Problem Solving in Physics II

Title	Problem Solving in Physics II
Semester	E2023
Master programme in	Fysik / Mathematical Physical Modelling / Physics and Scientific Modelling
Type of activity	Course
Teaching language	English
Study regulation	Read about the Master Programme and find the Study Regulations at ruc.dk Læs mere om uddannelsen og find din studieordning på ruc.dk

REGISTRATION AND STUDY ADMINISTRATIVE

Registration	Sign up for study activities at stads selvbetjening within the announced registration period, as you can see on the Studyadministration homepage. When signing up for study activities, please be aware of potential conflicts between study activities or exam dates. The planning of activities at Roskilde University is based on the recommended study programs which do not overlap. However, if you choose optional courses and/or study plans that goes beyond the recommended study programs, an overlap of lectures or exam dates may occur depending on which courses you choose.
Number of participants	
ECTS	10
Responsible for the activity	Martin Niss (maniss@ruc.dk) Nicholas Bailey (nbailey@ruc.dk)
Head of study	Studieleder for Fysik (fys-sl@ruc.dk)
Teachers	
Study administration	INM Registration & Exams (inm-exams@ruc.dk)
Exam code(s)	U60483

ACADEMIC CONTENT

Overall objective	The course Problem Solving in Physics II will develop the student's skills and competences in formalising problems in terms of physics, solving these and evaluating the solutions. This is done by exemplary work within the fundamental theories of physics (i.e., the fundamental theories of physics covered in Problem Solving in Physics I are included).
Detailed description of content	The list of topics includes mechanics, dimensional analysis, special relativity, thermodynamics and heat, fluid mechanics, waves and sound, accelerated frames of reference, construction of differential equations, electrodynamics, optics, quantum physics, statistical physics, atomic, nuclear and solid state physics.
Course material and Reading list	Unformalized Problems for Problem Solving in Physics I and Problem Solving in Physics II, IMFUFAtekst nr. 504, is the basic book pointing out the aim of the course. The syllabus covered as input is standard introductory physics as covered in typical introductory textbooks. A specific textbook will be recommended, to be supplemented with physics notes on Moodle.
Overall plan and expected work effort	Scheduled introduction, tests, consultation and evaluation in the class: 11 hours. Scheduled lectures at RUC with surveys and problem solving: 65 hours. It is expected that the students use twice as much time studying before and after the lectures as the time scheduled for lectures: 130 hours Exam: 4 hours Preparation for exam: 60 hours Sum: 270 hours
Format	
Evaluation and feedback	The course includes formative evaluation based on dialogue between the students and the teacher(s). Students are expected to provide constructive critique, feedback and viewpoints during the course if it is needed for the course to have better quality. Every other year at the end of the course, there will also be an evaluation through a questionnaire in SurveyXact. The Study Board will handle all evaluations along with any comments from the course responsible teacher. Furthermore, students can, in accordance with RUCs ‘feel free to state your views’ strategy through their representatives at the study board, send

evaluations, comments or insights form the course to the study board during or after the course.

Programme

The detailed program/lesson plan containing problems to be worked on in each lecture, and any associated reading, will be available on Moodle at the start of the course.

ASSESSMENT

Overall learning outcomes

After completing the course the students will be able to

- demonstrate and apply knowledge and understanding of electrodynamics, optics, quantum physics, statistical physics, atomic, nuclear, particle and solid state physics
- determine and argue which physics are at play in an openly formulated problem
- work out an openly formulated problem in physical and mathematical terms, solve the problem and evaluate the solution
- 'think like a physicist'.

Form of examination

Individual written invigilated exam.

The duration of the exam is 4 hours.

Permitted support and preparation materials for the exam: A formulae collection of max. one A4 size page (both sides of the paper may be used) made by the student.

Assessment: 7-point grading scale.
Moderation: External examiner.

