VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

BASIC COURSE INFORMATION WITHIN THE STUDY PROGRAMME

PROFESSIONAL GRADUATE STUDY PROGRAMME

INFORMATION SYSTEMS

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: Analysis and Design of Information Systems

Course Code:
IS310

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
3	2 + 2 + 0	60	5

Course objective:
To acquire knowledge and skills related to the development of an organization's information system (IS). To understand and apply methods for assessing IS complexity and organizational readiness for IS development, decomposition of the organization and its business processes. To gain knowledge and apply methods for business process analysis, matrix representation, and IS architecture optimization. To analyze process affinities and group them accordingly. To apply software product modeling methods and data modeling techniques. To develop project documentation for IS development and use CASE (Computer-Aided Software Engineering) tools to support the analysis and design of information systems.

Course content:
Identifying opportunities for IS-supported business improvement. Business process management. Business requirements analysis (business process modeling and information requirements). Structuring business opportunities into projects. Project specification and prioritization. Feasibility analysis and readiness assessment for IS development. System requirements analysis and specification. Various approaches to IS implementation for business support. Specification of alternative implementation solutions for specific ISs. Analysis of organizational structure and IS structure. Methods for comparing IS implementation approaches. Organizational implementation of a new information system. Various IS analysis and design methods. CASE tools for IS development.

General and specific competencies (knowledge and skills):
Understanding business needs that can be addressed through information systems. Initiating, specifying, and prioritizing information systems and assessing their feasibility. Defining problems or opportunities for launching projects. Applying methodologies for analyzing business situations (problems or opportunities), modeling using formal techniques, and specifying system requirements for business-aligned implementation. Identifying business requirements and translating them into technical specifications. Considering the use of alternative off-the-shelf systems (such as ERP, CRM, SCM, etc.).
Learning outcomes:
Upon successful completion of this course, students will be able to:

1. Design a business model and prepare documentation for IS development
2. Assess organizational readiness for IS development
3. Compare various methods of system analysis and design
4. Analyze off-the-shelf solutions in comparison with custom-developed systems
5. Define development and implementation steps for a new IS

Required literature:

1. Avison, D., & Fitzgerald, G. (2006). Information Systems Development.
2. Valacich, J., George, J., & Hoffer, J. (2010). Modern Systems Analysis and Design (6th Edition). Prentice Hall. ISBN: 013608821X

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: Information Systems Architectures

Course Code:
IS225

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
2	2 + 1 + 1	60	5

Course objectives:
To acquire knowledge and skills related to the design, selection, implementation, and maintenance of information system architectures within enterprises, with an emphasis on processes and applications (business and application layers).

Course content:
Frameworks for enterprise information systems architecture. Languages for modeling information system architectures. The ArchiMate language for modeling information system architectures. The Zachman framework for describing IS architecture. The TOGAF framework applied to the representation of business and information system architectures. Resource-oriented architecture. Data models in business. Architecture and integrity of data and information. UML diagrams in the development of software architecture for information systems. Information system architecture content management. Information system audits and compliance with regulations. System administration.

General and specific competencies (knowledge and skills):
Understanding various frameworks for analyzing information system architectures and making informed decisions. Evaluating plans for the integration of new technologies in business. Understanding key concepts of data and information architecture and evaluating existing architecture designs. Understanding the advantages and disadvantages of service-oriented architectures. Understanding the role of information system architecture auditing and regulatory compliance.

Learning outcomes:
Upon successful completion of this course, students will be able to:
1. Assess the justification for implementing an information system architecture based on models and resources.
2. Design an information system architecture using the ArchiMate modeling language.
3. Apply the Zachman framework for describing information system architecture.
4. Describe the TOGAF framework in the development of information system architectures.
5. Create essential UML diagrams for the software architecture of information systems.
6. Evaluate information system architectures.

Required literature:

1. Svyatoslav Kotusev: The Practice of Enterprise Architecture: A Modern Approach to Business and IT Alignment, SK Publishing, 2nd edition (January 15, 2021), ISBN: 978-064508252X
2. Gerben Wierda: Mastering Archimate Edition 3.1: A Serious Introduction to the Archimate® Enterprise Architecture Modelling Language, R&A Publishing, April 2021, ISBN: 9083143415

Course title: Authorization and Authentication

Course Code:
IS130

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
1	2 + 1 + 0	45	5

Course objectives:
Students will acquire knowledge in the field of user identification and authentication in information systems.

Course content:
Introduction. Fundamentals of information system security. The CIA model. Vulnerabilities, threats, and attacks. Types and models of authorization: login and password, fingerprint, iris scan, etc. Authorization protocols. Authorization for access to network resources. RADIUS server. Centralized key distribution. Authentication. AAA on network devices. AAA integration.

General and specific competencies (knowledge and skills):
Students will gain knowledge of the fundamentals of ICT security, as well as the knowledge and skills required for planning, creating, and maintaining user authorization and authentication systems. They will develop practical skills in server administration and in the use of AAA services.

Learning outcomes:
Upon successful completion of this course, students will be able to:
1. Identify security risks in the design of information systems.
2. Critically evaluate user authorization models.
3. Assess the suitability of authorization protocols within an information system.
4. Implement a user authorization and authentication system.
5. Critically evaluate various services within the security infrastructure of an information system.

Required literature:

1. Jordan Genung, Steven Bennett – CC Certified in Cybersecurity All-in-One Exam Guide, McGraw Hill, 2023.
2. Cisco Networking Academy website: www.netacad.com

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: Databases in the Internet Environment

Course Code:
IS120

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
1	2 + 2 + 0	60	5

Course objectives:
The course aims to familiarize students with methods for developing databases in an Internet environment and building web applications that provide access to those databases.

