

Faculty of Graphic Arts

STUDY COURSES DELIVERED IN ENGLISH

CODE	COURSE TITLE	SEMESTER Winter / Summer	ECTS	STUDY LEVEL BSc (Bachelor's)
19549	Reproduction photography 1	W	4	BSc
19513	Physics 1	W	5	BSc
19537	Printing forms	W	5	BSc
19543	Multimedia communications 1	W	5	BSc
19539	Printing inks	W	4	BSc
19528	Design of graphic media 1	S	4	BSc
19557	Bookbinding	S	5	BSc
19469	Quality management in printing	S	5	BSc
84305	Visual arts practice 4	S	4	BSc
128242	Layout	S	4	BSc

CODE	COURSE TITLE	SEMESTER Winter / Summer	ECTS	STUDY LEVEL MSc (Master's)
19476	Digital printing	W	5	MSc
19473	Application of digital photography in reproduction media	W	4	MSc
19510	History of printing	W	5	MSc
53571	Motion graphics	W	6	MSc
40782	Web design 1	W	6	MSc
19498	Holography	W	5	MSc
19455	Design and environment	S	5	MSc
19461	Environmental management systems	S	5	MSc
96536	Color in digital environment	S	3	MSc
19499	Digital multimedia 2	S	5	MSc
19502	Optoelectronics 2	S	6	MSc

For other courses listed in the educational plan, lectures in English in accordance with the subject teacher, can be conducted in the form of consultations.

STUDY COURSES IN ENGLISH	SEMESTER Winter / Summer	ECTS	STUDY LEVEL BSc / MSc
Course title: Reproduction photography 1	winter	4	BSc
Lecturer: Lidija Mandić			
<p>Course objectives:</p> <p>Identifying and understanding the workflow of reproduction process, as well as recognition of the role of prepress.</p> <ul style="list-style-type: none"> • Knowledge of the principles of reproduction. • Acquiring knowledge about the factors that affect the quality of reproduction. • Understanding of measuring devices for quality control of reproduction. 			
<p>Course scope: Overview of the workflow of reproduction process with emphasis on the prepress stage. Digitization. Input devices - a scanner, a digital camera. Factors that influence the quality of inputs (resolution, bit depth, range of tones, color space, file format ...). Differences in the preparation depending on the output . Factors affecting the quality of reproduction in certain phases of the reproduction process. The principle of separations. Screening systems, amplitude and frequency modulation, hybrid screening. Problem moiré's. Defining parameters such as: gray balance, coverage of dye, accepting dyes (trapping), dot gain (dot gain). Methods of achromatic replacement - UCR, GCR, UCA and their application.</p>			
<p>Forms of teaching : lectures and laboratory (e.g. tutorial class)</p>			
<p>Course literature:</p> <p>H. Kipphan et al., <i>Handbook of Print Media</i>, Springer, Berlin, 2001.</p> <p>R. S. Berns, <i>Billmeyer and Saltzman's Principles of Color Technology</i> - 3rd ed., John Wiley & Sons, New York, 2000.</p>			

STUDY COURSES IN ENGLISH	SEMESTER	ECTS	STUDY LEVEL
	Winter / Summer		BSc / MSc
Course title: Physics 1	W	5	Bsc
Lecturer: doc. dr. sc. Damir Modrić			
<p>Course objectives:</p> <p>The aim of the course is to acquire basic and specialized knowledge in the field of physics in graphic technology. Physics 1 is a course designed primarily to satisfy the Faculty of Graphic Arts admissions requirements.</p>			
<p>Course scope:</p> <p>Kinematics: Strategies for solving problems, units, vector algebra, components of vectors, 1-D and 2-D (including projectile motion) kinematics, circular motion.</p> <p>Force, Energy, Momentum: Newton's laws (static equilibrium (first law), dynamics of single particle (2nd law), systems of two or more bodies (3rd law)), Newton's laws of motion (friction), work, kinetic and potential energy, systems of particles, linear momentum (center of mass, Impulse and momentum, Conservation of linear momentum, collisions) conservation of energy, collisions.</p> <p>Rotations: Angular momentum, conservation of angular momentum, torque, rotational kinematics, moment of inertia, statics.</p> <p>Properties of Materials: Solids</p> <p>Properties of Materials: Fluids, Conservation of Flow, Buoyancy, Static and dynamic pressure in fluids. Hydraulic pressure, hydrostatic pressure and buoyancy. The force of surface tension. Cohesion and adhesion forces. Philic and phobic surfaces. Contact angle of different fluids and substrates. Wettability, non-wettability and contact angle, Surface tension as a line force and interfacial energy. Adsorption of dyes on the printing surface.</p> <p>Fluid dynamics: Ideal fluids; continuity equation and Bernoulli's equation. Real liquids; laminar motion. Force of viscosity. Flow of fluid through the pipe; Poisseuille law. The viscosity of liquids and printing inks.</p> <p>Energy Transformations, Heat, Heat sensors, Temperature and heat transfer (conduction, convection, radiation).</p> <p>Thermal physics and kinetic theory: Phases of Matter, Gas Laws, Specific Heat Capacity, Specific Latent Heat, The internal energy and temperature. The transitions between aggregate states.</p> <p>Relative humidity: Humidity; water vapor in the air. The absolute, maximum absolute and relative humidity. The relative humidity and the printing surfaces.</p>			
<p>Forms of teaching : (e.g. tutorial class) Lectures, seminars, laboratory practices</p>			
<p>Course literature: any book of physics (university level) in English</p>			

