutes of weekly self-study, 120 minutes laboratory work, 50 minutes report preparation |
| Credit points | : 3,34 ECTS/2(1) CSU |
| Pre-Requisite | : Basic Pharmaceutical Chemistry (FAF 1671) |
| Learning goals/ Course Outcomes | : Students are able to discuss the right volumetric methods for analysis of drug or drug materials based on their compound structure; to well demonstrate the volumetric analysis of drug or drug materials; to process data and evaluate the results of analysis of drug or drug materials; and to state if drug or drug materials meet the requirements needed. |
| Content | : This course discusses the basics of volumetric analysis of drug compounds quantitatively, which includes: acidimetry-alkalimetry, water-free titration, oxidation-reduction (iodo-iodimetry, permanganometry, serimetry, bromo-bromatometry, nitrimetry), complexometry, precipimetry (argentometry), and electrometry (potentiometry, voltammetry, coulometry). |
| Study/exam achievements | : A-E, 10% Task/Mini quiz, 15% Pre-test & Practice work, 10% Practice Report, 22.5% Midterm, 22.5% Final exam, 20% Practice exam |
| Forms of media | : Face to face instruction, Slides, Board, internet, practical instrument |



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- Literatures : 1. Kar, A, 2005, *Pharmaceutical Drug Analysis*, Age Int. Limited Publisher, New Delhi
2. Vogel's, 1989, *Textbook of quantitative analysis*, 5th Ed, Longmans, Green and Co, London, New York, Toronto
3. Watson, D.G., 1999, *Pharmaceutical Analysis: A Textbook for Pharmacy Students and Pharmaceutical Chemist*, 2nd Ed, ChurcillLivingson, UK
4. Miller, J.M.; Miller, J.C. *Statistics and Chemometrics for Analytical Chemistry*, Fifth. ed., Pearson Education Limited, London, 2005; 213-219, 234-236
5. Anonymous, 2018, *United States Pharmacopoeia*, New York, USA
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Universitas Gadjah Mada
Faculty of Pharmacy
Undergraduate Program in Pharmacy

Organic Chemistry I (5,01 ECTS/3(0) CSU)

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| Code/ Status | : FAF 1771/Compulsory |
| Module level | : Undergraduate |
| Semester | : 1 |
| Module Coordinators/ Lecturers | : Ratna Asmah Susidarti Sardjiman Hilda Ismail Ritmaleni |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Classroom lectures, 150 minutes/week |
| Workload | : 150 minutes of in-class lectures, 180 minutes of structured activities, 180 minutes of weekly self-study |
| Credit points | : 5,01 ECTS/3(0) CSU |
| Pre-Requisite | : - |
| Learning goals/ Course Outcomes | : Students are able to understand the basic concepts of structure and chemical bonds, functional groups, alkanes and cycloalkanes; the basic concepts of stereochemistry, alkenes, alkyne and alkyl halides; the basic concepts of aromatic compounds, electrophilic and nucleophilic aromatic substitution reactions; the basic concepts of ethers, epoxides, sulfides, alcohols, thiols, aliphatic and aromatic amines and phenols and the basics of retrosynthetic analysis on alcoholic compounds. |
| Content | : This course discusses the basics of chemical structures and bonds, functional groups, alkanes and cycloalkanes; stereochemistry, alkenes, alkyne, alkyl halides, aromatic compounds, substitution reactions for electrophilic and nucleophilic aromatics, ethers, epoxides, sulfides, alcohols, thiols, aliphatic and aromatic amines, phenols and the basics of retrosynthetic analysis of alcoholic compounds. |
| Study/exam achievements | : A-E, 50% Midterm, 50% Final exam |
| Forms of media | : Face to face instruction, Slides, Board, Internet |



Literatures

: Main References

1. McMurry, J., edisi 8, 2012, *Organic Chemistry*, Brooks / Cole Publishing Company, Monterey, California.

Supporting References

1. Solomon, T.W.G, 1997, *Fundamentals of Organic Chemistry*, John Wiley & Sons, Inc., New York.
 2. Fessenden, R.J. dan Fessenden J.S., 1997, *Kimia Organik*, Edisi kedua, Alih bahasa A.H. Pudjaatmaka, Erlangga, Surabaya.
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Organic Chemistry II (5,01 ECTS/3(1) CSU)

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| Code/ Status | : FAF 1772/Compulsory |
| Module level | : Undergraduate |
| Semester | : 2 |
| Module Coordinators/ Lecturers | : Ritmaleni Ratna Asmah Susidarti Sardjiman Hilda Ismail |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Classroom lectures, 100 minutes/week Practical works, 120 minutes/week |
| Workload | : 100 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study, 120 minutes laboratory work, 50 minutes report preparation |
| Credit points | : 5,01 ECTS/3(1) CSU |
| Pre-Requisite | : Organic Chemistry I (FAF 1771) |
| Learning goals/ Course Outcomes | : Students are able to understand the basic concepts of nucleophilic addition reactions in aldehydes and ketones; the basic concepts of nucleophilic acyl substitution reactions in carboxylic acid and its derivatives; the basic concepts of alpha substitution reactions and condensation on carbonyl compounds; and the basic concepts of carbohydrates, nucleic acids, fats, amino acids and proteins. |
| Content | : This course discusses about the classification of carbonyl compounds, how they are made, their reactions, and their applications to carbohydrate, protein and amino acid molecules and also about their use in the design of simple drug synthesis. |
| Study/exam achievements | : A-E, 50% Midterm, 50% Final exam |
| Forms of media | : Face to face instruction, Slides, Board, Internet |



Universitas Gadjah Mada
Faculty of Pharmacy
Undergraduate Program in Pharmacy

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- Literatures : 1. McMurry, J., edisi 8, 2012, *Organic Chemistry*, Brooks / Cole Publishing Company, Monterey, California.
2. Clayden et al., 2012, *Organic Chemistry*
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Universitas Gadjah Mada
Faculty of Pharmacy
Undergraduate Program in Pharmacy

Bahasa Indonesia and Scientific Writing (3,34 ECTS/2(0) CSU)

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| Code/ Status | : | FAF 2072/Compulsory |
| Module level | : | Undergraduate |
| Semester | : | 3 |
| Module | : | Susi Ari Kristina |
| Coordinators/ Lecturers | : | Ika Puspita Sari Nanang Fakhruhin Sylvia Utami TP |
| Language | : | Indonesian |
| The format/class hours per week during the semester | : | Classroom lecture, 100 minutes/week |
| Workload | : | 100 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study |
| Credit points | : | 3,34 ECTS/2(0) CSU |
| Pre-Requisite | : | - |
| Learning goals/ Course Outcomes | : | Students are able to understand the principles of the rules of Indonesian spelling, skillfully apply the Indonesian spelling concept to create good scientific articles, to sharpen effective communication skills through group work and presentations, and to respect other people's opinion through discussion and giving feedback when talking to others. |
| Content | : | This course contains material about the applications of Bahasa Indonesia for scientific writing, including the use of letters, words, punctuations, and the use of uptake of foreign languages, according to the rules of Indonesian spelling. Types of scientific writing and systematics of scientific writing, as well as techniques for compiling scientific writing are also taught in this course. Other skills taught in this course are search and writing of literature materials, reference writing, and the ethics of scientific writing. |
| Study/exam achievements | : | A-E, 35% Midterm, 35% Final exam, 25% discussion activities, and 5% of other activities |
| Forms of media | : | Face to face instruction, Slides, Board, internet |



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- Literatures : 1. Badan Pengembangan dan Pembinaan Bahasa Kemendikbud, Pedoman Umum Ejaan Bahasa Indonesia, 2016, Kementrian Pendidikan dan Kebudayaan, Jakarta.
2. Badan Pengembangan dan Pembinaan Bahasa Kemendikbud, 2016, Kamus Besar Bahasa Indonesia, Edisi V, Balai Pustaka, Jakarta
3. Committee on Publication Ethics (COPE), 2010, International Standadrs for Editors and Authors, Committee on Publication Ethics, Hampshire UK
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Universitas Gadjah Mada
Faculty of Pharmacy
Undergraduate Program in Pharmacy

Pharmacognosy-Phytochemistry (5,01 ECTS/3 (1) CSU)

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| Code/ Status | : FAF 2271/Compulsory |
| Module level | : Undergraduate |
| Semester | : 4 |
| Module Coordinators/ Lecturers | : Sudarsono Yosi Bayu Murti Subagus Wahyuono Erna Prawita Setyowati |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Classroom lecture, 100 minutes/week Practical works, 120 minutes/week |
| workload | : 100 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study, 120 minutes laboratory work, 50 minutes report preparation |
| Credit points | : 5,01 ECTS/3 (1) CSU |
| Pre-Requisite | : Organic Chemistry II (FAF 1772) |
| Learning goals/ Course Outcomes | : Students are able to explain biosynthetic pathway of the mevalonate acetate which mediates terpenoid formation, diversity of structure, and physical and chemical characteristics of terpenoid compounds; to explain the sources of efficacious substances and its supporting substances which derived from the polyketide and alkaloid groups, as well as understanding its pharmacological activities and other uses for humans, and phytochemical screening and identification principles; to explain biosynthetic pathway of the malonate- acetate which mediates polyketides formation, the diversity of structures, and the physical and chemical properties of polyketide compounds; to explain biosynthetic pathway which mediates formation, diversity of structures, and physical and chemical characteristics of alkaloid compounds; to carry out macroscopic, microscopic, and micro-chemical analysis of medicinal plants; to do phytochemical screening and qualitative analysis of natural materials by using TLC; to extract and simply separate natural materials; to conduct quantitative analysis of natural compounds; to explain the characteristics of natural compounds that can be used for identification and analysis of its contents. |
| Content | : This course discusses the basic scientific aspects, the correlation between secondary metabolites or marker metabolite profile and its pharmacological/biological effects in medicinal products that made from natural ingredients, including the structure of metabolite groups with bioactivity, chemical structure, qualitative/quantitative analysis, and usability in either drug treatments or development of natural drugs in the health sector. |
| Study/exam achievements | : A-E, 35% Midterm and 30% Final exam, 25% practical works, and 10% assignments. |
| Forms of media | : Face to face instruction, Slides, Board, Internet |



- Literatures
1. Bolton, S. dan Bon, C., 2004. *Pharmaceutical Statistics: Practical and clinical applications*. 4th., rev. and expanded ed. p. 308–337. M. Dekker, New York.
 2. Departemen Kesehatan Republik Indonesia, 2004, *Monografi Ekstrak Tumbuhan Obat Indonesia*, Departemen Kesehatan RI, Jakarta.
 3. List, P.. dan Schmidt, P., 1989. *Phytopharmaceutical Technology*. p. 99-105, CRC Press, Boston Gaedcke, F., Steinhoff, B., & Blasius, H., 2003, *Herbal Medicinal Products*, Medpharm Scientific Publisher, Stuttgart.
 4. Handa, S.S., Khanuja, S.P.S., Longo, G., Rakesh, D.D., 2008, *Extraction Technologies for Medicinal and Aromatic Plants*, Int. Centre for Science and High Technology, Italy.
 5. Jones, W. dan Kinghorn, A.D., 2005. Extraction of Plant Secondary Metabolites, dalam: Sarker, S., Latif, Z., dan Gray, A. (Editor), *Natural Products Isolation, Methods in Biotechnology*. hal. 323–351, Humana Press.



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- 8.) Bridle, 2003, Anxiety Disorder in: Handbook of Depression and Anxiety, Second Edition, Marcel Dekker, New York.
 - 9.) Lieb, 2005, Anxiety Disorder dalam Anxiety and Anxiolytic Drugs, Springer Verlag, Berlin.
 - 10.) Nash, 2005, Pharmacotherapy of Anxiety dalam Anxiety and Anxiolytic Drugs, Springer Verlag, Berlin.
 - 11.) Saladin, 2007, Anatomy and Physiology the unity of form and function 4th edition, Mc Graw Hill, New York.
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Pharmacy Management (3,34 ECTS/2(0) CSU)

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|---|---|
| Code/ Status | : FAF 2371/Compulsory |
| Module level | : Undergraduate |
| Semester | : 3 |
| Module Coordinators/ Lecturers | : Hardika Aditama Satibi Dwi Endarti Bondan Ardiningtyas |
| Language | : Indonesian |
| The format/class hours per week during the Semester | : Classroom lectures, 100 minutes/week |
| Workload | : 100 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study |
| Credit points | : 3,34 ECTS/2(0) CSU |
| Pre-Requisite | : Social Behavior Sciences for Pharmacy (FAF 1373) |
| Learning goals/ Course Outcomes | : Students are able to develop the principle and techniques of communication, to adapt in a new environment and modern technology, and to build interpersonal and interprofessional connection; to develop leadership principles and effective innovative management in doing tasks; and are able to decide correctly in solving problems in their specialty based on data and information analysis result. |
| Content | : This course discusses the fundamentals and application of organization management, human resources management, operation management, financial management, marketing management, and strategy management in pharmaceuticals. |
| Study/exam Achievements | : A-E, 5% Quiz, 35% Tasks, 20% Project, 20% Midterm and 20% Final exam |
| Forms of media | : Face to face instruction, Computer, Gadget, Slides |
| Literatures | : 1. Dessele, P., Shane, Z., David, P., 2005, <i>Pharmacy Management Assentials for All Practice Setting</i> , The McGraww-Hill Compony, USA. 2. Herist, K.N., Rollins, B., dan Perri, M., 2011, <i>Financial Analysis in Pharmacy Practice</i> , Pharmaceutical Press, India. 3. Kotler, P. dan Keller, K., 2012, <i>Marketing Management</i> , 14thed, Prentice Hall Inc., Sadle River, New Jersey. |



Formulation and Technology: Solid Dosage Forms (5,01 ECTS/3(1) CSU)

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|---|---|
| Code/ Status | : FAF 2571/Compulsory |
| Module level | : Undergraduate |
| Semester | : 3 |
| Module Coordinators/ Lecturers | : T.N. Saifullah Sulaiman Achmad Fudholi Angi Nadya Bestari |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Classroom lectures, 100 minutes/week Practical works, 120 minutes/week |
| Workload | : 100 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study, 120 minutes laboratory work, 50 minutes report preparation |
| Credit points | : 5,01 ECTS/3(1) CSU |
| Pre-Requisite | : Pharmaceutics I (FAF 1371) Physical Pharmacy II (FAF 1472) |
| Learning goals/ Course Outcomes | : Students are able to formulate solid dosage form by paying attention to quality assurance and to evaluate the quality of solid dosage formulas. |
| Content | : This course discusses about: tablet dosage form, including types and administration; properties of tablets and their evaluation, tablet formulations, methods and equipment used for the manufacture of tablets; problems occurred in the manufacture of tablets, sugar coated tablets, film coated tablets, coatings (granules, particles, pressed tablets), other types of tablets (layers, effervescent, sublingual, buccal, lozenges, fast dissolving tablet (FDT)), capsule formulations (both hard and soft capsule), and capsule filling equipment. |
| Study/exam achievements | : A-E, 5% Quizzes, 10% Tasks (Essay), 5% Pre-test (practicum), 10% Practicum Report, 10% Discussion, 10% Practical Examination, 25% Midterm, and 25% Final exam |
| Forms of media | : Face to face instruction, Slides, Board, Internet, Material and equipment (Practicum) |



Literatures

: Primary

- 1) Augsburger, L.L. & Hoag, S.W., 2008, *Pharmaceutical Dosage Form: Tablets*, 3rd Ed., Vol. I: Unit Operations and Mechanical Properties, Informa Healthcare, New York.
- 2) Banker, G.S. & Rhodes, C.T., 2002, *Modern Pharmaceutics*, 4th Ed., Marcel Dekker Inc., New York.
- 3) Depkes RI., 2014, *Farmakope Indonesia*, Ed. V.
- 4) Niazi, K.S., 2009, *Handbook of Pharmaceutical Manufacturing Formulations Compressed Solid Product*, Vol. 1, 2nd Ed., Informa Healthcare Inc., USA.
- 5) Qiu, Y., Chen, Y., & Zang, G.G. (Eds.), 2009, *Developing Solid Oral Dosage Form: Pharmaceutical Theory and Practice*, 1st Ed., Elsevier.
- 6) Swarbrick, J. (Ed.), 2007, *Encyclopedia of Pharmaceutical Technology* 3rd, Informa Healthcare Inc.

Secondary

- 7) USP, 2017. *United States Pharmacopoeia 40-National Formulary 35*. The United States Pharmacopoeial Convention, Rockville, Maryland, USA.
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Universitas Gadjah Mada
Faculty of Pharmacy
Undergraduate Program in Pharmacy

Formulation and Technology: Liquid and Semisolid Dosage Forms (5,01 ECTS/3(1) CSU)

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| Code/ Status | : FAF 2572/Compulsory |
| Module level | : Undergraduate |
| Semester | : 4 |
| Module Coordinators/ Lecturers | : Marchaban T.N. Saifullah Sulaiman Rina Kuswahyuning |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Classroom lectures, 100 minutes/week Practical works, 120 minutes/week |
| workload | : 100 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study, 120 minutes laboratory work, 50 minutes report preparation |
| Credit points | : 5,01 ECTS/3(1) CSU |
| Pre-Requisite | : Physical Pharmacy II (FAF 1472) |
| Learning goals/ Course Outcomes | : Students are able to understand, outline, and design formulations for emulsion, syrup, elixir, suspension, suppositories, ointment, cream, etc (in liquid or semisolid form); to formulate and create emulsion, suspense, syrup, ointment, cream, and suppositories; and are able to evaluate the stability of pharmaceutical dosage in liquid or semisolid form. |
| Content | : This course discusses about: introduction, ternary diagrams, emulsions, emulsifiers (surfactants, hydrocolloids, and dispersed solids), the manufacturing and packaging process of emulsion, suspension, syrup, elixir, ointments, creams; as well as design protocol of development and testing for ointments and suppositories. |
| Study/exam achievements | : A-E, 5% Quizzes, 10% Tasks (Essay), 5% Pre-test (practicum), 10% Practicum Report, 10% Discussion, 10% Practical Examination, 25% Midterm, and 25% Final exam |
| Forms of media | : Face to face instruction, Slides, Board, internet, Material and equipment (Practicum) |



Literatures

: Primary

- 1) Ansel, H.C., Popovich, N.G., & Allen Jr., L.V., 2005, *Pharmaceutical Dosage Forms and Drug Delivery System*, William & Wilkins, Parkway PA.
- 2) Aulton, M.E. (Ed.), 2002, *Pharmaceutic The Science of Dosage Form Design*, 2nd, ELBS, Hongkong.
- 3) Kulshreshtha, A.K., Singh, O.N., & Wall, G.M. (Eds.), 2010, *Pharmaceutical Suspensions: From Formulation Development to Manufacturing*, Springer, New York.
- 4) Nielloud, F. & Marti-Mestres, G. (Eds.), 2000, *Pharmaceutical Emulsions and Suspensions*, Marcel Dekker Inc., New York.

Secondary

- 5) Niazi, K.S., 2009, *Handbook of Pharmaceutical Manufacturing Formulations Semisolid Products*, Vol. 4, 2nd Ed., Informa Healthcare Inc.
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Product Stability (3,34 ECTS/2(0) CSU)

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| Code/ Status | : FAF 2573/Compulsory |
| Module level | : Undergraduate |
| Semester | : 4 |
| Module Coordinators/ Lecturers | : T.N. Saifullah S. Achmad Fudholi Akhmad Kharis Nugroho |
| Language | : Indonesian |
| The format/class hours per week during the Semester | : Classroom lectures, 100 minutes/week |
| Workload | : 100 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study |
| Credit points | : 3,34 ECTS/2(0) CSU |
| Pre-Requisite | : Physical Pharmacy II (FAF 1472) |
| Learning goals/ Course Outcomes | : Students are able to identify broken or expired pharmaceuticals products, or sub-standard in assessing quality and expired date; to explain and design quality control standard in criticizing product stability; and are able to evaluate pharmaceutical products quality in order to determine product stability. |
| Content | : This course contains study of medicinal products stability, medicines kinetical degradation, forms of product changes in storage, packaging effects on stability, effect of excipient on stability, stability test and shelf- life product testing method, and regulations about product stability test. |
| Study/exam Achievements | : A-E, 10% Quiz, 45% Midterm and 45% Final exam |
| Forms of media | : Face to face instruction, Computer, Gadget, Slides |
| Literatures | : 1. Huynh-Ba, K, (Ed.), 2009, <i>Handbook of Stability Testing in Pharmaceutical Development: Regulations, Methodologies, and Best Practices</i> , Springer. 2. Tønnesen, H. H., 2004, <i>Photostability Of Drugs And Drug Formulations Second Edition</i> , CRC Press. 3. Yoshioka, S. and Valentino, J. S., 2002, <i>Stability of Drugs and Dosage Forms</i> , Kluwer Academic Publishers. |



Analytical Chemistry II (5,01 ECTS/3(1) CSU)

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| Code/ Status | : FAF 2671/Compulsory |
| Module level | : Undergraduate |
| Semester | : 3 |
| Module Coordinators/ Lecturers | : Sudibyo Martono Endang Lukitaningsih Sugeng Riyanto Abdul Rohman |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Classroom lecture, 100 minutes/ week Practical works, 120 minutes/week |
| Workload | : 100 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study, 120 minutes laboratory work, 50 minutes report preparation |
| Credit points | : 5,01 ECTS/3(1) CSU |
| Pre-Requisite | : Analytical Chemistry I (FAF 1672) |
| Learning goals/ Course Outcomes | : Students are able to understand and explain the interaction of electromagnetic radiation and drug compounds. Students are able to understand, explain and practice analysis of drug compounds by UV-Vis spectrophotometry and instrumentation system uv-vis spectrophotometer; spectrofluorometry analysis of drug compounds and spectrofluorometer instrumentation system; analysis of drug compounds containing metal / metal ions by atomic absorption spectrophotometry and its instrumentation system; analysis of drug compounds by vibrational spectroscopy (infrared and Raman) and its instrumentation system; analysis of drug compounds with NMR spectroscopy and its instrumentation system; analysis of drug compounds by mass spectrometry and its instrumentation system. Students are able to analyze drug compounds with potentiometry. |
| Content | : This course discusses about the interaction between electromagnetic radiation and materials. Various spectrophotometric theories and techniques will be discussed, which include UV-Vis spectrophotometry, spectrofluorometry, atomic absorption spectrophotometry, atomic emission spectrophotometry with plasma beam source, infrared spectrophotometry, Raman spectrophotometry, NMR spectrometry and mass spectrometry. Practical work in this course includes: quantitative analysis of drugs using spectrometry methods and potentiometric titration. |
| Study/exam achievements | : A-E, 15% Midterm, 30% Final exam, 5% Discussion activity, 10% Mini quiz/Task, 20% Pre-test and Practice Report, 20% Practice Exam |
| Forms of media | : Face to face instruction, Slides, Board, Internet, practical instruments |



