

UNIVERSITY NORTH, UNIVERSITY CENTRE VARAŽDIN, DEPARTMENT OF MULTIMEDIA

Undergraduate study program in Multimedia, design and application (Bachelor program)

List of courses that can be delivered in English with learning outcomes

IT and Applications

1. Master the basics of working with a computer in file management. Use Internet technologies for searching. Send and receive emails. Understand netiquette.
2. Create text documents using word processing software. Apply different types of formatting to the document. Create a table of contents and other lists within the document. Generate mail merges.
3. Master the use of spreadsheet software. Apply basic cell formatting, create simple aggregate functions, and use conditional formatting.
4. Master the basics of presentation software. Apply different templates, design individual slides, and define animations for elements and transitions between slides.
5. Understand the basics of computer operation and operating systems. Know the fundamentals of digital data representation and measurement units. Understand the operation of memory and disk subsystems.

Mathematics I

1. Describe the sets of natural, integer, rational, real, and complex numbers, define arithmetic operations, and perform calculations within these sets.
2. List and describe operations with vectors; calculate and apply the scalar, vector, and mixed products in specific examples.
3. Explain and apply basic concepts of a real function of one real variable, analyze elementary functions, and sketch their graphs.
4. Define sequences and calculate the limits of sequences and functions.
5. Use the rules of differentiation to compute derivatives of explicitly and implicitly defined functions.
6. Apply differential calculus to determine limits and to find the equations of tangents and normals.
7. Apply differential calculus in the analysis of function graphs.

Social Philosophy

1. Define the concepts of philosophy, sociology, and social philosophy.
2. Explain and interpret the main topics of the course "Social Philosophy."
3. Describe different approaches to society.
4. Compare the concepts of politics, law, and morality.
5. Differentiate and define the concepts of ethics-morality, culture-civilization, and people-nation.

Foreign Language I - English

1. Recognize and describe the fundamental grammatical categories of the English language and, based on this knowledge, independently produce grammatically correct expressions in English in varied foreign-language contexts.
2. Independently search for and identify the appropriate verb forms, noun forms, and other word types in English texts, adapt them to the required register, and correctly use them in sentences.
3. Recognize cultural characteristics of English-speaking countries.
4. Identify, extract, and understand the meaning of both familiar and unfamiliar words in specialized texts.
5. Compile a list of unfamiliar words from specialized texts along with their basic characteristics for use in their own foreign-language expression.
6. Outline the content of a text based on global or detailed reading in English and present it in both oral and written form.

Mathematics II

1. Define the antiderivative and the indefinite integral, and determine antiderivatives using the basic properties of integration.
2. Apply basic integration methods to different types of functions.
3. Calculate the area of a region bounded by curves and the volume of a solid of revolution.
4. Explain the concepts of matrices and determinants, list their properties, and use them in matrix and determinant calculations.
5. Differentiate methods for solving systems of linear equations and solve systems of linear equations.
6. Examine the truth of a compound proposition and minimize a Boolean function.
7. Apply percentage calculations in more complex real-world problems.

Design of Print Media

1. Differentiate between paper formats and types.
2. Create a recording (description) of a graphic product.
3. Distinguish printing techniques according to the type of graphic product.
4. Describe the production process of a graphic product – the book.
5. Map the printing production process depending on: the type of graphic product, the format of the graphic product, the complexity of the graphic product, the available working resources.
6. Arrange pages for specific printing forms, determine the printing sequence in various printing formats, define binding lines, pre- and post-press trimming, folding, front and side marks, feeder angles, and feeder angles for bookbinding.
7. Calculate margins, assemble the print sheet, compute required quantities of materials, paper, and ink, and determine material consumption standards.

Printing Techniques

1. Define the basic concepts of printing.
2. Identify and describe individual printing techniques
3. Explain the production capabilities of different printing techniques.
4. Apply criteria for determining print quality.
5. Name and describe printing substrates and inks.
6. Identify and describe offset printing processes

Programming I

1. Define the concept of an algorithm, list ways to represent it computationally, and illustrate it with simple examples.
2. List and explain the phases of programming, and apply them in the practical development of programs using a C/C++ development environment.
3. Understand the basics of C/C++ syntax, including its data types and operators.
4. Differentiate basic programming structures and the basic data structure (array), and implement them in C/C++.
5. Define the role of functions, their definition, and usage.
6. Write and test programs in C/C++ for simple computational problems.

Color Psychology

1. Classify the basic concepts of color perception and justify the marketing elements of color usage according to specific requirements.
2. Propose projects related to increasing the sales of graphic products through the impact of colors on people and understand the issues related to the psychological effects of colors.
3. Assess the psychological effects of colors as defined by the market and find solutions to enhance the achievement of desired effects using colors.