STUDY COURSES IN ENGLISH	SEMESTER Winter / Summer	ECTS	STUDY LEVEL BSc / MSc
Course title: Multimedia communications 1	W	5	BSc
Lecturer: doc. dr. sc. Tajana Koren			
<p>Course objectives:</p> <p>Distinguish and compare the HTML elements. Applying CSS styles student will be able to define the layout and positioning of elements. Classify multimedia content on the web. Using multimedia content such as images, video and audio content on web. Linking and targeting web pages and creating basic navigation. Manipulating HTML elements using transition, transformation and animation.</p>			
<p>Course scope:</p> <p>Web design is based on HTML and CSS technology. HTML and CSS nowadays support all multimedia elements (text, images, audio, video, animation and interactivity). In this course students will learn different HTML elements from the basic web page structure to 2D and 3D transformations and animations using CSS. HTML and HTML5 elements will be compared as well as CSS and CSS3. Students will learn how to manipulate with text, box objects, lists and forms, how to style them. How to import or embed different multimedia content such as images, video and audio files. Linking and targeting web pages will be introduced. Students will learn about absolute and relative positioning of different HTML elements. CSS transitions, transformations and animations will be explained through interesting examples.</p>			
<p>Forms of teaching : Tutorial class (e.g. tutorial class)</p>			
<p>Course literature:</p> <p>http://www.w3schools.com/</p> <p>http://www.w3.org/</p>			

STUDY COURSES IN ENGLISH	SEMESTER	ECTS	STUDY LEVEL
	Winter / Summer		BSc / MSc
Course title: Printing forms	W	5	BSc
Lecturer: Sanja Mahović Poljaček			
<p>Course objectives: understanding the prepress workflow in the commercial printing reproduction; understanding the digital data assembly; identifying the properties and significance of printing forms for different reproduction processes; implementation of interdisciplinary processes into creative works for commercial printing; defining the historic and contemporary context of printing form making processes, quality control in printing plate workflow.</p>			
<p>Course scope: Study course in Printing forms includes the structure of the workflow process in the graphic prepress media reproduction. It covers the digital data assembly of a printed document, imposition and output devices in prepress. It emphasizes the printing form as an information reproduction media, as well as a media made of different materials treated with different processes in order to create an imprint. Digital and conventional processes in printing forms workflows are being analysed. Description and functionality of particular types of printing forms, formation of image and non-image surfaces are discussed in this course. It covers the terms related to printing forms for offset printing, gravure printing, screen printing and flexographic printing processes. Course covers the implementation of quality control elements in the printing form workflow as well as methods for quality control of different printing forms.</p>			
<p>Forms of teaching : Tutorial class (e.g. tutorial class)</p>			
<p>Course literature:</p> <p>Adams Richard M., Romano F., Computer to Plate: Automating the Printing Industry, Graphic Arts Technical Foundation, USA, 1996.</p> <p>Cusdin G., Flexography: Principles& Practices. 5th ed. Vol. 1. Foundation of Flexographic Technical Association, Inc: Ronkonkoma, NY, 1999.</p> <p>Kipphan H., Handbook of Print Media, Springer-Verlag Berlin Heidelberg, 2001.</p> <p>Page Crouch J., FlexographyPrimer. 2nd edition, PIA/GATF Press, Pittsburgh, 2005.</p> <p>Pipes, A.: Production for Graphic Designers, Laurence King Publishing, UK , 2009.</p> <p>Seydel M., Computer to Plate: Digital Workflow and Integration into Quality Offset Printing, TAGA Proceedings, Rochester (NY), (1996), 634-348</p>			