Form of Re-examination

Samme som ordinær eksamen / same form as ordinary exam

Type of examination in special cases

Examination and assessment criteria	The exam is a 4 hour written invigilated exam. The exam consists of a collection of problems which the students must solve. The assessment criteria of the written part • demonstrate knowledge and understanding of some of the theory constructs of physics • determine and argue for which type of physics is in play in an unformalized problem in physics • tackle an unformalized problem, formulating it in terms of physics and mathematics, solving the problem and evaluating the solution • "think like a physicist" within selected parts of physics.
Exam code(s)	Exam code(s) : U60483

Course days:

Hold: 1

Problem Solving in Physics II (PSM)

time	08-09-2023 12:15 til 08-09-2023 16:00
location	27.2-054 - lokale 3 (40)
Teacher	Martin Niss (maniss@ruc.dk) Nicholas Bailey (nbailey@ruc.dk)

Problem Solving in Physics II (PSM)

time	12-09-2023 08:15 til 12-09-2023 12:00
location	27.2-054 - lokale 3 (40)
Teacher	Nicholas Bailey (nbailey@ruc.dk) Martin Niss (maniss@ruc.dk)

Problem Solving in Physics II (PSM)

time	15-09-2023 12:15 til 15-09-2023 16:00

location	27.2-054 - lokale 3 (40)
Teacher	Martin Niss (maniss@ruc.dk) Nicholas Bailey (nbailey@ruc.dk)

Problem Solving in Physics II (PSM)

time	19-09-2023 09:30 til 19-09-2023 12:30
location	27.2-064 - pc lokale (40)
Teacher	Nicholas Bailey (nbailey@ruc.dk) Martin Niss (maniss@ruc.dk)

Problem Solving in Physics II (PSM)

time	22-09-2023 12:15 til 22-09-2023 16:00
location	27.2-054 - lokale 3 (40)
Teacher	Nicholas Bailey (nbailey@ruc.dk) Martin Niss (maniss@ruc.dk)

Problem Solving in Physics II (PSM)

time	26-09-2023 09:30 til 26-09-2023 12:30
location	27.2-064 - pc lokale (40)
Teacher	Nicholas Bailey (nbailey@ruc.dk) Martin Niss (maniss@ruc.dk)

Problem Solving in Physics II (PSM)

time	29-09-2023 12:15 til 29-09-2023 16:00
forberedelsesnorm	ikke valgt
forberedelsesnorm D-VIP	ikke valgt
location	27.2-064 - pc lokale (40)
Teacher	Martin Niss (maniss@ruc.dk) Nicholas Bailey (nbailey@ruc.dk)

Problem Solving in Physics II (PSM)

time	03-10-2023 09:30 til 03-10-2023 12:30

location 27.2-064 - pc lokale (40)
Teacher Martin Niss (maniss@ruc.dk)
Nicholas Bailey (nbailey@ruc.dk)

Problem Solving in Physics II (PSM)

time 06-10-2023 12:15 til
06-10-2023 16:00
location 27.2-054 - lokale 3 (40)
Teacher Martin Niss (maniss@ruc.dk)
Nicholas Bailey (nbailey@ruc.dk)

Problem Solving in Physics II (PSM)

time 10-10-2023 09:30 til
10-10-2023 12:30
location 27.2-064 - pc lokale (40)
Teacher Nicholas Bailey (nbailey@ruc.dk)
Martin Niss (maniss@ruc.dk)

Problem Solving in Physics II (PSM)

time 13-10-2023 12:15 til
13-10-2023 16:00
location 27.2-054 - lokale 3 (40)
Teacher Martin Niss (maniss@ruc.dk)
Nicholas Bailey (nbailey@ruc.dk)

Problem Solving in Physics II (PSM)

time 17-10-2023 09:30 til
17-10-2023 12:30
location 27.2-064 - pc lokale (40)
Teacher Martin Niss (maniss@ruc.dk)
Nicholas Bailey (nbailey@ruc.dk)

Problem Solving in Physics II (PSM)

time 20-10-2023 12:15 til
20-10-2023 16:00
location 27.2-054 - lokale 3 (40)

Teacher	Nicholas Bailey (nbailey@ruc.dk) Martin Niss (maniss@ruc.dk)

Problem Solving in Physics II (PSM) - please note start time at 9.00

time	24-10-2023 09:00 til 24-10-2023 12:00
forberedelsesnorm	ikke valgt
forberedelsesnorm D-VIP	ikke valgt
location	27.2-064 - pc lokale (40)
Teacher	Martin Niss (maniss@ruc.dk) Nicholas Bailey (nbailey@ruc.dk)

Problem Solving in Physics II (PSM)

time	27-10-2023 12:15 til 27-10-2023 16:00
location	27.2-054 - lokale 3 (40)
Teacher	Martin Niss (maniss@ruc.dk) Nicholas Bailey (nbailey@ruc.dk)

