Appendix number 1.5 to The Rector UR Resolution No. *12/2019*

SYLLABUS

**2018-2024** (date range)

Academic year 2021/2022

1. BASIC INFORMATION CONCERNING THIS SUBJECT

|  |  |
| --- | --- |
| Subject | Pharmacology with toxicology |
| Course code \* | Fm |
| Faculty of (name of the leading direction) | Medical College of Rzeszow University, University of Rzeszow |
| Department Name | Department of Experimental and Clinical Pharmacology |
| Field of study | Medical |
| level of education | Uniform Master studies |
| Profile | General academic |
| Form of study | Stationary / non-stationary |
| Year and semester | 4th year, 7th semester |
| Type of course | Obligatory |
| Language | English |
| Coordinator | prof. dr hab.n.med. Piotr Tutka |
| First and Last Name of the Teachers | prof. dr hab.n.med. Piotr Tutka  dr inż. Anna Czerniecka-Kubicka  dr inż. Bożena Czubat  dr n. farm. Karol Wróblewski  lek. Krzysztof Kiper  mgr farm. Patrycjusz Kołodziejczyk |

\* *-* According to the resolutions of the Educational Unit

1.1. Forms of classes, number of hours and ECTS

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Semester No. | Lecture | Classes | Conversation | Laboratory | Seminar | ZP | Praktical | Other | **Number of points ECTS** |
| 7 | 15 | 30 |  |  |  |  |  |  | 4 |
|  |  |  |  |  |  |  |  |  |  |

1.2. The form of class activities

* classes are in the traditional form
* classes are implemented using methods and techniques of distance learning

1.3 Examination Forms (exam, credit with grade or credit without grade)

2.BASIC REQUIREMENTS

|  |
| --- |
| Basic knowledge in the field of anatomy, physiology, biochemistry, microbiology, pathology, and first aid. |

3. OBJECTIVES, OUTCOMES, AND PROGRAM CONTENT USED IN TEACHING METHODS

3.1 Objectives of this course

|  |  |
| --- | --- |
| C1 | Obtaining knowledge by the student about the pharmacological action of drugs, indications, and contraindications to their use, side effects of drugs, and interactions between drugs used in the treatment of various diseases. |
| C2 | The students should know the mechanisms of drug action, clinical effects in the system, interactions, and principles of dosage. |
| C3 | Obtaining knowledge and skills to recognize and respond appropriately in the event of side effects. |
| C4 | Acquiring the ability to properly use sources of information about drugs (databases, scientific publications) and interpret the acquired knowledge. |
| C5 | Obtain basic knowledge about the pharmacotherapy of children, the elderly, pregnant women, and patients with liver and kidney damage and the ability to modify the doses of drugs in these conditions. |
| C6 | Acquisition of facts, concepts, and principles of rational pharmacotherapy in clinical practice. |
| C7 | The student should be able to prescribe ready-made medications and recipe  forms of drugs on the prescription |
| C8 | Obtain knowledge of the principles and treatment of life-threatening conditions. |
| C9 | The student should be able to understand the basic concepts of general toxicology and learning the mechanism of action of various toxic agents. |
| C10 | Gaining the ability to assess toxicological safety and interpret the results of toxicological tests. |
| C11 | Acquiring the ability to diagnose acute poisoning and implement basic treatment procedures. |