Literatures

: Main References

1. Ahuja, S., & Jespersen, N., 2006, *Modern Instrumental Analysis*, Elsevier, Amsterdam
2. Craig, D.O.M., & Reading, S., 2007, *Thermal Analysis of Pharmaceuticals*, CRC Press, London
3. Robinson, J W., Skelly Frame, E.M., Frame II, G.M., 2005, *Undergraduate Instrumental Analysis*, 6th Ed, Marcer Dekker, New York
4. Kar, A, 2005, *Pharmaceutical Drug Analysis*, Age Int. Limited Publisher, New Delhi
5. Watson, D.G., 1999, *Pharmaceutical Analysis: A Textbook for Pharmacy Students and Pharmaceutical Chemist*, 2nd Ed, ChurcillLivingson, UK

Supporting References

1. Pavia, D.L., Lampman, G.M., Kriz, G.S., 2008, *Introduction to Spectroscopy*, 3rd Ed, Thompson Learning, London
 2. Pescok, R.L., Shields, L.D., Cairns, T., and McWilliam, I.G., 1976, *Modern Methods of Chemical Analysis*, 2nd Ed., John Wiley & Sons, New York
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Medicinal Chemistry (3,34 ECTS/2(0) CSU)

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| Code/ Status | : FAF 2772/Compulsory |
| Module level | : Undergraduate |
| Semester | : 3 |
| Module Coordinators/ Lecturers | : Hari Purnomo Kuswandi Ediati B.S. Ari Sudarmanto |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Classroom lectures, 100 minutes/week |
| Workload | : 100 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study |
| Credit points | : 3,34 ECTS/2(0) CSU |
| Pre-Requisite | : Organic Chemistry II (FAF 1772) Pharmaceutical Biochemistry (FAF 1773) |
| Learning goals/ Course Outcomes | : Students are able to understand the scope and development of current medical chemistry, namely the discovery and development of drugs, including theories of receptor and drug metabolism. Students are able to explain the relationship between the structure of medicinal compounds and their pharmacological activity. |
| Content | : This course discusses the development of medical chemistry (discovery and development of drugs), the fate of drugs in the body based on their chemical structure (drug metabolism), receptor theory and drug- receptor interactions, physical-chemical aspects of drugs and the relationship between structure and activity (SAR Activity Relationship) of several medicinal compounds namely sulfonamides and antimalarials; antiinfectives and anticancers; histamine and antihistamines; adrenergic and antiadrenergics; narcotics and non-narcotic analgesics; cholinergic and anticholinergics; hormones and vitamins; cardiovascular; diuretics; antibiotics; depressants and central nervous system stimulants. |
| Study/exam achievements | : A-E, 35% Midterm, 35% Final exam, 10% Online mini quiz (individually), 20% Group task: reviewing a paper |
| Forms of media | : Face to face instruction, Slides, Board, Internet |



Literatures

: Main References

1. Beale, J. M. and Block, J. H., 2011, *Organic Medicinal and Pharmaceutical Chemistry*, Lippincot Williams and Wilkins.
2. Gringauz, A., 1997, *Medicinal Chemistry, How Drugs Act and Why*, Wiley-VCH, New York.
3. Kar, A., 2007, *Medicinal Chemistry*, New Age Int.Limited Publisher, New Delhi.
4. Lemke, T. L., Williams, D. A., Roche, V.F., and Zito, S. W., 2013, *FOYE'S Principles of Medicinal Chemistry 7th Edition*, USA, Lippincot Williams and Wilkins.
5. Nogrady, T, & Weaver, D.F., 2005, *Medicinal Chemistry, A Molecular and Biochemical Approach*, Oxford, London.
6. Purnomo, H, 2016, *Metabolisme Obat*, Pustaka pelajar, Yogyakarta
7. Siswandono dan Bambang S., 2000, *Kimia Medisinal 2*, Surabaya, Pusat Penerbitan dan Percetakan UNAIR.
8. Stevens, E., 2014, *Medicinal Chemistry The Modern Drug Discovery Process*, United State of America, Pearson Education, Inc.
9. Wilson, C.O., Gisvolds, O., &Doorge, R.F. (Ed.), 2011, *Textbook of Organic Medicinal and Pharmaceutical Chemistry*, 12th Ed., Lippincott Co., Toronto.
10. Wolff, M.E., 1995, *Burger's Medicinal Chemistry*, 3rd Ed., John Willey & Sons, California.

Supporting References

1. Shahid, M., Tripathi, T., Sobia, F., Moin, S., Siddiqui, M., and Khan, R. A., 2009, Histamine, Histamine Receptors, and their Role in Immunomodulation: An Updated Systematic Review, *The Open Immunology Journal*, 2, 9-41
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Pharmacology (3,34 ECTS/2(0) CSU)

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|---|---|
| Code/ Status | : FAF 2871/Compulsory |
| Module level | : Undergraduate |
| Semester | : 3 |
| Module Coordinators/ Lecturers | : Sugiyanto Zullies Ikawati Agung Endro Nugroho Nunung Yuniarti |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Classroom lectures, 100 minutes/week |
| Workload | : 100 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study |
| Credit points | : 3,34 ECTS/2(0) CSU |
| Pre-Requisite | : Human Anatomy and Physiology (FAD 1071) Pharmaceutical Biochemistry (FAF 1773) |
| Learning goals/ Course Outcomes | : Students are able to explain theoretical concepts about medicine and the fate of medicine in the body, demonstrate mastery of theoretical concepts about the principle of drug action and its interactions with receptor, explain the mechanism of drugs in the system autonomic nerve, central nervous system, and cardiovascular. |
| Content | : Pharmacology discusses about the fate of drugs and drug activity in the body along with their molecular mechanisms. This subject is preceded by an understanding of the definition of pharmacology, history and its development and the scope studied. It also discusses experimental pharmacology, in silico, in situ, in vitro, ex vivo, and in vivo, qualitative pharmacokinetics include drug absorption and its mechanism, distribution, metabolism, and molecular mechanisms and drug excretion. The principle of drug action and molecular mechanisms, drug interactions and receptors with kinetic focus and dose-effect relationships. The mechanism of action of the drug in the autonomic nervous system and the central nervous system, and cardiovascular drugs. |
| Study/exam achievements | : A-E, 67% Midterm and 37% Final exam |
| Forms of media | : Face to face instruction, Slides, Board, internet |
| Literatures | : <ol style="list-style-type: none">1. Neal, M.J., 2014, Medical Pharmacology at A Glance, 7th Edition, Wiley-Blackwell, UK.2. Stringer, J.L., 1996, Basic Concepts in Pharmacology: A Student's Survival Guide, 2nd Edition, McGraw-Hill, USA.3. Lullmann, H., Mohr, K., Ziegler, A., Bieger, D., 2000, Colour Atlas of Pharmacology, 2nd Edition revised and expanded, Thieme Stuttgart, New York.4. Brunton, L., Chabner, B., Knollman, B., 2011, Goodman and Gilman's The Pharmacological Basis of Therapeutics, 12th Edition, McGraw-Hill, USA.5. Ikawati, Z., 2014, Buku Farmakologi Molekuler, UGM Press. |



Universitas Gadjah Mada

Faculty of Pharmacy

Undergraduate Program in Pharmacy

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6. Turner, R.A., 1965, Screening methods in pharmacology, Academic Press Inc., 111 Fifth Ave., New York.
 7. Related scientific journal
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Pharmacokinetics (3,34 ECTS/2(0) CSU)

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|---|---|
| Code/ Status | : FAF 2872/Compulsory |
| Module level | : Undergraduate |
| Semester | : 3 |
| Module Coordinators/ Lecturers | : Djoko Wahyono Arief Rahman Hakim Purwantiningsih |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Classroom lectures, 100 minutes/week |
| Workload | : 100 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study |
| Credit points | : 3,34 ECTS/2(0) CSU |
| Pre-Requisite | : Human Anatomy and Physiology (FAD 1071); Co-Req: Pharmacology (FAF 2871) |
| Learning goals/ Course Outcomes | : Students are able to understand the basic theory or concept of pharmacokinetics which includes pharmacokinetic analysis using one open compartment models and two open compartment models, and pharmacokinetic analysis using non-compartment model. |
| Content | : Pharmacokinetics discusses about the fate of drugs in the body (absorption, distribution, metabolism, and excretion), definitions of pharmacokinetic, the order of kinetic, pharmacokinetic analysis using compartment models, one open compartment models and two open compartment models, and non-compartment models pharmacokinetics analysis. In the course of pharmacokinetics, the emphasis is on the determination of drug pharmacokinetic parameters and parameter hierarchy. |
| Study/exam achievements | : A-E, 50% Midterm and 50% Final exam |
| Forms of media | : Face to face instruction, Slides, Board, Internet |
| Literatures | : <ol style="list-style-type: none">1. Ritschel WA & Kearns GL(2004) Handbook of Basic Pharmacokinetics, 6 ed., American Pharmacist Association, Washington2. Shargel, L. dan Yu, A.B.C., 2016, Applied Biopharmaceutics and Pharmacokinetics, 7th ed., McGraw-Hill Education, New York3. Tozer, TN & Rowland, M (2006) Introduction to Pharmacokinetics and Pharmacodynamics – A Quantitative Basis of Drug Therapy. Lippincott Williams & Wilkins, Philadelphia |



Universitas Gadjah Mada
Faculty of Pharmacy
Undergraduate Program in Pharmacy

Experimental Pharmacology and Toxicology I (1,67 ECTS/1(1) CSU)

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| Code/ Status | : FAF 2873/Compulsory |
| Module level | : Undergraduate |
| Semester | : 4 |
| Module Coordinators/ Lecturers | : Sugiyanto Agung Endro Nugroho Arief Nurrochmat Purwantiningsih Nunung Yuniarti Ika Puspita Sari Retno Murwanti Arief Rahman Hakim Fivy Kurniawati Dyaningtyas Dewi |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Practical works, 120 minutes/week |
| Workload | : 120 minutes laboratory work, 50 minutes report preparation |
| Credit points | : 1,67 ECTS/1(1) CSU |
| Pre-Requisite | : Pharmacology (FAF 2871) |
| Learning goals/ Course Outcomes | : Students are able to explain the concept of experimental pharmacology, <i>in silico</i> , <i>in situ</i> , <i>in vitro</i> , <i>ex vivo</i> , <i>ex ovo</i> , <i>in vivo</i> , and have skills in how to prepare drug treatments for experimental animals; students are able to find and explain the information about various ways of administering drugs in test animals and their effects on drug absorption and have skills in providing drugs to test animals and compare their effects on drug absorption in test animals; to find and explain the information about metabolism and evaluate drug metabolism and the factors that influence it; to find and explain information regarding the timing of taking samples and assumptions of the compartment model and the selection of doses in pharmacokinetics; determination of the pharmacokinetic parameters of a drug after administration of a single dose; and have skills in taking samples of experimental animals; to find and explain information about dose-response relationship based on quantal responses and gradual responses with analgesic and anti-inflammatory tests. |
| Content | : This course contains basic techniques for drug administration, understanding of drug metabolism and the factors that influence it, how to do drug analysis in blood and and urine and validate it, pharmacological activity tests: anti-inflammatory, analgesic, antipyretic, sedative-hypnotics, evaluation of dose-response such as evaluation of gradual and quantal, application of SPSS in probit analysis. The learning method is done with practicum which is followed immediately by question and answer and discussion so that students understand each given subject. While the assessment method is based on pretest scores, lab activity performance, reports, discussions, and practical examination. |



Universitas Gadjah Mada
Faculty of Pharmacy
Undergraduate Program in Pharmacy

Study/exam achievements : A-E, 60% practical works, 40% practical test

Forms of media : Face to face instruction, Slides, Board, Internet

Literatures : Main

1. Neal, M.J., 2014, Medical Pharmacology at A Glance, 7th Edition, Wiley-Blackwell, UK.
2. Stringer, J.L., 1996, Basic Concepts in Pharmology: A Student's Survival Guide, 2nd Edition, McGraw-Hill, USA.
3. Lullmann, H., Mohr, K., Ziegler, A., Bieger, D., 2000, Colour Atlas of Pharmacology, 2nd Edition revised and expanded, Thieme Stuttgart, New York.

Supporting

4. Brunton, L., Chabner, B., Knollman, B., 2011, Goodman and Gilman's The Pharmacological Basis of Therapeutics, 12th Edition, McGraw-Hill, USA.
 5. Clementi F dan Fumagalli G, 2015, General and Molecular Pharmacology: Principles of Drug Action, John Wiley and Sons, New Jersey, USA
 6. Related scientific papers
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Universitas Gadjah Mada
Faculty of Pharmacy
Undergraduate Program in Pharmacy

Pharmacology II (3,34 ECTS/2(0) CSU)

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| Code/ Status | : FAF 2875/Compulsory |
| Module level | : Undergraduate |
| Semester | : 4 |
| Module Coordinators/ Lecturers | : Sugiyanto Zullies Ikawati Agung Endro Nugroho Nunung Yuniarti Arief Nurrochmat Dyaningtyas Dewi Pamungkas Putri |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Classroom lectures, 100 minutes/week |
| Workload | : 100 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study |
| Credit points | : 3,34 ECTS/2(0) CSU |
| Pre-Requisite | : Pharmacology (FAF 2871) |
| Learning goals/ Course Outcomes | : Students are able to explain theoretical concepts about drug interactions and their various action targets, and various types of receptors and transduction signal) and the molecular mechanism of action of the drug on cardiovascular system, specifically antihyperlipidemia, atherosclerosis, anticoagulants, antiplatelet, continued with analgesic-anti-inflammatory drug pharmacology, antipyretic, antihistamine, corticosteroid, immunosuppressants, drugs in the respiratory system, drugs in the digestive system, antiparasitic drugs, antifungal, antiviral, antibacterial, and antineoplastic, and drugs that affect the endocrine system (diabetes mellitus medications, thyroid disorders drugs, drugs reproductive system). |
| Content | : Pharmacology 2 contains a discussion of pharmacology (i.e. concerning theoretical concepts about drug interactions and various action targets, and types of receptors along with signal transduction) and molecular mechanisms of drug action on the cardiovascular system, especially antihyperlipidemic, atherosclerosis, anticoagulants, antiplatelet, followed by pharmacology analgesic-anti-inflammatory drugs, antipyretics, antihistamines, corticosteroids, immunosuppressants, drugs in the respiratory system, drugs in the digestive system, antiparasitic drugs, antifungal, antiviral, antibacterial, and antineoplastic drugs and drugs that affect the endocrine system (drugs for diabetes mellitus, drugs thyroid disorders, reproductive system drugs) |
| Study/exam achievements | : A-E, 45% Midterm, 45% Final exam, and 10% Mini quiz |
| Forms of media | : Face to face instruction, Slides, Board, internet |



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- Literatures : 1. Neal, M.J., 2014, Medical Pharmacology at A Glance, 7th Edition, Wiley-Blackwell, UK.
2. Stringer, J.L., 1996, Basic Concepts in Pharmacology: A Student's Survival Guide, 2nd Edition, McGraw-Hill, USA.
3. Lullmann, H., Mohr, K., Ziegler, A., Bieger, D., 2000, Colour Atlas of Pharmacology, 2nd Edition revised and expanded, Thieme Stuttgart, New York.
4. Brunton, L., Chabner, B., Knollman, B., 2011, Goodman and Gilman's The Pharmacological Basis of Therapeutics, 12th Edition, McGraw-Hill, USA.
5. Ikawati, Z., 2014, Buku Farmakologi Molekuler, UGM Press.
6. Clementi F dan Fumagalli G, 2015, General and Molecular Pharmacology: Principles of Drug Action, John Wiley and Sons, New Jersey, USA
7. Related scientific journals
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Universitas Gadjah Mada
Faculty of Pharmacy
Undergraduate Program in Pharmacy

Pharmacotherapy I (3,34 ECTS/2(0) CSU)

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| Code/ Status | : FAF 2971/Compulsory |
| Module level | : Undergraduate |
| Semester | : 4 |
| Module Coordinators/ Lecturers | : Djoko Wahyono Zullies Ikawati Fita Rahmawati Tri Murti Andayani Nanang Munif Yasin Woro Harjaningsih Fivy Kurniawati Mawardi Ihsan |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Classroom lectures, 100 minutes/week |
| workload | : 100 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study |
| Credit points | : 3,34 ECTS/2(0) CSU |
| Pre-Requisite | : Pharmacology (FAF 2871) |
| Learning goals/ Course Outcomes | : Students are able to understand the principles of rational pharmacotherapy, identify related problems medication (Drug-Related Problems, DRP) and evidence-based treatment search (Evidence-Based Medicine, EBM), explain pathophysiology, pharmacotherapy, monitoring effectiveness and drug side effects, as well as providing information and education to patients with pain, explain pathophysiology, pharmacotherapy, monitoring effectiveness and effects drug side, as well as providing information and education on endocrine disorders, explain pathophysiology, pharmacotherapy, effectiveness monitoring and drug side effects, as well as providing information and education on cardiovascular disease. |
| Content | : Pharmacotherapy 1 discusses about rational pharmacotherapy, identifies treatment-related problems (Drug-Related Problems, DRP), searches for evidence-based medicine (Evidence-Based Medicine, EBM), management of pain and headaches, osteoarthritis and rheumatoid arthritis, osteoporosis, diabetes mellitus, disorders thyroid, menstrual disorders, hypertension, hyperlipidemia, Ischemic Heart Disease (IHD), Acute Coronary Syndromes (ACS), and strokes. |
| Study/exam achievements | : A-E, 35% Midterm, 45% Final exam, 10% Group presentation, and 10% Leaflet assignment |
| Forms of media | : Face to face instruction, Slides, Board, Internet |



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- Literatures : 1. Dipro, J.T., et al. 2011, Pharmacotherapy: A Pathophysiologic Approach, 8th Ed, McGraw-Hill, New York
2. Kementerian Kesehatan Republik Indonesia, 2011, Modul Penggunaan Obat Rasional, Jakarta: Kementerian Kesehatan Republik Indonesia.
3. Alldredge, B.K., et al., 2013, Koda-Kimble & Young's Applied Therapeutics: The Clinical Use Of Drugs, 10th Ed, Lippincott Williams & Wilkins, Philadelphia
4. Brunton, L.L., et al. 2012, Goodman & Gilman's The Pharmacological basic of therapeutic, 12th Ed, McGraw-Hill, New York
5. Helms, R.A., et al. 2006, Textbook of Therapeutics, Drug and Disease Management, 8th Ed., Lippincot & Williams, Philadelphia
6. Holloway, K. & van Djik, L., 2011, The World Medicines Situation 2011: Rational Use of Medicines, Geneva: World Health Organization.
7. Scwinghammer, T.L. & Koehler, J.M., 2009, Pharmacotherapy Casebook: A Patient Focused Approach, 7th Ed., McGraw-Hill, New York
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Technology of Natural Resources Extraction (5,01 ECTS/3(1) CSU)

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|---|---|
| Code/ Status | : FAF 3271/Compulsory |
| Module level | : Undergraduate |
| Semester | : 5 |
| Module Coordinators/ Lecturers | : Triana Hertiani Suwijiyo Pramono Andayana Puspitasari |
| Language | : Indonesian |
| The format/class hours per week during the Semester | : Classroom lectures, 100 minutes/week Practical works, 120 minutes/week |
| Workload | : 100 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study, 120 minutes laboratory work, 50 minutes report preparation |
| Credit points | : 5,01 ECTS/3(1) CSU |
| Pre-Requisite | : Pharmacognosy-Phytochemistry (FAF 2271) |
| Learning goals/ Course Outcomes | : Students are able to identify suitable resources for extraction; to organize extraction and the next step in order to get extract for formulation; to do essential oil isolation; to utilize extract production optimization; and are able to develop natural resources standardization. |
| Content | : This course contains lectures (2 CSU) and practical works (1 CSU). After learning this course, the students are expected to understand, explain, and demonstrate production process starting from resources preparation, extraction, to extract formulation that is used to formulate galenic products, essential oil production, and standardization based on specific and non-specific parameter. |
| Study/exam Achievements | : A-E, 30% Practical Works, 15% Task, 30% Midterm, 25% Final exam |
| Forms of media | : Face to face instruction, Computer, Gadget, Slides, Internet |
| Literatures | : 1. Bolton, S. dan Bon, C., 2004. <i>Pharmaceutical Statistics: Practical and clinical applications</i> . 4th., rev. and expanded ed. p. 308–337. M. Dekker, New York. 2. Departemen Kesehatan Republik Indonesia, 2004, <i>Monografi Ekstrak Tumbuhan Obat Indonesia</i> , Departemen Kesehatan RI, Jakarta. 3. List, P.. dan Schmidt, P., 1989. <i>Phytopharmaceutical Technology</i> . p. 99- 105, CRC Press, Boston. |



Drug Education and Information (3,34 ECTS/2(0) CSU)

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| Code/ Status | : FAF 3371/Compulsory |
| Module level | : Undergraduate |
| Semester | : 5 |
| Module Coordinators/ Lecturers | : Marlita Putri Ekasari Rifqi Rokhman Niken Nur Widyakusuma Fify Kurniawati |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Classroom lectures, 100 minutes/week |
| Workload | : 100 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study |
| Credit points | : 3,34 ECTS/2(0) CSU |
| Pre-Requisite | : Social Behavioral Sciences for Pharmacy (FAF 1373) |
| Learning goals/ Course Outcomes | : Students are able to collect, search, analyze, and review drug information sources; to explain the principle of effective communication and electronic communication; to explain the principle of drug education to patients; to evaluate Patient Education Materials (PEM) and drug advertisements. |
| Content | : This course discuss the ability to collect, search, analyze, and review drug information resources, as well as effective communication skills that can support drug education, both directly and electronically, develop educational programs about drugs and treatment, evaluate Patient Education Materials (PEM) both printed and audiovisual and evaluate drug ads and treatments. |
| Study/exam achievements | : A-E, 45% Midterm, 5% assignments, and 50% Final exam |
| Forms of media | : Face to face instruction, Slides, Board, internet |
| Literatures | : Main <ol style="list-style-type: none">1. Malone, P.M., Mosdell, K.W., Kier, K.L., Stanovich, J.E., 2001, Drug Information : A Guide for Pharmacist, 2nd Ed., McGraw-Hill Companies, New York.2. McClellan, M.B., McGinnis, J.M., Nabel, E.G., Olsen, L.M., 2007, Evidence-Based Medicine and The Changing Nature of Health Care : IOM Annual Meeting Summary, The National Academic Press, Washington D.C.3. Rantucci, M.J., 1997, Pharmacist Talking with Patients, A Guide to Patient Counseling, 1th Ed, Williams & Winkins, Baltimore, Maryland.4. Rosenberg, W., and Donald, A., 1995, Evidence Based Medicine : an approach to clinical problem solving, BMJ, 310 : 1122-6.5. Beardsley, R.S., Kimberlin, C.L. & Tindall, W.N., 2008. Communication Skills in Pharmacy Practice : A Practical Guide for Students and Practitioners Fifth., Philadelphia, USA: Lippincott Williams & Wilkins. |



