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370518 - LENTS - Ophthalmic Lenses

Coordinating unit: 370 - FOOT - Terrassa School of Optics and Optometry
Teaching unit: 731 - OO - Department of Optics and Optometry
Academic year: 2019
Degree: BACHELOR'S DEGREE IN OPTICS AND OPTOMETRY (Syllabus 2009). (Teaching unit Compulsory)
ECTS credits: 6 Teaching languages: Catalan

Teaching staff

Coordinator: JESUS CAUM AREGAY (http://futur.upc.edu/JesusMariaCaumAregay)

Degree competences to which the subject contributes

Specific:

1. Acquire skills in patient care

2. Understand the different functions that can have glasses: compensation of ametropias, eye protection to general and labour use, low vision aids.
3. Distinguish between the characteristics of materials and designs of various types of ophthalmic lenses (including prisms and filters) and frames, and understand the basic principles of optics and not optical systems used for low vision.
4. Making use of machinery, instruments and tools needed to make assembly, adjustments, repairs and quality control of finished product.
5. Recognize if the glasses meet the standards refered to in ophthalmic optics, optical aids and eye protection.

6. Being able to take, treat, represent and interpret experimental data. "Use basic laboratory equipment and techniques"
7. Value the impact parameters psychoaesthetic, or psychosocial and economic impact to the user.

Generical:

8. Adaptation of all the fields of professional activity envers compatible aspects with the medium ambient (recycling, reuse of the materials,...)
9. Acquire communication techniques appropriate to ensure the success of teamwork

10. Capacity to assume different roles within the team, leadership, coordination with other members

11. Develop empathy with people

12. Judgments (ratings) reports and surveys

13. Encourage methodical work, rigorous, consistent and innovative

14. Reflect and be able to make a critic of the knowledge and developed skills and the level of achievement.

15. Locate new information and the interpretation of it in its context.

16. Working with evidence, methodology and rigour.

17. Value the methods used to achieve the objectives.

18. Value and incorporate technological necessary improvements for the proper development of the profession

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19. Assessing the acquisition of the course objectives.

Teaching methodology

- Classes exhibition by teachers.
- Problem solving in small groups.
- Cooperative learning in the laboratory.
- Reading and interpretation of publications.

Learning objectives of the subject

After the course the student or student should be able to:

- Understand and calculate the geometric parameters, the most important optical and physical characterizing all types of lenses used in ophthalmic and optometric prescriptions relate them to know the properties involved in the adaptation process.
- Understand the physical and chemical properties of the materials used in optics and optometry.
- Understand the processes of selection, design and manufacture of lenses.
- Understand and manage technical analysis, measurement, control and correction of optical systems compensating effects on the visual system, in order to optimize its design and its adaptation.
- To qualify for the calculation of geometric parameters of the visual systems of specific compensation: low vision, intraocular lenses, contact lenses and ophthalmic lenses.
- Know the aberrations of optical systems.
- Make contact with the marketing of products, supply, storage, preservation and information.
- Knowledge and practical application of principles and methods in optics and optometry, as well as the acquisition of skills and competencies described in the general objectives of the title.

Study load

Total learning time: 144h	Hours large group:	0h	0.00%
	Hours medium group:	32h	22.22%
	Hours small group:	28h	19.44%
	Guided activities:	0h	0.00%
	Self study:	84h	58.33%

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Content

1. INTRODUCTION. CLASSIFICATION OF OPHTHALMIC LENSES

Learning time: 7h

Theory classes: 1h
Practical classes: 0h
Laboratory classes: 2h
Guided activities: 0h
Self study : 4h

Description:
This content is worked:
- Different types of ophthalmic lenses classified according to surface geometry
- The functions of the different types of lenses as compensating elements

Related activities:
- Assessment of theoretical with a written test in the classroom.
- Evaluation of content with a practical test in the laboratory.

2. TOOLS WITH SPHERICAL POWER

Learning time: 26h 47m

Theory classes: 6h 30m
Practical classes: 1h
Laboratory classes: 4h 17m
Guided activities: 0h
Self study : 15h

Description:
This content is worked:
- Geometric and optical parameters that characterize the spherical lens.
- Relations between parameters.
- Exact calculation of spherical lens power.
- Procedures for measuring these parameters. Using frontofocòmetre, spherometer.

Related activities:
- Resolution of exercises.
- Assessment of theoretical with a written test in the classroom.
- Evaluation of content with a practical test in the laboratory.

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3. TOOLS WITH ASTIGMATISM POWER

Learning time: 34h 52m

Theory classes: 4h 20m
Practical classes: 2h
Laboratory classes: 8h 32m
Guided activities: 0h
Self study : 20h

Description:
This content is worked:
- Description of geometric surfaces.
- Relations between optical and geometric parameters.
- Methods of representation of such lenses.
- Application of slow bicilíndriques. Theorem Stocker
- Procedures for measuring parameters. Handling the lensmeter.

