



# Master Optique, Image, Vision, Multimédia Parcours Computational cOLOUR and Spectral Imaging (COSI)

**Diplôme** Master ERASMUS+  
**Domaine d'étude** Sciences, Technologies, Santé  
**Mention** Optique, Image, Vision, Multimédia  
**Parcours** Computational cOLOUR and Spectral Imaging (COSI)

## Objectifs

The 2-years (120 ECTS) Erasmus Mundus Joint Master Programme Computational Colour and Spectral Imaging (COSI) provides an interdisciplinary and innovative training programme in a specialized field combining colour and spectral imaging with advanced data science. We provide students with a unique competence and skill set, including advanced methodologies, models, and practical applications with two goals: Enhance their employability and improve their career prospects on one hand, and meet the current and future needs of industrial R&D and academic research on the other.

The Information and Communication Technologies, Health & Life Science, and Science & Technology sectors are in full growth. The innovative use of images is increasingly important in these sectors, particularly in Quality Control of Manufactured Products, Medical and Biomedical Imaging, Spectral Systems Design, Media Technology, Internet of Things. COSI competence is highly sought after in a wide range of sectors where the continued evolution of R&D fields requires adapted and extremely specialized courses with a strong focus on industrial applications and recent trends in various research areas.

With competitive scholarships available we expect to recruit excellent students from various educational backgrounds worldwide. The whole curriculum is entirely taught in English, but students will also gain multicultural skills as well as other transversal skills. COSI students will receive a specialized education very well adapted to their background, interests, and future career plans.

## Pour qui ?

### Conditions d'admission

For additional details regarding entry requirements: <https://cosi-master.eu/20152017-application/who-can-apply/>

Prepare your application: <https://cosi-master.eu/application-process/>

Application procedure: <https://cosi-master.eu/apply/>

# Programme

YEAR 1

SEMESTER 7 - Norwegian University of Science and Technology (NTNU) - From September to December

Minimum of 30 ECTS from the following courses

Compulsory courses - 30 credits	Credits	Syllabus	Instructor
Computer graphics fundamentals and applications	7.5		
Cross-media colour reproduction	7.5	Syllabus	Prof. Phil Green
Deep learning for visual computing	7.5	Syllabus	Hao Wang
Introduction to research on colour and visual computing	7.5	Syllabus	Peter Nussbaum
Technical compulsory unit			
Seminar series: programming course, MATLAB and Python / Research communication, incl. LaTeX. / Research ethics / Optics	No ECTS		Coordinated by Prof. Jean-Baptiste Thomas

Optional Courses - extra credits	Credits	Syllabus	Instructor
Norwegian language and culture	5		

**SEMESTER 8 - From January to June****Track at University Jean Monnet (UJM)**Minimum of **30 ECTS** from the following courses

<b>Compulsory courses - 20 credits</b>	<b>Credits</b>	<b>Syllabus</b>	<b>Instructor</b>
Advanced image processing	5	Syllabus	Ass Prof. Hubert Konik and Ass Prof. Damien Muselet
3D models in computer vision	5	Syllabus	Prof. Alain Trémeau
Light matter interaction and materials appearance: from physics to virtual reality	5	Syllabus	Prof. Alain Trémeau
From Statistics to data mining	5		

<b>Elective courses - min. 10 credits</b>	<b>Credits</b>	<b>Syllabus</b>	<b>Instructor</b>
Research methodology and projects management	5	Syllabus	Prof. Alain Trémeau
Digital Innovation and Entrepreneurship	5		
Pattern recognition	5		
Real Time 3D Visualization	5	Syllabus	Prof. Philippe Colantoni
French Language and Culture	2		CILEC

**Track at Universidad de Granada (UGR)**Minimum of **30 ECTS** from the following courses

<b>Compulsory courses - 15 ECTS</b>	<b>Credits</b>	<b>Syllabus</b>	<b>Instructor</b>
Advanced optoelectronics	5		F.J. Gámiz
Computer vision	5		N. Pérez de la Blanca
Advanced colour and spectral imaging	5		J. Hernández / E. Valero /  R. Huertas

<b>Elective courses - min. 15 credits</b>	<b>Credits</b>	<b>Syllabus</b>	<b>Instructor</b>
Optical sensors	5		C. Sampedro / A. Carrasco
Remote imaging and sensing	5		F.J. Olmo
Data Science	5		M. Lastra / F.J. Benítez
Advanced colour and image processing	5		E. Valero / J.L. Nieves / M. Martínez
Human Perception and Cognition	5		J.L. Nieves / R. Huertas / L. Gómez-Robledo

<b>Optional courses - extra credits</b>	<b>Credits</b>	<b>Syllabus</b>	<b>Instructor</b>
Spanish Language and Culture	5		Professors from the Centre for Modern Language (UGR)

MANDATORY INTERNSHIP : Summer internship in July/August

**YEAR 2**

SEMESTER 9 - From August to December

**Specialization in Computational Spectral Imaging - Track at University of Eastern Finland (UEF)**Minimum of **30 ECTS** from the following courses

<b>Compulsory courses - 25 ECTS</b>	<b>Credits</b>	<b>Syllabus</b>	<b>Instructor</b>
Applications on photonics	5		
Advanced spectral imaging devices	5		
Color science laboratory	5		
Industrial group project	5		
Advanced deep learning	5		

<b>Elective courses - min. 5 credits</b>	<b>Credits</b>	<b>Syllabus</b>	<b>Instructor</b>
Optical metrology and fabrication	5		
Location-aware mobile applications development	5		
Other elective course upon eligibility	5		

<b>Optional courses - extra credits</b>	<b>Credits</b>	<b>Syllabus</b>	<b>Instructor</b>
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Finnish Language	2		Language Centre (UEF)
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### Specialization in Colour and Visual Computing - Track at Norwegian University of Science and Technology (NTNU)

Minimum of **30 ECTS** from the following courses

Compulsory courses - 22.5 ECTS	Credits	Syllabus	Instructor
Specialisation in colour imaging	7.5	<a href="#">Syllabus</a>	Jean-Baptiste Thomas
Specialisation in video processing	7.5	<a href="#">Syllabus</a>	Fauzi Alaya Cheikh
Appearance, perception and measurement	7.5		Phil Green

Elective courses - min. 7.5 credits	Credits	Syllabus	Instructor
Advanced colour management	7.5	<a href="#">Syllabus</a>	Phil Green
Advanced project work	7.5	<a href="#">Syllabus</a>	Sony George
Other elective course upon eligibility	7.5		Phil Green

SEMESTER 10 - From January to August

MASTER'S THESIS

## Coût de l'inscription

4500€

[Détail coût d'inscription](#)

4500 € per year for students from a programme country

9000 € per year for students from a partner country.

Self-funded students will be able to pay participation costs in three instalments.

Scholarships available.