Course content:
Internet infrastructure. Server configuration. Data presentation objects. Creating web forms for communication with a database. Communication methods between web clients and web servers (POST, GET). Data validation. Application state management. Application and data security. Fundamentals of web services. Introduction to technologies and protocols used in web service development. Design, development, and deployment of web services. Development of applications using existing web services.

General and specific competencies (knowledge and skills):
Students will acquire knowledge and skills required to design and implement databases in an Internet environment, as well as to develop web services for communication with databases.

Learning outcomes:
Upon successful completion of this course, students will be able to:
1. Develop a web application that accesses a database.
2. Integrate web services into a web application for database access.
3. Design a database model suitable for use in an Internet environment.
4. Create a web service for communication between web applications and other systems.
5. Assess security risks in the use of web applications and data.
6. Coordinate activities within a multidisciplinary team.

Required literature:

1. Robert Nixon – Learning PHP, MySQL & JavaScript: With jQuery, CSS & HTML5, O'Reilly, 2018.
2. Luke Welling – PHP and MySQL Web Development (Developer's Library), 5th Edition, Addison-Wesley, 2017.

Course title: Diploma Thesis

Course Code:
IS242

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
4	1 + 0 + 4	75	5

Course objectives:
Through the master's thesis, students demonstrate their professional knowledge, independence, and ability to apply acquired competencies to a specific problem or research topic.

Course content:
1. Lecture on the methodology and structure of the master's thesis.
2. Preparation for thesis development.
3. Writing of the master's thesis.
4. Thesis defense.

General and specific competencies (knowledge and skills):
Students will develop the ability to independently define, research, and solve complex professional or applied problems, and to present their findings in a structured academic format.

Learning outcomes:
Upon successful completion of this course, students will be able to:
1. Define a professional or research problem.
2. Design and independently conduct research or solve an applied task/problem.
3. Apply the knowledge and competencies acquired during the study program.
4. Apply appropriate methods for academic and professional writing.
5. Use presentation skills to present the thesis and interpret research results.

Required literature:
1. Regulations on Bachelor's and Master's Theses, University of Applied Sciences Velika Gorica (VVG).
2. Guidelines for Writing Bachelor's and Master's Theses, University of Applied Sciences Velika Gorica (VVG).

VELEUČILIŠTE VELIKA GORICA
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Course title: Distributed Databases

Course Code:
IS140

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
1	2 + 1 + 0	45	5

Course objectives:
To introduce students to the architecture and operational principles of distributed database systems.

Course content:
Definition of distributed database management systems (DDBMS). Classification of DDBMS. Architecture of distributed systems. Data fragmentation and allocation. Chris Date's rules. Distributed query processing and updates. Catalogs. Distributed transactions (concurrency, two-phase commit, timestamps, recovery). Transaction protocols. Data synchronization. Heterogeneous distributed systems. Query decomposition and processing. Distributed query optimization. Concurrency control. Reliability and security of distributed database systems.

General and specific competencies (knowledge and skills):
Students will become familiar with the architecture, protocols, and challenges of distributed database management systems. They will acquire skills in query decomposition and processing within distributed databases.

Learning outcomes:
Upon successful completion of this course, students will be able to:
1. Evaluate the architecture of systems based on distributed databases.
2. Design a system supporting distributed transactions in such databases.
3. Anticipate scenarios of concurrent data access in distributed database environments.
4. Propose solutions to improve the reliability and security of distributed database systems.
5. Compare different distributed database management systems (DDBMS).

Required literature:
1. Saeed K. Rahimi, Frank S. Haug: Distributed Database Management Systems: A Practical Approach, Wiley and Sons Inc. Publication, 2010.

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: Information Systems in Organizations

Course Code:
IS470

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
4	2 + 1 + 1	60	5

Course objectives:
To provide students with knowledge related to information systems within organizations and the integration of information systems and organizational processes into a unified system with a shared database and reporting tools.

Course content:
The enterprise as a system and organization. Fundamentals of business management. Business processes and integration. Implementation of information systems in organizations. Analysis of business requirements for selecting and implementing information systems. Selection of software for IS implementation in organizations. Challenges of implementing global applications for organizational information systems. Managing change requests in organizations and IS. Process and data management in information systems. Production logistics, application planning, and management.

General and specific competencies (knowledge and skills):
Understanding the basics of information systems in organizations and issues related to their implementation. Evaluation of costs and benefits of implementing information systems. Understanding how to integrate functional business areas into a unified IS. Applying "best practice" principles in IS management. Understanding the role of IS in organizational processes. Integration of functional concepts such as accounting, marketing, and organizational behavior to improve business operations. Identifying, describing, and evaluating software solutions from major vendors. Understanding and monitoring current trends in organizational information systems.

Learning outcomes:
Upon successful completion of this course, students will be able to:
1. Evaluate the costs and benefits of implementing information systems in organizations.
2. Integrate various organizational functional areas into a comprehensive IS based on a shared database.
3. Select and evaluate the most suitable software solution according to specific business requirements and organizational capabilities.
4. Create basic business reports using data aggregation and analysis tools.
5. Analyze current trends and their implications for IS design and management.
6. Present IS analysis results through structured presentations and/or reports.

Required literature:

1. Laudon, K. C., & Laudon, J. P. (2020). Management Information Systems: Managing the Digital Firm (16th ed.). Pearson.
2. Harmon, P. (2019). Business Process Change: A Business Process Management Guide for Managers and Process Professionals (4th ed.). Morgan Kaufmann.