STUDY COURSES IN ENGLISH	SEMESTER	ECTS	STUDY LEVEL
	Winter / Summer		BSc / MSc
Course title: Printing inks	W	5	BSc

Lecturer: Assistant Professor **Sonja Jamnicki**, PhD

TEACHING UNITS (topics covered):

1. Components of printing inks
 - Use of pigments and dyes
 - Vehicle components (oils, resins, solvents)
 - Additives and their types, uses and properties
2. Drying mechanisms and ink formulations
 - Absorption drying
 - Oxidation-polymerisation drying
 - Evaporation drying
 - Quickset drying
 - Coldset drying
 - Heatset drying
 - Ultraviolet curing, EB curing
 - Other methods of ink drying and specialty inks
3. Rheology of printing inks (ink tack, ink flow, viscosity, thixotropy)
4. Letterpress inks
5. Lithographic inks
6. Flexographic Inks
7. Gravure Inks
8. Screen Inks
9. Ultraviolet and Electron Beam Curing Systems
10. Ink-jet inks
11. Manufacture of printing inks

FORMS OF TEACHING: Tutorial Class

EXAMINATION: Students are asked to write seminar papers on the course topics during the semester. Students need to pass the written paper examination at the end of the semester (with marks 2, 3, 4 or 5). The final grade is the average of the grades obtained through seminar papers and written examination. The option of an oral exam is also offered to the students pursuing a higher grade.

COURSE LITERATURE:

- Ronald E Todd, *Printing inks : Formulation principles, manufacture and quality control testing procedures*, Pira International, 1994
- C. H. Williams, *The Printer's Ink Handbook*, Mclean Hunter Ltd, Hertfordshire, 1992.
- N. R. Eldred and T. Scarlett, *What the Printer Should Know about Ink*, GATF, Pittsburgh, 1990.
- *The Printing Ink Manual, Fifth Edition*, R. H. Leach, R. J. Pierce (Eds.), Springer, Dordrecht, 2008.

STUDY COURSES IN ENGLISH	SEMESTER	ECTS	STUDY LEVEL
	Winter / Summer		BSc / MSc
Course title: Design of graphic media	S	4	BSc
Lecturer: Prof. dr. sc. Jesenka Pibernik			
Undergraduate studies, 4ECTS			
Lectures: 2 hours a week, Seminar: 1 hour a week			
Course objectives			
Students will be taught to create and design visual message by applying the main graphic design principles, to understand the basic concepts of text and image composition and to use various graphic media as well as computers to express their ideas.			
Course Scope			
Students investigate technical characteristics of various media as well as psychology of the target audience in order to balance creative ideas and technical constrains of a media. For that purpose the discussions are guided to clarify methodological principles of the design process. The strategy of the creative process is compared with the typical engineering methods – the problem understanding is based on deep research and constant analysis of the alternative results. Basic design principles e.g. typography, gestalt, contrast, repetition, layout and grid are used in order to represent visual idea or to create a visual story. Those principles are discusses from various design discourses in order to be applied on various graphic products. Students are taught competences of analysis and critical thinking about their own work and work of other designers. They demonstrate awareness of social context, technical possibilities and ethical norms in copywriting. In the process they are becoming aware of a need for a lifelong learning.			
Course structure			
During the course students are working on seven design assignments on topics discussed during the lectures. At the end of the course they have to finish a final project: brochure design.			
Required literature:			
White J. V., Editing by design, Allworth Press, 2011.			
Martin, B., Universal methods of design : 100 ways to research complex problems, develop innovative ideas, and design effective solutions, Beverly, MA : Rockport Publishers, 2012.			
Cabarga, L., Logo, font & lettering bible, HOW Design Books, F+W Publications, 2004.			
Holtzschue, L., Understanding color : an introduction for designers,3rd ed., Hoboken : Wiley, 2006.			