Problem Solving in Physics II (PSM)

time	31-10-2023 09:30 til 31-10-2023 12:30
location	27.2-064 - pc lokale (40)
Teacher	Nicholas Bailey (nbailey@ruc.dk) Martin Niss (maniss@ruc.dk)

Problem Solving in Physics II (PSM)

time	03-11-2023 12:15 til 03-11-2023 16:00
location	27.2-054 - lokale 3 (40)
Teacher	Martin Niss (maniss@ruc.dk) Nicholas Bailey (nbailey@ruc.dk)

Problem Solving in Physics II (PSM)

time	07-11-2023 09:30 til 07-11-2023 12:30
location	27.2-064 - pc lokale (40)

Teacher	Nicholas Bailey (nbailey@ruc.dk) Martin Niss (maniss@ruc.dk)

Problem Solving in Physics II (PSM)

time	10-11-2023 12:15 til 10-11-2023 16:00
location	27.2-054 - lokale 3 (40)
Teacher	Martin Niss (maniss@ruc.dk) Nicholas Bailey (nbailey@ruc.dk)

Problem Solving in Physics II (PSM)

time	14-11-2023 09:30 til 14-11-2023 12:30
location	27.2-064 - pc lokale (40)
Teacher	Nicholas Bailey (nbailey@ruc.dk) Martin Niss (maniss@ruc.dk)

Problem Solving in Physics II (PSM)

time	17-11-2023 12:15 til 17-11-2023 16:00
location	27.2-054 - lokale 3 (40)
Teacher	Nicholas Bailey (nbailey@ruc.dk) Martin Niss (maniss@ruc.dk)

Problem Solving in Physics II (PSM)

time	21-11-2023 09:30 til 21-11-2023 12:30
location	27.2-064 - pc lokale (40)
Teacher	Martin Niss (maniss@ruc.dk) Nicholas Bailey (nbailey@ruc.dk)

Problem Solving in Physics II (PSM)

time	24-11-2023 12:15 til 24-11-2023 16:00
location	27.2-054 - lokale 3 (40)
Teacher	Martin Niss (maniss@ruc.dk) Nicholas Bailey (nbailey@ruc.dk)

Problem Solving in Physics II (PSM)

time	28-11-2023 09:30 til 28-11-2023 12:30
location	27.2-064 - pc lokale (40)
Teacher	Nicholas Bailey (nbailey@ruc.dk) Martin Niss (maniss@ruc.dk)

Problem Solving in Physics II (PSM)

time	01-12-2023 12:15 til 01-12-2023 16:00
location	27.2-054 - lokale 3 (40)
Teacher	Nicholas Bailey (nbailey@ruc.dk) Martin Niss (maniss@ruc.dk)

Problem Solving in Physics II (PSM)

time	05-12-2023 09:30 til 05-12-2023 12:30
location	27.2-064 - pc lokale (40)
Teacher	Martin Niss (maniss@ruc.dk) Nicholas Bailey (nbailey@ruc.dk)

Problem Solving in Physics II (PSM)

time	08-12-2023 12:15 til 08-12-2023 16:00
location	27.2-054 - lokale 3 (40)
Teacher	Nicholas Bailey (nbailey@ruc.dk) Martin Niss (maniss@ruc.dk)

Problem Solving in Physics II (PSM)

time	12-12-2023 09:30 til 12-12-2023 12:30
location	27.2-064 - pc lokale (40)
Teacher	Nicholas Bailey (nbailey@ruc.dk) Martin Niss (maniss@ruc.dk)

Problem Solving in Physics II (PSM)

time	15-12-2023 12:15 til 15-12-2023 16:00
location	27.2-054 - lokale 3 (40)
Teacher	Nicholas Bailey (nbailey@ruc.dk) Martin Niss (maniss@ruc.dk)

Problem Solving in Physics II - Exam (PSM)

time	05-01-2024 10:00 til 05-01-2024 14:00
forberedelsesnorm	ikke valgt
forberedelsesnorm D-VIP	ikke valgt
location	44.3-40 - teorilokale (50)

Problem Solving in Physics II - Reexam (PSM)

time	23-02-2024 12:30 til 23-02-2024 16:30
forberedelsesnorm	ikke valgt
forberedelsesnorm D-VIP	ikke valgt
location	27.2-054 - lokale 3 (40)