MATHEMATICS

Pharmacy

Division of Biomathematics

Subject: MATHEMATICS
Year, Semester: 1st year/1st semester
Number of teaching hours:
Lecture: 14
Seminar: 28

1st week:
Lecture: Introduction to mathematics: sets and classification of numbers. Order of operations, rounding numbers, scientific notation, direct and inverse proportionality, units and their conversions, prefixes.
Practical: Introduction to mathematics: sets and classification of numbers. Order of operations, rounding numbers, scientific notation, direct and inverse proportionality, units and their conversions, prefixes.

2nd week:
Lecture: Linear and quadratic eqations, systems of equations. Logarithms and exponentials.
Practical: Linear and quadratic eqations, systems of equations. Logarithms and exponentials.

3rd week:
Lecture:
Vectors, coordinate geometry and functions (basic types, transformations, inverse functions). Slope and equations of a line. Fundamentals of trigonometry. Area and volume of geometrical figures.
The concept of limit, some limit theorems, continuity, some theorems on continuous functions.

Practical:
Vectors, coordinate geometry and functions (basic types, transformations, inverse functions). Slope and equations of a line. Fundamentals of trigonometry. Area and volume of geometrical figures.
The concept of limit, some limit theorems, continuity, some theorems on continuous functions.

4th week:
Lecture: Infinite series, compound interest, limit of sequences.
Practical: Infinite series, compound interest, limit of sequences.

5th week:
Lecture: Some definitions of derivatives, limit of sequences.
Practical: Some definitions of derivatives, limit of sequences.

6th week:
Lecture: The Chain rule, derivatives of trigonometric functions, Implicit differentiation and higher derivatives.
Practical: The Chain rule, derivatives of trigonometric functions, Implicit differentiation and higher derivatives.

7th week:
Lecture: Differentials and Newton-Raphson approximations, L'Hopital's rule, application of derivatives.
Practical: Differentials and Newton-Raphson approximations, L'Hopital's rule, application of derivatives.

8th week:
Lecture: Integration, an area problem, definition of definite integral, some theorems on integral calculus, fundamental theorem of calculus.
Practical: Integration, an area problem, definition of definite integral, some theorems on integral calculus, fundamental theorem of calculus.

9th week:
Lecture: Area between graphs, more applications of integral calculus.
Practical: Area between graphs, more applications of integral calculus.

10th week:
Lecture: Formal integration, indefinite integrals, integration by parts, trigonometric integrals.
Practical: Formal integration, indefinite integrals, integration by parts, trigonometric integrals.

11th week:
Lecture: Integration by trigonometric substitution, partial fraction.
Practical: Integration by trigonometric substitution, partial fraction.

12th week:
Lecture: Numerical integration, trapezoidal rule, Simpson's rule.
Practical: Numerical integration, trapezoidal rule, Simpson's rule.

13th week:
Lecture: Differential equations.
Practical: Differential equations.

14th week:
Lecture: Application of differential equations in biochemistry, Michaelis-Menten equation of enzyme kinetics.
Practical: Application of differential equations in biochemistry, Michaelis-Menten equation of enzyme kinetics.

Reading materials:

Fong Yuen, Wang Yuan: Calculus. Springer, Singapore, 2000.

Requirements

1. Lectures: Attendance to lectures is emphatically recommended. All material covered in the lectures is an integral part of the subject and therefore included in the self-control tests and the final exam. Some concepts and ideas are discussed in the lectures only and are not in the textbook.
A student may collect 10 bonus points at the seminars if she/he adequately answers the questions in the 5-minute tests at the beginning of the seminars. These bonus points are added to the result of the final exam and/or the course test according to point 5.

2. Seminars: Attendance to seminars is compulsory, however a student may miss maximum 4 (four) seminars. The teacher will discuss the material of the lectures in more detail on seminars. In the seminars, students are encouraged to ask questions related to the topic of the lectures discussed.

3. Exemptions: Applications for exemption from the mathematics course has to be turned in to the Credit Transfer Committee. Such requests are not accepted by the Biomathematics Division or the Department of Biophysics and Cell Biology. The deadline for such applications is Friday on the third week. No application will be considered after this date.

4. Requirements for signing the lecture book: Maximum 4 absences are allowed from the seminars. If the number of absences from the seminars is more than four, we will not sign the lecture book.

5. Self-control tests (STC) and final exam (FE): Students will have two STCs during the semester. One on week 7 and the other one on week 13 whose structure will be identical to those of the final exam. None of the SCTs are obligatory. Each SCT will be graded (0-100 %, 0% for absence) and the results of the two SCTs will be averaged (Xave). The missed test will be counted as 0% in the average. Missed SCTs cannot be made up at a later time. Based on the SCTs students may obtain the following grades:

X ave percentage	Mark
0-59.99	FAIL(1)
60-69.99	PASS(2)
70-79.99	SATISFACTORY(3)
80-89.99	GOOD(4)
90-100	EXCELLENT(5)

Students who could not meet the above described conditions for exemption during the two semesters must sit for the FE from the whole material of the semester. Students have three chances (A, B, C) for passing the mathematics FE in the winter exam period after the semester in which the course was taken. On the FE students may obtain the following grades:

Percentage

Mark
0-49.99
FAIL(1)
50-64.99
PASS(2)
65-74.99
SATISFACTORY(3)
75-84.99
GOOD(4)
85-100
EXCELLENT(5)

6. Compulsory reading:
Belágyi, Mátyus, Nyitrai: Mathematics,
ISBN: 978-963-343-8
Yuen & Yuan: Calculus, Springer-Verlag Singapore Pte. Ltd. 2000, ISBN: 981-3083-8, 981-3083-2

7. Rules for calculator usage during course tests and the final examination
In order to ensure a fair evaluation, to avoid disturbances in the testing room, and to protect the security of the test material the following types of calculators are NOT permitted:
- Calculators with built-in computer algebra systems (capable of simplifying algebraic expressions)
- Pocket organizers, handheld or laptop computers
- Any device capable of storing text. Calculators with a typewriter keypad (so-called QWERTY devices), electronic writing pads and pen-input devices are not allowed either. Calculators with letters on the keys (e.g. for entering hexadecimal numbers or variable names) are permitted as long as the keys are not arranged in QWERTY format
- Calculators or other devices capable of communicating with other devices
- Calculators built into wireless phones
- Calculators with paper tape or models that make noise
In general, students may use any four-function, scientific or graphing calculator except as specified above. Sharing calculators during tests is not allowed, and the test proctor will not provide a calculator.