Supporting

1. Boesen, K.P. et al., 2009. Improvisational Exercises to Improve Pharmacy Students ' Professional Communication Skills. , 73(2).
 2. Macleod-glover, B.N., 2008. Communication in Pharmacy Practice : An Overview. , (June 2006), pp.1–7. Available at: <https://www.tevacanada.com/pdfs/CCL---June-2006.aspx>.
 3. Northouse, Peter G., Northouse, L.L., 1992. Health Communication : Strategies for Health Professionals 2nd ed. S. Brottmiller, Wiliam, Kintzler, ed., Connecticut, USA: Appleton & Lange.
 4. Smith, W.T. et al., 2011. Disability in cultural competency pharmacy education. American journal of pharmaceutical education, 75(2), p.26. Available at: <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=3073100&tool=pmcentrez&rendertype=abstract>.
 5. Tietze, K.J., 2004. Clinical Skills for Pharmacists : A Patient-Focused Approach 2nd ed., Philadelphia,USA: Mosby Inc.
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Pharmaceutical Care (5,01 ECTS/3(0) CSU)

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| Code/ Status | : FAF 3372/Compulsory |
| Module level | : Undergraduate |
| Semester | : 5 |
| Module Coordinators/ Lecturers | : Chairun Wiedyaningsih Septimawanto Hardika Aditama Nanang Munif Yassin |
| Language | : Indonesian |
| The format/class hours per week during the Semester | : Classroom lectures, 150 minutes/week |
| Workload | : 150 minutes of in-class lectures, 180 minutes of structured activities, 180 minutes of weekly self-study |
| Credit points | : 5,01 ECTS/3(0) CSU |
| Pre-Requisite | : Pharmaceutics II (FAF 1372) Pharmacotherapy I (FAF 2971); Co-Req: Drug Education and Information (FAF 3371) |
| Learning goals/ Course Outcomes | : Students are able to evaluate pharmaceutical care based on competencies and pharmacist role in medical service; to analyze drug related problems, medication errors, uses of medical therapy and MESO; to solve medication problems in self-medication patient interview; and are able to solve problems in pharmaceutical care cases in hospitals. |
| Content | : This course discusses the concept of pharmaceutical care, pharmacist role in pharmaceutical care, problems in medicine uses, interaction of medicine, patient data collection, and discussion about comprehensive pharmaceutical care problem cases in clinics and hospitals. |
| Study/exam Achievements | : A-E, 10% Quiz, 20% Task, 20% Discussion, 30% Midterm, 20% Final exam |
| Forms of media | : Face to face instruction, Computer, Gadget, Slides, Internet |
| Literatures | : 1. Cipolle RJ, Strand LM, Morley PC. <i>Pharmaceutical Care Practice</i> , 2nd ed., McGraw Hill. 2004 2. Rovers, JP., Currie, J.D., Hagel, H.P., McDonough R.P., Sobotka, J.L (edt), 2003, <i>A Practical Guide to Pharmaceutical Care</i> , American Pharmacist Association, Washington, D.C 3. Thompson, JE, <i>A Practical Guide to Contemporary Pharmacy Practice</i> , 3rd. ed., Lippincott. 2009. |



Pharmacoeconomics (3,34 ECTS/2(0) CSU)

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| Code/ Status | : FAF 3373/Compulsory |
| Module level | : Undergraduate |
| Semester | : 6 |
| Module Coordinators/ Lecturers | : Dwi Endarti Satibi Susi Ari Kristina Tri Murti Andayani |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Classroom lectures, 100 minutes/week |
| Workload | : 100 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study |
| Credit points | : 3,34 ECTS/2(0) CSU |
| Pre-Requisite | : Pharmacotherapy I (FAF 2971) Pharmacoepidemiology (FAF 3971) |
| Learning goals/ Course Outcomes | : Students are able to master the principles of pharmacoeconomic that underlines the application of research results based on the latest scientific principles to optimize therapy; to master the pharmacoeconomic research design to solve problems that related to the efficacy, safety, and cost aspects of pharmaceutical supplies to optimize therapy; master the interpretation and implementation of pharmacoeconomic study results to optimize therapy. |
| Content | : Various topics of pharmacoeconomic disciplines, various methods of pharmacoeconomic studies (Cost of Illness, Cost-minimization analysis, Cost-effective analysis, Cost-Benefit analysis, Cost-utility analysis), how to measure costs and outcomes (clinical, economic, and humanistic) in pharmacoeconomic studies, model-based pharmacoeconomic study approaches, interpretation and implementation pharmacoeconomic study results. |
| Study/exam achievements | : A-E, 30% Midterm, 10% discussions, 10% presentation, 20% assignments, and 30% Final exam |
| Forms of media | : Face to face instruction, Slides, Board, Internet |
| Literatures | : Main literatures: 1. Drummond MF, Sculpher MJ, Claxton K, Stoddart GL, Torrance GW. Methods for the economic evaluation of health care programmes. Oxford university press; 2015 Sep 25. 2. Walters SJ. Quality of life outcomes in clinical trials and health-care evaluation: a practical guide to analysis and interpretation. John Wiley & Sons; 2009 Sep 10. 3. Edlin R, McCabe C, Hulme C, Hall P, Wright J. Cost effectiveness modelling for health technology assessment. Heidelberg: Springer; 2015. Supporting literatures: |



Universitas Gadjah Mada

Faculty of Pharmacy

Undergraduate Program in Pharmacy

1. Bootman JL., Townsend RJ., McGhan WF. 2015, *Principles of Pharmacoeconomics*, 3rdEd, Harvey Whitney Books Company, Cincinnati
2. Walley T., Haycox A., Boland A. 2004, *Pharmacoeconomics*, Churchill Livingstone, Philadelphia
3. Rascati KL. 2009, *Essentials of Pharmacoeconomics*, Lippincott Williams and Wilkins, Philadelphia
4. Rychlik R. 2002, *Strategies in Pharmacoeconomics and Outcomes Research*, Pharmaceutical Product Press, New York
5. Vogenberg FR. 2001, *Introduction to Applied Pharmacoeconomics*, McGraw-Hill Companies, USA



Compounding and Dispensing (3,34 ECTS/2(1) CSU)

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| Code/ Status | : FAF 3374/Compulsory |
| Module level | : Undergraduate |
| Semester | : 6 |
| Module Coordinators/ Lecturers | : Septimawanto Dwi P. Hardika Aditama Marlita Putri Ekasari Muvita Rina Wati |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Classroom lectures, 50 minutes/week Practical works, 120 minutes/week |
| Workload | : 50 minutes of in-class lectures, 60 minutes of structured activities, 60 minutes of weekly self-study, 120 minutes laboratory work, 50 minutes report preparation |
| Credit points | : 3,34 ECTS/2(1) CSU |
| Pre-Requisite | : Pharmaceutics II (FAF 1372) Pharmacotherapy I (FAF 2971) |
| Learning goals/ Course Outcomes | : Students are able to understand the definition of prescription, copy of prescription, and its regulations; screening of prescriptions which includes administrative screening, pharmaceutical screening, clinical screening as well as its solution. Students are able to prepare pharmaceutical preparations according to the standard, based on prescription or copy of prescription. Students are able to understand application of prescription provision in community. |
| Content | : This course discusses about prescriptions, copies of prescriptions and its regulations, administrative screening, pharmaceutical screening: dosage form and strength of pharmaceutical preparations, stability and compatibility in solid, semisolid, and liquid preparations, clinical screening: indications, contraindications, and allergies, dosage calculation, duplication, polypharmacy, and interactions, prescriptions in veterinary preparations, and discussion of electronic prescriptions and fake prescriptions. |
| Study/exam achievements | : A-E, 12% Discussion, 3% Mini quiz, 25% Midterm, 30% Final exam, 30% Practical work |
| Forms of media | : Face to face instruction, Slides, Board, internet, practical instruments |



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- Literatures
- : 1. Allen Jr., L.V., 2002, *The Art, Science, and Technology of Pharmaceutical Compounding*, 2nd Edition, American Pharmaceutical Association, Washington.
 2. American Pharmacist Association, 2015, *Drug Information Handbook*, Lexi-Comp, United States.
 3. Anief, M., 2005, *Ilmu Meracik Obat-Teori dan Praktik*, Gadjah Mada University Press, Yogyakarta.
 4. Hendriati, 2013, *Compounding dan Dispensing*, Graha Ilmu, Yogyakarta.
 5. Ikatan Apoteker Indonesia (IAI), 2016, *Informasi Spesialite Obat (ISO) Indonesia*, PT ISFI Penerbitan, Jakarta.
 6. Marriott, J.F., et al, 2010, *Pharmaceutical Compounding and Dispensing*, Pharmaceutical Press, United Kingdom
 7. Tatro, D.S., et al., 2015, *Drug Interaction Facts, Facts and Comparisons*, St. Louis.
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Biopharmaceutics (5,01 ECTS/3(1) CSU)

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| Code/ Status | : FAF 3471/Compulsory |
| Module level | : Undergraduate |
| Semester | : 1 |
| Module Coordinators/ Lecturers | : Akhmad Kharis Nugroho Adhyatmika Abdul Karim Zulkarnain |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Classroom lecture, 100 minutes/week Practical works, 120 minutes/week |
| workload | : 100 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study, 120 minutes laboratory work, 50 minutes report preparation |
| Credit points | : 5,01 ECTS/3(1) CSU |
| Pre-Requisite | : Pharmacokinetics (FAF 2872) |
| Learning goals/ Course Outcomes | : Students are able to understand: the definition, scope, purposes, advantages, the relation between biopharmaceutics and pharmaceutical professionalism; drug transport process through biological membranes; anatomical, physiological, and physical-chemical factors that affect drug's absorption; biopharmaceutical characteristics and its implication in drug formulations; bioavailability of drugs and their products; bioequivalence of drug products; in situ absorption principles, examples, and advantages; in vivo study method through pharmacokinetic studies, perfusion test, and its data analysis; in vitro study methods through diffusion study through across reversed intestinal membrane, mono-layered, and dissolution, and analyze its data; the concept and basic application, including the application in drug developments, of in vitro-in vivo absorption correlation; population-based biopharmaceutics study approach concept; to understand and practice various methods of in vitro, in situ, and in vivo absorption. |
| Content | : This course consists of learning through lectures and practical works. Overall, this course contains material about drug transport through biological membranes, physical and chemical factors of drugs and its products, anatomical and physiological factors where the drug is applied, absorption traits of drugs through in vitro, in situ, and in vivo, introduction to population- based biopharmaceutical approaches, bioavailability and bioequivalence of drug products, various factors that can affect the absorption of drugs and their products, efforts to increase absorption, drug formula designs, and drug products evaluation, to obtain optimum therapeutic effects. In the biopharmaceutics' practicums, students will learn and practice directly about the introduction of population-based biopharmaceutical modeling and computation, the importance of drug's intrinsic dissolution speed studies in preformulation stage, the effects of pH in vitro, in situ, and in vivo on drug's per-oral absorption, and in vitro drug's percutaneous absorption |
| Study/exam achievements | : A-E, 21% Midterm 21% Final exam, 25% quizzes, assignment, and discussion, and 18% practical works. |



Forms of media : Face to face instruction, Slides, Board, internet

Literatures : Main literatures:

1. Amidon. G.L, Lee, PI, and Topp, E.M, 2000, *Transport Processes in Pharmaceutical Systems*, Marcel Dekker Inc., New York.
2. Banakar, U., 1992,, *Pharmaceutical Dissolution Testing*, Marcel Dekker Inc., New York.
3. Dressman, J.B. and Lennernas, H, 2000, *Oral Drug Absorption Prediction and Assessment*, Marcel Dekker Inc., New York.
4. Dressman, J. and Kramer, J., 2005, *Pharmaceutical Dissolution Testing*, Taylor & Francis, Boca Raton.
5. Shargel, L., Wu-Pong, S., and Yu, A.B.C., 2005, *Applied Biopharmaceutics & Pharmacokinetics*, 5th Edition. McGraw Hill, Boston.
6. Welling, P.G., Tse, F.L.S., Dighe, S.V., 1991, *Pharmaceutical Bioequivalence*, Marcel Dekker, New Yowk.

Supporting literatures:

1. Banker, G.S., and Rhodes, CT., 1996, *Modern Pharmaceutics*, Marcel Dekker, New York.
 2. Ritschel W.A. and Eakrns, G.L., 2004, *Handbok of Basic Pharmacokinetics Including Clinical Applications*, 6th edition, American Pharmaceutical Association, Washington D.C.
 3. Sinko, P.J., 2006, *martin's Physical Pharmacy and Pharmaceutical Sciences*, 5th Edition, Lippincott Williams & Wilkins, Philadelphia.
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Drug Delivery System (3,34 ECTS/2(0) CSU)

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| Code/ Status | : FAF 3472/Compulsory |
| Module level | : Undergraduate |
| Semester | : 6 |
| Module Coordinators/ Lecturers | : Akhmad Kharis Nugroho Ronny Martien Adhyatmika |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Classroom lectures, 100 minutes/week |
| Workload | : 100 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study |
| Credit points | : 3,34 ECTS/2(0) CSU |
| Pre-Requisite | : Biopharmaceutics (FAF 3471) |
| Learning goals/ Course Outcomes | : Students are able to understand the meaning, scope, goals and benefits of Drug Delivery System in the field of pharmaceutical sciences. Students are able to understand the basic concepts of Drug Delivery System: 1) the difference between Drug Delivery System and conventional drug preparations; 2) the influence of biopharmaceutic factors on drug delivery system; and 3) mass transfer theory. Students are able to explain several alternative drug delivery formulations / routes which include: transdermal drug delivery system, liposome, orally disintegrating tablets, enteric coated preparations, microparticulates, prodrugs, delivery of nanoparticles, peptides and proteins, vaccines, pulmonary and nasal drug delivery system routes. Students are able to analyze and choose the best drug delivery system type for a drug with certain characteristics. |
| Content | : This course discusses about the difference between drug delivery system and conventional preparations; biopharmaceutical influence on drug delivery system; mass transfer theory; modified release, transdermal, liposome, orally disintegrating tablets, enteric coated, microparticulate, prodrug, delivery of nanoparticles, peptides and proteins, vaccines, pulmonary and nasal drug delivery system routes. |
| Study/exam achievements | : A-E, 40% Task, 20% Midterm, 40% Final exam |
| Forms of media | : Face to face instruction, Slides, Board, Internet |



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- Literatures
1. Mathiowitz, E., 1999, Encyclopedia of Controlled Drug Delivery, Vol. I, John Wiley & Sons, New York
 2. Mathiowitz, E., 1999, Encyclopedia of Controlled Drug Delivery, Vol. II, John Wiley & Sons, New York.
 3. Amiji, M.M. and Sandmann, B.J., 2003, Applied Physical Pharmacy, McGraw-Hill Medical Publishing Division, New York.
 4. Bronaugh, R.L. dan Maibach, H.I., 1999, Percutaneous Absorption: Drugs – Cosmetics –Mechanisms – Methodology, Marcel Dekker, New York.
 5. Roberts, M.S. dan Walters, K.A., 1998, Dermal Absorption and Toxicity Assessment, Marcel Dekker, New York.
 6. Janoff, A.S., 1999, Liposomes Rational Design, Marcel Dekker, New York.
 7. Park, K., Shalaby, W.S.W., Park, H., 1993, Biodegradable Hydrogels for Drug Delivery, Technomic Publishing, Lancaster.
 8. Amidon, G.L., Lee, P.I., Topp, E.M., 2000, Transport Processes in Pharmaceutical Systems, Marcel Dekker, New York.
 9. Sage, B. H.. Iontophoresis. In E. W. Smith and H. I. Maibach (eds.). Percutaneous Penetration Enhancer, CRC Press Inc., 1995. pp. 351-368.
 10. Banga, A. K., Bose, S. and Ghosh, T. K.. Iontophoresis and electroporation: comparisons and contrasts. Int J Pharm 179:1-19 (1999)
 11. Leboulanger, Fathi, B. M., Guy, R.H. and Begon~a Delgado-Charro, M., Reverse Iontophoresis as a Noninvasive Tool for Lithium Monitoring and Pharmacokinetic Profiling, Pharm Res, 21:,1214-1222 (2004)
 12. McAllister, D. V., Wang, P. M., Davis, S. P, Park, J.H., Canatella, P.J., Allen, M. G., and Prausnitz, M. R., Microfabricated needles for transdermal delivery of macromolecules and nanoparticles: Fabrication methods and transport studies, PNAS, 100: 13755–13760, (2003)
 13. Groneberg, D. Witt A.,C., Wagner U., Chung K.F., and Fischer, A., Fundamentals of Pulmonary Drug Delivery, Respiratory Med, 197: 382-387 (2003)
 14. Krishnamachari, Y. Geary, S.M., Lemke, C.D. ,Aliasger K. and Salem A.K., Nanoparticle Delivery Systems in Cancer Vaccines, Pharm Res 28:215–236 (2011)
 15. Merkus, F.W.H.M., Verhoef, J.C., Marttin, E., Romeijn, S.G., van der Kuy, P.H.M., Hermens, W.A.J.J., and Schipper, N.G.M., Cyclodextrins in nasal drug delivery, Adv. Drug Delivery Rev., 36: 41-57 (1999)
 16. O’Hagan, D.T. and Rappuoli, R., Novel Approaches to Vaccine Delivery, Pharm Res, 21, 1519-1530 (2004)
 17. Banker, G.S., and Rhodes, CT., 1996, Modern Pharmaceutics, Marcel Dekker Inc., New York.
 18. Sinko, P.J., 2006, Martin’s Physical Pharmacy and Pharmaceutical Sciences, 5th Edition, Lippincott Williams & Wilkins, Philadelphia.
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Universitas Gadjah Mada
Faculty of Pharmacy
Undergraduate Program in Pharmacy

Good Manufacturing Practice (3,34 ECTS/ 2(0) CSU)

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| Code/ Status | : FAF 3572/Compulsory |
| Module level | : Undergraduate |
| Semester | : 6 |
| Module | : Marchaban |
| Coordinators/ Lecturers | Achmad Fudholi T.N. Saifullah S Rina Kuswahyuning |
| Language | : Indonesian |
| The format/class hours per week during the semester workload | : Classroom lectures, 100 minutes/week : 100 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study |
| Credit points | : 3,34 ECTS/2(0) CSU |
| Pre-Requisite | : Formulation and Technology: Solid Dosage Forms (FAF 2571) Formulation and Technology: Liquid and Semisolid Dosage Forms (FAF 2572) Co-Req: Formulation and Technology: Sterile Dosage Forms (FAF 3571) |
| Learning goals/ Course Outcomes | : Students are able to understand and master the meaning, scope, purpose, advantages, and also relation to the problem of good drugs manufacturing in the pharmaceutical industry; the role of pharmacists in pharmaceutical industries; pharmacist's competence in good drug manufacturing in pharmaceutical industry. |
| Content | : This course contains materials about: dynamic GMP, drug manufacturing that fulfill the requirements according to quality, personnel, buildings and facilities, tools, sanitation and hygiene, production, quality control, self-inspection and quality audits, product complaint handling, product recall, documentation, contract-based manufacturing, pharmaceutical engineering, and waste management. |
| Study/exam achievements | : A-E, 45% Midterm, 2,5% quizzes, 7.5% essay assignments, and 45% Final exam |
| Forms of media | : Face to face instruction, Slides, Board, Internet |
| Literatures | : Main <ol style="list-style-type: none">1. Anonym, 2018, <i>Pedoman CPOB</i>, Badan POM, Jakarta.2. Schlindwein, W.A., and Gibson, M., 2018, <i>Pharmaceutical Quality by Design</i>, Hobeken, USA.3. Van der Vlies, C., 1996, <i>QC & GMP</i>, Handout Faculty of Pharmacy, UGM. Supporting <ol style="list-style-type: none">1. Anonym, 2012, <i>Cara Pembuatan Obat yang Baik</i>, Badan POM, Jakarta. |



Drugs, Cosmetics, and Food Analysis (5,01 ECTS/3(1) CSU)

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| Code/ Status | : FAF 3671/Compulsory |
| Module level | : Undergraduate |
| Semester | : 5 |
| Module Coordinators/ Lecturers | : Sudibyo Martono Abdul Rohman Sudjadi Endang Lukitaningsih |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Classroom lectures, 100 minutes/week Practical works, 120 minutes/week |
| Workload | : 100 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study, 120 minutes of laboratory works, 50 minutes report preparation |
| Credit points | : 5,01 ECTS/3(1) CSU |
| Pre-Requisite | : Chromatography (FAF 2672) |
| Learning goals/ Course Outcomes | : Students are able to analyze antipyretic and analgesic drugs: aspirin, aspirin mixed with its decompensates product (salicylic acid, acetic acid), aspirin + caffeine, mixture of: paracetamol/aspirin/ketoprofen/ibuprofen/diclofenac. Mixture of: paracetamol/caffeine/acetanilide/phenacetin. Aspirin. Using the titrimetric methods (acid-base titrations, non-aqueous titrations, spectrophotometry, HPLC), depending on the presence of the drug, in a single or mixed form; Students are able to analyze antibiotics, including classes of: Oxytetracycline/tetracycline/chlortetracycline group, penicillin group (ampicillin, G penicillin, V penicillin), a mixture of ampicillin and caffeine; ciprofloxacin, a mixture of ciprofloxacin and dexamethasone, Benzylpenicillin, using the titrimetric methods (Iodometry, UV-Vis spectrophotometry, HPLC) depending on the presence of the drug, in a single or mixed form; Students are able to analyse nerve drug classes: amitriptyline, Nortriptyline, Chlorpromazine, Amphetamine, Amitriptyline + Pregabalin, Amitriptyline + Mecobalamin, Amitriptyline + Chlordiazepoxide. Using the titrimetric methods (acid-base titrations, non-aqueous titrations, UV-Vis spectrophotometry, HPLC), depending on the presence of the drug, in a single or mixed form. Students are able to analyse vitamin and hormone drug classes: Vitamin: B1, B2, B12,C group, in single form or in combination with: folate acid, Niacin, and Niacinamide, hormone: cortisone, hydrocortisone, prednisone, norgestrel. Using the titrimetric methods (acid-base titration, non-aqueous titration, UV-Vis spectrophotometry, HPLC), depending on the presence of the drug, in a single or mixed form; Students are able to analyse the efficacy of sunscreen cosmetic in vitro or in vivo, and examine the weakness and privileges of each methods; |



Students are able to understand the mechanism of skin moisturizing processes and able to analyse moisturizer cosmetics.
Students are able to recognize which colouring ingredients are allowed or not to be used in cosmetics and able to analyze the colouring ingredients that are not allowed to be used in cosmetics;
Students get to know the mechanism of skin whitening processes and are able to analyze whitening cosmetics' efficacy especially in the inhibition of tyrosinase enzyme;
Students are able to analyze carbohydrate depending on their scope, with various analysis techniques including Luff-Schorll volumetric method, UV-Vis spectrophotometry, enzymatic, and various method of chromatography;
Students are able to choose protein analysis methods according to their scope and analyze proteins in food products using official methods which include Kjeldahl, Formol, and Dumas method, spectroscopy, and various chromatography methods;
Students are able to distinguish, characterize, and authenticate oils and fats using volumetric methods (saponification and iodine numbers), and infrared spectroscopy, are able to do lipid analysis and evaluate lipid oxidation products.
Students are able to analyze food additives including preservatives, sweeteners, colouring agents, and antioxidants, and are able to choose the appropriate analysis methods (volumetric, spectroscopy, and chromatography) based on their scope; vaccines and protein drugs; and the existence of genetically modified food.

