COURSE DESCRIPTIONS

Program:

BSc in Business Informatics – Autumn semester subjects

Subject: Mathematics 1

Professor in charge: Dr. Imre Balogh

Number of hours: 45

Credits: 6

Assessment: Exam

The aim of the subject:

For the students to improve their competences through the knowledge, skills and attitudes as specified in the training and output requirements

Knowledge:

The concept of sets, functions. Operations with sets and functions. Number sequences: monotony; limitation; convergence. Endless row. Limit of functions, continuity. Differential calculus: the relationship between differential quotient, differentiability and continuity. Examination of functions: monotony; extreme; convex-concave, inflection point. Multivariate functions: contours; partial derivative; extreme. Examine multivariate functions. Economic applications: extreme value tasks, financial calculations. Indefinite integral. Definite integral, Newton-Leibniz formula; applications

Competences:

The students

- will possess the basic methods of information gathering and mathematical analysis
- will apply the theories and methods learned, they will explore, systematize and analyse facts and fundamental connections
- will be receptive to new information, new professional knowledge and methodologies, and open to taking on new, independent and cooperative tasks and responsibilities
- will be able to take responsibility for their analyses, conclusions and decisions.

Teaching methodology:

The curriculum is processed through lectures, seminars, and on the basis of the student's work done individually or in groups. The seminars are aimed at the practical application of theoretical knowledge, during which students solve tasks under the guidance of the instructor, process case studies, and develop and present proposals for solving problems in different situations. The processing of the curriculum is supported by modern ICT tools, self-assessment tasks, examples and other educational aids developed by the instructor.

Compulsory and Recommended Literature:

university lecture notes, compiled by the professor in charge, Dr. Imre Balogh

Subject: Information Management

Professor in charge: Dr. István Gerják

Number of hours: 30

Credits: 4

Assessment: Exam

The aim of the subject:

For the students to improve their competences through the knowledge, skills and attitudes as specified in the training and output requirements.

Knowledge:

The development of information systems. The relationship between information system, information technology, information management. Types of services provided by the information system. Types of information systems (large systems, small systems, PC business software, other consumer software). Main applications. CRM, account management and invoicing systems, integrated ERP systems, HR systems, registry systems, business management systems. Objects of the development of information systems. Technical support systems. Information management models (IT management model, Gartner Alternative IM: supply-demand, source-make-deliver).

Competences:

The students

- will have the basic knowledge of information systems, will understand the principles of architecture organization, and will be able to interpret the components of computer and information architecture in context;
- will have basic knowledge of all areas of information management, including IT strategy, process management, system development, knowledge management, IT service management, project management, risk management, performance management, IT asset management, IT security and IT audit;
- will be able, with the help of the acquired IT procedures and methods, to develop real business organizations, to explore the operating conditions of the applications, to weigh and communicate the benefits, dangers and risks.

Teaching methodology:

The curriculum is processed through lectures, seminars, and on the basis of the student's work done individually or in groups. The seminars are aimed at the practical application of theoretical knowledge, during which students solve tasks under the guidance of the instructor, process case studies, and develop and present proposals for solving problems in different situations. The processing of the curriculum is supported by modern ICT tools, self-assessment tasks, examples and other educational aids developed by the instructor.

Compulsory and Recommended Literature:

Bourgeois, D. T., Smith, J. L., Wang, S., & Mortati, J. (2019). *Information systems for business and beyond*. Saylor Academy.
https://ecampusontario.pressbooks.pub/informationsystemscdn/
Gallaugher, J. (2010). *Information systems: A Manager's guide to harnessing technology*. Flat World Knowledge.
https://open.umn.edu/opentextbooks/textbooks/information-systems-a-manager-s-guide-to-harnessing-technology

Subject: Law

Professor in charge: Dr. József Fekete

Number of hours: 30

Credits: 3

Assessment: Exam

The aim of the subject:

For the students to improve their competences through the knowledge, skills and attitudes as specified in the training and output requirements.