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: Information Systems Infrastructure

Course Code:
IS135

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
1	2 + 1 + 1	60	5

Course objectives:
To provide students with knowledge and skills related to the hardware and software components of information systems, as well as the design of organizational processes and software solutions that require understanding the capabilities and limitations of information systems.

Course content:
Fundamental concepts of computer system architecture. Basic structures of computer system organization. Core technical components of computer-based systems. The role of information technology in modern organizations. Operating systems: basic functionalities, internal organization, multitasking, security, and virtualization. Computer networks: types of networks, components, the TCP/IP model, OSI model layers, and network security. Computer networks in organizations. Data centers. IT infrastructure security (component security, firewalls, and VPN usage). The role of frameworks for IT service control and management (COBIT, ITIL, etc.). Grid computing. Cloud computing. Analysis and performance management of information systems.

General and specific competencies (knowledge and skills):
Understanding key principles of data representation and manipulation in information systems. Understanding multi-layered architectures of systems and applications. Recognizing similarities and differences between infrastructure components such as servers, clients, network devices, wired and wireless connections, software, and security equipment, and their organization within enterprise infrastructure solutions. Understanding virtualization principles. Understanding communication protocols between devices through practical examples and configuring complete infrastructure solutions for small organizations. Applying fundamental IP networking concepts to configure simple computer networks. Understanding the Internet as an infrastructural component and designing simple Internet-based infrastructure solutions. Understanding the role and components of large-scale enterprise infrastructure solutions and IT management frameworks. Recognizing opportunities for adopting virtual service models such as Cloud Computing.

Learning outcomes:
Upon successful completion of this course, students will be able to:

1. Sketch and analyze multi-layered architectures of information systems and applications.
2. Evaluate different components of computer system infrastructure.
3. Assess the advantages and disadvantages of virtual systems and services as integral parts of information systems.
4. Critically evaluate various communication protocols between devices within information systems.
5. Recommend the design of a simple computer network based on fundamental IP networking concepts.
6. Implement a basic Internet-based infrastructure solution.
7. Compare infrastructure solutions for small and large organizations.

Required literature:

1. W. Stallings: Computer Organization and Architecture, 8th edition, Prentice Hall International, 2010.
2. Cisco Networking Academy website: www.netacad.com
3. Lecture and exercise materials.

VELEUČILIŠTE VELIKA GORICA
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Course title: Innovations and Emerging Technologies in Information Systems

Course Code:
IS450

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
2	2 + 1 + 1	60	5

Course objectives:
To provide students with knowledge about the development of innovations in information systems, as well as about new and emerging ICT technologies and their impact on modern organizations and everyday life.

Course content:
Globalization. Development of ICT innovations throughout history and key innovators. ICT technologies that have shaped modern business and daily life. The innovation process in information systems. The strategic importance of the web as a platform (web services, peer-to-peer networking, and social networking). Virtualization. The economy of digital goods and services. The search space. Trends and applications of recent and advanced ICT technologies (Internet of Things, cloud computing, machine learning, artificial intelligence, etc.) and their security aspects.

General and specific competencies (knowledge and skills):
Understanding how the use of technology enables organizations to globalize business processes and expand markets. Applying techniques used in innovative technologies within information systems. Understanding how technologies drive innovation and business process reengineering. Understanding the influence of the web and new technologies on creativity, information sharing, and functionality. Understanding the role of emerging ICT technologies in the business world. Applying new technologies to solve business problems. Addressing challenges brought by technological innovations and emerging technologies.

Learning outcomes:
Upon successful completion of this course, students will be able to:
1. Assess the contribution of innovative technologies to organizational operations.
2. Evaluate the strategic importance of emerging ICT technologies for business expansion.
3. Recommend innovative technologies to improve communication in achieving goals.
4. Combine current organizational business practices with new ICT technologies and innovations.
5. Analyze the operational principles of selected emerging ICT technologies.
6. Present examples of the application of selected innovative ICT technologies.

Required literature:

1. Hanes, D., Salgueiro, G., et al.: IoT Fundamentals: Networking Technologies, Protocols and Use Cases for the Internet of Things, Cisco Press, 1st edition (2017).
2. Cisco Networking Academy website: www.netacad.com.

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: Human-Computer Interaction

Course Code:
IS265

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
3	2 + 2 + 0	60	5

Course objectives:
To provide students with the knowledge and skills required to define, design, implement, and evaluate human-computer interaction in order to enhance user efficiency and satisfaction.

Course content:
Digital products (i.e., applications and devices) have become an essential part of everyday human activities. Their design must meet various criteria to be both useful and desirable. In general, design represents an intuitive and conscious effort to establish coherent order. Specifically, goal-directed design is a proven practical tool for addressing questions that arise during the definition and design of digital product interfaces, such as: how people use data and digital devices, how to research user needs, how to develop descriptive models of users and their activities, how to define design requirements, and how to present information effectively.

General and specific competencies (knowledge and skills):
Understanding the role of human-computer interaction in the development of digital products. Understanding paradigms and rules for designing human-computer interaction. Applying concepts of interface design and human-computer interaction in practice. Theoretical evaluation of graphical interface quality.