**3.2 OUTCOMES FOR THE COURSE**

|  |  |  |
| --- | --- | --- |
| EK (the effect of education) | The content of learning outcomes defined for the course (module) | Reference to directional effects [[1]](#footnote-1) |
| ek\_ 01 | Knows the groups of therapeutic agents | C.W35. |
| Ek\_ 02 | Knows the main mechanisms of drug action and their transitions in the human organism depending on its age | C.W36. |
| EK\_03 | Determines the influence of disease processes on the metabolism and elimination of drugs | C.W37. |
| EK\_04 | Knows the basic principles of pharmacotherapy | C.W38. |
| EK\_05 | Knows major unwanted responses to drugs and those resulting from drug interactions | C.W39. |
| EK\_06 | Understands the problem of drug resistance including the multidrug resistance | C.W40. |
| EK\_07 | Indicattions for a genetic test to individualize pharmacotherapy | C.W41. |
| EK\_08 | Knows the basic concepts of general toxicology | C.W43. |
| EK\_09 | Knows the drug groups, the abuse of which can cause poisoning | C.W44. |
| EK\_10 | Knows the symptoms of typical acute poisonings; intoxication caused by alcohol, narcotics, and psychotropic substances, heavy metals, and other drugs | C.W.45. |
| EK\_11 | Knows the basic principles of diagnostic procedures for poisoning. | C.W46 |
| EK\_12 | Knows the rules of pharmaceutical law | G.W10 |
| EK\_13 | Makes the simple pharmacokinetic calculations | C.U13. |
| EK\_14 | Knows the right medication dose to remedy pathological phenomena in the organism or an organ | C.U14. |
| EK\_15 | Designs a scheme of rational chemotherapy of infections and knows the principles of the empirical and targeted therapies. | C.U15. |
| EK\_16 | Can prepare pharmacy prescriptions for all types of medicinal substances. | C.U16. |
| EK\_17 | Uses pharmaceutical catalogs and medical databases | C.U17. |
| EK\_18 | Estimates a toxicological risk for certain age groups and of hepatic and renal failure; knows of principles the preventing medicine poisoning | C.U.18 |
| EK\_19 | Interprets the results of toxicological tests | C.U.19 |
| EK\_20 | Recognizes symptoms of drugs addiction and proposes a treatment | E.U19. |
| EK\_21 | Interprets characteristics of pharmaceuticals and critically evaluating medicine advertisements | E.U31. |
| EK\_22 | Recognizes the condition after consuming alcohol, narcotics, and other drugs. | E.U15. |
| EK\_23 | Can apply a treatment in the acute intoxication | E.U33. |

**3.3 CONTENT CURRICULUM**

1. **Problems of the lecture**

|  |  |
| --- | --- |
| **Course contents** | **Hours** |
| 1. Autonomic system drugs (part I) | 1 |
| 2. Autonomic system drugs (part I) | 1 |
| 3. Drugs affecting kidney function. Diuretics. | 1 |
| 4. Antihypertensive drugs. Management of hypertension and hypertensive emergencies. | 1 |
| 5. Antianginal drugs. Management of acute coronary syndromes.. | 1 |
| 6. Treatment of heart failure. | 1 |
| 7. Antiarrhythmic drugs. Management of supraventricular and ventricular arrhythmias | 1 |
| 8. Hormones and drugs affecting hypothalamus and pituitary gland. | 1 |
| 9. Thyroid gland hormones. Treatment of hypothyroidism and hyperthyroidism. | 1 |
| 10. Adrenal steroids and related drugs. | 1 |
| 11. Insulin. Management of diabetes mellitus type 1. | 1 |
| 12. Oral hypoglycemic drugs. Management of diabetes mellitus type 2. Treatment of obesity. | 1 |
| 13. Estrogens. Progestins. Androgens. Drugs affecting fertility and reproduction (part I). | 1 |
| 14. Estrogens. Progestins. Androgens. Drugs affecting fertility and reproduction (part II). | 1 |
| 15. Hormones and drugs affecting calcium/phosphate balance and bone metabolism. Treatment and prophylaxis of osteoporosis. | 1 |