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| Content | : In this course, students will learn methods of drug, cosmetics, and food analysis. Class of drugs that will be learned for drug analysis: antibiotics, analgesics, antipyretics, vitamins, hormones, and nerve drugs. Cosmetics analysis that will be studied: analysis of sunscreens, moisturizers, colouring agents, and bleaching agents. In food analysis, students will learn analysis of: carbohydrates, fats, proteins, and additives. For biotechnological products analysis, vaccine, genetically modified organisms, and drug proteins analysis will be studied. In this course, students are taught how to choose a method, either conventional or instrumental, based on the condition/existence of drugs/drug materials in a single or mixed or in combination with other components of the drug. |
| Study/exam achievements | : A-E, 15% Midterm, 30% Final exam, 10% quizzes or assignments, 20% practical works, 20% practical test. |
| Forms of media | : Face to face instruction, Slides, Board, Internet, Practical equipment |



Literatures

: Main Literatures:

1. Kar, A., 2005, Pharmaceutical Drug Analysis, New Age International (P) Ltd Publisher, New Delhi.
2. Harris, D. C., 2010, Quantitative Chemical Analysis, Eight Edition, WH Freean and Company, New York
3. Moffat, A.C., Osselton, M.D., and Widdop, B., 2011, Clarke's Analysis of Drug and poisons in Pharmaceuticals, body fluids and post-mortem material, Fourth Edition, Pharmaceutical Press, London.
4. Salvador A. And Chisvert A., 2007, Analysis of Cosmetic Products, 1st Ed., Elsevier, Netherland
5. Draelos Z.D and Thaman L.A., 2009, Cosmetic Formulation of Skin Care Products, Taylor&Francis, New York
6. Betton C.I., 2007, Global Regulatory Issues for the Cosmetics Industry, Vol I, William Andrew Inc.

Supporting literature:

Watson, D.G., 2003, Pharmaceutical Analysis, A Textbook for Pharmacy Students and Pharmaceutical Chemist, Churchill, Livingstone.



Radiopharmaceutical and Chemotherapy (3,34 ECTS/2(0) CSU)

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|---|--|
| Code/ Status | : FAF 3771/Compulsory |
| Module level | : Undergraduate |
| Semester | : 6 |
| Module Coordinators/ Lecturers | : Hilda Ismail Kuswandi Fita Rahmawati Retno Murwanti Adam Hermawan |
| Language | : Indonesian |
| The format/class hours per week during the Semester | : Classroom lectures, 100 minutes/week |
| Workload | : 100 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study |
| Credit points | : 3,34 ECTS/2(0) CSU |
| Pre-Requisite | : Basic Pharmaceutical Chemistry (FAF 1671) Pharmacotherapy I (FAF 2971) |
| Learning goals/ Course Outcomes | : Students are able to understand radiopharmaceuticals; explain threats and benefits of radiopharmaceuticals in pharmacy and medical, diagnostics, and analysis; infer radiopharmaceuticals product preparation principles and quality control; interpret patophysiology, cancer therapeutic principles and chemotherapy, and cytostatic medicines preparation; and are able to outline pharmacotherapy evaluation in cancers, and elaborate medicinal therapy monitoring, information, and education. |
| Content | : This course discusses study of radioactive substances benefits, characteristics, and threats; radiopharmaceutical products labeling and preparation; and application of radiopharmaceutical products uses, critically in treating cancer. This course also discusses about patophysiology theory, chemotherapy and cancer therapy principle, cytostatic medicines preparation and pharmacotherapy uses on cancers; also monitoring and medicinal therapy education on cancer. |
| Study/exam Achievements | : A-E, 20% Tasks, 40% Midterm and 40% Final exam |
| Forms of media | : Face to face instruction, Computer, Gadget, Slides |
| Literatures | : 1. Baum,S. and Bram,R. 1975, <i>Basic Nuclear Medicine</i> , Appleton-Century-Croft, New York. 2. Cember, H., 1983, <i>Introduction to Health Physics</i> , Second Editin, Pergamon Press Inc., New York. 3. Friedlander, G., et al, 1981, <i>Nuclear and Radiochemistry</i> , Third Edition, John Wiley and Sons Inc, New York. 4. Knoll, G.F., 1979, <i>Radiation Detection and Measurement</i> , John Wiley & Sons, New York. |



Pharmaceutical Biotechnology (3,34 ECTS/2(0) CSU)

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| Code/ Status | : FAF 3772/Compulsory |
| Module level | : Undergraduate |
| Semester | : 6 |
| Module Coordinators/ Lecturers | : Sismindari Puji Astuti Muthi' Ikawati Nanang Fakhrudin Adam Hermawan |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Classroom lectures, 100 minutes/week |
| Workload | : 100 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study |
| Credit points | : 3,34 ECTS/2(0) CSU |
| Pre-Requisite | : Molecular Biology (FAF 2771) Pharmaceutical Immunology (FAF 2773) |
| Learning goals/ Course Outcomes | : Students are able to explain the pharmaceutical biotechnology basic concept and stem cell, and their application for disease detection and stem cell therapy; to understand the basic principle of gene engineering and fermentation techniques as well as their application in secondary metabolites production; to understand the principle of gene engineering for biopharmaceutical production using biopharming technique in plants and animals; to understand basic principle in antibodies and vaccines production, as well as the principle of protein engineering and biosimilar; molecular biology application in therapy using biotechnology products such as immunotherapy and gene therapy. |
| Content | : This course explains about the application of molecular biology that includes: 1. Biopharmaceutical production (therapeutic proteins, vaccines, hormones, antibodies) using genetic engineering and biopharming technique; 2. Secondary metabolites production using genetic engineering and fermentation technique; 3. Molecular based disease identification; 4. Protein engineering and biosimilar; and 5. Therapy using biotechnological products, such as immunotherapy, gene therapy, oligonucleotide therapy, and stem cell therapy. In addition, this course also introduces regulation and bioethics in biotechnology. |
| Study/exam achievements | : A-E, 40% Midterm, 20% discussions, and 40% Final exam |
| Forms of media | : Face to face instruction, Slides, Board, Internet |



Literatures

: **Main Literatures:**

1. Crommelin D.J.A. and Sindelar R.D. (Eds.), 2008, *Pharmaceutical Biotechnology: An Introduction for Pharmacists and Pharmaceutical Scientists*, 3rd Edition, Harwood Academic Publishers, Amsterdam.
2. Gad, S.C. (Ed.), 2007, *Handbook of Pharmaceutical Biotechnology*, John Wiley & Sons, Inc., Hoboken, New Jersey.
3. Kayser, O. and Warzecha, H. (Eds.), 2012, *Pharmaceutical Biotechnology: Drug Discovery and Clinical Applications*, 2nd Ed., Wiley-VCH Verlag & Co. KGaA, Weinheim, Germany.
4. Sambamurthy K. and Kar A., 2006, *Pharmaceutical Biotechnology*, New Age International Publ. India.
5. Walsh G., 2007, *Pharmaceutical Biotechnology: Concepts and Applications*, John Wiley & Sons Ltd., England.

Supporting Literature

Selected journal articles



Universitas Gadjah Mada
Faculty of Pharmacy
Undergraduate Program in Pharmacy

Experimental Pharmacology and Toxicology II (1,67 ECTS/1(1) CSU)

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| Code/ Status | : FAF 3871/Compulsory |
| Module level | : Undergraduate |
| Semester | : 5 |
| Module Coordinators/ Lecturers | : Sugiyanto Agung Endro Nugroho Arief Nurrochmat Purwantiningsih Nunung Yuniarti Ika Puspita Sari Retno Murwanti Arief Rahman Hakim Fivy Kurniawati Dyaningtyas Dewi |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Practical works, 120 minutes/week |
| Workload | : 120 minutes laboratory work, 50 minutes report preparation |
| Credit points | : 1,67 ECTS/1(1) CSU |
| Pre-Requisite | : Toxicology (FAF 2874) Pharmacology II (FAF 2875) |
| Learning goals/ Course Outcomes | : Students are able to explain experimental toxicology concept, <i>in silico</i> , <i>in vitro</i> , <i>in situ</i> , <i>ex vivo</i> , <i>in vivo</i> , and have skills about how to prepare drug treatment to experimental animals; to find and explain the information about teratogenic tests and have skills in determining the phase of the estrus cycle and in analyzing the results of teratogenic tests; to find and explain information about the timing of taking samples and assumptions of the compartment and the dose selection in pharmacokinetics; determination of the pharmacokinetic parameters of a drug after administration of a single dose drug; and to have skills in taking samples of experimental animals; to find and explain information about hypertension and antihistamine tests and have the skills to give/present it to animals through various routes of administration. |
| Content | : Experimental pharmacology practicum 2 contains the practice of determining the timing of sample taking and assumption of the compartment model as well as the dose selection in pharmacokinetics, determination of pharmacokinetic parameters of drug after administration of a single dose using blood and urine data, antihypertension, teratogenic test, receptors as a drug action target. The learning method is done with practicum which is immediately followed by question and answer and discussion so that students understand each sub-subject given. Meanwhile, the the scoring method is based on the pretest, laboratory activities performance, discussion, and practical test score. |



Give.Study/exam achievements : A-E, 60% of practical works and 40% practical test

Forms of media : Face to face instruction, Slides, Board, Internet

Literatures : Main literatures:

1. Neal, M.J., 2014, Medical Pharmacology at A Glance, 7th Edition, Wiley-Blackwell, UK.
2. Stringer, J.L., 1996, Basic Concepts in Pharmology: A Student's Survival Guide, 2nd Edition, McGraw-Hill, USA.
3. Lullmann, H., Mohr, K., Ziegler, A., Bieger, D., 2000, Colour Atlas of Pharmacology, 2nd Edition revised and expanded, Thieme Stuttgart, New York.

Supporting literatures

4. Brunton, L., Chabner, B., Knollman, B., 2011, Goodman and Gilman's The Pharmacological Basis of Therapeutics, 12th Edition, McGraw-Hill, USA.
 5. Ikawati, Z., 2014, Buku Farmakologi Molekuler, UGM Press.
 6. Clementi F dan Fumagalli G, 2015, General and Molecular Pharmacology: Principles of Drug Action, John Wiley and Sons, New Jersey, USA
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Universitas Gadjah Mada
Faculty of Pharmacy
Undergraduate Program in Pharmacy

Pharmacotherapy II (3,34 ECTS/2(0) CSU)

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|---|---|
| Code/ Status | : FAF 3971/Compulsory |
| Module level | : Undergraduate |
| Semester | : 5 |
| Module Coordinators/ Lecturers | : Djoko Wahyono Zullies Ikawati Fita Rahmawati Tri Murti Andayani Nanang Munif Yasin Woro Harjaningsih Fivy Kurniawati Mawardi Ihsan |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Classroom lectures, 100 minutes/week |
| Workload | : 100 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study |
| Credit points | : 3,34 ECTS/2(0) CSU |
| Pre-Requisite | : Pharmacotherapy I (FAF 2971) |
| Learning goals/ Course Outcomes | : Students are able to explain pathophysiology, pharmacotherapy, effectiveness monitoring and drug side effects, as well as providing information and education to patients with disorders breathing, explain pathophysiology, pharmacotherapy, monitoring effectiveness and drug side effects, as well as providing information and education to patients with disorders digestion, explain pathophysiology, pharmacotherapy, monitoring effectiveness and effects medicine side, as well as providing information and education on bacterial, viral and infectious diseases parasite, explain pathophysiology, pharmacotherapy, effectiveness monitoring and drug side effects, as well as providing information and education on eye, ear and ear disorders larynx |
| Content | : Pharmacotherapy II studies the management of therapies in allergic rhinitis, asthma, chronic electrocardiography (COPD), peptic ulcer, GERD, hepatitis, glaucoma, acute respiratory infection (ARI), tuberculosis (TB), infection of the urinary tract (UTI), human immunodeficiency virus/ acquired immunodeficiency syndromes (HIV/AIDS), malaria and fever, pneumonia and digestive infection. |
| Study/exam achievements | : A-E, 35% Midterm, 45% Final exam, 10% Group presentation, and 10% Leaflet assignment |
| Forms of media | : Face to face instruction, Slides, Board, Internet |



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- Literatures : 1. Dipro, J.T., et al. 2011, Pharmacotherapy: A Pathophysiologic Approach, 8th Ed, McGraw-Hill, New York
2. Kementerian Kesehatan Republik Indonesia, 2011, Modul Penggunaan Obat Rasional, Jakarta: Kementerian Kesehatan Republik Indonesia.
3. Alldredge, B.K., et al., 2013, Koda-Kimble & Young's Applied Therapeutics: The Clinical Use Of Drugs, 10th Ed, Lippincott Williams & Wilkins, Philadelphia
4. Brunton, L.L., et al. 2012, Goodman & Gilman's The Pharmacological basic of therapeutic, 12th Ed, McGraw-Hill, New York
5. Helms, R.A., et al. 2006, Textbook of Therapeutics, Drug and Disease Management, 8th Ed., Lippincot & Williams, Philadelphia
6. Holloway, K. & van Djik, L., 2011, The World Medicines Situation 2011: Rational Use of Medicines, Geneva: World Health Organization.
7. Scwinghammer, T.L. & Koehler, J.M., 2009, Pharmacotherapy Casebook: A Patient Focused Approach, 7th Ed., McGraw-Hill, New York
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Therapeutic Drug Monitoring/Clinical Pharmacokinetics (3,34 ECTS/2(0) CSU)

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| Code/ Status | : FAF 3972/Compulsory |
| Module level | : Undergraduate |
| Semester | : 5 |
| Module Coordinators/ Lecturers | : Djoko Wahyono Arief Rahman Hakim |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Classroom lectures, 100 minutes/week |
| Workload | : 100 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study |
| Credit points | : 3,34 ECTS/2(0) CSU |
| Pre-Requisite | : Pharmacokinetics (FAF 2872) |
| Learning goals/ Course Outcomes | : Students are able to explain all factors that can influence the results of therapy, namely drug factors, internal factors, and external factors, explain dosage forms that have bioavailability problems, and recognize the active form of the drug, as a basis for calculating drug loading (DL) and DM, mention the drugs which need therapeutic drug monitoring (TDM), explain the definition of therapy, mention the therapeutic dose, describe the parameters of renal pathology, and their effects on drug pharmacokinetics in the calculation of DL and DM, performs DL and DM calculations on pathological conditions for both intravenous and oral administration, and estimate appropriate blood sampling time for determining the price of volume of distribution (Vd), clearance (CL) and $T_{1/2}$ elimination under pathological conditions. |
| Content | : Clinical Pharmacokinetics courses are the application of pharmacokinetics in the clinic, to design dosage regimen in individual patients. The dosage regimen includes intravenous infusion, repeated bolus intravenous injection, and repeated oral administration. Setting individual dosage regimens considering various factors that influence drug kinetics, also drug factors (internal and external factors). Therapeutic drug monitoring (TDM) was applied on pathological conditions, drug interactions, and missing dose. |
| Study/exam achievements | : A-E, 45% Midterm, 45% Final exam, and 10% Case studies |
| Forms of media | : Face to face instruction, Slides, Board, internet |
| Literatures | : 1. Benet LZ, Massoud N, Gambetoglio JG (1984) Pharmacokinetic Basis for Drug Treatment, Raven Press, New York 2. Chow SC & Liu JP (1992) Design and Analysis of Bioavailability and Bioequivalence Studies, Marcel Dekker, Inc., New York 3. Cone EJ, Fant RV, Henningfield JE (2004) Nicotine and Tobacco. Dalam A Mozayani & LP Raymon (eds) Handbook of Drug Interactions- A Clinical and Forensic Guide, Human Press, New Jersey 4. Crowley JJ, Cusack BJ, Vestal RE (1990) The Elderly. Dalam RL Williams, |



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- DC Brater, J Mordenti (eds) Rational Therapeutics : A Clinical Pharmacologic Guide for the Health Professional, Marcel Dekker, Inc., New York, p. 141-174
5. DiPiro JT, Blouin RA, Pruemmer JM, Spruill WJ (1988) Concept in Clinical Pharmacokinetics : A Self-Instructional Course, American Society of Hospital Pharmacists, Bethesda
6. George CF (1983) Drug Kinetics and Hepatic Blood Flow. Dalam M Gibaldi & L Prescott (eds) Handbook of Clinical Pharmacokinetics, ADIS Health Science Press, New York, p. 97-113
7. Giacomini JC, Nguyen K, Giacomini KM (1990) Calcium Channel Blocking Drugs, Organic nitrates, and β -Adrenergic Blocking Drugs. Dalam RL Williams, DC Brater, J Mordenti (eds) Rational Therapeutics : A Clinical Pharmacologic Guide for the Health Professional, Marcel Dekker, Inc., New York, p. 383-423
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Universitas Gadjah Mada
Faculty of Pharmacy
Undergraduate Program in Pharmacy

Pharmacotherapy III (3,34 ECTS/2(0) CSU)

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| Code/ Status | : FAF 3973/Compulsory |
| Module level | : Undergraduate |
| Semester | : 6 |
| Module Coordinators/ Lecturers | : Djoko Wahyono Zullies Ikawati Fita Rahmawati Tri Murti Andayani Nanang Munif Yasin Woro Harjaningsih Fivy Kurniawati Mawardi Ihsan |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Classroom lectures, 100 minutes/week |
| Workload | : 100 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study |
| Credit points | : 3,34 ECTS/2(0) CSU |
| Pre-Requisite | : Pharmacology (FAF 2871) |
| Learning goals/ Course Outcomes | : Students are able to explain pathophysiology, pharmacotherapy, effectiveness monitoring and drug side effects, as well as providing information and education to patients with disorders kidney, explain pathophysiology, pharmacotherapy, monitoring effectiveness and drug side effects, as well as providing information and education on nerve disorders, understand the principles of pharmacotherapy in patients with physiological conditions and special pathology. |
| Content | : Pharmacotherapy III studies the treatment of therapy in acute kidney injury, nephrotic syndrome, chronic kidney disease, complications of chronic kidney disease, electrolyte balance disorders, acid-base disorders, anemia, epilepsy, anxiety, depression, schizophrenia, bipolar disorder, and the principle of therapy in patients with special physiological conditions (children, geriatric, pregnant and lactating mothers) and special pathological conditions (kidney disorders and liver disorders). |
| Study/exam achievements | : A-E, 35% Midterm, 45% Final exam, 10% Group presentation, and 10% Leaflet assignment |
| Forms of media | : Face to face instruction, Slides, Board, Internet |
| Literatures | : 1. Dipiro, J.T., et al. 2011, Pharmacotherapy: A Pathophysiologic Approach, 8th Ed, McGraw-Hill, New York 2. Kementerian Kesehatan Republik Indonesia, 2011, Modul Penggunaan Obat Rasional, Jakarta: Kementerian Kesehatan Republik Indonesia. 3. Alldredge, B.K., et al., 2013, Koda-Kimble & Young's Applied Therapeutics: The Clinical Use Of Drugs, 10th Ed, Lippincott Williams & Wilkins, Philadelphia |



Universitas Gadjah Mada
Faculty of Pharmacy
Undergraduate Program in Pharmacy

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4. Brunton, L.L., et al. 2012, Goodman & Gilman's The Pharmacological basic of therapeutic, 12th Ed, McGraw-Hill, New York
 5. Helms, R.A., et al. 2006, Textbook of Therapeutics, Drug and Disease Management, 8th Ed., Lippincot & Williams, Philadelphia
 6. Holloway, K. & van Djik, L., 2011, The World Medicines Situation 2011: Rational Use of Medicines, Geneva: World Health Organization.
 7. Scwinghammer, T.L. & Koehler, J.M., 2009, Pharmacotherapy Casebook: A Patient Focused Approach, 7th Ed., McGraw-Hill, New York
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Clinical Pharmacy I (1,67 ECTS/1(1) CSU)

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| Code/ Status | : FAF 3974/Compulsory |
| Module level | : Undergraduate |
| Semester | : 6 |
| Module Coordinators/ Lecturers | : Zullies Ikawati Djoko Wahyono Fita Rahmawati Tri Murti Andayani Nanang Munif Yasin Woro Harjaningsih Fivy Kurniawati Mawardi Ihsan |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Lesson and discussion (lecture), 120 minutes at the first meeting of the semester Practical simulation, 120 minutes at the second meeting of the semester Lesson and discussion (group discussion), 120 minutes/week |
| workload | : 120 minutes of in-class lectures, 50 minutes of report preparation |
| Credit points | : 1,67 ECTS/1(1) CSU |
| Pre-Requisite | : Pharmacotherapy I (FAF 2971) |
| Learning goals/ Course Outcomes | : Students are able to discover patient history in order to define problem related to the efficacy and safety of pharmaceutical preparations; to do research for scientific literature and critical appraisal to optimize therapy; to identify and solve problems related to the efficacy and safety of pharmaceutical preparations in cases of rheumatology, endocrinology, and gastroenterology; to identify and solve problems related to the efficacy and safety of pharmaceutical preparations in cases of cardiology and respiratory; and are able to identify and solve problems related to the efficacy and safety of pharmaceutical preparations in cases of infection. |
| Content | : This course discusses how to discover patient history, do research on evidence-based medicine literatures, critical appraisal, and pharmaceutical care in cases of rheumatology, endocrinology, gastroenterology, cardiology, respiratory, and infection. |
| Study/exam achievements | : A-E; 15% Practical Simulation, 10% Pre-test, 20% Discussion, 25% Practical Report, and 30% Practicum Exam. |
| Forms of media | : Face to face instruction, Slides, Board, internet |