STUDY COURSES IN ENGLISH	SEMESTER	ECTS	STUDY LEVEL
	Winter / Summer		BSc / MSc
Course title: Bookbinding	summer	5	BSc

Lecturer: Assistant Professor **Suzana Pasanec Preprotić**, PhD

Course objectives:

1. Book shelf classification system
2. Bookbinding types (paperback, hardback, mechanical)
3. Binding block systems (adhesive, thread and wire stitching, comb)
4. Binding units type (individual sheets/leaf, folded sheets)
5. Adhesive binding methods (double-fan and rough spine)
6. Differences between Craft bookbinding and Book publishing
7. Finishing process steps (cutting, folding, gathering, binding block systems, trimming)
8. Technological principle of binding block system
9. Classification and type of folded sheet
10. Basic gathering principles (collating, inserting)
11. Craft binding block variants (side wire stitching, thread-stitching with linen tape)
12. Perfect binding diagram (block spine processing and gluing)
13. Adhesive types application (PVAc, hot-melt, PUR) in bookbinding
14. Perfect binding strength rating (pull test, FOGRA standard)
15. Paper suitability for perfect binding (high grades papers, recycle and wood-contained papers)
16. Book covers in craft bookbinding
17. Bookbinding materials and equipment
18. Creating handmade book (design bindings to suit specific projects)

Course scope:

The course follows finishing processes throughout publishing and craft bookbinding. It studies the bookbinding and binding block system types. It focuses on establishing the characteristics of bookbinding with regard to book shelf system, binding unit, adhesive and paper types. The aim of the course is to find the best solutions within the frame of bookbinding engineering. Practical work focus on specific details including individual handmade book. It allows the students to understand a complex network of binding technology.

Forms of teaching :

Students are asked to write seminar paper on the course topics during the semester. Also student needs to create handmade book of his choice. The oral speech is also included to the students give explanations about binding design. The final grade (with marks 2, 3, 4, or 5) is the average of the grades obtained through seminar papers and work practice.

Course literature:

- Weston, H., Bookcraft, Technique for Binding, Folding and Decorating to Create Books and More, Quarry Books, London, 2008.
- Kipphan, H., Handbook of printmedia: technologies and production methods, Springer Verlag Heidelberg, New York, 2001.
- Southworth, M., Southwourth, D.: Quality and Productivity in the Graphic Arts: Quality Control in the Bindery-Werner Rebsamen, Graphic Arts Publishing Co, New York, 1989.
- Clark, T., Bookbinding with adhesives, McGRAW-HILL Book Company Europe, England, 1994.

STUDY COURSES IN ENGLISH	SEMESTER Winter / Summer	ECTS	STUDY LEVEL BSc / MSc
Course title: Quality Management in Printing	S	5	MSc
Lecturer: Prof. as. Igor Zjakic			
Course objectives: Students will learn how to improve printing quality. During lectures students will learn methods and systems where it is possible to act on production by colour measuring. Colour measuring is done on control strips and it is possible to calculate some values to improve printing quality. Students will also learn about automated printing systems and new Hi-Fi printing techniques as well.			
Course scope: Students will make seminar according to quality management tasks			
Forms of teaching : Tutorial class			
Course literature: <ol style="list-style-type: none"> <li data-bbox="189 875 1401 909">1. H. Kiphann: <i>Handbook of Print Media</i>, Springer, Germany, 2001, Chapter 2. pp 204.-450. <li data-bbox="189 943 1401 1048">2. E. Kenly, M. Beach: <i>Getting It Printed: How to Work With Printers and Graphic Imaging Services to Assure Quality, Stay on Schedule and Control Costs</i>, F&W Publications, 2004, Chapter 5 & 6. pp. 69.- 137. 			

STUDY COURSES IN ENGLISH	SEMESTER Winter / Summer	ECTS	STUDY LEVEL BSc / MSc
Course title: Visual arts practice 4	S	4	Bsc
Lecturer: doc. dr. art. Vanda Jurković vjurkovi@grf.hr			
Course objectives: The program is aimed at creation of individual concepts. The main theme of Visual arts practice 4 is the sign, as a stylization with an emphasis on its semantic readability. Therefore the topics are: stylization and animation, figuration and abstraction, decorative and functional (ornament and caricature). What should also be processed are letters and media standards and the relation of graphic fonts and images. The tasks are to be solved creatively as visual arts tasks that are part of Graphic design - editing, design and redesign of graphic media.			

