MODULE HANDBOOK

DOCTOR IN PHARMACEUTICAL SCIENCES
UNIVERSITAS GADJAH MADA

Table of Contents

Advanced Herbal Medicine

Code/Status	FAS3220106/Elective
Module designation	Doctor in Pharmaceutical Science
Semester(s) in which the module is taught	1
Person responsible for the module	Prof. Dr. apt. Erna Prawita Setyowati, MSi. Prof. Dr. apt. Subagus Wahyuono, MSc. Prof. Dr. rer. nat. apt. Triana Hertiani, MSi. Dr.rer.nat. apt. Yosi Bayu Murti, MSi. Dr. apt. Andayana Puspitasari, MSi. Dr. rer. nat. apt. Nanang Fakhrudin, MSi.
Language	Indonesian
Teaching methods	100 minutes/weekly and 14 weeks during the semester
Workload (incl. contact hours, self-study hours)	100 minutes of in-class lectures
Credit points	3,2 ECTS/2 CSU
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	Students demonstrate proficiency in understanding chemotypic phenomena, particularly in the isolation, elucidation, and standardization of natural medicine. They are adept at evaluating strategies pivotal to the discovery and development of such medicine. Furthermore, their expertise extends to mastering the principles of cutting-edge technology employed in the production of natural medicine, highlighting a comprehensive grasp of both the theoretical and technological facets of this field.
Content	This course discusses the development and application of natural medicine with pharmacognosy and phytochemical approaches. The field of study of this course includes aspects of drug discovery from natural ingredients and the development of natural drug preparations.
Examination forms	Writing Exam, Task

Study and examination requirements	A-E. Exam or task in the form of a project/case based exam 100%
Reading list	**Main** 1. Vogel, H.G., (Ed.), 2016, Drug Discovery and Evaluation, 4nd edition, Springer-Verlag, Berlin. 2. Atta-ur-Rahman and Choudhary, M.I., 2005, Bioassay Techniques For Drug Development, Harwood Academic Publishers, Singapore. 3. Dewick, PM, 2009, Medicinal Natural Product, A Biosynthetic Approach 3rd Edition, John Wiley & Sons Ltd 4. Steven M. Colegate and Russell J. Molyneux, 2007, Bioactive Natural Products : detection, isolation, and structural determination 2nd ed, CRC Press 5. Related research paper
Date of last amendment	**Aug 1, 2023**

Advanced Pharmacoeconomics

Code/Status	FAS3220119/Elective
Module designation	Doctor in Pharmaceutical Science
Semester(s) in which the module is taught	1
Person responsible for the module	Prof. Dr. apt. Tri Murti Andayani, Sp. FRS Dr. apt. Dwi Endarti, M.Si
Language	Indonesian
Teaching methods	Problem-based learning, 100 minutes/weekly and 14 weeks during the semester
Workload (incl. contact hours, self-study hours)	100 minutes of in-class lectures
Credit points	3,2 ECTS/2 CSU
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	Students are expected to be able to be proficient in pharmacoeconomic involves measuring a spectrum of outcomes ranging from economic and clinical to humanistic. This expertise extends to conducting analyses through various methodologies, including clinical trials, observational data, and modelling. Furthermore, adept professionals can interpret study results to guide policy and clinical practices while also critically evaluating relevant literature to ensure evidence-based recommendations.
Content	This course describes various pharmacoeconomic analyzes; measurement of effectiveness and patient-reported outcomes; decision analysis models and sensitivity analysis; Pharmacoeconomic applications in drug selection and disease management.
Examination forms	Writing Exam, Task
Study and examination requirements	A-E. 60% project/case. 40% presentation and case discussion.

Reading list	**Main:** 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 **Additional:** 1. Rascati KL. 2009, *Essentials of Pharmacoeconomics*, Lippincott Williams and Wilkins, Philadelphia 2. Rychlik R. 2002, *Strategies in Pharmacoeconomics and Outcomes Research*, Pharmaceutical Product Press, New York 3. Vogenberg FR. 2001, *Introduction to Applied Pharmacoeconomics*, Mc Graw-Hill Companies, USA
Date of last amendment	**Aug 1, 2023**