Learning outcomes:
Upon successful completion of this course, students will be able to:

1. Define quantitative usability goals (e.g., learning time, speed, error rate, satisfaction) for a selected system, based on the concepts of effectiveness, efficiency, and satisfaction from ISO 9241.
2. Design and document an inclusive, user-centered development cycle—from stakeholder analysis to iterative prototyping—demonstrating how universal usability considerations (age, culture, disability, device limitations) are embedded in the requirements.
3. Apply evidence-based guidelines, principles, and theories to design screen layouts, data input flows, and feedback mechanisms that minimize memory load and optimize compatibility among novice, occasional, and expert users.
4. Select and conduct appropriate empirical and research methods (heuristic evaluation, laboratory testing, remote log study) to verify whether a prototype meets the goals established in Outcome 1 and iteratively improve the design based on findings.
5. Develop a prototype and justify at least two complementary interaction styles (e.g., direct manipulation + speech or augmented reality + gesture) that leverage device capabilities while maintaining coherent information architecture and navigation.
6. Critically analyze broader ethical, social, and sustainability implications of interface design choices, proposing specific design recommendations aligned with global objectives.

Required literature:

1. Dix, A., et al. Human-Computer Interaction, Prentice Hall, 3rd edition (2003), ISBN: 0130461091.
2. Interaction Design: Beyond Human-Computer Interaction, Wiley, 6th edition (2023), ISBN: 978-1-119-90109-9

Course title: Research Work Methodology

Course Code:
IS195

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
1	2 + 1 + 1	60	5

Course objectives:
To acquire knowledge and skills in research methodology and to enable students for independent research work. To train students to independently find, organize, and manage relevant information.

Course content:
Concept, objectives, and types of research. Fundamental, applied, and developmental research. Systematic approach to research. Research problem. Research planning and process. Organizing research. Data collection, processing, and analysis. Presentation of research results. Structure, writing, technical formatting, and preparation of professional papers, studies, articles, and posters. Knowledge organization, selection, and interpretation of information. Ethics in scientific and professional work.

General and specific competencies (knowledge and skills):
Ability to conduct independent research, draw conclusions, and write professional papers.

Learning outcomes:
Upon successful completion of this course, students will be able to:

1. Formulate the objective and purpose of research and define hypotheses.
2. Critically evaluate different types of research and the characteristics of research methods.
3. Analyze the basic principles and styles of written works and independently apply different citation styles.
4. Compare various types of written works.
5. Apply appropriate methods for searching catalogues and databases.
6. Select, compare, and use information from different sources.
7. Write and present a professional paper that includes research results.

Required literature:

1. Čendo Metzinger, T., & Toth, M. Metodologija istraživačkog rada za stručne studije. Velika Gorica: Veleučilište Velika Gorica, 2020.
2. Žugaj, M., Dumčić, K., & Dušak, V. Temelji znanstvenoistraživačkog rada: Metodologija i metodika. Varaždin: Fakultet organizacije i informatike, 2006.

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: Advanced Web Programming

Course Code:
IS170

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
1	1 + 3 + 0	60	5

Course objectives:
To acquire advanced knowledge in programming interactive web technologies.

Course content:
Serving and receiving objects on a web interface. Processing graphical objects on a web interface. Definition and capabilities of the SVG language. VML language. XSL-FO language. Grouping of graphical objects and creating clipping and masking paths. Filter effects on the web. Creating a graphical web template. Interactive web vector graphics. Interactive animation on the web interface. Dynamic generation of HTML and WML records. Automation of PDF document creation from a database. Web services. Developing web services using WSDL and SOAP specifications.

General and specific competencies (knowledge and skills):
Ability to independently design advanced projects based on web technologies. Acquisition of advanced skills enabling students to independently design, administer, and maintain web pages and services. Independent definition of websites, web interface design, use of graphical and multimedia files, and application of available programming tools for server-side programming.

Learning outcomes:
Upon successful completion of this course, students will be able to:
1. Organize a web interface optimized for multimedia content.
2. Create a web template to serve as the basis for a website design.
3. Generate reports based on data from a database.
4. Develop a web service for retrieving data from a database.
5. Recognize the need for lifelong learning by adopting new technologies.
6. Coordinate activities within a multidisciplinary team.

Required literature:

1. Šimec, A. Programiranje i optimizacija Internet stranica u HTML5 okruženju. Tehničko veleučilište u Zagrebu, 2015.
2. Masee, M. REST API Design Rulebook. O'Reilly Media, 2012.
3. Richardson, L., Amundsen, M., & Ruby, S. RESTful Web APIs: Services for a Changing World. O'Reilly Media, 2013.

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: Object-Oriented Programming

Course Code:
IS110

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
1	2 + 2 + 0	60	5

Course objectives:
To introduce students to the fundamental concepts of object-oriented programming (OOP).

Course content:
Definition of object-oriented programming. Differences between object-oriented and procedural programming. Introduction to programming tools and platforms. Classes and objects. Inheritance. Encapsulation. Polymorphism. Differences between dynamically and statically typed programming languages in OOP (abstract classes and methods, interfaces, delegates, overloading, working with objects without class checking — duck typing). Class and object diagrams. Sequence and collaboration diagrams. Activity and state diagrams.

General and specific competencies (knowledge and skills):
Students will become familiar with the characteristics and concepts of object-oriented programming. Through practical exercises in defining and developing applications, students will acquire hands-on knowledge and skills for applying object-oriented programming principles to problem-solving, as well as proficiency in using object-oriented programming languages and development tools.

Learning outcomes:
Upon successful completion of this course, students will be able to:
1. Write a simple program based on object-oriented principles.
2. Create an application project or its components using the Unified Modeling Language (UML) and implement the corresponding program solution.
3. Organize application components into classes, interfaces, and packages in accordance with object-oriented programming principles.
4. Develop an object-oriented class hierarchy model as a foundation for application implementation.
5. Self-assess when complex classes should be restructured into simpler ones for better modularity.
6. Organize classes so that they interact with other application components through well-defined class interfaces.
7. Design a flexible structure adaptable for future extensions.