Foreign Language II - English

1. Recognize and describe the fundamental grammatical categories of the English language and independently produce grammatically correct expressions in varied foreign-language contexts.
2. Independently search for and identify the appropriate verb forms, noun forms, and other word types in English texts, adapt them to the required register, and correctly use them in sentences.
3. Recognize cultural characteristics of English-speaking countries.
4. Identify, extract, and understand the meaning of both familiar and unfamiliar words in specialized texts.
5. Compile a list of unfamiliar words from specialized texts with their basic features for use in personal foreign-language expression.
6. Outline the content of a text based on global or detailed reading in English and present it in both oral and written form.

Programming II

1. Understand the basic programming tools for developing web applications and the fundamentals of version control tools.
2. Understand regular expressions, including basic primitives for matching individual characters and repetition. Be able to interpret and modify given regular expressions, and independently write simple regular expressions for pattern matching.
3. Understand the basic syntax of XML and the role of schemas in defining XML structures, as well as the purpose of basic types of XML files.
4. Apply HTML syntax to create and format static web pages. Use CSS to separate styling elements into external files.
5. Understand the basics of JavaScript syntax, including declarations, supported types, basic control structures, and functions.
6. Understand DOM structures and functions. Use JavaScript to add dynamic elements to HTML pages. Understand the basics of JSON.

Introduction to Digital Video Technology in Electronic Media

1. Define and explain: the characteristics of human vision relevant to the technical specifications of video systems, photometric and radiometric (energy) quantities, and the basic laws, elements, and parameters of video system colorimetry.
2. List, sketch, compare, and explain: the parameters of analog PAL and NTSC television systems, the interfaces of component and composite video signals, the procedures and parameters for digitizing video signals, and the image parameters and interfaces of digital SD and HD video signals.
3. List, explain, and describe: the basic video signal compression methods according to MPEG and DV standards, the digital video signal encoding processes according to MPEG standards, and the MPEG-2 video data streams for transmission and storage of video material.
4. List and illustrate: the media and associated standards for storing digital video signals, and the systems for broadcasting and distributing digital video signals.
5. Explain, identify according to a task, and interpret: terminology, interface elements, basic tools, and procedures for editing video material in a nonlinear editing program, and demonstrate these skills by creating a video project.

Visual Culture

1. Describe a photograph and an image, and define its artistic achievement.
2. Differentiate between vector and raster (pixel) graphics.
3. Solve problems using lateral thinking.
4. Define the main groups of visual communication.
5. Analyze graffiti and describe the meaning of its visual form.
6. Compare the effects of visual media within the public communication space.
7. Critically analyze the role of visual culture and visual communications in contemporary society.
8. Analyze the results of media and related social research, particularly in film and theater studies.

Information Management

1. Understand the basics of information theory. Distinguish between continuous and discrete forms of representation and understand the fundamentals of digital information encoding. Be familiar with different measures for evaluating information, network effects, and apply them to real-world examples. Be able to connect to various data sources, design data entry forms, and generate basic reports from the data.
2. Understand the basics of information systems (IS). Be familiar with the different components of an IS. Understand the fundamentals of implementing information systems in practice. Be able to use major examples of complex information systems in business and apply them to real-world cases.
3. Understand the basics of electronic business (e-business). Explain different variants of e-business depending on the participants. Understand and apply the basics of secure communication.

Audio Engineering I

1. Define the fundamental concepts related to vibrations, periodic phenomena, and waves, with an emphasis on applications in the audio field.
2. Explain the basic parameters of periodic phenomena (period, frequency, elongation, amplitude), the representation of signal levels on a decibel scale, and frequency intervals in octaves.
3. Provide a general explanation of the conversion of energy and signals from the acoustic domain to electrical signals, and subsequently to digital recordings.
4. Identify and describe the basic components of a digital audio workstation (DAW), connect and configure them, and apply them for basic audio tasks: playback of digital recordings and recording of external (analog) sources.
5. Master basic skills in using a selected professional desktop audio program for digital recording and audio signal processing, create and edit audio recordings from external sound sources by applying the knowledge from points 1 and 2.

Information Presentation

1. Differentiate between a visually effective presentation and a poor one.
2. Create an attractive multimedia presentation.
3. Analyze and successfully eliminate unnecessary data using brainstorming techniques.
4. Make progress in verbal communication with a targeted audience.
5. Define the target audience for whom the presentation is intended.
6. Analyze the information collected during the preparation of the presentation.
7. Present and justify a thesis to the target audience that forms the foundation of the presentation.

CTP Systems

1. Define the concept of CtP (Computer-to-Plate) technology.
2. Identify and describe specific types of CtP technology.
3. Explain the significance of NIP (Non-Impact Printing) technology and digital printing.
4. Analyze and compare traditional and digital printing techniques.
5. Identify the types of NIP technologies.
6. Recognize and describe the characteristics of NIP technologies.
7. Recognize and describe the characteristics of CtF (Computer-to-Film) and CtP devices.