**B. Problems of classes**

|  |  |
| --- | --- |
| **Course contents** | **Hours** |
| 1. Drugs affecting cholinergic system (part I): cholinomimietics. | 1 |
| 1. Drugs affecting cholinergic system (part II): cholinolytics. | 1 |
| 1. Catecholamines. Drugs affecting adrenergic system indirectly. | 1 |
| 1. Drugs affecting α-adrenergic system | 1 |
| 1. β-adrenomimetyc drugs. | 1 |
| 1. β-adrenolytic drugs | 1 |
| 1. Drugs affecting kidney function (diuretics, vasopressin analogues). | 1 |
| 1. Angiotensin converting enzyme inhibitors and angiotensin receptor antagonists. | 1 |
| 1. Drugs used in the treatment of heart failure. | 1 |
| 1. Management of hypertension and hypertensive emergencies. | 1 |
| 1. Antihypertensive drugs. | 1 |
| 1. Drugs used in sudden cardiac arrest and cardiovascular emergencies (including cardiogenic shock). | 1 |
| 1. Drugs used in the treatment of peripheral vascular disorders. |  |
| 1. Antianginal drugs. | 1 |
| 1. Management of myocardial infarction and other acute coronary syndromes. | 1 |
| 1. Antiarrhythmic drugs. | 1 |
| 1. Test nr 1 (classes 1-16 material). | 1 |
| 1. Hormones and drugs affecting hypothalamus and pituitary gland | 1 |
| 1. Thyroid gland hormones. Drugs used in the treatment of thyroid disorders. | 1 |
| 1. Estrogens. Progestins. Hormonal contraceptive drugs. | 1 |
| 1. Adrenal steroids and their synthetic analogues. Inhibitors of adrenal steroids synthesis a and action (part I) | 1 |
| 1. Adrenal steroids and their synthetic analogues. Inhibitors of adrenal steroids synthesis a and action (part II). | 1 |
| 1. Androgens. | 1 |
| 1. Other drugs affecting fertility and reproduction. | 1 |
| 1. Insulin. | 1 |
| 1. Oral antidiabetic drugs. | 1 |
| 1. Management of diabetes mellitus type 1 and 2. Other drugs affecting carbohydrate metabolism and appetite. | 1 |
| 1. Hormones and drugs affecting calcium/phosphate balance and bone metabolism. Treatment and prophylaxis of osteoporosis. | 1 |
| 1. Progress in pharmacotherapy. | 1 |
| 1. Test nr 2 (classes 18-28 material). | 1 |

3.4 Didactic methods

Lecture: lecture with a multimedia presentation using Office 365

Classes: Group work (solving tasks and clinical problems). Discussion. Analysis of clinical cases. Planning of experiments. Performing Experiments. Formulating and analyzing research problems. Database searching. Preparation of multimedia presentation. Participation in research grant.

4. METHODS AND EVALUATION CRITERIA

4.1 Methods of verification of learning outcomes

|  |  |  |
| --- | --- | --- |
| Symbol of effect | Methods of assessment of learning outcomes  (Eg.: tests, oral exams, written exams, project reports, observations during classes) | Form of classes |
| ek\_ 01 | oral/written answer, final test | lecture, exercises |
| Ek\_ 02 | oral/written answer, final test | lecture, exercises |
| EK\_03 | oral/written answer, final test | lecture, exercises |
| EK\_04 | oral/written answer, final test | lecture, exercises |
| EK\_05 | oral/written answer, final test | lecture, exercises |
| EK\_06 | oral/written answer, final test | lecture, exercises |
| EK\_07 | the written answer, final test | lecture, exercises |
| EK\_08 | oral/written answer, final test | lecture |
| EK\_09 | the written answer, final test | lecture, exercises |
| EK\_10 | oral/written answer, final test | lecture, exercises |
| EK\_11 | oral/written answer, final test | lecture, exercises |
| EK\_12 | written answer, final test | exercises |
| EK\_13 | the oral answer, multimedia presentation | lecture, exercises |
| EK\_14 | oral answer, | exercises |
| EK\_15 | oral/written answer, final test | exercises |
| EK\_16 | the oral answer, multimedia presentation | exercises |
| EK\_17 | oral/written answer, multimedia presentation, final test | exercises |
| EK\_18 | oral/written answer, final test | exercises |
| EK\_19 | oral answer | exercises |
| EK\_20 | oral answer | exercises |
| EK\_21 | oral/written answer, final test | lecture, exercises |
| EK\_22 | oral/written answer | exercises |
| EK\_23 | oral/written answer, final test | lecture, exercises |