Required literature:

1. Collingbourne, H. The Book of Ruby. No Starch Press, 2009.
2. Hamilton, K., & Miles, R. Learning UML 2.0. O'Reilly, 2006.

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: Data Retention and Business Continuity

Course Code:
IS230

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
2	2 + 2 + 0	60	5

Course objectives:
The aim of this course is to provide students with knowledge about the importance of data preservation and possible protection methods for data, information, and documents. Students will learn procedures for assessing potential risks of data destruction, available protective measures, and ensuring business continuity within organizational systems.

Course content:
Concept, role, significance, and value of data and information within business information systems. Conceptual definition of information security, data and information protection, and information security management (ISMS – Information Security Management System). Legal framework in the field of information security. International standards in information security management systems. Planning of ISMS — objectives and planning stages, defining the ISMS scope. Information system security policy with management commitment and support. Analysis of information system resources within an organization. Sources of potential threats to IS resources, focusing on data, programs, information, documentation, and media on which they are stored and processed. Assessment of the vulnerability of individual IS resources to specific threats. Risk assessment — the concept of risk in data preservation, and methods for risk assessment. Determining parameter values for risk calculation, performing risk calculations, acceptance or rejection of specific risks. Creation of risk matrices including all relevant parameters, their names, and calculated values. Analysis of potential protective measures for IS resources (data, information, programs, documentation, media) based on the risk analysis results. Systematic approach to information system protection. Establishing and controlling protection. Evaluation of the effectiveness of protective measures through the sequential link of three protection subsystems (plan – implementation – control). Final reporting on information system protection. Preparation of plans and documentation for continuous analysis and implementation of security and protection measures (ISMS), based on the latest versions of international standards in data and information security. Monitoring, maintaining, and continuously improving the security and protection of all IS resources.

General and specific competencies (knowledge and skills):
Students will be able to identify and reduce critical information system security risks and focus efforts on data preservation and protection to achieve business objectives. They will gain knowledge and skills necessary for planning, implementing, and controlling data and information security management systems, thereby ensuring business continuity in organizational systems.

Learning outcomes:
Upon successful completion of this course, students will be able to:

1. Conduct quantitative and qualitative analysis of information system resources within a business system.
2. Assess types and structures of potential threats to information system resources.
3. Rank the likelihood and potential impact of threats on specific IS resources.
4. Apply appropriate methods for risk assessment in continuous IS operations.
5. Analyze necessary and available IS protection measures in accordance with the assessed risks.
6. Develop an ISMS protection plan and test both the plan and its implementation within the IS environment.

Required literature:

1. Wieczorek, M., Naujoks, U., Bartlett, R.: Business Continuity: IT Risk Management for International Corporations. Springer, 2002, ISBN 3540430512.
2. Bača, M.: Uvod u računalnu sigurnost (Introduction to Computer Security). Narodne novine, Zagreb, 2004.
3. Anderson, R.: Security Engineering: A Guide to Building Dependable Systems. (Leading international textbook on systems security. First edition available in PDF at: http://www.cl.cam.ac.uk/~rja14/book.html)

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: Information Systems Performance

Course Code:
IS360

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
3	2 + 2 + 0	60	5

Course objectives:
The aim of the course is to provide students with knowledge and skills related to the evaluation and optimization of information system performance. Product quality is defined as the degree to which a product meets user needs, encompassing both functional and non-functional requirements. Meeting non-functional requirements, such as performance, requires the ability to assess and measure the capabilities and limitations of information systems. Furthermore, information systems must maintain specified performance levels under normal conditions and continue operating despite faults.
Given the complexity of information systems — composed of numerous hardware, software, and network components — students will acquire a comprehensive understanding of system performance, including subsystems, software libraries, and applications. One critical non-functional requirement is system security, which represents a major challenge today and must be managed effectively as part of performance optimization.

Course content:
Analysis of computer architecture and components, operating systems, database performance, and computer networks. Models of information system organization. Fundamental concepts and measurements of system performance. General principles of performance measurement. Basics of queuing theory. Hardware testing, instrumentation, data measurement, and analysis. Selection, evaluation, and use of performance measurement tools. Performance testing of information systems and data analysis. Identification, evaluation, and management of risks in performance control. Understanding of risk management principles, information system security, and auditing.

General and specific competencies (knowledge and skills):
Students will develop an understanding of the key principles of information system operation and performance evaluation, relevant to system designers, programmers, administrators, managers, and users. They will gain knowledge of performance measurement tools for computer systems and components, advantages and disadvantages of multi-layered architectures, and network topology. Students will also understand database system architecture, risk management fundamentals, information system security, and cybersecurity protection.
Additionally, they will be able to apply analytical methods for evaluating and testing system performance, select appropriate analytical tools depending on the system type (e.g., operating systems, databases, networks), and model and analyze system performance.

Learning outcomes:
Upon successful completion of this course, students will be able to:
1. Evaluate the results of information system performance measurements.
2. Apply standards in defining and evaluating information system performance.
3. Conduct risk assessments and manage information system security.
4. Identify system components with the greatest impact on performance.
5. Determine ways to improve information system performance.
6. Use static analysis in system design and implementation.
7. Assess requirements of various solution models and the complexity of their implementation.
8. Define and apply methods for measuring information system performance.
9. Correlate performance measurement results with system design and implementation.