STUDY COURSES IN ENGLISH	SEMESTER Winter / Summer	ECTS	STUDY LEVEL BSc / MSc
Course title: Composition	S	4	BSc
Lecturer: doc. dr. sc. Tajana Koren			
Course objectives:			
<p>Course scope:</p> <p>In this course students will learn to program how text will be displayed in different programming languages. Those languages are for different purposes: print media and web. Postscript, HTML5 and CSS3, SVG will be used. Students will learn to manipulate with fonts, text display, filling text or create outlines. In Postscript loops will be used. Basic SVG shapes, gradients and interactivity will be learned. Text animation will be introduced with SVG, HTML5 and CSS3 for web.</p>			
<p>Forms of teaching : Tutorial class (e.g. tutorial class)</p>			
<p>Course literature:</p> <p>V. Žiljak, K. Pap: "Postscript"</p> <p>http://www.w3schools.com/</p> <p>http://www.w3.org/</p>			

STUDY COURSES IN ENGLISH	SEMESTER	ECTS	STUDY LEVEL
	<u>Winter / Summer</u>		BSc / MSc
Course title: Digital Printing		5	MSc
Lecturer: assistant lecturer Majnaric Igor,			
Course objectives:			
<p>Students will intensify the theoretical bases established on Computer to Press and Computer to Print technologies. All relevant NIP printing technologies including their basic work principles will be analyzed in more details. The students will also get acquainted with the construction characteristics of the digital rotary and sheet printing machines which role is decisive in achieving the high quality print. During the course the problems caused by the interaction of the printing substrates, printing inks (toners) and other factors which exist in the working surroundings (in digital printing house) will be identified. In the course the student will create models by means of computers and make the prints in different digital techniques. After that they will compare them applying the different measuring methods for evaluation of the reproduction quality. The evaluation will be done by using the advanced image analysis methods with the standard comparison based on densitometry, colorimetric and spectro-photometric measuring methods.</p>			
Course scope:			
<p>During the course the students will get the fundamental theoretical knowledge on digital printing techniques. The course comprises the digital printing techniques which are technically and economically justified. It is primarily the knowledge on electrographic printing and Inkjet printing.. Because of their complexity, their vital components will be dealt in more details (photoreceptors and printing Inkjet heads). In this way the influence of phases will be analyzed: charging, exposure, developing, transfer, fixing and cleaning of photoconductors. The experimental techniques of the digital printing will be dealt in the course, the printing principles of which have recently been presented. In this connection the printing principles based on; magnetographic printing, ionographic printing photographic printing, thermographic printing, electric coagulation and electrographic printing are thought of. The specificity of the different digital printing techniques, their possibilities and print characteristics as the final result of work will be described. A special attention will be paid to the treatment of direct and indirect techniques and to the rotary and sheet printing. The hybrid printing will also be dealt with, with the comparison of the combination possibilities of digital and classic printing techniques. At the end the further prediction of the digital printing technique development will be given.</p>			
Forms of teaching : 2 0 2			
lecture and exercise (tutorial class max 3 students)			
Course literature:			
<p>H. Kipphan et al., Handbook of Print Media, Springer, Berlin, 2001. G. Goldman, The World of Printers, Piong, OCE Printing Systems, 2004. B. Baumler, C. Senff, Laserdruck, Polygraph Verlag GmbH, Frankfurt am Main, 1988. G. A. Nathmann, Nonimpact Printing, Graphic Arts Technical Fundation, Pittsburgh, 1989.</p>			

F. J. Romano, H. M. Feuton, On Demand Printing, Graphic Arts, Technical Fundation, Pittsburgh,1998.

I. Manarić, Studija indirektne elektrofotografije, Grafički fakultet Zagreb, 2007.

STUDY COURSES IN ENGLISH	SEMESTER	ECTS	STUDY LEVEL
	Winter / Summer		BSc / MSc
Course title: Application of digital photography in reproduction media	winter	4	MSc
Lecturer: Maja Strgar Kurečić			
Course objectives:			
<ul style="list-style-type: none"> • Acquiring knowledge on basic types, parts and operating principles of digital cameras and lenses. • Acquiring knowledge about the technical characteristics of digital cameras related to image quality. • Understand the criteria and standards of technical quality of digital photography and critical judgment of the same. • Ability to interpret and apply the acquired theoretical knowledge in practical work with a digital camera. Proper handling with different models of digital cameras in various lighting conditions. 			
Course scope:			
<p>The course follows the development of digital photography throughout history. It studies the main types of digital cameras and their applicability in different reproduction media. It focuses on establishing the characteristics of digital camera with regard to reproduction quality, resolution, bit depth, sensors (CCD, CMOS, Foveon X3).</p> <p>Other fields of interest:</p> <ul style="list-style-type: none"> - control of tonal range with the help of histograms and curves - techniques for increasing the dynamic range of digital photography - High Dynamic Range photography - establishing methodology for testing the quality of images taken with a digital camera - image processing for certain reproduction media - file formats (TIFF, JPEG, GIF, PDF, Photo CD, PICT, PNG) - new technology developments and new standards - light painting - time lapse photography - photo essay 			
Forms of teaching :			
<ul style="list-style-type: none"> - tutorial class - exercise in studio with other students 			
Course literature:			
<p>M. Langford, E. Bilissi; Langford's Advanced Photography, 7th edition, Focal Press, UK, 2008.</p> <p>M. Freeman, The Digital SLR Handbook; Ilex Press Limited, UK, 2007.</p> <p>M. Freeman; Perfect Exposure, Ilex Press Limited, UK, 2009.</p> <p>B. Fraser & J. Schewe: Real World Camera Raw, Peachpit Press, Berkeley, 2009. Reinhard, Erik; Ward, Greg; Pattanaik, Sumanta; Debevec, Paul; <i>High dynamic range imaging: acquisition, display, and image-based lighting</i>, 2th edition, Amsterdam: Elsevier/Morgan Kaufmann, 2010.</p>			