Graphic Design

1. Students will be able to explain the basic concepts related to design and the role of a designer.
2. Students will be able to differentiate between vector, pixel, and raster graphics.
3. Students will be able to analyze and compare design tasks.
4. Students will be able to explain the process of creating verbal and visual identity.
5. Students will be able to plan and manage each design task as a communication process.
6. **Students will be able to select and evaluate the best design solutions.**

3D Modelling

1. Identify and recognize functions and algorithms for 3D modeling.
2. Explain and identify algorithms, methods, and techniques focused on planning, creating, and manipulating 3D models.
3. Understand the technology and possibilities for obtaining 3D models.
4. Apply and demonstrate knowledge in creating a 3D project task (image; 2D model; 3D model, interactive controls, and environment).
5. Organize and prepare a 3D model for further processing (games, animation, 3D engraving, 3D printing).
6. Devise ways to extend work to other 3D development platforms (other 3D software).
7. Assess and evaluate the quality of 3D models, and select the working method according to the complexity of the project task.

Audio Engineering II

1. Define fundamental electroacoustic concepts, distinguish the properties of alternating (AC) signals from direct (DC) signals, schematically describe the interconnection of electroacoustic devices as sources and loads, and indicate the desirable relationships of their impedances in an audio chain.
2. Describe peak and effective (RMS) levels of alternating signals, their ratios for typical test signals, and differences in dB, and relate this to reading signal levels on peak and VU meters in practice.
3. Explain the operating principles of basic electroacoustic devices: amplifiers, nonlinear processors, and transducers. Sketch and analyze the frequency response of a system (peak and cutoff frequency, Q factor).
4. With improved understanding, connect and use electroacoustic devices, describe their basic properties, and utilize audio software for recording, playback, and analysis of audio material.
5. Listen to audio recordings more critically, draw better conclusions about the quality of individual parts of the audio chain, and identify interference and resonance problems in acoustic spaces.

Programming III

1. Understand the role and basic properties of JavaScript libraries for interacting with and enhancing web pages. Knowledge of HTML5 and CSS3.
2. Understand the basics of AJAX technologies and JSON.
3. Be able to use jQuery libraries for web applications and other purposes. Knowledge of basic syntax and working with DOM elements of a page.
4. Understand, install, and use the LAMP stack as a platform for web applications. Knowledge of other application stacks and their basic features.
5. Knowledge of the PHP programming language. Understanding basic syntax, application for web development, and database access.
6. Knowledge of additional PHP libraries for various applications. Familiarity with libraries for forms, documentation generation, and testing.

Post-production Techniques and Workflows

1. Define and explain the characteristics of the recorded (observed) scene: the spatial distribution of luminance in the image, geometric structures in the image, speed and directions of movement of characters in the image, colors of characters and details in the image, and apparent positions of characters in the image along the viewing direction; as well as the characteristics of the image obtained from recording the scene: luminance gradation, structures (details) in the image, kinematic content, chromatic content, and stereoscopic content in the image.
2. Present and compare the basic technical parameters of images according to standards for the following systems: analog PAL and NTSC television systems, digital standard-definition (SD) television systems, digital high-definition (HD) television systems, digital ultra-high-definition (UHD-1, UHD-2) systems, digital cinema systems (2k, 4k, and 8k), and the basic technical parameters of images on film stock (35mm).
3. Present and compare the technical characteristics of video recordings obtained with these systems, file formats, and media for storing video material.
4. Define the conditions for observing electronic images (projected and on-screen) and explain their impact on changing the appearance of image content; determine the necessary (qualitative and quantitative) adjustments of image parameters (picture rendering) to achieve optimal visual reproduction.
5. Demonstrate in a nonlinear video editing system: project and media file management (description, labeling, organizing, and searching); the use of tools for image editing, audio, visual effects, color correction, and synchronization of multiple video materials; and the export of system settings, folders with bins, bins, sequences, and final video materials.

Web design

1. Students will be able to define the process of creating a website.
2. Students will be able to explain the basic concepts related to web design and the role of the designer.
3. Students will be able to apply graphic and programming tools necessary for creating a website.
4. Students will be able to analyze and compare HTML/CSS web design solutions.
5. Students will be able to plan and manage each web design task as a communication process.
6. Students will be able to select and evaluate the best web design solutions.

Computer Animation

1. Define and recognize methods used in animating 3D modeled computer objects.
2. Identify and explain the technology for rigging and creating motion.
3. Apply abstract thinking about computer joints and use knowledge of the bone system and hierarchy.
4. Analyze the necessary steps for creating 3D project tasks (3D model, computer animation of motion, interactive controls, and environment).
5. Design, organize, and build a virtual space for computer animation involving static and dynamic objects (video, computer games).
6. Compare and explain output formats that store digital animation and motion.
7. Evaluate personal knowledge and skills related to rigging and computer animation.
8. Independently manage a project task and understand all its phases.