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- Literatures
- : 1) Dipiro, J.T., et al. 2011, *Pharmacotherapy: A Pathophysiologic Approach*, 8th Ed, McGraw-Hill, New York
 - 2) Alldredge, B.K., et al., 2013, *Koda-Kimble & Young's Applied Therapeutics: The Clinical Use Of Drugs*, 10th Ed, Lippincott Williams & Wilkins, Philadelphia
 - 3) Brunton, L.L., et al. 2012, *Goodman & Gilman's The Pharmacological basic of therapeutic*, 12th Ed, McGraw-Hill, New York
 - 4) Scwinghammer, T.L. & Koehler, J.M., 2009, *Pharmacotherapy Casebook: A Patient Focused Approach*, 7th Ed., McGraw-Hill, New York
 - 5) Bootland, D., et al. 2015. *Critical Appraisal for FCEM*. CRC Press, Boca Raton.
 - 6) Bridle, 2003, *Anxiety Disorder in: Handbook of Depression and Anxiety*, Second Edition, Marcel Dekker, New York.
 - 7) Lieb, 2005, *Anxiety Disorder dalam Anxiety and Anxiolytic Drugs*, Springer Verlag, Berlin.
 - 8) Nash, 2005, *Pharmacotherapy of Anxiety dalam Anxiety and Anxiolytic Drugs*, Springer Verlag, Berlin.
 - 9) Saladin, 2007, *Anatomy and Physiology the unity of form and function* 4th edition, Mc Graw Hill, New York.
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National Health System (3,34 ECTS/2(0) CSU)

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| Code/ Status | : FAF 4371 /Compulsory |
| Module level | : Undergraduate |
| Semester | : 7 |
| Module Coordinators/ Lecturers | : Anna Wahyuni Widayanti Dwi Endarti Susi Ari Kristina Chairun Wiedyaningsih |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Classroom lectures, 100 minutes/week |
| Workload | : 100 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study |
| Credit points | : 3,34 ECTS/2(0) CSU |
| Pre-Requisite | : Pharmacoeconomics (FAF 3373) |
| Learning goals/ Course Outcomes | : Students are able to explain the concept of the health service system in Indonesia and compare the health service system in various countries. Students are able to understand the health financing system as a part of universal health care and health insurance system. Students are able to explain the health technology assessment (HTA) and its role along with pharmacoeconomic studies in the process of making decision of a health program. Students are able to discuss the role of the health information system in supporting the health system and national health insurance in Indonesia. |
| Content | : This course discusses about concept of health service system, characteristic of health service system, comparison of health service systems in various countries, health financing system, concept of universal insurance, national health organization, introduction of health technology assessment (HTA), the role of HTA and the results of pharmacoeconomic studies in decision making, national formulary, and the role of health information system in national health insurance. |
| Study/exam achievements | : A-E, 10% Individual task, 10% Discussion, 35% Midterm, 45% Final exam |
| Forms of media | : Face to face instruction, Slides, Board, Internet |



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- Literatures
- : 1. Johnson, J.A. and Stoskopf, C.H., 2010. Comparative health systems: global perspectives. Jones & Bartlett Publishers.
 2. Lovett-Scott, M. and Prather, M.F., 2012. Global Health Systems. Jones & Bartlett Publishers.
 3. <http://www.who.int/healthsystems/en/>
 4. Kemenkes RI., 2009. Sistem Kesehatan Nasional. Jakarta.
 5. Perpres RI No 28 tahun 2016 tentang Perubahan ketiga atas perpres no 12 tahun 2013 tentang Jaminan Kesehatan
 6. Banta, D., 2003. The development of health technology assessment. Health policy, 63(2), pp.121-132.
 7. Drummond, M.F. and McGuire, A., 2001. Economic evaluation in health care: merging theory with practice. OUP Oxford.
 8. Richard Edlin, Christopher McCabe, Claire Hulme, Peter Hall, Judy Wright. 2015. Cost Effectiveness Modelling for Health Technology Assessment: A Practical Course. Springer International Publishing, Switzerland.
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Universitas Gadjah Mada
Faculty of Pharmacy
Undergraduate Program in Pharmacy

Clinical Pharmacy II (1,67 ECTS/1(1) CSU)

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| Code/ Status | : FAF 4971/Compulsory |
| Module level | : Undergraduate |
| Semester | : 7 |
| Module Coordinators/ Lecturers | : Djoko Wahyono Zullies Ikawati Fita Rahmawati Tri Murti Andayani Nanang Munif Yasin Woro Harjaningsih Fivy Kurniawati Mawardi Ihsan Arif Rahman Hakim |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Lesson and discussion (lecture), 120 minutes at the first meeting of the semester Lesson and discussion (group discussion), 120 minutes/week |
| workload | : 120 minutes of in-class lectures, 50 minutes of report preparation |
| Credit points | : 1,67 ECTS/1(1) CSU |
| Pre-Requisite | : Pharmacotherapy I (FAF 2971) |
| Learning goals/ Course Outcomes | : Students are able to identify and solve problems related to the efficacy and safety of pharmaceutical preparations in cases of kidney disease; to identify and solve problems related to the efficacy and safety of pharmaceutical preparations in cases of neurological disorder; to identify and solve problems related to the efficacy and safety of pharmaceutical preparations in cases of drugs that require TDM (Therapeutic Drug Monitoring); and are able to identify and solve problems related to the efficacy and safety of pharmaceutical preparations in cases of oncology. |
| Content | : This course discusses how to identify and solve problems related to the efficacy and safety of pharmaceutical preparations in cases of kidney disease, neurological disorder, drugs that require TDM (Therapeutic Drug Monitoring), and oncology. |
| Study/exam achievements | : A-E, 15% Teamwork, 10% Pre-test, 20% Discussion, 25% Practical Report, and 30% Practical Exam. |
| Forms of media | : Face to face instruction, Slides, Board, internet |



Literatures

- : 1) Dipiro, J.T., et al. 2011, Pharmacotherapy: A Pathophysiologic Approach, 8th Ed, McGraw-Hill, New York
- 2) Alldredge, B.K., et al., 2013, Koda-Kimble & Young's Applied Therapeutics: The Clinical Use Of Drugs, 10th Ed, Lippincott Williams & Wilkins, Philadelphia
- 3) Brunton, L.L., et al. 2012, Goodman & Gilman's The Pharmacological basic of therapeutic, 12th Ed, McGraw-Hill, New York
- 4) Scwinghammer, T.L. & Koehler, J.M., 2009, Pharmacotherapy Casebook: A Patient Focused Approach, 7th Ed., McGraw-Hill, New York
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Universitas Gadjah Mada
Faculty of Pharmacy
Undergraduate Program in Pharmacy

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- 8.) Bridle, 2003, Anxiety Disorder in: Handbook of Depression and Anxiety, Second Edition, Marcel Dekker, New York.
 - 9.) Lieb, 2005, Anxiety Disorder dalam Anxiety and Anxiolytic Drugs, Springer Verlag, Berlin.
 - 10.) Nash, 2005, Pharmacotherapy of Anxiety dalam Anxiety and Anxiolytic Drugs, Springer Verlag, Berlin.
 - 11.) Saladin, 2007, Anatomy and Physiology the unity of form and function 4th edition, Mc Graw Hill, New York.
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Marine Natural Products (3,34 ECTS/2(0) CSU)

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| Code/ Status | : FAP 0271/Elective |
| Module level | : Undergraduate |
| Semester | : 7 |
| Module Coordinators/ Lecturers | : Yosi Bayu Murti Triana Hertiani Erna Prawita Setyowati |
| Language | : Indonesian |
| The format/class hours/ per week during the semester | : Classroom lectures, 100 minutes/week |
| Workload | : 100 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study |
| Credit points | : 3,34 ECTS/2(0) CSU |
| Pre-Requisite | : - |
| Learning goals/ Course Outcomes | : Students are able to outline the resources of active compounds and secondary active compounds originated from the sea; and are able to show various structures, biosynthetic pathways, isolation and production strategies of natural compositions from the sea. |
| Content | : This course is an elective course that provide knowledge about marine medicinal substances, including marine biota as natural resources for medicine, characteristics of marine natural compounds and their applications, general principles of extraction and isolation procedures for marine natural compounds, as well as the production strategy of marine natural materials in the future. |
| Study/exam achievements | : A-E, 10% Tasks or Quizzes, 45% Midterm, and 45% Final exam |
| Forms of media | : Face to face instruction, Slides, Board, Internet |



Literatures

: **Primary**

1. Bhakuni, D.S., and Rawat, D.S., 2005, Bioactive Marine Natural Products, Springer, USA.
2. Fusetani, N., 2000, Drugs From the Sea, Karger.
3. Scheper (Ed.), 2005, Marine Biotechnology I and II, Springer.
4. Cannel R.J.P., 1998, How to Approach the Isolation of a Natural Product. Natural Products Isolation, Totowa: Humana Press.
5. Paul M. Dewick, 2002, Medicinal Natural Product A Biosynthetic Approach, 2nd Ed., John Wiley and Sons, Ltd.

Secondary

Related scientific journals



Formulation and Technology: Sterile Dosage Form (3,34 ECTS/2(1) CSU)

| | |
|---|--|
| Code/ Status | : FAF 3571/Compulsory |
| Module level | : Undergraduate |
| Semester | : 6 |
| Module Coordinators/ Lecturers | : Marchaban Ronny Martien Angi Nadya Bestari Miftahus Sa'adah |
| Language | : Indonesian |
| The format/class hours per week during the Semester | : Lesson and discussion, 50 minutes/weekly and 14 weeks during the semester Practical works, 4 hours/weekly and 7 weeks during the semester |
| Workload | : 50 minutes of in-class lectures, 50 minutes of structured activities |
| Credit points | : 3.34 ECTS/2(1)CSU |
| Pre-Requisite | : FAF 1472 |
| Learning goals/ Course Outcomes | : Students are able to understand, explain, and build sterile dosage form formulation; to formulate and make sterile dosage form; and are able to evaluate sterile dosage form in pharmaceuticals. |
| Content | : This course discusses basics and requisites of sterile dosage form, carrier substances and solvent, packing, microorganism inactivation, requisites of steril dosage form making including sterility test and pirogenic test in parenteral form and ophthalmic form in industrial scale. |
| Study/exam Achievements | : A-E, 5% Quiz, 5% Discussion, 20% Midterm, 20% Final exam, 50% Practical Works |
| Forms of media | : Face to face instruction, Computer, Gadget, Slides, Internet |
| Literatures | : 1. Alexander, T., Florence, A.T., & Siepman, J., 2009, <i>Modern Pharmaceutics: Applications and Advances</i> , Vol. 2, 5th Ed., Informa Healthcare, New York. 2. Avis, K.E., Lachman, L., & Lieberman, H.A., 1992, <i>Pharmaceutical Dosage Forms</i> , Parenteral Medication, Vol. I, II & III, Marcel Dekkes Inc., New York. 3. Odum, J.N., 2004, <i>Sterile Product Facility Design and Project Management</i> , 2nd Ed., CRC Press, London. |



Community Pharmacy and Regulation (11,69 ECTS/7(0) CSU)

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|---|---|
| Code/ Status | : FAK 4072/Compulsory (Elective Course Package) |
| Module level | : Undergraduate |
| Semester | : 7 |
| Module Coordinators/ Lecturers | : Susi Ari Kristina Nanang Munif Yasin Anna Wahyuni Marlita Putri Ekasari Muvita Rina Kuswandi Tri Murti Andayani |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Lesson and discussion: problem based teaching, 300 minutes/weekly and 4 weeks during the semester Project based teaching, 300 minutes/weekly and 6 weeks during the semester Case based teaching, 300 minutes/weekly and 4 weeks during the semester |
| workload | : 100 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study |
| Credit points | : 11,69 /7 (0)CSU |
| Pre-Requisite | : 110 CSU |
| Learning goals/ Course Outcomes | : Students are able to explain the concepts of professionalism, communication, and collaboration in the practice of pharmaceutical care in the community; to determine and apply relevant ethics and morals in the practice of pharmaceutical care in the community; to identify and analyze issues related to general health and pharmacy in the community; to classify the level of policies and regulations and analyze their implementation in the community; to design methods in the realization of programs that are measurable, comprehensive, and soluble; to measure the effectiveness, efficiency, and sustainability of the program; to manage drug preparations, consumable medical materials, medical devices in primary care (pharmacies and community health centers (PUSKESMAS)); to conduct clinical pharmacy in primary care (pharmacies and community health centers); and are able to communicate ideas and recommendations for program implementation through a good dissemination process. |
| Content | : This course is related to pharmaceutical care practice in the community that prioritizes ethics, professionalism, communication, collaboration related to drug management and clinical pharmacy care in the community, designing community-based programs and evaluating regulations and policies. |
| Study/exam achievements | : A-E, 60% Project, 20% Exam, 10% Mid Project Presentation, and 10% Final Project Presentation |
| Forms of media | : Face to face instruction, Slides, Board, internet |



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- Literatures :
1. Carter, J., Slack, M., 2010, Pharmacy in Public Health Basic and Beyond, American Society of Health System Pharmacist Inc., USA.
 2. Levin, B., L., Hurd, P.D., Hanson A, 2008, Introduction to Public Health in Pharmacy, Jones and Baret Publisher Inc., USA.
 3. Tulchinsky, T., H., Varavikova, E., A., 2009, The New Public Health, 2nd edition, Elsevier Inc., USA.
 4. Mc.Carthy, R., L., Schafermeyer, K.W., 2007, Introduction to Health Care Delivery – A Primer for Pharmacist, 4th edition, Jones and Baret Publisher Inc., USA.
 5. Posey, L.M., 2009, Pharmacy: An Introduction to The Profession, American Pharmacist Association, Washington.
 6. Carr, S., Unwin, N., Pless-Mulloli, T., 2007, An Introduction to Public Health and Epidemiology, Open University Press, McGraw-Hill Education, England.
 7. Gard, P. A. 2000. Behavioral Approach to Pharmacy. Oxford: Practice Blackwell Science.
 8. Harding, G.; Nettleton, S.; Taylor, K (Ed), 1993, Sociology for Pharmacists : An Introduction, The Macmillan Press Ltd., Hongkong.
 9. Ibid., 1994, Social Pharmacy, London: The Pharmaceutical Press.
 10. Smith, M.C., Wertheimer, A.I.; 1996, Social and Behavioral Aspect of Pharmaceutical Care, Philadelphia: Pharmaceutical Products Press.
 11. Wertheimer, A.I.; Smith, M.C.; 1989, Pharmacy Practice : Social and Behavioral Aspect, 3rd Ed., Baltimore: William-Wilkins.
 12. Smith FJ. (2002). Pharmacy practice research methods. London: Pharmaceutical Press.
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Elective Course Package – Cosmetics and Food (11,69 ECTS/7(0) CSU)

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|---|---|
| Code/ Status | : FAK 4076/Elective |
| Module level | : Undergraduate |
| Semester | : 7 |
| Module Coordinators/ Lecturers | : ? |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Lesson and discussion, 350 minutes/weekly and 14 weeks during the semester |
| workload | : 350 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study |
| Credit points | : 11,69 ECTS/7(0)CSU |
| Pre-Requisite | : 110 CSU |
| Learning goals/ Course Outcomes | : Students are able to show the idea of cosmetics, nutraceuticals, and foods; to apply modern technology in cosmetics, nutraceuticals, and foods; and are able to assess the efficacy and safety of cosmetics, nutraceuticals, and foods. |
| Content | : This course discusses about the cosmetology and nutraceuticals; the physiology and function of skin; the purpose of cosmetics and nutraceuticals; the regulation and notification rules of cosmetics products as well as food products registration; how to make cosmetics and foods, starting from choosing raw materials, formulation, technology and process validation, labels and packaging, quality assurance procedure for cosmetics and food products; as well as utilization of natural resources for cosmetics, nutraceuticals, and foods. |
| Study/exam achievements | : A-E, 5% Quiz, 10% Essay, 25% Internship Report and Laboratory Work Project, 10% Discussion, 25% Midterm Exam, 25% Final Exam |
| Forms of media | : Face to face instruction, Slides, Board, internet, industry, home industry, beauty clinic, laboratory instrument, research materials |



Literatures : Primary

1. Betton, C.I., 2007, Global regulatory issues for the Cosmetics Industry, Vol 1, William Andrew Inc.
2. Rogiers, V. and Pauwels, M., 2008, Safety Assessment of Cosmetics in Europe, Karge A.G., Switzerland
3. Salvador, A. and Chisvert, A., 2007, Analysis of Cosmetic Products, Elsevier, Amsterdam
4. Shaath, N.A., 2005, Sunscreen-regulation and cosmetics, 3rd edition, Taylor & Francis Co.
5. Tønnesen, H.H., 1996, Photostability of Drugs and Drug Formulations, Taylor & Francis Co.
6. Chilcott, R.P., Price, S., 2008, Principle and practice of Skin Toxicology, John Wiley and Sons, USA
7. Selamat, J & Iqbal, S.Z, 2016, Food Safety, Basic Concepts, Recent Issues and Future Challenges, Springer,
8. Ghosh, D. & Smarta, R.B., 2007, Pharmaceuticals to Nutraceuticals, A shift in disease prevention, CRC Press
9. Pathak, Y., 2016, Nutraceuticals: Basic Research/Clinical application, CRC Press

Secondary

Other related resources (scientific articles from international journals)



Distribution and Marketing Management (11,69 ECTS/7(0) CSU)

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|---|--|
| Code/ Status | : FAK 4077 / Elective Course Package |
| Module level | : Undergraduate |
| Semester | : 7 |
| Module Coordinators/ Lecturers | : Satibi Sardjiman Bondan Ardiningtyas Woro Harjaningsih Hardika Aditama |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Lesson and discussion, 200 minutes/weekly and 10 weeks during the semester Internship, 3 days/weekly and 4 weeks during the semester |
| workload | : 100 minutes/200 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study |
| Credit points | : 11,69 ECTS/7(0) CSU |
| Pre-Requisite | : 110 CSU |
| Learning goals/ Course Outcomes | : Students are able to evaluate how to distribute drugs in distribution facilities; develop marketing plans for pharmaceutical preparations and medical devices; compare distribution and marketing practices in terms of ethical and legal aspects; solve problems in the distribution and marketing of pharmaceutical preparations and medical devices; and establish communication with distribution and marketing partners of pharmaceutical preparations and medical devices. |
| Content | : This course presents the form of learning through lectures, internships, and comprehensive discussions. Distribution and marketing management in field of pharmacy discusses about the introduction of management and regulation of drug distribution, CDOB, management of process and risk in distribution, concepts of pharmaceutical product marketing, delivering and communication values, and strategic marketing management. |
| Study/exam achievements | : A-E, 10% Quiz, 20% Midterm, 20% Final exam, 12.5% Task 1, 12.5% Task 2, 12.5% Internship report, 12.5% Focused group discussion (FGD) |
| Forms of media | : Face to face instruction, Slides, Board, internet |



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- Literatures : 1. Kotler, P., Keller, K.L, 2012, Marketing Management 14 Ed, Prentice Hall
2. Porter, ME., 2007, Strategi Bersaing (terjemahan), Karisma Publishing Group
3. Wheelen, TL., dan Hunger, JD., 2010, Strategic Management and Business Policy, 12 Ed, Pearson
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Hospital Pharmacy (11,69 ECTS/7(0) CSU)

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|---|--|
| Code/ Status | : FAK 4705 / Elective Course Package |
| Module level | : Undergraduate |
| Semester | : 7 |
| Module Coordinators/ Lecturers | : Zullies Ikawati |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Lesson and discussion, 350 minutes/weekly and 14 weeks during the semester |
| workload | : 350 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study |
| Credit points | : 11,69 ECTS/7(0) CSU |
| Pre-Requisite | : 110 CSU |
| Learning goals/ Course Outcomes | : Students are able to analyze application of pharmaceutical preparations management and support management in hospital. Students are able to solve drug therapy problems in patients of particular population. Students are able to demonstrate dispensing aseptic preparations. |
| Content | : This course discusses the management of pharmaceutical preparations in hospital and clinical pharmaceutical care in hospital. The management of pharmaceutical preparations in hospital includes: management of pharmaceutical preparations inventory (Sorting, Planning, Procurement, Storage, Distribution, Control, Disposal, Reporting, and One-Stop Drug Policy), Support Management (Organization, Information system, Quality Assurance of Pharmaceutical care in Hospital), and Health Technology Assessment (HTA). Clinical pharmaceutical care in hospital includes: Pharmaceutical care for patients of particular population (Geriatric, Pediatrics, Kidney disorders, Liver disorders, Pregnant and breastfeeding women), monitoring drug therapy (effectiveness and side effects), clinical toxicology, and pharmacogenomics. |
| Study/exam achievements | : A-E, 25% Written exam I, 25% Written exam II, 10% Report, 20% Discussion I, 20% Discussion II |
| Forms of media | : Face to face instruction, Slides, Board, internet |



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- Literatures : 1. Embrey, MA. (editor). 2012. MDS-3: Managing Access to Medicines and Health Technologies. Kumarian Press.
2. Cicchetti, A., Marchetti, M., Dibidino, R., Corio, M. 2018. Hospital Based Health Technology Assessment World-Wide Survey. Health Technology Assessment International.
3. Zgarrick, DP; Alston, GL; Moczygemba, LR; Desselle, SP. 2009. Pharmacy Management: Essentials for all practice settings. The McGraw-Hill Companies, Inc. USA
4. World Health Organization. 2011. Health Technology Assessment of Medical Devices. World Health Organization.
5. Dipiro, J.T., et al. 2011. Pharmacotherapy: A Pathophysiologic Approach, 8th Ed, McGraw-Hill.
6. Alldredge, B.K., et al. 2013. Koda-Kimble & Young's Applied Therapeutics: The Clinical Use Of Drugs, 10th Ed, Lippincott Williams & Wilkins.
7. Brunton, L.L., et al. 2012. Goodman & Gilman's The Pharmacological basic of therapeutic, 12th Ed, McGraw-Hill.
8. Helms, R.A., et al. 2006. Textbook of Therapeutics, Drug and Disease Management, 8th Ed., Lippincot & Williams.
9. Scwinghammer, T.L. & Koehler, J.M.. 2009. Pharmacotherapy Casebook: A Patient Focused Approach, 7th Ed., McGraw-Hill.
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Pharmaceutical Immunology (3,34 ECTS/2(1) CSU)