STUDY COURSES IN ENGLISH	SEMESTER	ECTS	STUDY LEVEL
	Winter / Summer		BSc / MSc
Course title: The history of Printing	w	4	MSc

Lecturer: Branka Lozo

COURSE CONTENT: The history of paper production, spreading from China to Europe during centuries, distinction from velum and papyrus; etymology of the ancient expressions *liber* and *byblos*; First printed book in China in the 7th century, wooden and *china* types, printing in Korea; The theory of possible spread of the knowledge from the Far East to Europe via the Silk way; Johannes Gutenberg, his life and social circumstances; Gutenberg's inventions prior to the printing; inventions related to printing: wooden movable types, metal movable types, new ink formulation, preparation of the press; The Bible, technical aspects: printing substrates: paper and velum; typesetting: 40 and 42 lines; black ink printing, rubrication: printed and written; illustrations and illuminations; binding. Preserved copies and fragments, digitalized velum and paper copies, British Library. The spread of the printing technique: European countries; Croatia; Non-European countries. The relevance of Italian printing houses for the Croatian printing history: Venice, Padua, Rome; Croatian printers in Italy; Croatian authors of the books printed in Italy. Croatian incunabula: types in Glagolitic alphabet, The Missal, the first Croatian printed book, the very first book printed in Glagolitic types, other Croatian incunabula, Glagolitic and Latin; preserved copies; reprints. Croatian printing-houses: Kolin, Senj, Rijeka; Croatian printers in Croatia: Blaž Baromić, Silvestar Bedričić, Gašpar Turčić, Šimun Kožičić Benja. The role of Blaž Baromić: Printing house in Senj; invention of ligatures in typesetting of Glagolitic texts. Printing houses in continental Croatia. Newspaper: development of newspaper, periodical editions: written in Greece and Rome; printed in Germany, England, France, Italy, Netherlands and Switzerland. Newspaper in Croatia: Pavao Ritter Vitezović, Ljudevit Gaj. Invention of offset printing, web offset; other printing techniques; digital printing: Benjamin Landa; the use of printing techniques in other domains: bio-printing; 3D printing; RFID: printing of conductive antennas. Printing without printing: e-books; e-newspaper; e-inks; e-paper.

COURSE UNITS: Each unit takes one to two weeks

1. The history of paper production
2. First printed books
3. Johannes Gutenberg – his life
4. Gutenberg's inventions
5. The Bible
6. Spread of the printing skill
7. Croatian incunabula
8. Newspaper
9. Development of other printing techniques
10. Digital printing
11. E-paper; e-books; e-newspaper

STUDY VISITS:

1. National and University Library: Manuscripts and Old Books Collection
2. National and University Library: Print Collection, Recovery department
3. Croatian State Archives
4. Ethnographic Museum
5. Museum of Arts and Crafts
6. Croatian Academy of Sciences and Arts: Old and Rare Books Collection

COURSE OBJECTIVES AND LEARNING OUTCOMES: After completing the course the students should be aware of the relevance of the national heritage in the context of the global history of printing and related inventions; the course should also reveal the diversity of the present-day options in the printing-related activities.

FORMS OF TEACHING: Lectures and seminars: The course is organized in 2 teaching hours per week and 2 hours of seminars every other week; the seminars include study visits to institutions of interest.

EXAMINATION: The written paper examination is due after every three or four teaching units; The students need to receive the grade pass (marks 2, 3, 4 or 5) in each of the three written papers during the semester; The final grade is the average of the three grades; The option of oral exam is offered to the students pursuing a higher grade.