Clinical Trial

Code/Status	FAS3220116/Elective
Module designation	Doctor in Pharmaceutical Science
Semester(s) in which the module is taught	1
Person responsible for the module	Prof. Dr. Zullies Ikawati, Apt. Dr. Fita Rahmawati, SpFRS, Apt.
Language	Indonesian
Teaching methods	Problem based learning. Presentation and discussion. 100 minutes/weekly and 14 weeks during the semester
Workload (incl. contact hours, self-study hours)	100 minutes of in-class lectures
Credit points	3,2 ECTS/2 CSU
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	Students are well-versed in the concept of Good Clinical Practice, emphasizing the importance of ethical and quality standards in clinical trials. Additionally, they possess the skills to formulate a protocol for randomized clinical trials (RCT), showcasing their comprehensive understanding of both theoretical and practical aspects of clinical research.
Content	This course teaches ethical aspects in clinical research (Good Clinical Practice) and the ability to develop good clinical trial protocols
Examination forms	Writing Exam, Task
Study and examination requirements	A-E. Project/case 50%. Presentation and discussion 50%.
Reading list	**Main** (1) GCP Module from https://gcp.nidatraining.org (2) Guidelines for Good Clinical Trials in Indonesia, BPOM, 2016
Date of last amendment	**Aug 1, 2023**

Community Pharmacy

Code/Status	FAS3220121/CElective
Module designation	Doctor in Pharmaceutical Science
Semester(s) in which the module is taught	1
Person responsible for the module	Dr. Chairun Wiedyaningsih, M.Kes., M.App.Sc., Apt Dr. Susi Ari Kristina, M.Kes., Apt Dr Anna Wahyuni Widayanti, MPH, Apt
Language	Indonesian
Teaching methods	Project and case based learning, 100 minutes/weekly and 14 weeks during the semester
Workload (incl. contact hours, self-study hours)	100 minutes of in-class lectures
Credit points	3,2 ECTS/2 CSU
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	In the field of community pharmacy, students are being equipped to not only discover and develop novel scientific theories and ideas but also to merge the advancements of science and technology with the principles of humanities. They engage in comprehensive interdisciplinary research endeavors, encompassing theoretical studies, experiments, and innovative dissertations, further communicated through scholarly publications and various media outlets. These students also cultivate the ability to critically assess research, particularly emphasizing the role of pharmacists in drug policy, abuse prevention, and promoting informed drug use. Their training hones their skills in crafting scientifically grounded arguments, formulating solutions, and devising intervention strategies that adhere to rigorous academic and ethical standards.

Content	This course focuses on improving students' abilities in evaluating, developing strategies, and integrating pharmaceutical service knowledge in primary care, counseling, communication and education to patients/community, within the pharmacy/health center and community environment. Overall Community Pharmacy discusses and motivates students to carry out research innovations in the field of community pharmacy, such as global pharmacy practice, development of drug information technology, optimization of rational drug use, design of interventions for pharmaceutical services, making policy recommendations in the field of community pharmacy,
Examination forms	Writing Exam, Task
Study and examination requirements	A-E. Journal based 25%. Case based 25%. Comprehensive discussion 25%. Project based 25%.
Reading list	**Main** Quick, J.D., Rankin, J.R, Laing, R.O., O'Connor., R.W., 1997, *Managing Drug Supply, 2nd* edition, Kumarin Press, West Harford, USA. **Additional** 1. Rutter P, 2013, Community Pharmacy, Symptoms, Diagnosis, and Treatment, Churcill Livingstone, Elsevier Ltd. **2.** Dhillon, S., 2009. Pharmacy Case Studies. Pharmaceutical Press. **3.** Tietze, K.J., 2011. Clinical Skills for Pharmacists: A Patient-Focused Approach, 3e, 3 edition. ed. Mosby, St. Louis, Mo.
Date of last amendment	**Aug 1, 2023**

