

**COURSE DATA****DATA SUBJECT**

**Code:** 34473  
**Name:** Oncology and medical genetics  
**Cycle:** Undergraduate Studies  
**ECTS Credits:** 6  
**Academic year:** 2025-26

**STUDY (S)**

| Degree                    | Center                             | Acad. year | Period         |
|---------------------------|------------------------------------|------------|----------------|
| 1204 - Degree in Medicine | Facultat de Medicina i Odontologia | 4          | Second quarter |

**SUBJECT-MATTER**

| Degree                    | Subject-matter             | Character  |
|---------------------------|----------------------------|------------|
| 1204 - Degree in Medicine | Human clinical training II | COMPULSORY |

**COORDINATION**

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CERVANTES RUIPEREZ ANDRES MANUEL R

**SUMMARY**

Half of the subject will develop the topics about Oncology and the other half of the subject will develop the topics of Medical Genetics.

Oncology is the medical specialty that deals with the analysis and treatment of malignant tumours. Oncology, therefore, is in charge of the detection, treatment and control of neoplasm diseases. In the case of treatment, it considers the possibility of subjecting the patient surgery and non-surgical therapies, such as chemotherapy, radiotherapy and molecular treatments. On the other hand, Oncology seeks to provide palliative care to all who suffer terminal diseases and approaches focalized genetic tests focused on the detection of tumours. The general objectives are to train professionals with theoretical and practical knowledge, attitudes and skills that enable the student to solve and guide the medical situations that condition tumour disease.

Human Genetics is the scientific discipline that studies the human species heritage. The Medical Genetics is the medical-sanitary specialty that applies the knowledge of this discipline to the medical practice, dealing with the diseases of genetic origin, including hereditary and malformed or disabling pathologies of the human species. It includes all the aspects related with the aforementioned: etiology, physiopathology,



heritage mechanisms, population screening, diagnosis (clinical and laboratory), prognosis and recurrence risk (genetic counselling), treatment and prevention, including prenatal and postnatal stage of the person.

## PREVIOUS KNOWLEDGE

## RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

There are no specified enrollment restrictions with other subjects of the curriculum.

## COMPETENCES / LEARNING OUTCOMES

### 1204 - Degree in Medicine

Acknowledge diversity and multiculturality.

Acquire proper clinical experience in hospitals, health care centres and other health institutions, under supervision, as well as basic knowledge of clinical management focused on the patient and the correct use of tests, medicines and other resources available in the health care system.

Capacity for communicating with professional circles from other domains.

Consideration of ethics as a fundamental value in the professional practise.

Criticism and self-criticism skills.

Establish the diagnosis, prognosis and treatment, applying principles based on the best information available and on conditions of clinical safety.

Have the capacity to make an initial diagnosis and establish a reasonable strategy of diagnosis.

Indicate the most accurate therapy in acute and chronic processes prevailing, as well as for terminally ill patients.

Is aware of tumour disease, its diagnose and management.

Know how to use IT in clinical, therapeutic and preventive activities, and those of research.

Know how to use the sources of clinical and biomedical information available, and value them critically in order to obtain, organise, interpret and communicate scientific and sanitary information.

Knows how to evaluate modifications in clinical parameters at different ages.

Knows how to make a diagnosis and apply genetic counselling.

Knows how to perform a complete anamnesis, focused on the patient and orientated to various pathologies, interpreting its meaning.

Obtain and elaborate a clinical history with relevant information.



- Perform a physical examination and a mental health assessment.
- Plan and propose appropriate preventive measures for each clinical situation.
- Proper organisation and planning of the workload and timing in professional activities.
- Team-working skills and engaging with other people in the same line of work or different.
- Working capacity to function in an international context.

## DESCRIPTION OF CONTENTS

### 1. THEORETICAL LESSONS: Oncology

1. Cancer epidemiology: incidence, prevalence and mortality. Tumours registry. Etiologic factors. Heritage predisposition. Cancer pathogenesis.
2. Diagnosis and natural history of cancer. Primary and secondary prevention. Cancer clinical manifestations. Diagnosis, extension diagnosis and prognosis factors.
3. Cancer multidisciplinary approach. The tumours committees. Treatment principles of cancer. Medical treatment of cancer: chemotherapy and hormonal therapy.
4. Biological treatment of cancer. Guided therapies against molecular targets. Immunotherapy.
5. Research in Oncology. Clinical essays.
6. Palliative and support treatment. Control of symptoms in patients with advanced tumours. Treatment toxicity: prevention and control strategies.
7. Germinal tumours with a model of curable neoplasm with chemotherapy.
8. Breast cancer as a model of treatable neoplasm according to its molecular profile.
9. Colon and rectal cancer as a model of treatable neoplasm in a multidisciplinary approach.
10. Lung cancer as a model of heterogeneous neoplasm with different treatment profiles according to their molecular profile.
11. Ovarian cancer as a model of the necessity of therapeutic innovation.
12. Prostate cancer.