TEACHING ASSESSMENT: The students will be asked to assess the quality of the course in the form of an anonymous survey at the end of the semester.

STUDY COURSES IN ENGLISH	SEMESTER	ECTS	STUDY LEVEL
	Winter / Summer		BSc / MSc
Course title: Motion Graphics	W	6	MSc

Lecturer: prof. Jesenka Pibernik, Phd

Course objectives:

By the end of the course students will have:

- Knowledge and understanding of the key aspects and concepts of motion design graphic design and technology e.g. combination of visual and auditory stimulus
- The ability to apply gained knowledge and understanding to identify, formulate and solve motion design communication problems;
- The ability to select and apply relevant analytic, storytelling and modelling methods (storyboards, thumbnail sketches, stop motion techniques) .
- The ability to apply their knowledge and understanding to develop and realize a motion graphic design to meet the need of defined public;
- An understanding of design methodologies in motion graphics and kinetic typography and the ability to use appropriate technology tools.
- They develop an understanding of applied techniques and methods for animations, interpolations, transitions, sequences design, special effects as well as an understanding of their limitations;

Course scope:

Beside the potential for transferring larger amounts of information, motion graphics offers new and engaging experience- narration to an audience. Through a linear sequence of teaching units students explore narrative structure, conceptual frame, realization and contextualization supported by media applications. The aim of the course is to find innovative solutions within the frame of traditional forms of motion graphics, such as variations in graphic design, film, video and photography (opening titles in films, TV intersections, commercials, music videos, dynamic info-graphics and webpages), typified by multi-layered animation, color (or lack thereof), rotating perspective, metamorphosis and motion typography. Practical work allows students to explore the interdependence of design, technology and interactivity in the forming and production of motion graphics.

Forms of teaching :

(e.g. **tutorial class**)

A collaboration approach is assumed, stemming from the idea that learning is a social and dialogue process – assignments are therefore performed in the form of individual and group work. Using the interpretative method of media analysis, students explore genre, textual and technological characteristics of motion graphics:

performing a series of practical exercises, and using analogue and digital creation techniques, students create projects for different media forms of motion graphics. Examples are given for each project.

Using different methods of creation, students shape design in a creative manner and master typical research methods, from an idea through alternatives to the final solution.

By reviewing examples and having group discussions, students raise their awareness of the audience and of the trends that shape content.

By creating mental maps and storyboards, students generate variants of time-space relationships in narrative form. Students learn about professional work through lectures by visiting professors and other professionals. Teaching is done in a mixed manner (e-learning)

Course literature:

M. Woolman, Motion Design: Moving Graphics for Television, Music, Video, Cinema and Digital Interfaces, RotoVision, Hove, 2004

D. Greene, How Did They Do That? Motion Graphics, Gloucester, MA: Rockport, 2003

D. Krasner: Motion Graphic Design: Applied History and Aesthetics, Elsevier, 2008

STUDY COURSES IN ENGLISH	SEMESTER Winter / Summer	ECTS	STUDY LEVEL BSc / MSc
Course title: Holography	w	5	Msc
Lecturer: doc. dr. sc. Damir Modrić			
<p>Course objectives:</p> <p>The aim of the course is to acquire basic and professional knowledge, skills and abilities of implementation and the process of production of holograms in graphic technology. Holography is a course designed primarily to satisfy the Faculty of Graphic Arts admissions requirements.</p>			
<p>Course scope:</p> <p>Sources of holography. Waves and phase. The concept phase of the wave. The definition phase. Local inclination and divergence of complex wave front. Interference of two light beams. The mathematical description of the interference. The optical grating. The diffraction efficiency of the grating. Holography. The object beam. The reference beam. Interference pattern. Materials in holography. The reconstruction of the hologram. The formation of the virtual and real images. The dynamic range. Noise. Multiple scenes. Reflection and transmission holograms. Absorption and phase holograms. Planar and volume holograms. Optical components for recording holograms. Lasers. Recording and transmission of reflection holograms. Rainbow holograms. Preparing for generating the printing matrices (shim). Electroforming. Application, process and control. Finishing. Stamping holograms. Composition of holographic hot stamp foil. Machines for printing. Computer-generated holograms. Holograms as protection elements in press.</p>			
<p>Forms of teaching : (e.g. tutorial class)</p> <p>Lectures, seminars, laboratory practices</p>			
<p>Course literature:</p> <p>any book of holography (university level) in English</p>			

