Course syllabus – Draft

Semester 11 – Elective course in clinical medicine, 7.5 credits

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General information

Course code	2LA303
Course name	Medical diagnostics
Credits	7.5 credits
Form of education	Higher education, study regulation of 2007
Main field of study	Medicine
Level	AV – Second cycle
Grading scale	Fail (U) or Pass (G)
Department responsible	Department of Laboratory Medicine (LabMed)
Deciding body	Programme Committee for the Medical Programme

Specific entry requirements

A passing grade in semesters 1–10 is required.

A student who has failed workplace-based learning (VFU) in clinical settings or equivalent due to serious deficiencies in knowledge, skills, or professional conduct that have jeopardized patient safety or public trust in healthcare is eligible for a new VFU opportunity only once the individual action plan has been completed.

Aims

The overall aim of the course is for the student to develop professional competence as a physician within healthcare teams. Based on previous courses in the medical programme, the student shall broaden and deepen clinical competence in clinical medicine with a focus on medical diagnostics. The student is expected to achieve a higher level of independence in skills of importance for the physician profession.

Learning outcomes

The learning outcomes (3–5 related to knowledge and understanding and 3–5 related to skills and abilities) are aligned with the national learning objectives for the medical degree as stated in the Swedish Higher Education Ordinance (SFS 1993:100). Learning outcomes related to knowledge and understanding are categorized according to the SOLO taxonomy (S2–S5), and learning outcomes related to skills and abilities are categorized according to Miller's pyramid (M3–M4). Learning outcomes are achieved at course level with differentiated emphasis depending on the VFU placement.

Knowledge and understanding

- describe basic principles and clinical applications of advanced laboratory medicine techniques such as proteomics, DNA/RNA sequencing, pharmacogenomics, and AI-based image analysis (SOLO 4)
- describe main principles and areas of use of laboratory medicine methods in clinical chemistry, microbiology, immunology, pharmacology, pathology, and transfusion medicine, and relate these to diagnostics, treatment, and follow-up (SOLO 4)
- describe basic principles, clinical indications, and limitations of imaging and functional diagnostic techniques (e.g. X-ray, ultrasound, CT, MRI, PET, SPECT) and their role in clinical decision-making (SOLO 4)
- explain and evaluate key concepts in precision medicine, including molecular diagnostics, cell and gene therapy, individualized pharmacotherapy, and diagnostic decision support (SOLO 5)
- critically analyze diagnostic methods in terms of sensitivity, specificity, method validation, and quality assurance, and discuss their significance for clinical decision-making within laboratory and imaging diagnostics (SOLO 5)

Skills and abilities

- perform and apply selected basic laboratory and imaging diagnostic methods in a clinical context, including sampling, analysis, and basic image interpretation, in accordance with local routines (Miller 4; EPA 2 and 6)
- interpret and analyze laboratory and imaging diagnostic results and formulate clinically relevant assessments and proposals for further management (Miller 4; EPA 1–4)
- conduct a short scientific or analytical group project within a diagnostic area, including formulation of a research question, basic data collection or literature review, and oral and written presentation (Miller 3; EPA 10)
- communicate, discuss, and document diagnostic findings in a clear and structured manner and collaborate professionally in interprofessional teams (Miller 4; EPA 9)
- identify needs for diagnostic and preventive measures within the clinical setting and participate in clinical decision-making processes under supervision (Miller 4; EPA 5 and 9)

Approach and professional conduct

- interact with patients, next of kin, fellow students, teachers, and healthcare staff in a respectful, empathetic, and professional manner
- critically reflect on ethical and societal implications of the use of AI, genetic testing, and cell therapies within laboratory and imaging diagnostics and precision medicine (SOLO 5)
- apply laboratory and imaging diagnostic methods in a patient-centred, evidence-based, and ethically sound clinical practice (SOLO 5)
- identify, critically review, and manage potential sources of error and evaluate the importance of quality assurance and method validation within laboratory and imaging diagnostics (SOLO 5)

- reflect on and develop one's own learning and evaluate and improve collaboration and communication in interprofessional contexts, including active participation in peer learning (SOLO 5)

Course content

The course integrates and deepens elements of the theoretical content of the medical programme through an extended period of workplace-based learning (VFU) in clinically active healthcare teams, enabling practical professional training. Skills training is partly conducted as composite clinical activities (SKA) aligned with the nationally agreed EPA framework.

Teaching and learning activities

The main teaching and learning activity is workplace-based learning (VFU) within clinically active healthcare teams under supervision with individual feedback. Teaching also includes integrated theoretical components, teacher-led skills training, and a group-based case assignment focusing on patient safety culture.

Examination

During VFU, repeated formative assessments of the student's clinical competence, including professional conduct, are conducted using assessment tools such as Mini-CEX, DOPS, and EPA/SKA instruments. Students document their development in an individual course portfolio. No traditional written sit-down examination is included in the course.

Compulsory course components

Compulsory participation

- course introduction
- theoretical instruction
- workplace-based learning (VFU) according to schedule
- teacher-led skills training and seminars
- participation in composite clinical activities (SKA) and assessed EPAs
- submission and oral presentation of a group assignment (case description)

Compulsory formative assessments

- EPA and/or SKA at least once per week, with feedback from clinical supervisor
- simulated medication prescribing and medication report (not applicable in settings without treatment responsibility)

Examination components

- assessment during VFU** of EPAs/SKAs: observed level of independence in relation to the defined performance level for each skills-based learning outcome
- assessment of professional conduct***

** Examination during VFU consists of a summative assessment based on repeated formative assessment material from VFU. The material comprises multiple formative assessments supported by, among other things, assessment tools for level of independence in performing specified EPAs.

*** Learning outcomes related to professional conduct are assessed continuously based on assessment criteria, in all contexts where the student acts in the role of a student or in activities related to the university or healthcare services, including communication and digital media. In the event of insufficient achievement of learning outcomes, the examiner may fail the student in VFU. In such cases, an individual action plan shall be established.

For assessment of professional conduct during VFU, the student is entitled to two examination opportunities. Re-examination requires that the student retake the entire course, in accordance with the established action plan.

Active participation in compulsory course components constitutes a central part of the course examination. The examiner decides whether and how absence from compulsory components may be compensated. Until the student has participated in compulsory components or compensated for absence in accordance with the examiner's instructions, course results cannot be reported.

The examiner may immediately terminate a student's workplace-based learning (VFU) in clinical settings or equivalent if the student demonstrates such serious deficiencies in knowledge, skills, or professional conduct that patient safety or public trust in healthcare is jeopardized. In such cases, the student fails the relevant component and one VFU opportunity is considered used. An individual action plan shall then be established.

If special grounds exist, or if adaptations are required for students with disabilities, the examiner may decide to deviate from the course syllabus regulations regarding examination format, number of examination opportunities, opportunities for completion, or exemption from compulsory components. The course content, learning outcomes, and required level of knowledge, skills, and abilities may not be changed, removed, or reduced.

Additional provisions

Language of instruction: Swedish; teaching and literature in English may occur.

Course evaluation is conducted in accordance with Karolinska Institutet's guidelines.

Recommended literature and other learning resources

Current scientific articles within the field and local clinical guidelines.

SKA (Composite Clinical Activity) is a concept developed to operationalize EPA assessments in clinical practice.