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| Code/ Status | : FAF 2773/Compulsory |
| Module level | : Undergraduate |
| Semester | : 4 |
| Module Coordinators/ Lecturers | : Muthi' Ikawati Ediati Sasmito Retno Murwanti M. Novrizal Abdi Sahid |
| Language | : Indonesian |
| The format/class hours per week during the Semester | : Lesson and discussion, 50 minutes/weekly and 14 weeks during the semester Practical works, 4 hours/weekly and 7 weeks during the semester |
| Workload | : 50 minutes of in-class lectures, 50 minutes of structured activities |
| Credit points | : 3.34 ECTS/2(1)CSU |
| Pre-Requisite | : FAF 2771, FAF 2871 |
| Learning goals/ Course Outcomes | : Students are able to understand immunology basic concept related to pharmaceuticals which are classification, components, and mechanism of immune system in basic and adaptive immune response, mucosal immune response, immunology tolerance, autoimmune, and hypersensitivity; to apply knowledge about antigen-antibody reaction in pharmaceuticals; to develop immunology principles in medicine development and diagnosis; and are able to conclude newest immunology researches result in journals related to pharmaceuticals. |
| Content | : This course discusses basic concepts of pharmaceutical immunology, consists of immune responses introduction, immune system components, antigen processing and presentation, antibodies, mucosal immune system, immunology tolerance and autoimmune, and hypersensitivity. Meanwhile, in practical works students will be given skills and experience in antigen-antibody reaction application, and pharmaceutical immunology techniques. |
| Study/exam Achievements | : A-E, 15% Quiz, 15% Task, 35% Midterm, 35% Final exam |
| Forms of media | : Face to face instruction, Computer, Gadget, Slides, Internet |
| Literatures | : 1. Abbas, A.K., Lichtman, A.H., and Pillai, S. 2015, <i>Cellular and Molecular Immunology</i> , 8th Ed., WB Saunders Co., Philadelphia. 2. Delver, P.J., Martin, S.J., Burton, D.R. and Roitt, I.M. 2017, <i>Roitt's Essential Immunology</i> , 13th Ed., John Wiley & Sons, Inc., Chichester, West Sussex. 3. Flaherty, D. 2012, <i>Immunology for Pharmacy</i> , Elsevier, Mosby, Missouri. |



Industrial Pharmacy (11,69 ECTS/7(0) CSU)

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|---|---|
| Code/ Status | : FAK 4074 / Elective Course Package |
| Module level | : Undergraduate |
| Semester | : 7 |
| Module Coordinators/ Lecturers | : Sudibyo Martono Achmad Fudholi Sudarsono Marchaban TN. Saifullah Yosi Bayu Murti Ratna Budhi Pebriana |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Lesson and discussion, 350 minutes/weekly and 14 weeks during the semester |
| workload | : 350 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study |
| Credit points | : 11,69 ECTS/7(0) CSU |
| Pre-Requisite | : 110 CSU |
| Learning goals/ Course Outcomes | : Students are able to develop pharmaceutical preparations with certain quality; develop testing methods for raw material and finished good. Students are able to implement quality assurance system throughout the process |
| Content | : This course is delivered in the form of learning through lectures, discussions, internship, and FGD. This course package discusses about how to develop pharmaceutical and veterinary preparations as well as aspects that must be considered in the manufacture of pharmaceutical preparations such as quality assurance, production management, PPIC management, process technology, process validation, development and validation of analytical methods, packaging technology, criteria and procedures for registering pharmaceutical and veterinary preparations. |
| Study/exam achievements | : A-E, 5% Quiz, 50% Discussion, 30% Internship & report, 15% Focused Group Discussion |
| Forms of media | : Face to face instruction, Slides, Board, internet |



Literatures

: Main References

1. Anonim, 2018, Pedoman CPOB, Badan POM, Jakarta
2. Anonim, 2018, Pedoman CPOTB, Badan POM, Jakarta
3. Schlindwein, W.A., and Gibson, M, 2018, Pharmaceutical Quality by Design, Hobeken, USA
4. Van der Vlies, C., 1996, QC & GMP, Handout Fac of Pharmacy UGM, Jogjakarta
5. Lang, J. C., 2010, Production and Inventory Management with Substitutions, Springer Verlag, Amsterdam
6. Ahuja, S. and Rasmussen, H., 2007, HPLC method development for pharmaceuticals, vol.8, Separation science and technology, Elsevier, Academic Press, Amsterdam.
7. Ermer, J. and Miller, J.H.M., 2005, Method validation in pharmaceutical analysis, A guide to best practice, Wiley-VCH Verlag GmbH, Weinheim.
8. Miller, J.M. and Crowther, J.B., 2000, Analytical Chemistry in a GMP Environment, John Wiley & Sons, Inc., New York.
9. Anonim, 2003, Kriteria dan tatalaksana registrasi obat, Badan POM, Jakarta

Pendukung

10. Chan, C.C., Lam, H., Lee, Y.C., and Zhang, X.M., 2004, Analytical method validation and instrument performance verification, Wiley-Interscience, John Wiley & Sons Inc., Hoboken, New Jersey.
 11. POPP CPOB, Badan POM, Jakarta
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Universitas Gadjah Mada
Faculty of Pharmacy
Undergraduate Program in Pharmacy

Molecular Biology (5,01 ECTS/3(1) CSU)

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| Code/ Status | : FAF 2771/Compulsory |
| Module level | : Undergraduate |
| Semester | : 3 |
| Module | : Riris Istigfari Jenis |
| Coordinators/ Lecturers | Edy Meiyanto Sismindari Kuswandi Adam Hermawan Muthi' Ikawati Purwanto |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Lesson and discussion, 100 minutes/weekly and 14 weeks during the semester Practical works, 4 hours/weekly and 7 weeks during the semester |
| workload | : 100 minutes of in-class lectures, 4 hours of practical work, 120 minutes of structured activities, 120 minutes of weekly self-study |
| Credit points | : 5,01 ECTS/3(1) CSU |
| Pre-Requisite | : FAF 1171 Cell Biology-Microbiology, FAF 1773 Pharmaceutical Biochemistry |
| Learning goals/ Course Outcomes | : Students are expected to be able to analyze biological system at the molecular level, hoping that this ability can be the basis of other sciences such as immunology, pharmacology, pharmacochemistry, and drug discovery. |
| Content | : This course discusses the scope and benefits of studying pharmaceutical microbiology, cell biology and parasitology in the field of pharmacy in particular and health in general, which includes the basic concepts of cell biology for prokaryotic and eukaryotic organisms, subcellular structures and functions that occur within cell organelles, how the cellular system can be targeted as antimicrobial action, cell division process and its application in the discovery of antimicrobial drugs and the occurrence of disease. The types of microbes and parasites, pathogenicity and control both physically and chemically, the model of the mechanism of antibiotic action and its resistance, and the tests and biases that are commonly needed in pharmaceutical microbiology also discussed. At the end of this course a case study that integrates previous lecture materials is given in the form of a discussion group forum. This course consists of 2 credits of lecture and 1 practical works. This course contains various subjects such as: prokaryotes and eukaryotes, organelles and power generation function in cells, cytoskeleton, nucleic acid's structure and characteristics. This course explains molecularly |



about: central dogma of gene expression, gene and genome structure, and polymorphism. This course also explains about: the process of mutation and its repair system; how a gene is replicated, expressed into RNA, and then becomes a protein; the regulation of gene expression both in prokaryotes and eukaryotes; how cell communication (transduction signal) works and the types of transduction signal; the process of cell division and its regulation; as well as carcinogenesis.

The Molecular biology and cell's practicum is divided into 2 subjects: laboratory work and dry practicum. Laboratory work includes: introduction of cell culture and cytotoxic tests; DNA isolation and DNA purity analysis; polymorphism identification of a gene using the Polymerase Chain Reaction(PCR)-Restriction Fragment Length Polymorphism method; PCR products analysis using electrophoresis agarose gel; protein expression analysis using the Westernblot method. Dry practicum includes: introduction of NCBI website-based bioinformatics by studying the protein expression system (Hormone receptors).

Study/exam achievements : A-E, 40% Midterm, 20% quizzes, and 40% Final exam

Forms of media : Face to face instruction, Slides, Board, internet

Literatures : Alberts, B., et al., 2015, *Molecular Biology of the Cell*, 6th edition, Garland Publishing, USA.
Becker, W.M., Kleinsmith, L.J., and Hardin, J., 2000, *The World of The Cell*, 4th Edition, The Benjamin/Cummings Publishing Co., San Fransisco.
Cancer Chemoprevention Research Center Farmasi UGM, *Protokol Uji Western Blot*, <http://www.ccrcc.farmasi.ugm.ac.id/wp-content/uploads/protokol-western-blot1-maret-2010.pdf>, diakses Agustus 2018.
Cascorbi, L., et al, 1995, *Arylamine N-Acetyltransferase (NAT2) Mutations and Their Allelic Linkage in Unrelated Caucasian Individuals: Correlation with Phenotypic Activity*, Am. J. Hum. Genet. 57:581;592.
Davis, L.G., Kuehl, W.M., and Battey, J.F., 1994, *Basic Methods in Molecular Biology 2nd Edition*, Appleton and Lange, Norwalk, Connecticut.
Elliot W.H., and Elliot D.C., 1996, *Biochemistry and Molecular Biology*.
Fukino, K., et al, 2008, *Effects of N-cetyltransferase (NAT2), CYP2E1, and GST Genotypes on the Serum Concentrations of Isoniazid and Metabolites in Tuberculosis Patients*, J. Toxicol. Sci., Vol. 33, No.2, 187 – 195.
Lodish, H., Berk, A., Zipursky, SL., Matsudaira, P., Baltimore, D., and Darnel, J., 2000, *Molecular Cell Biology*, the 4th Edition, W.H. Freeman and Co., New York.
Muthusamy, K.A., et al., 2012, *Genetic Polymorphism of EGF 5'-UTR and NAT2 857G/A Associated with Glioma in a Case Control Study of Malaysian Patients*, Genet, Mol. Res., 11 (3): 2939 – 2945.
Sambrook and Russell, 2001, *Molecular Cloning: A Laboratory Manual 3rd Edition*, Cold Spring Harbor Laboratory Press, Cold Spring Harbor, New York.



Universitas Gadjah Mada
Faculty of Pharmacy
Undergraduate Program in Pharmacy

Pharmaceutical Biochemistry (5,01 ECTS/3(1) CSU)

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| Code/ Status | : FAF 1773/Compulsory |
| Module level | : Undergraduate |
| Semester | : 2 |
| Module | : Rumiyati |
| Coordinators/ Lecturers | Sismindari Edy Meiyanto Riris Istigfari Jenie Adam Hermawan |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Lesson and discussion, 100 minutes/weekly and 14 weeks during the semester Practical works, 4 hours/weekly and 7 weeks during the semester |
| workload | : 100 minutes of in-class lectures, 4 hours of practical works, 120 minutes of structured activities, 120 minutes of weekly self-study |
| Credit points | : 5,01 ECTS/3(1) CSU |
| Pre-Requisite | : FAF 1771 Organic Chemistry 1, Co-req: FAF 1772 Organic Chemistry 2 |
| Learning goals/ Course Outcomes | : |
| Content | : This course contains various topics, such as: the role of biochemistry, the role of water for life, living and inanimate objects, protein structure and functions, protein purification techniques, membrane structure and dynamics, basic concept and kinetics of enzyme, basic concept and design of metabolism, carbohydrates, glycolysis, the citric acid cycle, oxidative phosphorylation, gluconeogenesis, glycogen metabolism, fatty acid metabolism, amino acid degradation and the urea cycle, biosynthesis of: lipid membranes and steroids, amino acid and hem, nucleotides, and integrated metabolism. |
| Study/exam achievements | : A-E, 50% Midterm and 50% Final exam |
| Forms of media | : Face to face instruction, Slides, Board, internet |



- Literatures
1. Alberts, B., Bray, D., Lewis, J., Raff, M., Roberts, K., Watson, J.D., 1994, *Molecular Biology of The Cell*, Third Ed., Garland Publishing Inc., New York, USA.
 2. Avers, C.J., 1982, *Basic Cell Biology*, 2nd Edition, Willard Grant Press, Boston.
 3. Becker, W.M., Kleinsmith, L.J., and Hardin, J., 2000, *The World of The Cell*, 4th Edition, The Benjamin/Cummings Publishing Co., San Fransisco.
 4. Campbell, N.A., 1996, *Biology*, 4th Edition, The Benjamin/Cummings Publishing Co., California, USA .
 5. Karp, G., 1999, *Cell and Molecular Biology: Concepts and Experiments*, 2nd Edititon, John Willey and Sons, New York.
 6. Knox, B., Ladiges, P., Evans, N., 1999, *Biology*, 4th Edition, WCB,/McGraw-Hill Publishers, Australia.
 7. Prescott, L.M., Harley, J.P., Klein, D.A., 1993, *Microbiology*, 2nd Edition, Wm.C. Brown Publishers, USA.
 8. Anonim, 2002, *The Biologi Project*, The university of Arizona, USA, available [online] http://www.biology.arizona.edu/cell_bio/tutorials.html, 24 Juni 2004.
 9. Anonim, 2004, The Difference Between Prokaryotic and Eukaryotic Cells, available [online], <http://www.trentu.ca/academic/biology/101/2.html#prokaryotic>, 26 Juni 2004.
 10. Farabee, M.J., 2001, *Photosynthesis*, available [online] <http://www.emc.maricopa.edu/faculty/farabee/BIOBK/BioBookPS.html>, 24 Juni 2004.
 11. Gwen V. Childs, Ph.D., 1998, *Lysosome*, tersedia [online] <http://cellbio.utmb.edu/cellbio/lysosome.htm>, 26 Juni 2004.
 12. Thorpe, N.O., 1984, *Cell Biology*, John Willey and Sons, New York.
 13. Vanderschaegen, P., 1995. *Golgi Apparatus*, available [online], <http://www.winterwren.com/apbio/cellorganelles/golgi.html>, 26 Juni 2004.
 14. Weaver R.F and Hendrick, P.W., 1992, *Genetics*, 2nd Edititon, W.m.C., Brown Publishers, USA.
Wolfe, S.L., 1993, *Molecular and Cellular Biology*, Wadsworth Publishing Company, Bekmont, California.



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- 8.) Bridle, 2003, Anxiety Disorder in: Handbook of Depression and Anxiety, Second Edition, Marcel Dekker, New York.
 - 9.) Lieb, 2005, Anxiety Disorder dalam Anxiety and Anxiolytic Drugs, Springer Verlag, Berlin.
 - 10.) Nash, 2005, Pharmacotherapy of Anxiety dalam Anxiety and Anxiolytic Drugs, Springer Verlag, Berlin.
 - 11.) Saladin, 2007, Anatomy and Physiology the unity of form and function 4th edition, Mc Graw Hill, New York.
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Pharmacoepidemiology (3,34 ECTS/2(0) CSU)

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| Code/ Status | : FAF 3975/Compulsory |
| Module level | : Undergraduate |
| Semester | : 5 |
| Module | : Tri Murti Andayani |
| Coordinators/ Lecturers | Ika Puspitasari Fivy Kurniawati |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Lesson and discussion, 100 minutes/weekly and 14 weeks during the semester |
| workload | : 100 minutes of in-class lectures, 14 weeks during the semester, including 150 minutes doing assignment and 100 minutes group presentation and discussion. |
| Credit points | : 3,34 ECTS/2(0) CSU |
| Pre-Requisite | : FAF 2071 Research Methodology and Pharmaceutical Statistics |
| Learning goals/ Course Outcomes | : Students are able to understand about the basic concepts of pharmacoepidemiology, principle of biostatistics in epidemiological studies, causality and relationships between variables in the pharmacoepidemiology study, interpretation of the results of the pharmacoepidemiology study, case report and case series research design, case control research design, cohort research design, a randomized controlled trial research design, data validity and confounding in research, outcome parameters in the pharmacoepidemiology study, data sources in pharmacoepidemiology, instrumental variables, pharmacovigilance, application of the pharmacoepidemiology study. |
| Content | : This course discusses about the basic concepts of pharmacoepidemiology, biostatistics principles in epidemiological studies, research designs in pharmacoepidemiology, outcome parameters used in pharmakoepidemiology studies, and data sources in pharmacoepidemiology studies, so students are able to apply the results of pharmacoepidemiology studies to identify, evaluate, and evaluate and explain the problem of drug use and its solution at the population level. |
| Study/exam achievements | : A-E, 35% Midterm, 45% Final exam, 10% of assignments, and 10% of group presentation. |
| Forms of media | : Face to face instruction, Slides, Board, internet. |



Literatures

- : 1. Rothman, J.K., 2012. Epidemiology an Introduction 2nd Edition, Oxford University Press, New York.
2. Rosner, B., 2010, Fundamentals of Biostatistics 7th Edition, Cengage Learning, USA
3. Strom, B.L. ed., 2006. Pharmacoepidemiology. John Wiley & Sons.
4. Yang, Y. and West-Strum, D., 2010. Understanding pharmacoepidemiology. McGraw Hill Professional.
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Pharmacotherapy III (3,34 ECTS/2(0) CSU)

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| Code/ Status | : FAF 3973/Compulsory |
| Module level | : Undergraduate |
| Semester | : 6 |
| Module Coordinators/ Lecturers | : Djoko Wahyono Zullies Ikawati Fita Rahmawati Tri Murti Andayani Nanang Munif Yasin Woro Harjaningsih Fivy Kurniawati Mawardi Ihsan |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Lesson and discussion, 100 minutes/weekly and 14 weeks during the semester |
| workload | : 100 minutes of in-class lectures |
| Credit points | : 3.34 ECTS/2(0)CSU |
| Pre-Requisite | : Pharmacotherapy II (FAF 3971) |
| Learning goals/ Outcomes | : Students are able to explain pathophysiology, pharmacotherapy, effectiveness monitoring and drug side effects, as well as providing information and education to patients with disorders kidney, explain pathophysiology, pharmacotherapy, monitoring effectiveness and drug side effects, as well as providing information and education on nerve disorders, understand the principles of pharmacotherapy in patients with physiological conditions and special pathology. |
| Content | : Pharmacotherapy III studies the treatment of therapy in acute kidney injury, nephrotic syndrome, chronic kidney disease, complications of chronic kidney disease, electrolyte balance disorders, acid-base disorders, anemia, epilepsy, anxiety, depression, schizophrenia, bipolar disorder, and the principle of therapy in patients with special physiological conditions (children, geriatric, pregnant and lactating mothers) and special pathological conditions (kidney disorders and liver disorders). |
| Study/exam achievements | : A-E, 35% Midterm, 45% Final exam, 10% Group presentation, and 10% Leaflet assignment |
| Forms of media | : Face to face instruction, Slides, Board, internet |
| Literatures | : 1. Dipro, J.T., et al. 2011, Pharmacotherapy: A Pathophysiologic Approach, 8th Ed, McGraw-Hill, New York 2. Kementerian Kesehatan Republik Indonesia, 2011, Modul Penggunaan Obat Rasional, Jakarta: Kementerian Kesehatan Republik Indonesia. 3. Alldredge, B.K., et al., 2013, Koda-Kimble & Young's Applied Therapeutics: The Clinical Use Of Drugs, 10th Ed, Lippincott Williams & Wilkins, Philadelphia 4. Brunton, L.L., et al. 2012, Goodman & Gilman's The Pharmacological basic of therapeutic, 12th Ed, McGraw-Hill, New York 5. Helms, R.A., et al. 2006, Textbook of Therapeutics, Drug and Disease Management, 8th Ed., Lippincot & Williams, Philadelphia 6. Holloway, K. & van Dijk, L., 2011, The World Medicines Situation 2011: |



Universitas Gadjah Mada
Faculty of Pharmacy
Undergraduate Program in Pharmacy

Rational Use of Medicines, Geneva: World Health Organization.

7. Scwinghammer, T.L. & Koehler, J.M., 2009, Pharmacotherapy Casebook: A Patient Focused Approach, 7th Ed., McGraw-Hill, New York



Phytotherapy (3,34 ECTS/2(0) CSU)

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| Code/ Status | : FAF 3172/Compulsory |
| Module level | : Undergraduate |
| Semester | : 6 |
| Module | : Nanang Fakhruddin |
| Coordinators/ Lecturers | Suwidjiyo Pramono Sudarsono Arief Nurrochmad |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Lesson and discussion, 100 minutes/weekly and 14 weeks during the semester Practical works, 4 hours/weekly and 7 weeks during the semester |
| workload | : 100 minutes of in-class lectures, 4 hours of practical works, 120 minutes of structured activities, 120 minutes of weekly self-study |
| Credit points | : 5,01 ECTS/3(1) CSU |
| Pre-Requisite | : FAF 1171 Cell Biology-Microbiology, FAF 2875 Pharmacology II |
| Learning goals/ Course Outcomes | : Students are able to apply the rules or laws that apply in solving problems related to phytotherapy applications or traditional drug development; to explain the selection of ingredients in the preparation of traditional medicinal herb drug formulas; and to provide rational phytotherapy recommendations. |
| Content | : Study of phytotherapy is related to the treatment of diseases that use natural ingredients (traditional drugs), especially medicinal plants. This course studies about the definition, scope, history, development, basic concepts, and regulation in phytotherapy. In addition, potential pharmacetics, pharmacodynamic, pharmacokinetic interactions, interactions of phytotherapy with synthetic drugs, claims of efficacy and supporting data in phytotherapy preparations will also be discussed, as well as phytotherapy in the context of government programs such as herbal medicine. In this course, students will also learn the phytotherapy for common diseases suffered Indonesian people, such as digestive system disorders, cardiovascular system, excretion system, diabetes, cancer, hyperuricemia, hypercholesterolemia and obesity, and phytotherapy for maintaining health, fitness, and vitality. |
| Study/exam achievements | : A-E, 40% Midterm, 40% Final exam, and 20% of assignments. |
| Forms of media | : Face to face instruction, Slides, Board, internet, practical works |



Literatures

: Main Literatures:

1. Anonim, 1997, Kodifikasi Perundangan Obat Tradisional, Ditjen POM, Depkes R.I, Jakarta
2. Mills, S. & Bone, K., 1999, Principles and practice of Phytotherapy, Churchill Livingstone, Edinburgh.
3. Schulz, V., Hansel, R.,& Tyler, V.E, 1997, Rational Phytotherapy, Springer, Berlin.
4. Divya Vohora and SP Vohora, 2016, Safety Concerns for Herbal Drugs, CRC Press, Boca Raton
5. Williamson, E., Driver, S., Baxter, K., 2009, Stockley Herbal Medicines Interactions, Pharmaceutical Press, London.
6. Ebadi M., 2002, Pharmacodynamic basis of Herbal Medicine, CRC Press, Boca Raton, Florida
7. Awang, Dennis V. C. 2009, Tyler's herbs of choice : the therapeutic use of phytomedicinals, 3rd edition, CRC Press, New York.