4.2 Conditions for completing the course (evaluation criteria)

|  |
| --- |
| The pharmacology course includes 60 hours of lectures and 90 hours of classes during three semesters: 6, 7, 8. The course ends in the final test exam.  The lectures and classes are mandatory. Students are obliged to be familiar with the issues covered by the lecture held during the respective week and with the material to be discussed during classes according to the topic schedule. The student who is absent at the lecture is obliged to pass the respective material orally.  Conditions for completing the pharmacology course:  - presence at all classes and lectures  - demonstrating knowledge and skills at least on a satisfactory level in the obligatory program material in each of the three semesters (see content), i.e. completion of three semesters  - linking the pharmacological knowledge with its application for the patient contact.  - obtaining at least satisfactory (3.0) final grade  Conditions for completing the semester:  The requirement for passing each semester is the presence at all classes and lectures, obtaining at least a satisfactory final grade from the exercises, and passing a test on the recipe.  The grade from completing the semester will be the result of all learning outcomes, i.e. the student's knowledge, skills, and social competencies. The scoring rules are contained in the internal regulations. Scoring will include oral answers, written tests (e.g. a prescription test), control tests (minimum two per semester), activity assessment (assessment of competencies and attitudes). The final grade in each semester will depend on the number of points obtained by the student. Obtaining the minimum number of points is a requirement for passing the course, and joining the next semester, and the final exam. Students who do not achieve the required minimum number of points will not be able to take the 8th semester and final exam and will have to pass the entire material in the form of a test.  **Detailed evaluation criteria:**  The final grade for the classes will be determined based on the points obtained by the student. The student can obtain max. 16 points in each semester based on: **a.** points from 2 partial tests (maximum 10 points)  The final grade for the classes will be determined based on the points obtained by the student, which include:  a. points from 2 partial tests (maximum 10 points)  Each part of the pharmacology course ends in the control test (two tests during each semester). The test consists of 25 questions. Each test can be awarded a maximum of 5 points. Tests will be performed on the one established date only. These is not possible to correct the test grade or write the test on another term due to absence. In the case of an excused absence (hospitalization etc.), the student will have the opportunity to pass the material. The term to pass the material and its form will be determined by the teacher leading the group.  Each test will be estimated based on as follows:  0-8 correct answers – „-2” (minus two) points  9-12 correct answers – 0 points  13 correct answers – 1 point  14 correct answers – 2 points  15-16 correct answers – 3 points  17-18 correct answers – 3,5 points  19-20 correct answers – 4 points  21-22 correct answers – 4,5 points  23-25 correct answers – 5 points  **Attention!** The unexcused absence during the test leads to obtain minus two points (- 2 points).  b. points from an oral or written answer (maximum 4 points)  The student should know the current material and with the previous class. This knowledge can be verified orally or in writing (the form is decided by the teacher). The student may answer orally or in writing at least 2 times (or more). The grade scale for oral / written responses is 0, 1, 1.5, 2, 2.5, 3, 3.5 and 4 points. The final number of answer points will be the average of the points obtained from all the answers in the semester. A student may be unprepared for classes once a semester, but he must inform the teacher about it before starting the classes. If the student is prepared for all the classes, he/she will receive an additional 0.5 points at the end of the semester.  c. points for activity (competence and attitude) during classes (maximum 1 point)  The student's activity during the whole course (e.g. participation in discussions, brilliant answers, general attitude) will be assessed according to a scale of 0, 0.5, and 1 point. The student can prepare a multimedia presentation (mini-lecture lasting 10-12 minutes) with the subject agreed with the teacher. The presentation should be prepared in PowerPoint (PTT format) and sent to the following address: farmakologia@ur.edu.pl at least 3 days before its show date during the classes. The file should contain in the title: the title of the presentation, surname and first name, group number, and surname of the tutor. The student may receive 0.5 points for preparing the presentation. A maximum of 2 presentations can be shown during one exercise.  The minimum of points required to pass the semester is 8.5 points.  Each semester will be estimated based on the following score:  8.5-9.5 points – 3.0  10.0-11.0 points – 3.5  11,5-12,5 points – 4,0  13,0-13,5 points – 4,5  14,0-16 points – 5  Students who fail 8.5 points, fail the first term and semester. They haveto pass all the material in the form of a test, from which they must obtain at least 60% correct answers. The date of the test will be determined by the Head of Department after consultation with the students.  A student who did not obtain the required 8.5 points in the first term but passed the test later will receive 3.0 (satisfactory) as the final grade for the exercises. In the described situation, the number of points from the semester necessary to give the final grade for the subject will be calculated as (2.0 + 3.0)/2 = 3.0 (satisfactory). If the student does not achieve 8.5 points in the classes and fails the retake in the first term, he/she will receive an unsatisfactory grade (2.0) in the first examination period. Then it is necessary to pass the semester in the re-sit session on the date and the form determined by the Head of Department.  **Final exam**  The final exam will be carried out after the 8th semesters. The student can pass the final exam after he/she has obtained the positive pass of all semesters (6, 7, and 8th semester). The final exam will be passed in the test form and it will be covered issues lectures, exercises, and self-cultivation. The test contains 100 single-choice questions (five possible answers and only one of them is correct) and takes approx. 100 minutes since the start of the writing test. Students can obtain one point for each correct answer. To pass the final exam, the required score is 60% of correctly answered questions out of the total number of 100 questions.  If the total grade of Student is in range of 4.25-4.5 from three semesters, the student earns a 5% points bonus at the final exam. If the total score from three semesters is higher than 4.5 points, the student earns an 8% points bonus at the final exam. Attention: the bonus points are added to the final exam score only if the final exam is passed (at least 60% of correct answers).  The exam will be estimated based on the following score:  0-60 correct answers – failed (2.0)  60-68 correct answers – passed (3.0)  69-76 correct answers – passed (3.5)  77-84 correct answers – passed (4.0)  85-92 correct answers – passed (4.5)  93-100 correct answers – passed (5.0)  Unexcuse absence from the exam results in a 2.0. Absence from the examination may be excused and the student can pass the exam in a re-sit exam session. It will be marked as the first time of the exam. The retake exam will be prepared in a test form.  **Final pharmacology score**  The final grade for the course is the average of grades obtained based on 3 semesters (see above) and the grade of the final exam. The average marks of the 3 semesters will be 40%, and the grade obtained from the final exam will be 60% of the final grade of course. In the case of the average of 3.25, 3.75, 4.25, and 4.75, the final grade is determined by the result of the final exam. A student who fails any of the 3 semesters and/or does not receive at least a satisfactory grade in the final exam will not receive credit for the course (unsatisfactory grade).  Criteria of the final grade:  5.0 –knows of each of the contents of education at the level of 93% -100%  4.5 – knows of each of the contents of education at the level of 85%-92%  4.0 – knows of each of the contents of education at the level of 77%-84%  3.5 – knows of each of the contents of education at the level of 69%-76%  3.0 – knows of each of the contents of education at the level of 60%-68%  2.0 – knows of each of the contents of education below 60% |