## 2. THEORETICAL LESSONS: Medical Genetics

1. Introduction. Basic principles in genetics. Role of the genetics in medicine. Types of genetic diseases. Clinical impact of the genetic disease.

2. Monogenetic diseases: detection of genetic diseases in medical practice.

3. Monogenetic diseases. Modifier factors. New mutation. Mosaicism of the germinal line. Delay in the age of presentation: example, Huntington disease. Reduced penetrance: example, retinoblastoma heritage.

4. Monogenetic diseases: modifier factors (II). Variable expressivity: example, Neurofibromatosis. Pleiotropy and locus heterogeneity: example, Marfan's syndrome. Genomic imprinting, epigenetic changes: example, Prader-Willi and Angelman's syndromes. Uniparental disomy.

5. Diseases linked with the X chromosome, transmission patterns. Lethal alleles in homozygous. Most frequent recessive diseases. Inactivation of the X chromosome and genes expressions linked with the X chromosome. Genetics of the Fragile X chromosome Syndrome (FXS). Limited phenotypes or influenced by gender.

6. Principles of the multifactor disease. Multifactor disorders. Principles of the multifactor disease. Search of candidate genes. Genetic and environmental base. Load/threshold model. Most frequent diseases that affect the adult population: cardiovascular diseases, hypertension, familial hypercholesterolemia, etc.

## 3. THEORETICAL LESSONS: Medical Genetics (continuous)

7. Clinical cytogenetic. Chromosome anomalies detection. Autosomal disorder. Incidence. Clinical indications for the chromosomal analysis. Trisomies and viable monosomy. Risk factors. Chromosomal anomalies and clinical phenotypes: trisomy 21, trisomy 13, trisomy 18, etc.

8. Clinical cytogenetics (II). Gonosomopathies. Chromosomal basis of sexual determination. Aneuploidies of the sex chromosomes in women: Turner syndrome, chromosomal variants, trisomy X. Aneuploidies of sex chromosomes in men: Klinefelter syndrome, double Y syndrome, structural abnormalities of the Y chromosome. Genetic bases of sexual differentiation. XX men. XY women.

9. Genetic bases of cancer. Genes involved: protooncogenes and tumor suppressor genes. Genetic changes involved in tumor progression. Inheritance of cancer susceptibility.

10. Population genetics. Genetic variation in human population. Genetic structure of the human population. Gene frequencies. Hardy-Weinberg's equilibrium. Genetic drift, migration and gene flow. Evolution.

11. Genetic advise and risk evaluation. Indications for the genetic advise. Prenatal diagnosis. Methodology.



## 4. PRACTICAL LESSONS: Oncology

### 2. Seminar practices:

- Discussion of cases of breast cancer
- Discussion of cases of lung cancer
- Discussion of cases of colon cancer
- Oncological emergencies
- Oncological support treatment: cancer pain/myelosuppression

### 3. Clinical practices

## 5. PRACTICAL CLASSES: Medical genetics

### Problems resolution

- 1.- Mutation analysis: molecular diagnosis. Analysis of structural genetic variations. Database management.
- 2.- Resolution and interpretation of family trees.
- 3.- Resolution of Mendelian genetic problems.
- 4.- Resolution of cytogenetic problems.

### Seminar Practices

- 1.- Molecular diagnosis techniques.
- 2.- High-performance genetic techniques.
- 3.- Genetic bases of metabolic diseases.
- 4.- Epigenome and disease. MicroRNAs, molecular bases and applications.
- 5.- Transmission pattern of mitochondrial diseases. Mitochondrial myopathies.
- 6.- Presentation of clinical cases.