Required literature:

1. Harcol-Balter, M. Performance Modeling and Design of Computer Systems: Queueing Theory in Action. Cambridge University Press, 2013.
2. Krakar, Z., et al. Corporate Information Security. Faculty of Organization and Informatics, University of Zagreb, 2014.

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: PHP Web Programming

Course Code:
IS180

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
1	1 + 3 + 0	60	5

Course objectives:
To provide students with knowledge and practical experience in PHP web programming.

Course content:
Introduction to web programming. Programming languages for web development. PHP: data types, variables, operators, and control flow statements; basics of functions, strings, arrays, and objects. Interaction with databases. Generation of dynamic images and PDF files. Use of XML files. Development of security scripts and error handling mechanisms.

General and specific competencies (knowledge and skills):
Students will be able to independently develop web applications using PHP and design advanced PHP-MySQL-based applications.

Learning outcomes:
Upon successful completion of this course, students will be able to:

1. Design a program using the fundamental features of the PHP programming language.
2. Develop a PHP web application that uses a MySQL database.
3. Generate dynamic images for use within a PHP web application.
4. Write scripts to ensure security during the use of web applications.
5. Critically assess and handle errors occurring during application execution.
6. Manage web application content through a secure interface.
7. Develop a project according to specified guidelines.
8. Evaluate modules and components used in the project.

Required literature:

1. Šimec, A. Uvod u HTML, XHTML i CSS. Tehničko veleučilište u Zagrebu, 2011.
2. Šimec, A. Programiranje i optimizacija Internet stranica u HTML5 okruženju. Tehničko veleučilište u Zagrebu, 2015.
3. Rochkind, M. Expert PHP and MySQL: Application Design and Development. Apress, 2013.

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: JAVA Programming

Course Code:
IS210

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
2	1 + 3 + 0	60	5

Course objectives:
To introduce students to the Java programming language, the fundamentals of object-oriented programming, and the development of applications in Java.

Course content:
Comparison of Java's capabilities and syntax with other object-oriented languages. Introduction to development tools and platforms. Application development through instantiation of objects from existing classes and creation of custom ones. Components and interfaces. Inheritance. Error handling and exceptions. Dynamic data structures. Generic programming. Multithreaded programming. Reflective programming structures. Design patterns in Java. Creation of documentation for Java programs. Use of lambda expressions in programming. Implementation of Java programs that use files. Development of graphical interfaces using JavaFX technology. Connecting Java applications to databases. Overview of features in the latest versions of the Java programming language.

General and specific competencies (knowledge and skills):
Students will learn the characteristics and syntax of the Java programming language. By solving concrete programming tasks, they will acquire practical knowledge and experience. They will understand Java's specificities compared to other object-oriented languages and gain the skills needed to independently develop simpler Java applications.

Learning outcomes:
Upon successful completion of this course, students will be able to:

1. Write program code for a JavaFX application that uses a graphical interface and a database.
2. Choose Java as a suitable programming language for solving a selected problem.
3. Organize application components into classes, interfaces, and packages in accordance with object-oriented programming principles.
4. Develop JavaFX applications that solve various practical problems.
5. Self-assess the suitability of the Java programming language for solving specific practical problems.
6. Configure the Eclipse development environment for efficient JavaFX application development.
7. Design class structures for Java applications to facilitate future extensions.
8. Identify possibilities for extending applications using open-source libraries.
9. Refactor existing application solutions into the Java programming language.
10. Integrate knowledge of other programming languages with Java.
11. Critically evaluate the advantages and disadvantages of Java compared to other programming languages.

Required literature:

1. Schildt, H. Java: The Complete Reference, 12th Edition, McGraw Hill, 2021. ISBN: 1260463419
2. Sharan, K. Learn JavaFX 17: Building User Experience and Interfaces with Java, Apress, 2022. ISBN: 148427847X

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: Seminar Paper

Course Code:
IS150

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
1	1 + 0 + 3	60	5

Course objectives:
To develop students' independence in preparing professional papers and presenting them. To prepare students for writing their final thesis.

Course content:
Seminar paper topics may be selected from the entire range of subjects covered in this study program. Ideally, the seminar paper should serve as preparation for the final (graduate) thesis, continuing naturally into the thesis project.

General and specific competencies (knowledge and skills):
Ability to independently prepare professional papers and present them to others.

Learning outcomes:
Upon successful completion of this course, students will be able to:

1. Write a professional paper containing all the key components required for describing and solving specific tasks and projects.
2. Present the results of their work to a wider audience using appropriate presentation software.
3. Prepare a presentation that clearly outlines the problem and conclusions within a given time frame.
4. Structure the written part of the paper to include a problem description, solution, and conclusion.
5. Conclude the professional paper with a critical assessment of the strengths and weaknesses of the proposed solution.

Required literature:

1. Guidelines for Writing Seminar Papers, internal publication, VVG.

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: Web Security

Course Code:
IS380

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
4	2 + 1 + 1	60	5

Course objectives:
To familiarize students with web security issues in the context of business system dependence on Internet communication, cybercrime, and digital forensics. To provide knowledge about the risks and threats of Internet communication and how to protect against them. To introduce students to practical methods, measures, and tools applicable in building and developing security systems.

Course content:
Fundamentals of information security. Legal and regulatory framework. Information security standards. Implementation of information security management systems. Web application security. Public Key Infrastructure (PKI). Cloud information system security. Cybercrime. Digital forensics.