Geriatric Care

Code/Status	FAS3220118/Elective
Module designation	Doctor in Pharmaceutical Science
Semester(s) in which the module is taught	1
Person responsible for the module	Dr. Fita Rahmawati, SpFRS, Apt. Dr. dr. Probosuseno, Sp.PD-KGer, FINASIM, SE, MM
Language	Indonesian
Teaching methods	Problem based learning. Presentation and discussion. 100 minutes/weekly and 14 weeks during the semester
Workload (incl. contact hours, self-study hours)	100 minutes of in-class lectures
Credit points	3,2 ECTS/2 CSU
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	Students are expected to master the multi-faceted domain of comprehensive geriatric services, including the pivotal role of pharmacy within geriatric care teams. Their education encompasses an understanding of physiological changes in elderly patients, along with concepts related to oral health and the psychological aspects of geriatric care. They are further equipped to evaluate drug use in the elderly, conducting personalized counseling and assessing nutritional requirements. Additionally, these students are versed in designing and critically evaluating research specific to the geriatric field, reflecting a holistic approach to elderly patient care and treatment.
Content	This course explains the concept of geriatric care in a comprehensive manner as well as research in the field of geriatrics including decreased physiology in elderly patients, drug use in elderly patients, nutritional needs in elderly patients, oral dental health, psychology in geriatric patients, the role of pharmacy in the geriatric care team , studies in the field of geriatrics.

Examination forms	Writing Exam, Task
Study and examination requirements	A-E. Task 50%. Midterm 25%. Final term 25%.
Reading list	**Main** 1. Handbook of ***Geriatric Care*** Management, Fourth Edition 2. Brocklehurst's ***Textbook*** of ***Geriatric Medicine*** and Gerontology, 8th Edition,
Date of last amendment	**Aug 1, 2023**

Intervention Model in Clinical Pharmacy

Code/Status	FAS3220120/Elective
Module designation	Doctor in Pharmaceutical Science
Semester(s) in which the module is taught	1
Person responsible for the module	Dr. apt. Nanang Munif Yasin, M. Pharm Prof. Dr. apt. Tri Murti Andayani, Sp.FRS Dr. apt. Susi Ari Kristina, M. Kes
Language	Indonesian
Teaching methods	Problem based learning. 100 minutes/weekly and 14 weeks during the semester
Workload (incl. contact hours, self-study hours)	100 minutes of in-class lectures
Credit points	3,2 ECTS/2 CSU
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	Students are expected to be master in the theory and framework of clinical intervention, drawing from a wealth of literature. They adeptly apply guidelines for intervention studies to forge new clinical interventions in the pharmaceutical realm. Their training further encompasses the application of clinical trial concepts and methodologies. Additionally, they have the skills to define outcomes in these studies and craft instruments essential for measuring these outcomes, reflecting a comprehensive grasp of intervention research.
Content	This course explains the theory and framework of clinical intervention from various literatures, applies guidelines for intervention studies to develop clinical interventions; clinical trial study concepts and methods for the development of intervention studies in the pharmaceutical sector; outocmes in intervention studies and develop instruments for measuring outcomes
Examination forms	Writing Exam, Task
Study and examination requirements	A-E. Project/Case 60%. Presentation and discussion 40%.

Reading list	**Main** 1. Moullin JC, Sabater-Hernández D, Fernandez-Llimos F, Benrimoj SI. A systematic review of implementation frameworks of innovations in healthcare and resulting generic implementation framework. Health Res Policy Syst. 2015;13:16. 2. Schulz KF, Altman DG, Moher D. CONSORT 2010 statement: updated guidelines for reporting parallel group randomised trials. Int J Surg. 2011;9(8):672–7. 3. Richards DA, Rahm Hallberg I. Complex interventions in health. In: An overview of research methods. London & New York: Routledge; 2015. 4. Grol RP, Bosch MC, Hulscher ME, Eccles MP, Wensing M. Planning and studying improvement in patient care: the use of theoretical perspectives. Milbank Q. 2007;85(1):93–138. 5. Craig P, Dieppe P, Macintyre S, Michie S, Nazareth I, Petticrew M. Developing and evaluating complex interventions: the new Medical Research Council guidance. BMJ. 2008;337:a1655 6. Craig P, Dieppe P, Macintyre S, Michie S, Nazareth I, Petticrew M. Developing and evaluating complex interventions: the new M0edical Research Council guidance. BMJ. 2008;337:a1655 **Additional** 1. The EQUATOR (Enhancing the QUAlity and Transparency Of health Research) Network. [http://www.equator-network.org/ 2. Ogrinc G, Davies L, Goodman D, Batalden P, Davidoff F, Stevens D. SQUIRE 2.0 (Standards for QUality Improvement Reporting Excellence): revised publication guidelines from a detailed consensus process. BMJ Qual Saf. 2015;25:986-92. 3. Möhler R, Köpke S, Meyer G. Criteria for reporting the development and evaluation of complex

	interventions in healthcare: revised guideline (CReDECI 2). Trials. 2015;16:204 4. Hoffmann TC, Glasziou PP, Boutron I, Milne R, Perera R, Moher D, et al. Better reporting of interventions: template for intervention description and replication (TIDieR) checklist and guide. BMJ. 2014;348:g1687.
Date of last amendment	**Aug 1, 2023**