STUDY COURSES IN ENGLISH	SEMESTER Winter / Summer	ECTS	STUDY LEVEL BSc / MSc
Course title: Design and Environment	s	5	MSc
<p>Lecturer: dr.sc. Ivana Bolanča Mirković, Assistant Professor (ibolanca@grf.hr)</p> <p>Seminars: Marina Vukoje, Assistant (marina.vukoje@grf.hr)</p>			
<p>Summary:</p> <p>Classes are conducted in the form of lectures, seminars and auditory exercises in consultation with the professor and assistant. Examination includes continuous monitoring of students activities during the semester, the results achieved by monitoring of seminars quality, activities, projects and level of knowledge on exams.</p> <p>Lectures include topics related to environmental protection and sustainable development, environmental aspects of graphic engineering, eco-design, LCA:</p> <ul style="list-style-type: none"> • Environmental problems of the modern world and urban agglomerations; • Influence of technological development to the environment; • Introduction to eco-design and sustainable development; • Design of environmental friendly products; • The relationship between eco-design and social responsibility; • Introduction to Life Cycle Assessment (LCA) as a holistic assessment of the impact of production and graphic products on the environment; • Overview of LCA factors; • LCA materials for digital and conventional techniques; • Design in relation to the production of materials and nanotechnology; • Electronics, information and communications technology in terms of design and innovation, economic laws, social cohesion and environmental responsibility; • Implementation of environmentally friendly factors in the process of product design; • Using the principles of eco-design. 			

STUDY COURSES IN ENGLISH	SEMESTER	ECTS	STUDY LEVEL
	Winter / Summer		BSc / MSc
Course title: Environmental Management Systems	s	5	MSc
<p>Lecturer: dr.sc. Ivana Bolanča Mirković, Assistant Professor (ibolanca@grf.hr)</p> <p>Seminars: Marina Vukoje, Assistant (marina.vukoje@grf.hr)</p>			
<p>Summary:</p> <p>Classes are conducted in the form of lectures, seminars and auditory exercises in consultation with the professor and assistant. Examination includes continuous monitoring of students activities during the semester, the results achieved by monitoring of seminars quality, activities, projects and level of knowledge on exams.</p> <p>Lectures include topics related to Environmental Management Systems; Environmental policy – tasks; principles of organization, determination the status of the environmental aspects of the company.</p> <p>Implementation of programs that contribute to increasing the quality of the environment within the company.</p> <ul style="list-style-type: none"> • Introducing to Environmental Management Systems (EMS); • Aims and objectives of Environmental Management Systems; • System Requirements and organizations; • Documentation of EMS and system control; • The model of EMS, planning, implementation and operation; • Description of the production processes; environmental protection in technological process; • Recognizing the environmental impact-domain emission of pollutants, wastewater, noise machines, energy and materials consumption; • Setting ISO 14001 (scope, references, definitions, requirements) standard as a fundamental evaluation model of EMS; • Application of LCA in industry and assessment methodology; • Definition and classification of Environmental Indicators; • Ecological balance – optimization of environmental suitability and products. 			

STUDY COURSES IN ENGLISH	SEMESTER Winter / Summer	ECTS	STUDY LEVEL BSc / MSc
Course title: Digital multimedia 2	S	6	MSc
Lecturer: doc. dr. sc. Tajana Koren			
Course objectives:			
<p>Course scope:</p> <p>In this course students will learn the common terms in digital video. Formats of digital video and relationship among frame size, frame aspect ratio and pixel aspect ratio as well as compression methods will be explained. Students will capture their own video in the studio with green screen background. Video will be edited in Adobe Premiere. Editing includes adding audio files and text. Post-production will be obtained in Adobe After Effects.</p>			
<p>Forms of teaching : Tutorial class (e.g. tutorial class)</p>			
Course literature:			

STUDY COURSES IN ENGLISH	SEMESTER Winter / Summer	ECTS	STUDY LEVEL BSc / MSc
Course title: Optoelectronics 2	summer	6	MSc
Lecturer: Lidija Mandić			
Course objectives: to know new technologies, explain the working principle of the device, evaluate the devices of the same type according to the characteristics			
Course scope: different screen technology and working principle, working principle and application of RFID and NFC, motion sensors and their comparison, printed electronics			
Forms of teaching :tutorial class, working on computers (e.g. tutorial class)			
Course literature: Kasap, Optoelectronics and photonics , 2001 Saleh, Teich, Fundamentals of photonics, Wiley, 2007.			