General and specific competencies (knowledge and skills):
Upon completion, students will be able to identify the domain space and security challenges of the web and web-based information systems, categorize threats and approaches to mitigating them, create documentation in accordance with security standards, organize and implement protection of web-based information systems, design web system security mechanisms, propose technical and legal protection methods for web-based systems, manage organizational units responsible for information system security, and perform digital forensic analysis of compromised systems.

Learning outcomes:
Upon successful completion of this course, students will be able to:
1. Analyze and apply legal regulations in the areas of e-business, e-commerce, digital signatures, and personal data protection.
2. Evaluate an organization's security policy according to the ISO 27001 standard.
3. Recommend the most appropriate security protocol for web application protection.
4. Analyze web application attacks and apply measures for protection.
5. Present technologies for information system security.
6. Present the concept of an Information Security Management System (ISMS).

Required literature:

1. Krakar, Z. et al.: Corporate Information Security, Faculty of Organization and Informatics, 2016.
2. Harding, L.: The Snowden Files: The Inside Story of the World's Most Wanted Man, EPH Media, 2014.

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: Information Systems Management Strategies

Course Code:
IS410

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
4	2 + 1 + 1	60	5

Course objectives:
To examine the current state, challenges, and benefits of implementing information systems within organizational (business) systems. To apply appropriate methods for strategic planning of information system development and implementation. Based on the current IS state and strategic development plan, to propose the reengineering of the existing information system with an emphasis on developing business process implementation through modern information and communication technologies and organizational methods.

Course content:
Systems and the systemic approach to information system development, basic principles of the systemic approach. The role and importance of IS in organizational (business) systems. Process-oriented approach in planning, development, and application of information systems. Application of the BSP (Business Systems Planning) method for strategic information system planning — including the development of appropriate planning matrices. Proposal of information system architecture using metrics such as cohesion, information function, quality measures, and process affinity. Analysis of existing and required resources for IS implementation in a selected business system. Application of appropriate methods for business process analysis and data model design. Independent development of a strategic IS development plan using the BSP method for a chosen business system.

General and specific competencies (knowledge and skills):
Students will understand the significance, role, and position of information systems within organizational (business) systems. They will be able to systematically approach IS planning and development, design IS architectures (subsystems) using appropriate strategic planning methods, and identify key business processes to be implemented through modern information and communication technologies.

Learning outcomes:
Upon successful completion of this course, students will be able to:
1. Develop a proposal for a strategic IS development plan using the BSP method.
2. Apply appropriate methods for business process analysis.
3. Propose IS architecture (subsystems) and prioritize their development.
4. Evaluate potential internal and external risks related to IS development and implementation in a business environment.
5. Select an appropriate model for IS organization within a business system.

Required literature:

1. Laudon, K. C., & Laudon, J. P.: Management Information Systems, 14th ed., Pearson Education, 2016, ISBN: 9780133898163.
2. Klasić, K., & Klarin, K.: Information Systems – Principles and Practice, College of Information Technology, Zagreb, 2009.
3. Pavlić, M.: Information Systems, Školska knjiga, Zagreb, 2011.
4. Radošević, I.: Designing Business Information Systems, VERN University, Zagreb, 2020.

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: Decision-support Systems

Course Code:
IS290

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
2	2 + 2 + 0	60	5

Course objectives:
To teach students how to use methods and information technology to support decision-making processes.

Course content:
Introduction to decision-making and Decision Support Systems (DSS). DSS architecture. ERP systems. Business intelligence. Expert systems. Data warehousing. Metadata and metadata management. Dimensional databases. OLAP. Data mining. Neural network methodology. Reporting and presentation systems.

General and specific competencies (knowledge and skills):
Students will master methods of conceptual, logical, and physical modeling. They will gain fundamental knowledge about decision support information systems, their architecture, use, implementation, and maintenance. Upon completion, students will be capable of participating in teams responsible for planning and implementing DSS systems.

Learning outcomes:
Upon successful completion of this course, students will be able to:
1. Design and build a data warehouse.
2. Develop and implement an OLAP system.
3. Create business reports based on data stored in a data warehouse.
4. Integrate multiple systems into a unified decision support system.
5. Assess which parts of a business information system are suitable for applying expert systems.

Required literature:

1. Klepac, G., Mršić, L.: Business Intelligence through Case Studies, Lider & Tim Press, Zagreb, 2006.
2. Klepac, G., Panian, Ž.: Business Intelligence, Masmedia, Zagreb, 2003.
3. Lecture and exercise materials.

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: Database Management Systems

Course Code:
IS220

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
2	2 + 2 + 0	60	5

Course objectives:
To familiarize students with the capabilities and architecture of database management systems (DBMS).

Course content:
Definition of database management systems. System architecture. Logical and physical structure of DBMS. Features, capabilities, and types of database management systems. Navigational, relational, and object-oriented systems. SQL systems. Data protection. User authentication and authorization. Defining user privileges. System implementation and maintenance. Overview of architectures for achieving high DBMS availability. Cloud-based DBMS systems.
General and specific competencies (knowledge and skills):
Students will become familiar with the characteristics and functionalities of database management systems. They will acquire skills in installing and administering DBMS systems such as MSSQL, MySQL, and Oracle.

Learning outcomes:
Upon successful completion of this course, students will be able to:
1. Assess the advantages and disadvantages of different types of database management systems.
2. Compare various DBMS types.
3. Prepare and perform installations of DBMS systems for different kinds of databases.
4. Configure DBMS settings for regular data backup creation.
5. Anticipate possible problem and error scenarios in database operations.
6. Plan regular updates of database management systems.
7. Create a security policy for database management and implement a disaster recovery strategy.