Related activities:
- Resolution of exercises.
- In the small group session will proceed to evaluate the level acquired in the handling of the front.
- Assessment of theoretical with a written test in the classroom.
- Evaluation of content with a practical test in the laboratory.

4. LENSES WITH PRISMATIC POWER

Learning time: 31h 46m

Theory classes: 4h 20m
Practical classes: 1h
Laboratory classes: 6h 26m
Guided activities: 0h
Self study : 20h

Description:
This content is worked:
- Concepts and methods for measuring prismatic power.
- Methods of obtaining a prismatic lens.
- Prentice Law.
- Convention of the bases.
- Prismatic effects achieved by decentralization.

Related activities:
- Resolution of exercises.
- Assessment of theoretical with a written test in the classroom.
- Evaluation of content with a practical test in the laboratory.

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5. BIFOCALS LENSES	Learning time: 9h 19m Theory classes: 2h 10m Practical classes: 0h Laboratory classes: 2h 09m Guided activities: 0h Self study : 5h

Description:
This content is worked:
- Geometry of the bifocal linked to its functionality.
- Concepts of addition, image jump and optical center nearby.

Related activities:
- Resolution of exercises.
- Assessment of theoretical with a written test in the classroom.
- Evaluation of content with a practical test in the laboratory.

6. LENSES WITH A PROGRESSIVE ADDITION	Learning time: 10h 19m Theory classes: 2h 10m Practical classes: 0h Laboratory classes: 2h 09m Guided activities: 0h Self study : 6h

Description:
This content is worked:
- Description of surfaces.
- Recognition and extraction parameters.
- Advantages and disadvantages on the bifocal lens.

Related activities:
- Working staff documents related to the topic.
- Assessment of theoretical with a written test in the classroom.
- Evaluation of content with a practical test in the laboratory.

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7.ABERRATIONS IN OPHTHALMIC LENSES	Learning time: 21h 38m Theory classes: 5h 20m Practical classes: 2h Laboratory classes: 4h 18m Guided activities: 0h Self study : 10h

Description:
This content is worked:
- Definition and classification of the various aberrations to be considered in an ophthalmic lens.
- Mathematical models for simulation of aberrations linked to lens design.
- Functions for.

Related activities:
- Resolution of exercises.
- Assessment of theoretical with a written test in the classroom.
- Evaluation of content with a practical test in the laboratory.

8. MANUFACTURING OPHTHALMIC LENSES	Learning time: 8h 19m Theory classes: 2h 10m Practical classes: 0h Laboratory classes: 2h 09m Guided activities: 0h Self study : 4h

Description:
This content is worked:
- Different types of manufacturing processes.
- Cut and polished surfaces with symmetry of revolution around a point or an axis.
- Cutting and polishing of surfaces without symmetry of revolution.
- Surface treatments.

Related activities:
- Assessment of theoretical with a written test in the classroom.
- Evaluation of content with a practical test in the laboratory.

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Qualification system

The total score is the result of a test result face in the classroom, written individual test in the laboratory, and results reporting practices, and activities proposed in the classroom, with the following weighting:
- Written test: 45%
- Laboratory test: 15%
- Practices: 25%
- Proposed activities in the classroom: 15%

Information on the various assessment activities will be detailed in the intranet of the subject (digital campus Atenea).

Regulations for carrying out activities

All submissions must be pursuant to the guidelines on the intranet of the subject (digital campus Atenea).

Bibliography

Basic:

Caum Aregay, J. [et al.]. Tecnología óptica: lentes oftálmicas, diseño y adaptación [on line]. Barcelona: Edicions UPC, 2001 [Consultation: 08/01/2016]. Available on: <http://hdl.handle.net/2099.3/36343>. ISBN 8483014742.

Jalie, M. The principles of ophthalmic lenses. 4th ed. London: The Association of Dispensing Opticians, 1984. ISBN 0900099208.

Jalie, Mo. Ophthalmic lenses & dispensing. 3rd ed. Oxford: Butterworth Heinemann, 2008. ISBN 9780750688949.

Fannin, Troy E. Óptica clínica. 2ª ed. Barcelona: Omega, 2007. ISBN 9788428214223.

Complementary:

Rosenthal, J. William. Spectacles and other vision aids: a history and guide to collecting. San Francisco: Norman Publishing, 1996. ISBN 0930405714.

Horne, D. F. Spectacle lens technology. Bristol: Adam Hilger, 1978. ISBN 0852742789.

Others resources: