

COURSE OUTLINE

- **General**

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| SCHOOL | SCHOOL OF APPLIED ARTS & CULTURE | | |
| ACADEMIC UNIT | DEPARTMENT OF GRAPHIC DESIGN & VISUAL COMMUNICATION | | |
| LEVEL OF STUDIES | Undergraduate | | |
| COURSE CODE | N1-4080 | SEMESTER | 4th |
| COURSE TITLE | PRINTING INKS AND COATINGS | | |
| INDEPENDENT TEACHING ACTIVITIES <i>if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits</i> | | WEEKLY TEACHING HOURS | CREDITS |
| Lectures | | 2 | |
| Laboratory | | 2 | |
| Total | | 4 | 6 |
| <i>Add rows if necessary. The organization of teaching and the teaching methods used are described in detail at (d)</i> | | | |
| COURSE TYPE <i>general background, special background, specialised general knowledge, skills development</i> | Foundation Specialization | | |
| PREREQUISITE COURSES | | | |
| LANGUAGE OF INSTRUCTION and EXAMINATIONS | GREEK | | |
| IS THE COURSE OFFERED TO ERASMUS STUDENTS? | YES (in English) | | |
| COURSE WEBSITE (URL) | https://eclass.uniwa.gr/courses/TGT104/ | | |

- **LEARNING OUTCOMES**

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| <p>Learning outcomes</p> <p><i>The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described. Consult Appendix A</i></p> <ul style="list-style-type: none"> • <i>Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</i> • <i>Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</i> • <i>Guidelines for writing Learning Outcomes</i> |
| <p>This course aims to familiarize students with inks and coating materials, so that they know the origin, composition, required characteristics and properties, their role in the printing process to be able to recognize and recognize them. manage safely and efficiently based on specifications and standards in the quality control laboratory but also in the production and printing areas. It also aims to familiarize and teach students the scientific - instrumental and empirical - practical methods of quality control of printing inks and coating materials before and after their application and their integrated management in storage, during transport and disposal.</p> <p>After the successful completion of the teaching of the course, students are expected to:</p> <ul style="list-style-type: none"> • know the composition, and the origin and characteristics of the ingredients, the basic features and properties of printing inks and coatings • be able to select them based on their characteristics and specifications and apply them depending on the substrate, the printing process and the desired final product. |

- be able to apply the knowledge gained about the quality control of printing inks and coatings and solve problems during storage, management, mixing and use before - during - and after printing, but also about the disposal of these materials.
- use and manage them safely and responsibly in accordance with specifications and standards, taking into account relevant regulations and applicable law.
- to respond and contribute responsibly and creatively to the general developments regarding the development of scientific and technological issues related to Research and Innovation in the Academic and Productive sector of industry both in Greece and internationally.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

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| Search for, analysis and synthesis of data and information, with the use of the necessary technology | Production of new research ideas |
| Adapting to new situations | Project planning and management |
| Decision-making environment | Respect for difference and multiculturalism |
| responsibility | Respect for the natural |
| Working independently | Showing social, professional and ethical |
| Team work | and sensitivity to gender issues |
| Working in an international environment | Criticism and self-criticism |
| thinking | Production of free, creative and inductive |
| Working in an interdisciplinary environment | Others... |

Upon successful completion of the course, students are expected to:

- be prepared for effective scientific and technological research in the field of printing inks and coating materials, so that they can select and use them efficiently, responsibly and safely in quality control laboratories, production units and printing companies.

be able to analyze and synthesize data and information on printing inks and coatings, their production and control technologies as well as their applications.

- be able to work individually and in groups and be able to make decisions about problems related to printing inks and coatings in the production, control - management and printing areas on a laboratory and industrial scale.

In general, the theoretical and practical background they will acquire will help them:

- be able to follow the developments of science and technology in the field of printing inks and coatings,
- generate new research ideas and participate in innovative fields,
- show respect for the human factor and life and the natural environment in general,
- and to respond to their work in both national and international environment, demonstrating scientific integrity and professional - ethical responsibility.

• SYLLABUS

Theoretical module: Initially, a brief historical overview of the printing materials is given, followed by a presentation of the materials used in modern printing inks, as they vary based on the different types of printing substrates and the techniques with which they are applied. The composition of the inks based on the pigments and their carrier is studied, and in more detail the chemical composition, and the origin and characteristics of the ink components, the properties and uses of the pigments, the fats, the resins, the solvents, additives for printing inks and

varnishes and coatings. The stages and ways of making inks, the methods of mixing and dispersing are presented. Then the methods and mechanisms of drying and curing of the inks and coating materials are developed. The mechanical, physical and chemical properties of inks are studied. The flow properties of fluid inks and the optical properties and strengths of printed inks are examined in detail. The classic - conventional but also the modern - innovative applications and the possibilities of the use of the advanced types of inks are presented (based on the modern legislation, standards, regulations regarding the sustainability and the viability of the new products). The categories of inks and coatings are studied: Liquid inks and dry toners. Also, the special type of inks and coatings (Thermochromic, conductive inks, materials and printing techniques for special effects, etc.) to create modern printing effects. The basic principles of quality control and measurements of ink properties before and after printing are presented.

Laboratorial module: In this part part of the course there is a demonstration and acquaintance with the basic ingredients and the methods of mixing and dispersing pigments and the stages of ink production. The regulations, standards, role of MSDS and TDS are explained, based on which the basic components of inks and coating varnishes are selected, in order to ensure their proper management at all stages from receipt and storage, to printing and their disposal or recycling. Next, the basic principles governing the quality control and testing of the properties of liquid inks (when selecting, supplying, storing, and pre-printing) are analyzed, such as viscosity, drying speed, stability, foaming, etc. The following is the assessment of the resistance of printed inks to physical, chemical and mechanical stresses (control of resistance to light, alkalis, detergents and soaps, fats-oils and solvents, control of adhesion and assessment of resistance to friction, engraving, etc.). The visual characteristics and properties are evaluated, such as gloss, opacity, color characteristics of printed inks and coating varnishes. Testing of different types of inks on different types of substrates is performed with laboratory printing devices that resemble different printing methods. Experimental data is recorded and processed, price tables and curves are constructed, and a technical reference-work report is written.

● **TEACHING and LEARNING METHODS – EVALUATION**

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| DELIVERY <i>Face-to-face, Distance learning, etc.</i> | Face-to-face | |
| USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, communication with students</i> | Presentations on power point and video projections. Training on special software about mathematical processing of measurements and simulations. | |
| TEACHING METHODS <i>The manner and methods of teaching are described in detail. Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.</i> | Δραστηριότητα | Φόρτος Εργασίας Εξαμήνου |
| <i>The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the</i> | Lectures | 30 |
| | Laboratorial experiments | 30 |
| | Technical reports and projects | 40 |
| | Study and preparation | 40 |
| | Educational seminars / exhibitions, etc. | 10 |
| | Course total | 150 |

| ECTS | |
|---|--|
| <p style="text-align: center;">STUDENT PERFORMANCE EVALUATION</p> <p>Description of the <i>evaluation procedure, Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation.</i></p> <p style="text-align: center;"><i>Other specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i></p> | <p>I. Theoretical exams (50%) Written questionnaire and oral - visual presentation.</p> <p>II. Laboratorial exams (50%) Practical and written exams on experiments and projects.</p> |

• **ATTACHED BIBLIOGRAPHY**

Greek sources

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