

SYLLABUS OF LECTURES
Pharmaceutical Chemistry (2)
Summer Semester 2025 / 2026

Bratislava, February 3, 2026

Form of Education: Lectures – in the range of 2 h / week

Date and Place of Education: *According to decision of Comenius University Bratislava / Faculty of Pharmacy, Comenius University Bratislava* – presence form of education (room according to a schedule)

Completion of Education: Written final evaluation (exam), granting of credits

Lecturers: Assoc. Prof. PharmDr. Ivan Malík, PhD.

PharmDr. Lenka Stopková, PhD.

SYLLABUS OF LECTURES

1ST WEEK – Drugs Influencing a Cardiovascular System. Cardiotonics, Cardiotonics. Vasodilating Agents (Definitions, drugs – systematic chemical division, chemical structures of some compounds, mechanisms of action, structure–activity relationships, biotransformation pathways)

2ND WEEK – Antihypertensives. Drugs Influencing Veins (Definitions, drugs – systematic chemical division, chemical structures of some compounds, mechanisms of action, structure–activity relationships, biotransformation pathways)

3RD WEEK – Drugs Regulating Blood Coagulation Processes. Blood Substitutes. Lipid-Lowering Drugs – Treatment of Hypercholesterolemia. Treatment of Hypertriglyceridemia (Definitions, drugs – systematic chemical division, chemical structures of some compounds, mechanisms of action, structure–activity relationships, biotransformation pathways).

4TH WEEK – Hepatoprotective Agents. Diuretics, Anti-Diuresis Drugs. Ligands of Vasopressin Receptors (Definitions, drugs – systematic chemical division, chemical structures of some compounds, mechanisms of action, structure–activity relationships, biotransformation pathways).

5TH WEEK – Anthelmintics. Isecticidal Agents (Definitions, drugs – systematic chemical division, chemical structures of some compounds, mechanisms of action, structure–activity relationships, biotransformation pathways).

Discussion connected with the topics lectured previously.

6TH WEEK – Antifungal Drugs. Anti-Protozoal Agents (Definitions, drugs – systematic chemical division, chemical structures of some compounds, mechanisms of action, structure–activity relationships, biotransformation pathways).

7TH WEEK – Antimalarial Drugs. Anti-Tuberculosis Drugs. Anti-Leprosy Drugs (Definitions, drugs – systematic chemical division, chemical structures of some compounds, mechanisms of action, structure–activity relationships, biotransformation pathways).

8TH WEEK – Cystic Fibrosis. Emerging Cystic Fibrosis Transmembrane Conductance Regulator Modulators as New Drugs for Cystic Fibrosis (Definitions, drugs – systematic chemical division, chemical structures of some compounds, mechanisms of action, structure–activity relationships, biotransformation pathways).

9TH WEEK – Antibacterial Chemotherapeutics / Antibiotics, part 1. beta-Lactam Antibiotics, beta-Lactamase Inhibitors (Definitions, drugs – systematic chemical division, chemical structures of some compounds, mechanisms of action, structure–activity relationships, biotransformation pathways).

10TH WEEK – Antibacterial Chemotherapeutics / Antibiotics, part 2. Diaminopyrimidines. Quinolones (Gyrase Inhibitors). **Nitrofurans** (Definitions, drugs – systematic chemical division, chemical structures of some compounds, mechanisms of action, structure–activity relationships, biotransformation pathways).

Discussion connected with the topics lectured previously.

11TH WEEK – Antiviral Agents (Definitions, drugs – systematic division, chemical structures of some compounds, mechanisms of action, structure–activity relationships, biotransformation pathways).

12TH WEEK – Cytostatics, part 1. Alkylating Agents. Compounds Forming Complexes with DNA. Compounds Generating Reactive Entities. Antimetabolites. Protein Synthesis Inhibitors. Antimitotic Drugs (Definitions, drugs – systematic division, chemical structures of some compounds, mechanisms of action, structure–activity relationships, biotransformation pathways).

13TH WEEK – Cytostatics, part 2. Angiogenesis Inhibitors. PROTAC Technology, PROTAC Molecules. Inhibitors of Histone Deacetylases and Other Protein Deacetylases. Inhibitors of Histone Methyltransferases. MAPK Signaling Pathway Inhibitors. Proteasome Inhibitors (Definitions, drugs – systematic chemical division, chemical structures of some compounds, mechanisms of action, structure–activity relationships, biotransformation pathways).

Recommended Literature

Malík, I. (2026). The Lectures from the *Pharmaceutical Chemistry (2)* Course

Abraham, D.J., & Rotella, D.P. (2010). *Burger's Medicinal Chemistry and Drug Discovery*, 8 Volume Set. 7th Ed. Wiley, Hoboken, NY, United States of America, 6416 pp.

Avendaño, C., & Menéndez, J.C. (2015). *Medicinal Chemistry of Anticancer Drugs*. 2nd Ed. Elsevier, Amsterdam, the Netherlands; Elsevier, Kidlington, Oxford, United Kingdom; Elsevier, Waltham, MA, United States of America, 744 pp.

Beale, J.M., & Block, J.H. (2011). *Wilson and Gisvold's Textbook of Organic Medicinal and Pharmaceutical Chemistry*. 12th Ed. Wolters Kluwer Health (Lippincott Williams & Wilkins), Philadelphia, United States of America, 1022 pp.

Chackalamannil, S., Rotella, D., & Ward, S. (2017). *Comprehensive Medicinal Chemistry III*, 3rd Ed. Elsevier, Amsterdam, Netherlands, 4536 pp.

Desai, M.C., Meanwell, N.A., Thurston, D.E., Ganellin, R., Fox, D., Guccione, S., Martinez, A., Rotella, D., Belema, M., Sperandio, D., Shi, P.-Y., Jordan, R., Halcomb, R., Roberts, Ch., Johns, B.A., Griffin, S., Beaulieu, P.L., McCauley, J.A., Sofia, M., Xu, L., Guyer, B., & Peel, M.R. (2013). *Successful Strategies for the Discovery of Antiviral Drugs: RSC (Drug Discovery)*. Drug Discovery Series No. 32, Royal Society of Chemistry, Cambridge, United Kingdom, 533 pp.

Firestine, S.M., Lister, T., Abel-Santos, E., Hedstrom, L., Melander, Ch., Fisher, S., Khursigara, C., Lazarides, L., Garneau-Tsodikova, S., & Balibar, C.J. (2017). *Antibiotic Drug Discovery: New Targets and Molecular Entities*. 1st Ed., Kindle Ed. Drug Discovery Series No. 58, Royal Society of Chemistry, Cambridge, United Kingdom, 285 pp.

Chackalamannil, S., Rotella, D., & Ward, S. (2017). *Comprehensive Medicinal Chemistry III*, 3rd Ed. Elsevier, Amsterdam, Netherlands, 4536 pp.

Patrick, G.L. (2017). *An Introduction to Medicinal Chemistry*. 6th Ed. Oxford University Press, New York, USA, 832 pp.

Roche, V.F., Zito, S.V., Lemke, T.L., & Williams, D.A. (2019). *Foye's Principles of Medicinal Chemistry*. 8th Ed. Wolters Kluwer Health Adis (ESP), Baltimore, USA, 1168 pp.

Silverman, R.B., & Holladay, M.W. (2015). *The Organic Chemistry of Drug Design and Drug Action*. 3rd Ed. Elsevier, Waltham, USA, 521 pp.

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