## WORKLOAD

### PRESENCIAL ACTIVITIES

| Activity           | Hours |
|--------------------|-------|
| Theory             | 26,00 |
| Seminars           | 26,00 |
| Laboratory         | 0,00  |
| In-class tutorials | 0,00  |



|                    |              |
|--------------------|--------------|
| Clinical practice  | 23,00        |
| <b>Total hours</b> | <b>75,00</b> |

### NON PRESENCIAL ACTIVITIES

| Activity  | Hours        |
|---|--------------|
| Attendance at other activities  | 0,00         |
| Individual or group project   | 15,00        |
| Independent study and work  | 40,00        |
| Preparation of lessons  | 20,00        |
| Preparation for assessment activities                                 | 0,00         |
| Resolution of case studies  | 0,00         |
| Preparation of supplementary reports                                  | 0,00         |
| Preparation of the internship report and evaluation of the internship | 0,00         |
| <b>Total hours</b>  | <b>75,00</b> |

### TEACHING METHODOLOGY

In **theoretical lessons (master class)**, the teacher will inform about the most important concepts and contents to show knowledge and skills students must acquire. Students' participation will be encouraged by the teachers. Teaching materials used by the professor could be available by the electronic resource "Aula Virtual".

Classroom practices (**seminars**). In small groups, teachers will show specialized topics in depth, cases study, bibliography handling and current topics... Work group and oral presentation of the acquired knowledge will be encouraged. "Cooperative learning" is the goal of this activity.

**Clinical practices:** Students' clinical practices will be held in University Hospitals, primary Attention Centers and mental health Centers to teach students how to perform anamnesis and basic clinical explorations.

The gender perspective, the respect for diversity, and the sustainable development goals (SDGs) will be incorporated into teaching, whenever possible.

### EVALUATION

**Theoretical assessment:** 50% of the final mark. It will be done through a written test that will be about the content of the program and will have as the main objective to assess the knowledge acquisition. The content of the test will be the same for each group of the same subject.

**Practical assessment:** 50% of the final mark. It will be done by the assessment of the participation in the different activities and with the fulfilment of a test that assesses the acquisition of skills related with the general and specific competencies.



Regarding the **Oncology** part, the assessment will be as follows:

- Theory, 5 points: 30 multiple-choice questions, 5 options. Wrong answers will not subtract any point. Blank answers will be counted as 0
- Practice, 5 points: 30 multiple-choice questions. 5 options. Wrong answers will not subtract any point. Blank responses will be counted as 0

Regarding the **Medical Genetics** part, the assessment is as it follows:

- Teoria, 5 punts: 40 preguntes tipus test, 4 opcions cada una. Cada resposta errònia resta la tercera part d'una resposta encertada. A les preguntes no contestades se les donarà un valor de zero.
- Practices, 5 points: Informatics exercises: 0.5 points (0.25 each one). Exam: 4.5 points. It will contain several practical exercises and short seminar questions.

To achieve the final mark, the student must pass both the Oncology part and the Medical genetics part. The marks of both areas in the theoretical and practical assessment are divided between 2.

In order to access to an advance on the call of this subject, it is a requirement that the student has coursed all his/her practices.

Attendance at practical activities is mandatory. The student is considered to meet this requirement if he or she has attended a minimum of 80% of these activities and has adequately justified the impossibility of attending the remaining sessions due to the occurrence of a cause of force majeure. It will be essential to comply with this requirement to pass the subject.

Students are reminded of the importance of carrying out evaluation surveys on all the teaching staff of the degree subjects.

## REFERENCES

- THOMPSON & THOMPSON. Genética en Medicina. Ed. Masson, 8<sup>a</sup> edición.
- LYNN B. JORDE. Genética Médica. Ed. Elsevier 4<sup>a</sup> edición.
- RAFAEL OLIVA VIRGILI. Genética Médica. Ed. Díaz de Santos.
- EMERY and RIMOIN'S. Principles and Practice of Medical Genetics. Ed. Elsevier, 6<sup>a</sup> edición.
- EMERY. Elementos de Genética Médica. 15<sup>a</sup> edición
- HARRISON¿S PRINCIPLES OF INTERNAL MEDICINE. Ed McGraw-Hill Education. 20<sup>a</sup> edición.



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- DEVITA, HELLMAN AND ROSENBERG'S CANCER: PRINCIPLES AND PRACTICE OF ONCOLOGY. Wolters Kluwer Health Library. 11<sup>a</sup> edición. 2018.
- RECURSOS e-Salut: - ClinicalKey Student Medicina, Odontologia y Enfermería [ <https://uv-es.libguides.com/RecursosSalut> ]- Acces Medicina [ [https://uv-es.libguides.com/Access\\_Medicina](https://uv-es.libguides.com/Access_Medicina) ] - Médica Panamericana [ [https://uv-es.libguides.com/Medica\\_Panamericana](https://uv-es.libguides.com/Medica_Panamericana) ]