



COURSE MODULE . INTRODUCTION TO SPECIALIZATION FIELDS & INDUSTRIAL CASES

COURSE CODE	COSI ISC
COURSE LEVEL	Master
ECTS CREDITS	5
COURSE INSTRUCTOR/S	Prof. Alain Trémeau (UJM) with the assistance of guest lecturer(s)/expert(s) or industrial(s)
EDUCATION PERIOD	SEMESTER 1
EXPECTED PRIOR-KNOWLEDGE	course %colour Science+, use of Matlab
LANGUAGE OF INSTRUCTION	English

AIM This course introduces basics and fundamental principles of color and goniocolorimetry (principles and applications of multi-angle measurements); measuring colour quality (principles and applications of setting instrumental color tolerances); colour appearance of real objects varying in material, hue, and shape, at micro and macro scales, and other topics related to applicative/industrial fields. This course is focused on advanced and emerging fields in the application of colour and spectral technologies with direct application to industry. It covers topics such as: advanced colour science and computational colour; human cognition and computer vision; spectral science and spectral technologies; colour in medical imaging and biomedical applications; colour management connecting devices, systems and materials. To develop their analytical skills, students have to study or to work, and report on practical tasks and on industrial study cases. For practical works, students use MATLAB and specific softwares, as well as different measurement systems and equipments.

TEACHING ACTIVITIES This course is based on flip-teaching, exchanges and discussions between students and instructor, lectures and practical sessions activities, as well as homework.

COURSE OUTLINE

- (topic 1) Colour in quality control and machine vision (e.g. in food industry)
- (topic 2) Colour in medical and biomedical applications, life science (e.g. in dentistry)
- (topic 3) Colour management connecting devices, systems and materials (e.g. display devices)
- (topic 4) Spectral science and spectral technologies (e.g. in food industry)
- (topic 5) Colour in metallic coating at micro and macro level (e.g. in automotive industry)

PRACTICAL ACTIVITIES Practical works (laboratory sessions and industrial study cases) in order to understand/deepen principles introduced in the lectures, to practice on real applications and to train students.

LEARNING OUTCOMES¹

- ~ *Knowledge and Comprehension* of the basics introduced in this course and how and why they have been implemented in some applications;
- ~ *Application, Analysis, Synthesis and Evaluation* skills of the main concepts introduced in this course;
- ~ Ability to apply/implement principles introduced in the lectures on practical tasks and on industrial study cases;
- ~ Ability to self-learn, to understand why some solutions may solve some problems meanwhile for other applications these solutions cannot be used.

FORM/S OF ASSESSMENT Written exam (25%), Practical works (50%), Acquired skills (25%)

¹ The meaning of *keywords* in italic used to define Learning Outcomes are detailed in Annex.



ASSESSMENT CRITERION Written exam and Practical works

Excellent - outstanding performance	A
Very Good - above the average standard but with some errors	B
Good - generally sound work with a number of notable errors	C
Satisfactory - fair but with significant shortcomings	D
Sufficient - performance meets the minimum criteria	E
Fail - some more work required before the credit can be awarded	FX
Fail - considerable further work is required	F

Detail of criteria used to assess acquired skills :

- ~ Activities and questionnaires giving evidence of knowing (5%)
- ~ Activities and questionnaires giving evidence of comprehension/understanding (5%)
- ~ Activities and questionnaires giving evidence of analysis (5%)
- ~ Activities and questionnaires giving evidence of synthesis (5%)
- ~ Activities and questionnaires giving evidence of evaluation (5%)

Excellent	A
Very Good - above the average standard	B
Good - generally sound well	C
Satisfactory - but with significant shortcomings	D
Sufficient - performance meets the minimum criteria	E
Fail - some more work required	FX
Fail - considerable further work is required	F

The evaluation of informal learning outcomes will be based on questionnaires and laboratory notebook (self-evaluation, learning diary).

LITERATURE AND STUDY MATERIALS

- ~ Principles of Color Technology by Billmeyer, Saltzman and Berns
- ~ Technical reports and scientific papers provided by the course instructor

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CONTACT DETAILS

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