Molecular Biology Technique

Code/Status	FAS3220108/Elective
Module designation	Doctor in Pharmaceutical Science
Semester(s) in which the module is taught	1
Person responsible for the module	Dr. apt. Riris Istighfari Jenie, M.Si. Dr. apt. Rumiyati, M.Si. Dr. apt. Muthi' Ikawati, M.Sc. Dr. apt. Adam Hermawan, M.Sc.
Language	Indonesian
Teaching methods	Problem/case based learning. 100 minutes/weekly and 14 weeks during the semester
Workload (incl. contact hours, self-study hours)	100 minutes of in-class lectures
Credit points	3,2 ECTS/2 CSU
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	Students are proficiently trained in the concepts, principles, and cutting-edge technological applications of molecular biology techniques. Their expertise spans a broad spectrum, encompassing DNA and RNA-based methodologies, protein-based approaches, cell-centric techniques, and other advanced molecular biology practices. This comprehensive mastery ensures they are equipped with the knowledge and skills to navigate the rapidly evolving landscape of molecular biology with precision and depth.

Content	This course focuses on the application of molecular biology techniques in the discovery and development of drugs and other pharmaceutical products. This course discusses the steps needed for each method related to the topic, starting from preparation, procedure, analysis, to important factors that need attention. Topics discussed in this course include cloning techniques; isolation, purification and analysis of nucleic acids and proteins (ie gel electrophoresis, polymerase chain reaction, immunochromatography); transfection in mammalian cell cultures; protein methods (ie immunoprecipitation, Western blot, protein staining); and cell-based assays. Advanced techniques such as flow cytometry, microarrays, and sequencing are also discussed in this course.
Examination forms	Writing Exam, Task
Study and examination requirements	A-E. Project/case 50%. Presentation and discussion 50%.
Reading list	**Main** 1. Cseke, L.J., Kirakosyan, A., Kaufman, P.B., & Westfall, M.V. (Eds.). (2011). *Handbook of Molecular and Cellular Methods in Biology and Medicine* (3rd ed.). CRC Press. https://doi.org/10.1201/b11351 **Additional:** 1. Alberts, B., et al., 2015, Molecular Biology of the Cell, 6th Edition, Garland Publishing, USA 2. Becker, W.M., Kleinsmith, L.J., and Hardin, J., 2000, The World of The Cell, 4th Edition, The Benjamin/Cummings Publishing Co., San Fransisco 3. Cancer Chemoprevention Research Center Farmasi UGM, Protokol Uji Western blot, http://www.ccrc.farmasi.ugm.ac.id/wp-content/uploads/protokol-western-blot-1-maret-2010.pdf, diakses Agustus 2018. 4. Related research paper publication
Date of last amendment	**Aug 1, 2023**

Pharmaceutical Biology

Code/Status	FAS3220105/Elective
Module designation	Doctor in Pharmaceutical Science
Semester(s) in which the module is taught	1
Person responsible for the module	Dr. Sylvia Utami Tunjung Pratiwi, M.Si Dr. apt. Puji Astuti, M.Sc Dr. apt. Indah Purwantini, M.Si Dr. Djoko Santosa, M.Si Dr. apt. Purwanto, M.Sc apt. Puguh Indrasetiawan, M.Sc., Ph.D
Language	Indonesian
Teaching methods	Cooperative learning, Collaborative learning, Problem (Case) based learning. 100 minutes/weekly and 14 weeks during the semester
Workload (incl. contact hours, self-study hours)	100 minutes of in-class lectures
Credit points	3,2 ECTS/2 CSU
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	Students demonstrate a comprehensive understanding of cell biology theory and its pivotal role in advancing biotechnology. They are adept at grasping the principles of microbiological systems, leveraging them for bioassays. Additionally, they are proficient in select topics related to biological systems, ensuring their applicability in the pharmaceutical and health sectors.

Content	This course discusses cell biology and its applications in supporting biotechnology, microbiological systems and their application for virus-based bioassays, cell systems and plant tissues, mammalian cell and tissue systems for production of vaccines and antibodies, introduction of biosynthetic pathways of biological systems, bioengineering of metabolite synthesis, optimization of metabolite production physically and chemically, bioreactor design for metabolite production, downstream processing as well as capita selecta related to biological systems for applications in the world of pharmaceuticals and health.
Examination forms	Writing Exam, Task
Study and examination requirements	A-E. Case/project based learning (content) 30%. Case/project based learning (presentation) 5%. Case/project based learning (discussion) 15%. Midterm 30%. Final term 20%.

Reading list	**Main** 1. El Mansi et al., 2012, Fermentation Microbiology and Biotechnology, CRC Press 2. Cowan et al., 2021, Microbiology: A System Approach, 6th Ed., McGraw Hill 3. Hanlon G and Hodges N, 2013, Essential Microbiology for Pharmacy and Pharmaceutical Science, John Wiley 4. Stephen P. Denyer, Norman Hodges, Sean P. Gorman,Brendan F. Gilmore, 2011, Hugo and Russell's Pharmaceutical Microbiology, 8th ed, Wiley-Blackwell 5. Rahman et al., 2001, Bioassay Techniques for Drug Development 1st Ed., Harwood Academic Publishers 6. Wolfe, S.L., 1993, Molecular and Cellular Biology, Wadsworth Publishing Company, Bekmont, California. 7. Okafor U, 2007, Modern Industrial Microbiology and Biotechnology, Science Publisher **Additional** 1. Homsen, 2005, Complex media from processing of agricultural crops for microbial fermentation, Applied Microbiology and Biotechnology 2. Lee et al, 2019, Separation and purification of three, four, and five carbon diamines from fermentation broth, Chemical Engineering Science 196:324–332 3. Asean Guidelines for Validation Of Analytical Procedures for Vaccines, 2018
Date of last amendment	**Aug 1, 2023**

Pharmaceutical Management I

Code/Status	FAS3220122/Elective
Module designation	Doctor in Pharmaceutical Science
Semester(s) in which the module is taught	1
Person responsible for the module	Prof. Dr. apt. Satibi, M. Si Dr. apt. Susi Ari Kristina, M. Kes Dr. apt. Dwi Endarti, M.Si
Language	Indonesian
Teaching methods	Problem based learning, 100 minutes/weekly and 14 weeks during the semester
Workload (incl. contact hours, self-study hours)	100 minutes of in-class lectures
Credit points	3,2 ECTS/2 CSU
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	Students are anticipated to grasp the intricacies of health insurance, drug policy, and essential medicine, while also delving into the factors that enhance health indicators. They undertake drug management analyses to refine drug administration within health facilities. Furthermore, they are taught to critically appraise health technology assessments and economic evaluation studies, positioning them to influence national policy recommendations effectively.
Content	This course explains the concept of national health insurance, drug policy and efforts to increase access to essential drugs. Knowledge of drug management in health facilities is provided to support pharmacist skills. The role in health technology assessment and its application in health policy is also given in this course.
Examination forms	Writing Exam, Task
Study and examination requirements	A-E. Project/case 60%. Presentation and case discussion 40%.

Reading list	**Main** 1. Teitelbaum, Joel B, and Sara E Wilensky. 2013. Essentials of Health Policy and Law, 2nd edition. Burlington, MA: Jones and Bartlett Learning. 2. Quick, Jonathan D, Hogerzeil, Hans V, Rankin, James R, Dukes, Maurice Nelson Graham, Laing, Richard. et al. (1997). Managing drug supply : the selection, procurement, distribution, and use of pharmaceuticals / Management Sciences for Health in collaboration with the World Health Organization; editors : Jonathan D. Quick ... [et al.], 2nd ed., rev. and expanded. West Hartford, Connecticut : Kumarian Press. 3. World Health Organization. (2001). Essential drugs and medicines policy : a selected listing of publications and documents. World Health Organization. 4. Rascati KL. 2009, *Essentials of Pharmacoeconomics*, Lippincott Williams and Wilkins, Philadelphia **Additional** 1. Blank RH, Burau V. Comparative Health Policy. 2nd edition. New York: Palgrave Macmillan. 2007. Reserve WA 540.1 B642 2007. 2. Erin R. Fox, Pharm.D., BCPS, FASHP, Milena M. McLaughlin, Pharm.D., M.Sc., BCPS-AQ ID, AAHIVP, ASHP guidelines on managing drug product shortages, *American Journal of Health-System Pharmacy*, Volume 75, Issue 21, 1 November 2018, Pages 1742–1750
Date of last amendment	**Aug 1, 2023**

Pharmaceutical Management II

Code/Status	FAS3220123/Elective
Module designation	Doctor in Pharmaceutical Science
Semester(s) in which the module is taught	1
Person responsible for the module	Prof. Dr. apt. Satibi, M.Si Dr. apt. Dwi Endarti, M.Si Dr. apt. Chairun Wiedyaningsih, M.Kes, M.Appsc Dr. apt. TN. Saifullah Sulaiman, M.Si
Language	Indonesian
Teaching methods	Case based learning, 100 minutes/weekly and 14 weeks during the semester
Workload (incl. contact hours, self-study hours)	100 minutes of in-class lectures
Credit points	3,2 ECTS/2 CSU
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	Students are trained to dissect the elements affecting drug availability, formulating effective solutions to address these challenges. They possess the capability to assess factors influencing drug pricing and broader health costs, subsequently devising strategies to regulate these expenses, including the selection of drugs for health benefit packages. Their expertise extends to executing interventions and evaluations concerning rational drug usage. Furthermore, they are adept at crafting innovative solutions, like the integration of the Internet of Things (IoT) in Good Distribution Practice (GDP) and overall pharmaceutical management.
Content	This course discusses and motivates students to conduct research in the field of pharmaceutical management, especially those related to the roles of drug policy, regulation, drug management and rational drug use.
Examination forms	Writing Exam, Task
Study and examination requirements	A-E. Project/case 60%. Presentation and case discussion 40%.

Reading list	**Main** 1. Teitelbaum, Joel B, and Sara E Wilensky. 2013. Essentials of Health Policy and Law, 2nd edition. Burlington, MA: Jones and Bartlett Learning. 2. Quick, Jonathan D, Hogerzeil, Hans V, Rankin, James R, Dukes, Maurice Nelson Graham, Laing, Richard. et al. (1997). Managing drug supply : the selection, procurement, distribution, and use of pharmaceuticals / Management Sciences for Health in collaboration with the World Health Organization; editors : Jonathan D. Quick ... [et al.], 2nd ed., rev. and expanded. West Hartford, Connecticut : Kumarian Press. 3. World Health Organization. (2001). Essential drugs and medicines policy : a selected listing of publications and documents. World Health Organization. 4. Rascati KL. 2009, *Essentials of Pharmacoeconomics*, Lippincott Williams and Wilkins, Philadelphia **Additional** 1. Blank RH, Burau V. Comparative Health Policy. 2nd edition. New York: Palgrave Macmillan. 2007. Reserve WA 540.1 B642 2007. 2. Erin R. Fox, Pharm.D., BCPS, FASHP, Milena M. McLaughlin, Pharm.D., M.Sc., BCPS-AQ ID, AAHIVP, ASHP guidelines on managing drug product shortages, *American Journal of Health-System Pharmacy*, Volume 75, Issue 21, 1 November 2018, Pages 1742–1750 3. Carroll, N.V., 2007. Financial management for pharmacists: A decision-making approach. Lippincott Williams & Wilkins.
Date of last amendment	**Aug 1, 2023**

Pharmacology and Toxicology II

Code/Status	FAF8421/Elective
Module designation	Doctor in Pharmaceutical Science
Semester(s) in which the module is taught	1
Person responsible for the module	Dr. Purwantiningsih, M.Si., Apt Prof. Dr. Agung Endro Nugroho, M.Si., Apt Dr. Arief Nurrochmad, M.Sc., M.Si., Apt Dr. drh. Retno Murwanti, MP Dr. Nunung Yuniarti, M.Si., Apt Dr. Dyaningtyas Dewi Pamungkas Putri, M.Sc., Apt Dr. Soni Siswanto, S.Farm., M.Biomed., Apt
Language	Indonesian
Teaching methods	100 minutes/weekly and 14 weeks during the semester
Workload (incl. contact hours, self-study hours)	100 minutes of in-class lectures
Credit points	3,2 ECTS/2 CSU
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	Students are expected to mastery in pharmacology encompasses a deep understanding of pharmacokinetic-pharmacodynamic models drug metabolism, and pharmacogenomics. This expertise also extends to experimental pharmacology expertise also extends to experimental pharmacology, notably within endocrine systems and chemotherapy, and delves into experimental toxicology. Concurrently, proficiency is demonstrated in the application and design of cutting-edge pharmacological and toxicological testing methodologies.

Content	This course discusses quantitative pharmacokinetics, drug metabolism and pharmacogenetics, experimental pharmacology of drug metabolism and drug transport and polymorphism, toxicokinetics, pharmacology of drugs in the endocrine system, experimental pharmacology of drugs in the endocrine system, chemotherapy, molecular mechanisms of toxic compounds, research interest and discussion.
Examination forms	Writing Exam, Task
Study and examination requirements	A-E. 30% discussion. 25% task. 45% final exam.
Reading list	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 Basic of Therapeutics, 9th Ed., McGraw-Hill Inc., Singapore. 3. Pratt, W.B. and Taylor, P., 1990, Principles of Drug Action, Churchill Livingstone, New York. 4. Rang, H.P., Dale, M.M., and Ritter, J.M., 1999, Pharmacology, 4th Ed., Churchill Livingstone, Melbourne. 5. Ritschel, 1992, Handbook of Basic Pharmacokinetics, Hamilton, Illinois. 6. Smith, C.M., and Reynard, A.M., 1995, Essential of Pharmacology, W.B. Saunders & Co., Philadelphia. 7. Fishnein JC., 2008, Advances in Molecular Toxicology, 1st Eds, Elsevier Sci & Tech., Oxford, UK. 8. Timbrell JA., 2009. Principles of Biochemical Toxicology. 4th Ed, Taylor & Francis, London, UK. 9. Derelanko MJ and Hollinger MA., 2002, Handbook of Toxicology, 2nd ed, CRC Press, Boca Raton, Florida, USA. 10. Manahan SE., 2003, Toxicological Chemistry and Biochemistry, 3rd ed, CRC Press, Boca Raton, Florida, USA.
Date of last amendment	Aug 1, 2023

Pharmacovigilance

Code/Status	FAS3220108/Elective
Module designation	Doctor in Pharmaceutical Science
Semester(s) in which the module is taught	1
Person responsible for the module	Dr. Fita Rahmawati, SpFRS, Apt. Prof. Dr. Zullies Ikawati, Apt.
Language	Indonesian
Teaching methods	Problem based learning. Presentation and discussion. 100 minutes/weekly and 14 weeks during the semester
Workload (incl. contact hours, self-study hours)	100 minutes of in-class lectures
Credit points	3,2 ECTS/2 CSU
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	Students are adept at understanding the critical concept and role of pharmacovigilance in identifying drug safety, recognizing the vital contribution of health workers in this domain, and its global implementation. They are skilled in reporting and performing causality analyses of adverse drug events, and can effectively dissect case reports detailing side effects on diverse organ systems. Moreover, their proficiency extends to designing and critically evaluating research specifically within the field of pharmacovigilance, underscoring a holistic understanding of drug safety monitoring.
Content	This course explains the concept and role of pharmacovigilance in drug safety detection, implementation of pharmacovigilance in the world, methods of reporting and causality analysis of adverse events/drug side effects, the role of health workers in pharmacovigilance, and discussion of case reports of drug side effects in various organ systems .
Examination forms	Writing Exam, Task

Study and examination requirements	A-E. Task 50%. Midterm 25%. Final term 25%.
Reading list	**Main** (1) Basic Pharmacovigilance Module- BPOM 2020 (2) Meyler's Side Effects of Drugs, 16th Edition
Date of last amendment	**Aug 1, 2023**

Research methodology for PhD

Code/Status	FAS3220101/Compulsory
Module designation	Doctor in Pharmaceutical Science
Semester(s) in which the module is taught	1
Person responsible for the module	Prof. Dr. apt. Tri Murti Andayani, Sp.FRS Prof. Dr. apt. Edy Meiyanto., M.Sc Dr. rer. nat. apt. Yosi Bayu Murti, M.Si Anna Wahyuni Widayanti, MPH., Apt., P.HD
Language	Indonesian
Teaching methods	Project based learning. 100 minutes/weekly and 14 weeks during the semester
Workload (incl. contact hours, self-study hours)	100 minutes of in-class lectures
Credit points	3,2 ECTS/2 CSU
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	Students are adept at designing research across diverse fields, ensuring the integrity and quality of their investigations. Their competence spans from the realms of science and technology to the study of natural materials. Moreover, they demonstrate proficiency in crafting research projects both in clinical pharmacy and community settings, always underpinned by a commitment to research quality assurance, showcasing their comprehensive and versatile research capabilities.
Content	This course discusses various research methodologies at the doctoral level, both for scientific pharmacy research and clinical and community pharmacy research
Examination forms	Writing Exam, Task
Study and examination requirements	A-E. Project/Case 60%. Presentation and discussion 40%.

Reading list	**Main** 1. Brown, T.R. and Smith, m.C., 1986, *Handbook Of Institutional Pharmacy Practice 2n*d Ed., Williams & Wilkins, Balitimore 2. Gibaldi, J., 1999, *MLA Handbook For Writers Of Research Papers., 5th* Ed., The Modern Languange Association Of America New York 3. Mulyadi, 2001, *Skripsi I (Metodologi Penelitian) Bagian Sampel, Data, Analisis Data, Dan Penyusunan Laporan Penelitian*, Buku Ajar Fakultas Farmasi UGM 4. Nelson, A.A., 1980, *Research Methods For Pharmaceutical Practice*, Am., J. Hosp.Pharm., 37,107-110 5. Pratiknya, A.W., 2003., *Dasar-Dasar Metodologi Penelitian Kedokteran Dan Kesehatan,* PT. Raja Grafindo Persada, jakarta. 6. Creswell J. 2014, Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. 4 th ed. Thousand Oaks, CA: SAGE Publications 7. Plano Clark, V. L., Creswell, J. W. (2017). Designing and Conducting Mixed Methods Research. United States: SAGE Publications 8. Sutton, J., Austin, Z. (2018). Research Methods in Pharmacy Practice: Methods and Applications Made Easy. Netherlands: Elsevier Health Sciences. 9. Pope, C., & Mays, N. (Eds.). (2020). Qualitative research in health care (pp. 111-134). Oxford, UK:: Wiley Blackwell.
Date of last amendment	**Aug 1, 2023**

Structure Elucidation

Code/Status	FAS3220110/Elective
Module designation	Doctor in Pharmaceutical Science
Semester(s) in which the module is taught	1
Person responsible for the module	Prof. Dr. apt. Ratna Asmah Susidarti, M.S. Dr. Ritmaleni Prof. Dr. rer. nat. apt. Endang Lukitaningsih, M.Si.
Language	Indonesian
Teaching methods	Case Based Learning, 100 minutes/weekly and 16 weeks during the semester
Workload (incl. contact hours, self-study hours)	100 minutes of in-class lectures
Credit points	3,2 ECTS/2 CSU
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	Students acquire proficiency in various spectroscopy techniques, including UV and IR spectroscopy, mass spectroscopy, and both 1D- and 2D-NMR spectroscopy. Furthermore, they are trained to interpret UV, IR, NMR, and mass spectra effectively, equipping them with the skills to determine the structure of compounds based on these spectral data.
Content	This course discusses the basics of UV, IR, mass, and NMR spectroscopy as well as spectral interpretation to manipulate the chemical structure of a compound.
Examination forms	Writing Exam, Task
Study and examination requirements	A-E. 20% presentation, 30% task, 20% midterm, 30% final exam.

Reading list	**Main:** 1. Pavia, D., Lampman, G.M., and Kriz, G.S., 2001, Introduction to Spectroscopy :A Guide for 1. Student of Organic Chemistry, W.B. third ed., Sauders Company, London 2. Silverstein RM, Webster FX., 1998, Spectrometric Identification of Organic Compounds, 6th edition, John Wiley & Sons, New York 3. McLafferty FW., 1980, Interpretation of Mass Spectra, Mill Valey, University Science Books, California **Additional:** 1. Williams, D.H., Fleming, I., 1995, Spectroscopic methods in Organic Chemistry, Fifth edition., McGraw-Hill, Maidenhead, Berkshire, England 2. Kemp,W., 1979, Organik Spectroscopy, The MacMillan Press Ltd, London
Date of last amendment	**Aug 1, 2023**