Required literature:

1. Date, C. J.: Database Systems, Addison-Wesley, 2000.
2. Hoffer, J. A., Prescott, M., McFadden, F.: Modern Database Management, 9th edition, Prentice Hall, 2008.

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: Knowledge Base Management Systems

Course Code:
IS350

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
3	2 + 2 + 0	60	5

Course objectives:
To acquire knowledge related to knowledge bases, their creation, data collection, and utilization, as well as the application of knowledge bases in organizational business processes.

Course content:
Introduction to knowledge base management. The nature of knowledge. Tools for managing knowledge bases. The impact of knowledge base management on organizational performance. Factors influencing the knowledge base. Technologies for knowledge base management (artificial intelligence, digital libraries, repositories, etc.). Systems for storing and utilizing human expertise. Conversion between different types of knowledge. Systems for creating knowledge bases. Systems for storing, organizing, formalizing, and distributing knowledge (concept maps, process modeling, RSS, Wiki, Delphi method, etc.). Tools for knowledge categorization and classification. The future of knowledge management.

General and specific competencies (knowledge and skills):
Understanding the basic concepts related to studying knowledge and its creation, collection, presentation, dissemination, utilization, and management. Understanding the role and use of knowledge bases within organizations and institutions, as well as common obstacles in knowledge management. Familiarity with fundamental concepts, methods, techniques, and computer tools for managing knowledge bases. Understanding the integration of knowledge bases with other components of the information system.

Learning outcomes:
Upon successful completion of this course, students will be able to:
1. Critically assess different types of information and concepts of general and specific knowledge.
2. Design knowledge management (KM) solutions.
3. Critically evaluate the application of new technologies in knowledge management.
4. Recommend knowledge management practices for improving organizational processes.
5. Apply leadership skills in planning, managing, and evaluating knowledge management.
6. Assess the role of knowledge bases in managing global crises.

Required literature:

1. Becerra-Fernandez, I., Sabherwal, R., Kumi, R.: Knowledge Management Systems and Processes in the AI Era, 3rd Edition, ISBN: 978-1-032-42802-4.
2. Jennex, M. E.: Case Studies in Knowledge Management, San Diego State University, USA, ISBN: 1-59140-352-9.

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: Business Process Management

Course Code:
IS320

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
3	2 + 2 + 0	60	5

Course objectives:
To acquire knowledge and skills necessary for understanding, designing, and improving business processes.

Course content:
Challenges in business process management. Methods for managing and improving business processes. Understanding organizational processes (definition and classification of processes, identification of key processes, modeling and documenting processes). Principles and guidelines for process improvement and change management in processes. Software support for process modeling and improvement. Tools for simulating business process execution. Creating and executing business process instances. Data modeling and screen design for business process activities. Creating subprocesses. Applying business rules in business processes. Integration of business processes with Java programming components.

General and specific competencies (knowledge and skills):
Modeling business processes. Implementing process improvements. Understanding the role and potential of business process management (BPM). Managing process changes. Understanding different approaches to modeling and improving business processes. Using basic tools for process modeling. Applying business rules in processes. Integrating business processes with external systems.

Learning outcomes:
Upon successful completion of this course, students will be able to:
1. Design a business process using a process diagram.
2. Critically evaluate the performance of business processes.
3. Redesign business processes in response to new business requirements.
4. Assess which business processes in an organization can be improved through process management.
5. Evaluate the results of business process simulation.
6. Connect different organizational services with the designed business process.
7. Define levels of detail within a business process across activities and subprocesses in a process diagram.
8. Install, configure, and use the jBPM system.

Required literature:

1. Simone Fiorini, Arun V. Gopalakrishnan: Mastering jBPM6, Packt Publishing, June 2015, ISBN: 1783289570.
2. John Jeston: Business Process Management: Practical Guidelines to Successful Implementations, 4th Edition, Routledge, January 2018, ISBN: 1138738409.

VELEUČILIŠTE VELIKA GORICA
UNIVERSITY of APPLIED SCIENCES VELIKA GORICA

Course title: Project Management

Course Code:
IS280

Semester:	Lectures + Exercises + Seminar:	Total Hours:	ECTS Credits:
2	2 + 2 + 0	60	5

Course objectives:
To acquire knowledge and skills for the successful management and implementation of projects using modern project management tools and methodologies.

Course content:
Project initiation. Defining and managing project scope. Project planning. Risk analysis and success factors. Defining the project team. Determining necessary project resources. Cost management. Quality management. Project progress monitoring. Project closure. Managerial skills. Marketing.

General and specific competencies (knowledge and skills):
Managing complex tasks in project management (planning, organizing, leading, and monitoring) for one or more projects within an organization. Knowledge of project portfolio management, project networking, and skills in presentation, moderation, and meeting organization.

Learning outcomes:
Upon successful completion of this course, students will be able to:
1. Define project objectives.
2. Apply project development methodologies.
3. Create a project plan including tasks, deadlines, costs, and resources within financial and time constraints.
4. Allocate work according to the profiles of professionals involved in the project.
5. Organize project activities (initiation, planning, execution, monitoring and control, closure).
6. Manage projects (integration, scope, time, cost, quality, resources, communication, risk, procurement, and stakeholders).
7. Present project proposals, reports, or results to a professional and/or public audience.

Required literature:
1. A Guide to the Project Management Body of Knowledge (PMBOK Guide) – Sixth Edition, PMI, 2017.
2. PMI Combined Standard Glossary (localized Croatian version), Version 1.1, PMI Croatia Chapter.
3. Teaching materials from lectures and exercises.