Supporting literature:

1. Anonim, 2000, General guidelines for methodologies on research and evaluation of traditional medicine, WHO, Geneva.
 2. Cooper, R., Kronenberg, F. (Eds.), 2009, Botanical Medicine: From Bench To Bedside, Mary Ann Liebert, New York.
 3. Benzie, I.F.F., Wachrel-Galor, S., (Eds.), 2011, Herbal medicine: biomolecular and clinical aspects, 2nd Ed, CRC Press, New York.
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Research and Drug Discovery (11,69 ECTS/7(0) CSU)

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| Code/ Status | : FAK 4071 / Elective Course Package |
| Module level | : Undergraduate |
| Semester | : 7 |
| Module Coordinators/ Lecturers | : Ritmaleni Subagus Wahyuono Akhmad Kharis Nugroho Nunung Yuniarti Sismindari Hari Purnomo Muthi' Ikawati Ika Puspitasari Adam Hermawan Arief Rahman Hakim B.S. Ari Sudarmanto Nanang Fakhrudin Adhyatmika |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Lesson and discussion, 200 minutes/weekly and 14 weeks during the semester Internship, 17.5 hours/weekly and 2 weeks during the semester |
| workload | : 100 minutes/200 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study |
| Credit points | : 11,69 ECTS/7(0) CSU |
| Pre-Requisite | : 110 CSU |
| Learning goals/ Course Outcomes | : Students are able to analyze basic concepts about the design of small molecule drug and macromolecules, which include synthetic drugs, natural medicines, and macromolecular drugs; problems about synthesis, analysis of drug ingredients, activity tests, and pre-formulation of small molecule drugs and macromolecules. Students are able to apply the basic concepts of research and drug discovery. |
| Content | : This course package discusses the stages of drug discovery from upstream to downstream. This course discusses the ethnomedicine approach to find active compounds; molecular design of active compounds; isolation, structure elucidation and synthesis of active compound; efficacy test and safety test of active compound; structure modification to find active compound with higher potency. This course discusses the pre-clinical and clinical tests in the discovery of new drugs. |
| Study/exam achievements | : A-E, 18% Task, 26.4% Midterm, 12.6% Discussion and presentation (Focused Group Discussion), 21.5% Final exam: Internship practice, 21.5% Final exam: Internship report |
| Forms of media | : Face to face instruction, Slides, Board, internet |



Literatures : Main References

1. Bulugahapitiya VP., 2018, Plants Based Natural products : Extraction, Isolation and Phytochemical screening methods, Indika Graphics Matara, Sri Langka
2. Gibson M, 2009, Pharmaceutical preformulation and formulation: A practical guide from candidate drug selection to commercial dosage form, 2nd Edition, CRC Press.
3. Grotewold E. (Ed.), 2014, The Science of Flavonoids, Springer, Columbus, Ohio, USA. Note : (Erich Grotewold Department of Cellular and Molecular Biology The Ohio State University Columbus, Ohio 43210 USA grotewold.1@osu.edu)
4. Kayser, O. and Warzecha, H. (Eds.), 2012, Pharmaceutical Biotechnology: Drug Discovery and Clinical Applications, 2nd Ed., Wiley-VCH Verlag & Co. KGaA , Weinheim, Germany.
5. Walsh G., 2007, Pharmaceutical Biotechnology: Concepts and Applications, John Wiley & Sons Ltd., England.
6. Warren, S. and Paul Wyatt, 2008, Organic Synthesis: The Disconnection Approach, 2nd Ed, John Willey & Sons, Inc., Chennai-India, Great Britain.

Supporting References

7. Acharya PC, Shetty S, Fernandes C, Soares D, Maheshwari R, and Tekade RK, 2018, Chapter 1 – Preformulation in drug research and pharmaceutical product development, Academic Press.
 8. Clayden et al., 2012, Organic Chemistry.
 9. Niazi SK, 2019, Handbook of preformulation: Chemical, biological, and botanical drugs, 2nd edition, CRC Press; atau Niazi SK, 2007, Handbook of preformulation: Chemical, biological, and botanical drugs, 1st edition, CRC.
 10. Patrick G., 2001, Instant Notes : Medicinal Chemistry, pp. 75-82, BIOS Scientific Publishers Ltd., 9 Newtec Place, Magdalen Road, Oxford OX4 1RE, UK
 11. Raks V., Al- Suod H., and Buszewski B., 2018, Isolation, Separation, and Preconcentration of Biologically Active Compounds from Plant Matrices by Extraction Techniques, Chromatographia, 81:189–202.
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Universitas Gadjah Mada
Faculty of Pharmacy
Undergraduate Program in Pharmacy

Research Methodology and Pharmaceutical Statistics (5,01 ECTS/3 CSU)

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| Code/ Status | : FAF 2071/Compulsory |
| Module level | : Undergraduate |
| Semester | : 3 |
| Module Coordinators/ Lecturers | : Edy Meiyanto Suwijiyono Pramono Tri Murti Andayani T.N. Saifullah Sulaiman S. |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Lesson and discussion, 150 minutes/weekly and 14 weeks during the semester |
| workload | : 150 minutes of in-class lectures, making resume of literature, presentation and making research proposals |
| Credit points | : 5,01 ECTS/3 CSU |
| Pre-Requisite | : - |
| Learning goals/ Course Outcomes | : Students are able understand the definition of science and research in space scope of pharmacy, scientific research concepts, ethics science, validity and reliability of research, design research, able to compile / make proposals and research reports and scientific articles as well avoid plagiarism |
| Content | : Research Methodology courses study things related to research methods and research design. The material consists of definition of science, ethics and scope of pharmacy science, research concepts, logic of thinking, validity and reliability research, research design, preparation of proposals and research reports, as well as plagiarism. |
| Study/exam achievements | : A-E, 25% Task / Proposal, 30% Midterm, 20% Final exam, 10% Presentation |
| Forms of media | : Face to face instruction, Slides, Board, internet |



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- Literatures
1. Anonymous, 2013, Buku Petunjuk Skripsi Fakultas Farmasi Universitas Gadjah Mada, Panitia Skripsi Farmasi Universitas Gadjah Mada
 2. Brown, T.R. and Smith, m.C., 1986, Handbook Of Institutional Pharmacy Practice 2nd Ed., Williams & Wilkins, Balitimore
 3. Gibaldi, J., 1999, MLA Handbook For Writers Of Research Papers., 5th Ed., The Modern Language Association Of America New York
 4. Mulyadi, 2001, Skripsi I (Metodologi Penelitian) Bagian Sampel, Data, Analisis Data, Dan Penyusunan Laporan Penelitian, Buku Ajar Fakultas Farmasi UGM
 5. Nelson, A.A., 1980, Research Methods For Pharmaceutical Practice, Am., J. Hosp.Pharm., 37,107-110
 6. Pratiknya, A.W., 2003., Dasar-Dasar Metodologi Penelitian Kedokteran Dan Kesehatan, PT. RajaGrafindo Persada, jakarta.
 7. Schefler, W.C., 1979, Statistika Untuk Biologi, Farmasi, Kedokteran, Dan Ilmu Yang Bertautan, Translate Edition : Suroso, Penerbit ITB, Bandung.
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Toxicology (3,34 ECTS/2(0) CSU)

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| Code/ Status | : FAF 2874/Compulsory |
| Module level | : Undergraduate |
| Semester | : 4 |
| Module Coordinators/ Lecturers | : Retno Murwanti Arief Nurrochmad Purwantiningsih |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Lesson and discussion, 100 minutes/weekly and 14 weeks during the semester |
| workload | : 100 minutes of in-class lectures, explaining the presentation, and doing the mini quiz |
| Credit points | : 3.34 ECTS/2(0)CSU |
| Pre-Requisite | : Pharmacology 1 (FAF 2871) |
| Learning goals/ Course Outcomes | : Students are able to understand basic orientation toxicology which includes various basic concepts and general toxicological principle, understand the factors that are affect toxicity, toxic responses to toxic substances benchmarks and their application in the pharmaceutical world, understand the basic concepts of therapy antidote and management of the treatment and risk basis assessment, and understand the general principle of tests toxicology, type of test, and risk assessment basis |
| Content | : Toxicology studies and discusses about definition and the scope of toxicology, xenobiotic fate/substances toxic in the body, general toxicological concept which includes various conditions of toxic effects, mechanisms action, form and nature of the toxic effects, the factors which are affect toxicity, toxic responses to foreign compounds, molecular mechanisms of biochemical effects toxic, qualitative and toxicity benchmarks quantitative, basic antidote therapy and management antidote therapy, general principles of toxicology testing, a variety of non- typical and typical toxicology tests, and basis for risk assessment and assessment of treatment. |
| Study/exam achievements | : A-E, 5% online mini quiz, 45% Midterm, and 50% Final exam |
| Forms of media | : Face to face instruction, Slides, Board, internet |
| Literatures | : 1. Loomis, T.A. 1994. <i>Essentials of Toxicology</i> . 3rd Ed. Lea & Febiger: Philadelphia. 2. Donatus, I.A. 2005, <i>Toksikologi Dasar</i> . Edisi II. Bagian Farmakologi dan Farmasi Klinik, Fakultas Farmasi UGM, Yogyakarta. 3. Haschek, W.M., Wallig, & Rousseaux, C., 2010, <i>Fundamentals in Toxicologic Pathology</i> , 2nd Ed., Academic Press, London. 4. Timbrell, J.A. 2009. <i>Principles of Biochemical Toxicology</i> . 4th Ed, Taylor & Francis, London |



Universitas Gadjah Mada

Faculty of Pharmacy

Undergraduate Program in Pharmacy

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5. Hodgson, E, 2004, *A Textbook of Modern Toxicology*, McGraw-Hill International Ed, New York
 6. Klaasen, C.D., (Eds.), 2008, *Casarett and Doull's Toxicology: The Basic Science of Poisons*, 7rd Ed., McMillan Publishing Company
 7. Ecobichon, DJ, 1997, *The Basic of Toxicity*, Second Edition, CRC Press, Boca Raton, New York.
 8. Related journal
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Traditional Medicine (11,69 ECTS/7(0) CSU)

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| Code/ Status | : FAK 4073 / Elective Course Package |
| Module level | : Undergraduate |
| Semester | : 7 |
| Module Coordinators/ Lecturers | : Andayana Puspitasari G. |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Lesson and discussion, 350 minutes/weekly and 14 weeks during the semester |
| workload | : 350 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study |
| Credit points | : 11,69 ECTS/7(0) CSU |
| Pre-Requisite | : 110 CSU |
| Learning goals/ Course Outcomes | : Students are able to apply the principles in development of traditional medicine. Students are able to design preparations and quality assurance system for traditional medicine. Students are able to demonstrate or illustrate the registration process for traditional medicine. |
| Content | : This elective course package discusses the product design of traditional medicine, starting from the development of new products, production process, quality assurance, to product registration. Product Development module discusses about how new designs are made, market analysis, methods of producing good traditional medicine, and its related regulations. Product module emphasizes on the choice of raw materials, composition, formulation, extraction technology, and packaging. Quality Assurance module discusses the application of quality assurance systems in the traditional medicine industry, implementation on methods of producing good traditional medicine, identification of raw materials, and analysis of active ingredients traditional medicine products. The course also discusses about procedures of traditional medicine product registration. |
| Study/exam achievements | : A-E, 20% Report, 15% Presentation/discussion, 10% Task, 25% Midterm, 30% Final exam |
| Forms of media | : Face to face instruction, Slides, Board, internet |



Universitas Gadjah Mada
Faculty of Pharmacy
Undergraduate Program in Pharmacy

Capita Selecta in Pharmaceutical Analysis (3,34 ECTS/2(0) CSU)

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| Code/ Status | : FAP 0671/Elective |
| Module level | : Undergraduate |
| Semester | : 7 |
| Module Coordinators/ Lecturers | : Abdul Rohman Sudibyo Martono Tatang Irianti Ratna Budhi Pebriana |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Lesson and discussion, 100 minutes/weekly and 14 weeks during the semester |
| workload | : 100 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study |
| Credit points | : 3,34 ECTS/2(0) CSU |
| Pre-Requisite | : No |
| Learning goals/ Course Outcomes | : Students are able to choose and apply various sample preparation techniques for analysis of compound contained in a matrix of environmental sample and biomedical fluid; as well as to choose and apply various analytical techniques for analysis of compound contained in environmental samples and biomedical samples. |
| Content | : This course discusses various sample preparation techniques for analyzing environmental samples and biomedical liquid samples including extraction, solid phase extraction and solid phase microextraction; processing of pharmaceutical industry waste; analyzing quality standard of bottled mineral water and quality standard of pharmaceutical industry liquid waste using volumetric analysis, spectrophotometry and chromatography; and analysis of various drug compounds (antibiotics, analgesics, antipyretics, vitamins, hormones, nerve drugs) in biological fluids (urine, blood, and others). |
| Study/exam achievements | : A-E, 10% Mini quiz or task, 20% Presentation, 35% Midterm, 35% Final exam |
| Forms of media | : Face to face instruction, Slides, Board, internet |



Literatures

: Main References

1. Mitra, S. 2003. Sample Preparation Techniques in Analytical Chemistry. John Wiley & Sons, Inc., Hoboken, New Jersey.
2. Simpson, N.J.K. 2000. Solid Phase Extraction. Taylor and Francis, New York.
3. Kar, A, 2005, Pharmaceutical Drug Analysis, Age Int. Limited Publisher, New Delhi
4. Watson, D.G., 1999, Pharmaceutical Analysis: A Textbook for Pharmacy Students and Pharmaceutical Chemist, 2nd Ed, ChurchillLivingston, UK
5. Anonim, 2018, United States Pharmacopoeia, New York, USA.

Supporting References

6. Barcelo, D. 1993. Environmental Analysis: Techniques, applications and Quality Assurance. Elsevier, Amsterdam.
 7. Reeve, R.N. 2003. Introduction to environmental Analysis. John Wiley & Sons, Inc., Hoboken, New Jersey.
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Universitas Gadjah Mada
Faculty of Pharmacy
Undergraduate Program in Pharmacy

Synthesis of Raw Drug Materials (3,34 ECTS/2(0) CSU)

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| Code/ Status | : FAP 0771/Elective |
| Module level | : Undergraduate |
| Semester | : 7 |
| Module Coordinators/ Lecturers | : Hilda Ismail Ratna Asmah Sardjiman B.S. Ari Sudarmanto Ritmaleni Wiratni Budhiyanto |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Lesson and discussion, 100 minutes/weekly and 14 weeks during the semester |
| workload | : 100 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study |
| Credit points | : 3,34 ECTS/2(0) CSU |
| Pre-Requisite | : No |
| Learning goals/ Course Outcomes | : Students are able to have knowledge about the definition, classification, applied regulations and requirements of raw drug materials. Students are able to understand synthesis techniques, chemical reactions used, instrument preparation, and separation of synthesis products on laboratory scale; as well as stages of scaling up and development of production process on industrial scale. Students are able to know various examples of process in producing raw drug materials on industrial scale, possibility of its application in Indonesia and utilizing potential natural resource in Indonesia for production of raw drug materials. |
| Content | : This course discusses definition, requirements and regulations applied in the management of raw drug materials; strategies and methods of raw drug materials synthesis, chemical reactions used, instrument preparation, process monitoring, separation and purification on laboratory scale; advanced stages of scaling up development, analysis of economic feasibility and development strategies which can be implemented; and various examples of raw drug materials synthesis on industrial scale. |
| Study/exam achievements | : A-E, 20% Task, 40% Midterm, 40% Final exam |
| Forms of media | : Face to face instruction, Slides, Board, internet |



Literatures

: Main References

1. Mitra, S. 2003. Sample Preparation Techniques in Analytical Chemistry. John Wiley & Sons, Inc., Hoboken, New Jersey.
2. Simpson, N.J.K. 2000. Solid Phase Extraction. Taylor and Francis, New York.
3. Kar, A, 2005, Pharmaceutical Drug Analysis, Age Int. Limited Publisher, New Delhi
4. Watson, D.G., 1999, Pharmaceutical Analysis: A Textbook for Pharmacy Students and Pharmaceutical Chemist, 2nd Ed, ChurchillLivingston, UK
5. Anonim, 2018, United States Pharmacopoeia, New York, USA.

Supporting References

6. Barcelo, D. 1993. Environmental Analysis: Techniques, applications and Quality Assurance. Elsevier, Amsterdam.
 7. Reeve, R.N. 2003. Introduction to environmental Analysis. John Wiley & Sons, Inc., Hoboken, New Jersey.
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Technology of Process in Pharmaceutical Industry (3,34 ECTS/2(0) CSU)

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| Code/ Status | : FAP 0571/Elective |
| Module level | : Undergraduate |
| Semester | : 7 |
| Module Coordinators/ Lecturers | : T.N. Saifullah Aswati Mindaryani Khadijah |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Lesson and discussion, 100 minutes/weekly and 14 weeks during the semester |
| workload | : 100 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study |
| Credit points | : 3,34 ECTS/2(0) CSU |
| Pre-Requisite | : No |
| Learning goals/ Course Outcomes | : Students are able to understand the basic principles of energy and mass transfer used in pharmaceutical industry process. Students are able to understand and utilize the concepts of energy and mass transfer in the process of drying, heat transfer, filtration, particle and powder mixing, particle size reduction, optimization and corrosion techniques. |
| Content | : This course discusses various major processes carried out in producing pharmaceutical products in pharmaceutical industry. |
| Study/exam achievements | : A-E, 2,5% Quiz, 7,5% Essay task, 45% Midterm, 45% Final exam |
| Forms of media | : Face to face instruction, Slides, Board, internet |
| Literatures | : Main References <ol style="list-style-type: none">1. Anthony J. Hikey & David Ganderton, 2010, Pharmaceutical Process Engineering, Vol. 195, 2nd Ed., Informa Healthcare Inc., New York.2. Alexander, T., Florence, A.T., & Siepmann J., 2009, Modern Pharmaceutics: Basic Principles and System, Vol. 1, 5th Ed., Informa Healthcare Inc., New York.3. Alexander, T., Florence, A.T., & Siepmann J., 2009, Applications and Advances, Vol. 2, 5th Ed., Informa Healthcare Inc., New York.4. Green, D. & Perry, R., 2007, Perry's Chemical Engineers' Handbook, 8th Ed., McGraw-Hill, London. Supporting References <ol style="list-style-type: none">5. Banker, G.S. and Rhodes, C.T., 2002, Modern Pharmaceutics, 4th., Marcel Dekker Inc., New York, Basel, Hongkong.6. Green, D., and Perry, R., 2007, Perry's Chemical Engineers' Handbook, |



8th Ed., McGraw-Hill.

7. Masuda, H., Higashitani, K., and Yoshida, H., 2006, Powder Technology Handbook Taylor & Francis Group.
8. Swarbrick, J. (Ed.), 2007, Encyclopedia of Pharmaceutical Technology 3rd, Informa Healthcare USA.
9. Oetjen, G. W. and Haseley, P., 2004., Freeze-Drying, 2nd (Ed)., Wiley-Vch Verlag GmbH & Co.



Religion - Catholic (3,34 ECTS/2(0) CSU)

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| Code/ Status | : FAF 1071/Compulsory |
| Module level | : Undergraduate |
| Semester | : 2 |
| Module | : |
| Coordinators/ Lecturers | |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Lesson and discussion, 100 minutes/weekly and 14 weeks during the semester |
| workload | : 100 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study |
| Credit points | : 3,34 ECTS/2(0) CSU |
| Pre-Requisite | : - |
| Learning goals/ Course Outcomes | : <ol style="list-style-type: none">1. Increase students' knowledge and understanding of Catholic teachings so that student's faith and devotion to God increasingly grow.2. Preparing students for life and life based on religious moral values, as a moral-social mission.3. Preparing students to be more sensitive and caring in their life together in the community, and increasingly involved in the Church to build a life-defender culture (pro-life).4. Empowering students to utilize research results for development of holistic and inclusive Catholic religious education as an integrated knowledge system and a learning to live together in a pluralist society, so that students are able to appreciate the cooperation between religious communities in devoting knowledge and technology and art for national / public interest.5. Helping students find forms of integration between faith and science, so that students have a broad, virtuous, wise outlook, rational and dynamic as a consequence of their faith involvement, both in private life as well as in community and state life.6. Further processing the student's faith experience in preparation for the working world.7. Encourage students to internalize the values of Catholic faith and morals in building their life as a mature, tough, missionary and dialogic Catholic, with the pattern of Jesus Christ personally, so that students will become 100% Catholic and 100% Indonesian. |
| Content | : This course discusses about the purpose(s) of human life according to the scriptures, human relations, religion and faith in plurality, Church |



and Community Faith, Church's Social Teachings and the principles that it fought for.