**5. Total student workload required to achieve the desired result in hours and ECTS credits**

|  |  |
| --- | --- |
| Activity | **The average number of hours to complete the activity** |
| Contact hours (with the teacher) resulting from the study schedule of classes | 45 |
| Contact hours (with the teacher) participation in the consultations, exams | 1 |
| Non-contact hours - student's work  (preparation for classes, exam, writing a paper, etc.) | 79 |
| SUM OF HOURS | 125 |
| TOTAL NUMBER OF ECTS | 4 |

*\** *It should be taken into account that 1 ECTS point corresponds to 25-30 hours of total student workload.*

6. TRAINING PRACTICES IN THE SUBJECT

|  |  |
| --- | --- |
| Number of hours |  |
| Rules and forms of apprenticeship |  |

7. LITERATURE

|  |
| --- |
| The obligatory books:   1. Craig W. Stevens, George M. Brenner. Brenner and Stevens’ Pharmacology, 2017 2. James M. Ritter, Rod J. Flower, Graeme Henderson, Yoon Kong Loke, David MacEwan, Humphrey P. Rang. Rang & Dale's Pharmacology, 2021. |
| **Recommended literature:**   1. Anthony J. Trevor, Bertram G. Katzung. Basic and Clinical Pharmacology, 2017 2. Laurence L. Brunton, Björn C. Knollmann, Randa Hilal-Dandan. Goodman and Gilman's The Pharmacological Basis of Therapeutics, 2017 3. Karen Whalen. Lippincott Illustrated Reviews: Pharmacology. 2018   **and other academic books indicated by teachers** |

Acceptance Unit Manager or authorized person

1. In the case of a path of education leading to obtaining teaching qualifications, also take into account the learning outcomes of the standards of education preparing for the teaching profession. [↑](#footnote-ref-1)