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| Study/exam achievements | : A-E, 30% Midterm, 40% Final exam, and 30% of assignments and presentations. |
| Forms of media | : Face to face instruction, Slides, Board, internet, practical works |
| Literatures | : Main Literatures: <ol style="list-style-type: none">1. Curran, Charles E, <i>Catholic Social Teaching 1891-Present: Historical, Theological and Ethical Analysis</i>, Washington D.C. Georgetown University Press, 2002.2. DeBerri, Edward P. and Hug, James E , <i>Catholic Social Teaching Our Best Kept Secret</i>, Washington, DC, 200017, Center of Concern, 2005.3. Dewan Karya Pastoral Keuskupan Agung Semarang, <i>Merajut Persaudaraan Sejati Lintas Iman</i>, Yogyakarta, Kanisius, 2014.4. Dijkstra Johannes, SJ, <i>Menjadi Garam Dunia Sejati</i>, Jakarta, Yayasan Bhumiksara, 2006.5. Habeahan Salman, <i>Membangun Hidup Berpolakan Pribadi Yesus</i>, Yogyakarta, Yayasan Pustaka Nusatama, 2006.6. Hadiwardoyo, Purwa Al, MSF, <i>Intisari Keempat Injil</i>, Yogyakarta, Kanisius, 2015.7. Hadiwardoyo, Purwa Al, MSF, <i>Intisari Kisah Para Rasul</i>, Yogyakarta, Kanisius, 20168. Hadiwardoyo, Purwa Al, MSF <i>Sikap Gereja Katolik terhadap Masalah Sosial</i>.9. Haryanto, Ignatius dan Benedanto Pax, <i>Terbuka terhadap Sesama Umat Beragama, Aktualisasi Ajaran Sosial Gereja tentang Agama yang Inklusif</i>, Yogyakarta, Kanisius, 2004.10. Kirchberger, Georg, <i>Misi Gereja Dewasa Ini</i>, Jakarta, Lembaga Pembentukan Berlanjut Arnold Janssen dan Penerbit Celesty Hieronika, 1999.11. Knitter Paul F, <i>Introducing Theologies of Religions</i>, New York, Orbis Books, 2005.12. Konsorsium Sosialisasi Ajaran Sosial Gereja, <i>Sosialisasi Ajaran Sosial Gereja</i>, Yogyakarta, Kanisius, 2002.13. KWI. Iman Katolik, Yogyakarta, Kanisius-Obor, 1966.14. Rukiyanto, B.A. dan Esti Sumarah, Ignatia (ed.), <i>Semakin Menjadi Manusiawai: Teologi Moral Masa Kini</i>, Yogyakarta, Universitas Sanata Dharma, 2014.15. Tisera Guido, SVD, <i>Firman Telah Menjadi Manusia: Memahami Injil Yohanes</i>, Yogyakarta, Kanisius, 1992. |



Universitas Gadjah Mada
Faculty of Pharmacy
Undergraduate Program in Pharmacy

16. Wijngaards John, *Yesus Sang Pembebas*, Yogyakarta,
Kanisius, 1994.



Elective Course Package – Clinical Toxicology (11,69 ECTS/7(0) CSU)

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| Code/ Status | : FAP 0971/Elective |
| Module level | : Undergraduate |
| Semester | : 7 |
| Module Coordinators/ Lecturers | : ? Fivy Kurniawati, M.Sc., Apt. |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Lesson and discussion, 350 minutes/weekly and 14 weeks during the semester |
| workload | : 350 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study |
| Credit points | : 11,69 ECTS/7(0)CSU |
| Pre-Requisite | : FAF 2871 |
| Learning goals/ Course Outcomes | : Students are able to understand the definitions, scope and relationship of clinical toxicology with related subjects; to understand and explain the aspects of acute, chronic, intentional, and unintentional poisoning in the human body; to understand and identify poisons, conclude a diagnosis in poisoning cases, and to choose the appropriate treatment of poisoning therapy; to understand and be able to apply the principles of toxicokinetics in various cases of poisoning; and are able to carry out drug poisoning therapy, pesticides and insecticides, food and beverages, heavy metals, narcotics, venom (snakes, spiders), household materials, pollutants, toxic waste, narcotics, and so on. |
| Content | : This course discusses about the aspects of acute, intentional, inadvertent, chronic poisoning in the human body, identification of poisons, diagnosis of poisoning, management of appropriate poisoning therapy in drug, pesticide, food and beverage poisoning, heavy metals, narcotics, animals, and materials daily use ingredients. |
| Study/exam achievements | : A-E, 55% Midterm Exam, 45% Final Exam |
| Forms of media | : Face to face instruction, Slides, Board, internet. |



Literatures : Primary

1. Goldfrank L.R., et al (editors)., 2004, Toxicologic Emergencies, 9th ed., Appleton & Lange, Norwalk.
 2. Olson K.R., et al (editors), 2007, Poisoning & Drug Overdose, 5nd ed., Appleton & Lange, Norwalk.
 3. Stine K.E. & Brown T.M. , 1996, Principles of Toxicology, CRC Press, Florida.
 4. Donatus I.A., 2005, Toksikologi , Bag. Farmakologi & Farmasi Klinik, Fak. Farmasi, UGM , Yogyakarta.
 5. Flanagan R.J.,Braithwaite R.A., Brown S.S., Widdop B., de Wolff F.A., 1995, Basic Analytical Toxicology, WHO, Geneve, alih bahasa oleh Sri Noegrohati dkk., Pusat Informasi Obat Dan Makanan, BPOM, Jakarta.
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Universitas Gadjah Mada
Faculty of Pharmacy
Undergraduate Program in Pharmacy

Elective Course Package –Drug Interactions (11,69 ECTS/7(0) CSU)

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| Code/ Status | : FAP 0871/Elective |
| Module level | : Undergraduate |
| Semester | : 7 |
| Module Coordinators/ Lecturers | : Dr. Purwatiningsih, M.Si., Apt. Dr. Arief Nurrochmad, M.Sc., Apt. |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Lesson and discussion, 350 minutes/weekly and 14 weeks during the semester |
| workload | : 350 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study |
| Credit points | : 11,69 ECTS/7(0)CSU |
| Pre-Requisite | : - |
| Learning goals/ Course Outcomes | : Students are able to able to understand the basic principles of drug interactions and their benefits in medicine; to explain the prevalence and frequency of drug interactions in therapy; to explain the mechanism and clinical response of gastrointestinal drug interactions, cardiovascular drugs, antibiotics, antifungal, and antiviral, antidiabetic, drugs on the central nervous system, and anticancer. |
| Content | : This course discusses the definition, prevalence, and incidence of drug interactions, followed by a discussion of the mechanism and clinical implications of drug-drug, drug-food and beverage interactions, and drug-herbal interactions, in terms of pharmacokinetic and pharmacodynamics aspects, and the final outcome of drug interactions in the form of clinical response. In vitro drug interactions are also discussed. But mostly discusses about drugs commonly used in therapy, such as gastrointestinal drug interactions, cardiovascular drugs, antibiotics, antifungal, and antiviral, antidiabetic, drugs on the central nervous system, and anticancer |
| Study/exam achievements | : A-E, 15% Papers and Discussion, 40% Midterm Exam, 45% Final Exam |
| Forms of media | : Face to face instruction, Slides, Board, internet. |



Literatures : Primary

1. Brody, T.M., Larner, J.L., Minneman, K.P., and Neu, H.C., (Ed.), 1994, *Human Pharmacology*, 2nd Ed., Mosby, Sydney.
 2. Gilman, A.G., Rall, T.W., Nies, A.S., Taylor, P., (Eds.), 1996, *The Pharmacological Basis of Therapeutics*, 9thEd., McGraw-Hill Inc., Singapore.
 3. Rang, H.P., Dale, M.M., Ritter, J.M., Moore, P.K., 2003, *Pharmacology*, 5thEd., Churchill Livingstone, Melbourne.
 4. Rodrigues, A.D., 2002, *Drug-drug Interactions*, Taylor&Francis, New York.
 5. Mozayani, A. dan Raymon, L.P., 2004, *Handbook of Drug Interactions*, Humana Press, New Jersey.
 6. Cupp, M.J. dan Tracy T.S., 2003, *Dietary Supplements: Toxicology and Clinical Pharmacology*, Humana Press, New Jersey.
 7. Ebadi, M., 2002, *Pharmacodynamic Basis of Herbal Medicine*, CRC Press, Boca Ration.
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Religion - Hinduism (3,34 ECTS/2(0) CSU)

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| Code/ Status | : FAF 1071/Compulsory |
| Module level | : Undergraduate |
| Semester | : 2 |
| Module | : |
| Coordinators/ Lecturers | |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Lesson and discussion, 100 minutes/weekly and 14 weeks during the semester |
| workload | : 100 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study |
| Credit points | : 3,34 ECTS/2(0) CSU |
| Pre-Requisite | : - |
| Learning goals/ Course Outcomes | : <ol style="list-style-type: none">1. Students are able to be an ideal scholar according to Dharma; to have Sradha and Bhakti, spiritual morality and open perspective according to Satyam Sivam and Sundharam in leading their lives.2. Students are able to have proper knowledge to respond any change in society, and to interpret essential values.3. Students are able to possess both intellectual attitude and religious morality.4. Students are able to communicate and have tolerance in living society.5. Students are able to honor humanity values according to ahimsa |
| Content | : This course discusses about the history and development of Hinduism, concept of Brahmavidya, Vedas as scripture and source of law for Hindus, concepts of ideal human according to Hinduism, concepts of Hindu precepts, variety of Hindu religious arts, existence of Dharma Gita, living in harmony through Hindu perspective, Hindu Leadership according to Nitisastra, codification of Hindu law, economics model according to Arthasastra, concept of health according to Ayurveda, and the existence of Hinduism in development of modern world. |
| Study/exam achievements | : A-E, 10 % Exercises, 10 % Daily tasks, 20 % Midterm, 50 % Final Exam, 10 % Paper presentation |
| Forms of media | : Face to face instruction, Slides, Board, internet |



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- Literatures : 1. Cassirer, E, 1987, *Manusia dan Kebudayaan: Sebuah Esei Tentang Manusia*, terjemahan Alois A. Nugroho, Gremedia, Jakarta.
2. Dillistone, F.W, 2003, *Daya Kekuata Simbol, The Power of Symbols*, terjemahan A. Widyatmartaya, Kanisius , Yogyakarta
3. Kajeng, Nyoman DKK, 1999, *Sarasamuscaya Dengan Teks Bahasa Sansekerta dan Jawa Kuna*, Paramita, Surabaya
4. Kamajaya Gede, 2000, *Yoga Kundalini, Carauntuk mencapai Sidhi dan Moka*s,Paramita, Surabaya.
5. Mantara, IB,1983/1984, *Tata Susila Hindu Dharma*, Parisadha Indoneisa Pusat, Jakarta.
6. Pendit, Nyoman S, 1979, *Bhagawad Gita*, Departemen Agama RI, Jakarta
7. Pudja, Gde, dan Sudarta Rai, 1976/1977, *Menawa Dharmasastra, Manu Dharmasastra/Weda Smrti Compedium Hukum Hindu*, CV. Junasco, Jakarta
8. Pudja, Gde, 1984, *Sraddha, Mayasari*, Jakarta
9. Pudja, Gede, 1992, *Theologi Hindu (Brahma Widya)*, Dharma Saratih, Jakarta
10. Sura Gede, 2001, *Pengendalian Diri dan Etika dalam ajaran agama Hindu*, Hanoman Sakti, Jakarta
11. Team, 2001, *Modul Keluarga Bahagia Sejahtra, Menurut Pandangan Hindu*, Departemen Agama Pusat, Jakarta
12. Titib, I Made, 2003, *Teologi dan Simbol-simbol Dalam Agama Hindu*, Paramita , Surabaya
13. Team, 2004, *Graha Jagadhita*, Paramita, Surabaya
14. Wardhana, Ida Bagus Rai, 1963, *Sosiologi Hindu Dharma*, Departemen Agama Hindu dan Budha, Jakarta
15. Wiana Ketut, 1993, *Bagaimana Umat Hindu menghayati Tuhan*, Manikgeni Denpasar
16. Tim Penyusun, 2014, *Mata kuliah Wajib Umum (MKWU) Pendidikan Agama Hindu*, Kementerian Pendidikan dan Kebudayaan Republik Indonesia.
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Human Anatomy and Physiology (5,01 ECTS/3(1) CSU)

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| Code/ Status | : FAD 1071/Compulsory |
| Module level | : Undergraduate |
| Semester | : 1 |
| Module Coordinators/ Lecturers | : Dicky Moch. Rizal Ginus Partadiredja |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Lesson and discussion, 100 minutes/weekly and 14 weeks during the semester Practical works, 4 hours/weekly and 9 weeks during the semester |
| workload | : 100 minutes of in-class lectures, 120 minutes of practical work, 120 minutes of structured activities (writing the final report of practical work) |
| Credit points | : 5,01 ECTS/3(1) CSU |
| Pre-Requisite | : - |
| Learning goals/ Course Outcomes | : Student are able to understand the anatomy of organs and physiology of the central and peripheral nervous system, urinary (kidney and body fluids), senses, cardiovascular, as well as metabolism and thermoregulation, the endocrine and reproductive systems, gastrointestinal, blood and immunity, respiration, exercise physiology, and musculoskeletal. |
| Content | : This course gives students lectures on the topics of anatomy and physiology from various organ systems that are important for health students to learn, especially pharmacy. The course discusses about organ anatomy and physiology of the central and peripheral nervous system, urinary (kidney and body fluids), senses, cardiovascular, and metabolism and thermoregulation, endocrine and reproduction, gastrointestinal, blood and immunity, respiration, exercise physiology, and musculoskeletal. |
| Study/exam achievements | : A-E, 35% Midterm, 35% Final exam, 10% Final report, 20% Practical assignment |
| Forms of media | : Face to face instruction, Slides, Board, internet, and laboratory tools |
| Literatures | : 1. Arthur, C. &Guyton, M.D., 2007, Textbook of Medical Physiology, 11th Ed., WB Saunders Co., Philadelphia, London, Toronto. 2. Ganong, W.F., 1995, Review of Medical Physiology, 17th Ed., Lange Medical Book, Prentice Hall International Inc. 3. Kelly, L., 2005, Essential of Human Physiology for Pharmacy, CRC Press. London. Scanlon, V.C. &Sanders, T., 2007, Essentials of Anatomy and Physiology, 5th Ed., F.A. Davis Company, Philadelphia. |



Universitas Gadjah Mada
Faculty of Pharmacy
Undergraduate Program in Pharmacy

Elective Course Package –Pharmaceutical Care Practice (11,69 ECTS/7(0) CSU)

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| Code/ Status | : FAF 0303/Elective |
| Module level | : Undergraduate |
| Semester | : 7 |
| Module Coordinators/ Lecturers | : Chairun Wiedyaningsih Satibi Hardika Aditama Muvita Rina Wati |
| Language | : Indonesian |
| The format/class hours per week during the semester | : Lesson and discussion, 350 minutes/weekly and 14 weeks during the semester |
| workload | : 350 minutes of in-class lectures, 120 minutes of structured activities, 120 minutes of weekly self-study |
| Credit points | : 11,69 ECTS/7(0)CSU |
| Pre-Requisite | : FAF 1303 |
| Learning goals/ Course Outcomes | : Students are able show the relationship between the role of the pharmaceutical profession with statutory regulations and professional competence recognized in pharmaceutical regulations; to evaluate the pharmaceutical care process includes a rationality study of drug use and identification of potential medication errors; to plan drug therapy activities for patients as a whole including the stages of the treatment plan, dispensing, and monitoring the process / results of treatment in accordance with the principles of pharmaceutical care; and are able to design good pharmaceutical services by considering applicable regulations and advances in pharmaceutical science. |
| Content | : This course discusses pharmacist practices with new paradigms, scope and definitions, pharmacist competencies, steps for implementing pharmaceutical care, the key of patient integrity for drug therapy, systematic categories of drug treatment problems, regulations for pharmaceutical care, cases of clinical problems and ways to treat them, practical constraints, marketing of pharmaceutical services, readiness to practice, and the development of pharmacists' abilities for practice success. |
| Study/exam achievements | : A-E, ? |
| Forms of media | : Face to face instruction, Slides, Board, internet. |



Literatures : Primary

1. Cipolle, R.J., Strand, L.M., Morley, P.C., 2004, Pharmaceutical Care Practice: Clinician's Guide, 2nd Ed, McGraw Hill Professional, New York
2. Tietze, K.J., 2012, Clinical Skill for Pharmacist, 3rd Ed, Mosby, St.Louis



Universitas Gadjah Mada
Faculty of Pharmacy
Undergraduate Program in Pharmacy

Thesis Writing (6,68 ECTS/4(4) CSU)

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| Code/ Status | : FAF 4071/Compulsory |
| Module level | : Undergraduate |
| Semester | : 8 |
| Module Coordinators/ Lecturers | : Thesis Supervisor Lecturer |
| Language | : Indonesian or English |
| The format/class hours per week during the semester | : - |
| workload | : - |
| Credit points | : 6,68 ECTS/4(4) CSU |
| Pre-Requisite | : Elective Course Packages |
| Learning goals/ Course Outcomes | : Students are able to internalize academic values, norms, and ethics, show an attitude of responsibility for work in their field of expertise independently, develop ideas and ideas scientifically in the form of research plans related to pharmacy, write research results in the form of scientific final report in the form of scientific documents, conduct research independently or in groups. |
| Content | : Thesis writing is the culmination point of the entire learning process that has been passed by students as well as an evaluation of the readiness and maturity of students after attending the entire set of courses. In this case students are directed to have the ability to think and write scientifically by using research methods. In the thesis course starting from the stage of searching for the thesis topic and the thesis supervisor, the thesis proposal examination will be carried out, which the examination of the proposal will be evaluated the background of the selection of the thesis topic and the correctness of the method to be used. After students pass the thesis proposal exam, students are able to/permitted to carry out thesis research under the guidance of the thesis supervisor. After students complete their thesis research and pour their thesis research results in written form in their thesis scripts, a closed thesis examination is conducted to assess the results/goals of the student thesis research that has been carried out. |
| Study/exam achievements | : A-C, 25% thesis proposal exam (5% oral presentation, 10% contents, 10% discussion) and 75% closed thesis exam (10% writing, 30% contents, 5% oral presentation, 30% discussion). |
| Forms of media | : Face to face instruction, Slides, Board. |
| Literatures | : Main literatures: SK Dekan Fakultas Farmasi UGM Nomor UGM/FA/2090/UM/01/39 tentang Peraturan Pelaksanaan Skripsi Program sarjana Ilmu Farmasi Fakultas Farmasi Universitas Gadjah Mada Supporting literatures: Books that are relevant in the writing of the thesis |



Religion - Buddhism (3,34 ECTS/2(0) CSU)

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| Code/ Status | : FAF 1071/Compulsory |
| Module level | : Undergraduate |
| Semester | : 2 |
| Module Coordinators/ Lecturers | : Dr. Dr. Ir. Effendie Tanumihardja, SU, MM |
| Language | : Indonesian |
| The format/class hours per week during the semester workload | : Lesson and discussion, 100 minutes/weekly and 14 weeks during the semester : 100 minutes of in-class lectures in 11 weeks, 100 minutes of structured activities in 6 weeks, 100 minutes of weekly of exercises in 7 weeks, and 100 minutes of weekly of seminar in 3 weeks |
| Credit points | : 3,34 ECTS/2(0) CSU |
| Pre-Requisite | : - |
| Learning goals/ Course Outcomes | : A. Knowledge and understanding: 1). Knowledge and understanding of the meaning of the Tripitaka scriptures 2). Knowledge and understanding of the essence of Saddha and Sanghyang Adi Buddha, The One Almighty God. 2). Knowledge and understanding of humans and the Buddhist moral basis. 3). Knowledge and understanding of science, technology and art Buddhist perspective 4). Knowledge and understanding of society, culture and politics Buddha 5). Knowledge and understanding of universal law and law 6). Knowledge and understanding of sublime inner development 7). Knowledge and understanding of harmonious life among people religion and living things with the environment. 8). Knowledge and understanding of contextual Buddhism with fields studies. B. Abilities and Skills: 1). Expertise and skills in applying the moral basis of Buddhism in everyday life. 2). Expertise and skills in applying Buddhism and its culture in social and political life 3). Expertise and skills in applying Buddhism in develop science, technology and art. 4). Expertise and skills in applying Buddhism in written form by linking knowledge of the field of study with Buddhist. |



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| | <p>C. Attitude:</p> <ol style="list-style-type: none">1). The attitude of belief in Sanghyang Adi Buddha in the form of quality and the quantity of rituals, and other activities that go together.2). Changes in attitude are better in everyday actions both in a manner individuals, towards the surrounding community and the environment.3). Showing an attitude of scientific honesty in writing. |
| Content | : This course discusses about the contents of the Tripitaka Buddhist scriptures as a guide to life, how to understand about Buddhism and its philosophy as a basis for thinking and behave daily in diverse Indonesian society, implementation tolerance and peace in accordance with universal law Buddha, understanding Buddhist culture and politics in response to scientific progress knowledge, technology and art, compiling papers and conduct seminars in the framework of implementation Buddhism in their respective fields of study, and how to be more active in religious rituals and other Buddhist activities. |
| Study/exam achievements | : A-C, 15% Participation, 20% Mid Term, 20% Final exam, 10% tasks, 10% seminar, and 25% mentally attitude. |
| Forms of media | : Face to face instruction, Slides, Board, internet, practical works |
| Literatures | : Main Literatures: <ol style="list-style-type: none">1. Arifin, H.M., 1990, Menguak Misteri Ajaran Agama-Agama Be Jakarta : Golden Trayon Press.2. Departemen Agama RI, 1991, Pengkajian dan Pengembangan Kerukunan Hidup Beragama di Indonesia, Jakarta : Balitbang Departemen Agama RI.3. Dewaraja, L.S., 2000, Kedudukan Wanita dalam Agama Buddha Jakarta : FPM Sekolah Tri Ratna.4. Ekayana, 1995, Sains dan Buddha Dharma, Jakarta : Karaniya5. Geertz, C., 1992, Kebudayaan dan Agama, Jogjakarta : Kanisius6. Hartoko, D., 1984, Manusia dan Seni, Jogjakarta : Kanisius.7. Harold, C., 1989, Pluralisme Tantangan bagi Agama-Agama, ter Jogjakarta : Kanisius.8. Houston, S., 1985, Agama Agama Manusia, terj., Jakarta : Yaya Obor Indonesia.9. Jinarakkhita, A., 1992, Meditasi untuk Pendidikan Tinggi Agam Buddha, Jakarta : Vajra Dharma Nusantara.10. Kirthisinghe, B.P., 1995, Agama Buddha dan Ilmu Pengetahuan terj., Jakarta: Aryasuryacandra.11. Krishnanda, W.M., 2003, Wacana Buddha Dharma, Jakarta: Yayasan Dharma Pembangunan12. Mahavirothavaro, 1991, Samma Samadhi, terj., Bandung : Yaya Succino Indonesia.13. Narada, 1992, Sang Buddha dan Ajaran-Ajaran-Nya, jilid 1 dan Jakarta: Dharmadipa Arama.14. Paravahera, V., 1987, Buddhist Meditation in theory and practic Kuala Lumpur: Buddhist Missionary Society.15. Piyasilo, 1988, Buddhist Culture, Selangor : The friends of Buddhism16. Rashid, T., 1997, Sila dan Vinaya, Jakarta : Buddhist Bodhi |



Saccako, 2005, Ketuhanan dalam Agama Buddha, Medan: Dian Dharma

17. Tanumihardja, E. 2016, Buddhadhamma untuk Universitas. Yogyakarta: UNY Press

18. Wowor, C., 1997, Pandangan Sosial Agama Buddha, Jakarta: Aryasurcandra.

19. Wowor, C., 1995, Ketuhanan dalam Agama Buddha, Jakarta : STAB Nalanda.

Others literatures

1). Organisasi Sangha di Indonesia maupun luar negeri

2). Organisasi Buddha di Indonesia maupun luar negeri

3). Vihara-vihara dan perpustakaannya

4). Tokoh-tokoh agama Buddha dan lain lain.