Knowledge:

Basic legal concepts. Hierarchy of laws. Fundamental Law. The application of the law. The division of the legal system. The structure of the Civil Code, the subjects of civil law. The concept and principles of civil law. Man as a legal entity. Legal entities of legal persons. General rules of contracts. The general rule of civil liability. Legal regulation of the economy. The functions of law in economic relations, the main areas of legal regulation in economic life. The subjects of economic law, the characteristics and forms of their relations. Types of contracts in business law. Decisions of authorities and local governments influencing the activities of economic entities. The law, establishment, organisational forms, management and responsibility, control, minority rights of business associations. Consumer protection and competition law. Termination of business associations; (with and without a legal successor) liquidation, voluntary liquidation, bankruptcy proceedings. Sole proprietorship law. The role of courts in economic law, with special regard to the courts of registration. Unfair market conduct. Basic provisions of labour law. Economic criminal law. Intellectual Property Law.

Competences:

The students

- will be familiar with the processes, legal and ethical requirements of sales and business activities,
- will follow and interpret the global economic and international business processes, the changes in the related policies and legislation relevant to the economic policy and the field, and their effects, and will take these into account in their analyses, proposals and decisions;
- will strive to make their decisions in situations requiring a complex approach and unexpected decision-making situations, taking full account of the law and ethical norms.
- will assume responsibility for complying with professional, legal and ethical norms and rules related to their work and conduct.

Teaching methodology:

The curriculum is processed through lectures, seminars, and on the basis of the student's work done individually or in groups. The seminars are aimed at the practical application of theoretical knowledge, during which students solve tasks under the guidance of the instructor, process case studies, and develop and present proposals for solving problems in different situations. The processing of the curriculum is supported by modern ICT tools, self-assessment tasks, examples and other educational aids developed by the instructor.

Compulsory and Recommended Literature:

Michael H. Martella Fundamentals of the Law

Link: https://open.umn.edu/opentextbooks/textbooks/law-101-fundamentals-of-the-law?utm_source=chatgpt.com

The Legal and Ethical Environment of Business, Terence Lau, University of Dayton

Lisa Johnson, University of Puget Sound

https://open.umn.edu/opentextbooks/textbooks/the-legal-and-ethical-environment-of-business

Subject: IT Security

Professor in charge: Dr. Rózsa Horváth Bokor

Number of hours: 30

Credits: 4

Assessment: Exam

The aim of the subject:

For the students to improve their competences through the knowledge, skills and attitudes as specified in the training and output requirements.

Knowledge:

Interpretation of IT security, requirements. Security tasks of the development and operation of IT infrastructure. IT security and technology challenges, risks, threats. Content and form of organizational regulatory documentation. International and national standards, the need to apply them.

Teaching methodology:

The curriculum is processed through lectures, seminars, and on the basis of the student's work done individually or in groups. The seminars are aimed at the practical application of theoretical knowledge, during which students solve tasks under the guidance of the instructor, process case studies, and develop and present proposals for solving problems in different situations. The processing of the curriculum is supported by modern ICT tools, self-assessment tasks, examples and other educational aids developed by the instructor.

Compulsory and Recommended Literature:

Ryan, T. (2023). Computer Systems Security: Planning for Success. https://open.umn.edu/opentextbooks/textbooks/computer-systems-security-planning-for-success

Anderson, R. (2010). *Security engineering: a guide to building dependable distributed systems*. John Wiley & Sons. https://www.cl.cam.ac.uk/archive/rja14/Papers/SEv3.pdf

Subject: Economics 1

Professor in charge: Dr. György Fabricius-Ferke

Number of hours: 45

Credits: 6

Assessment: Exam

The aim of the subject:

For the students to improve their competences through the knowledge, skills and attitudes as specified in the training and output requirements.

Knowledge:

Economy, scarcity, resources. Economic models. Measuring economic performance. The market and the market mechanism. The consumer choice. Indifference curves, rate of substitution and marginal rate. The utility function and the marginal utility. Budget straight. The consumer's optimal decision. Analysis of demand. The effect of incomes, prices and expectations on demand. Individual and market demand. The demand price and the consumer surplus. Theoretical foundations of the company and production. The production function (short-term, long-term). Costs of production. Cost functions. Marginal cost, average cost. Shifting cost curves. The competitive market. Profit maximization. The supply curve of the competitive firm. Individual and market offer. The supply price and the producer surplus. Competitive market equilibrium, momentary, short-term and long-term market equilibrium. Imperfect market competition and monopoly. Main market forms. Profit maximization. The effects of monopoly on income distribution and welfare. The market for factors of production. Saving and investing. International trade and comparative advantage. Trade policy. Market failures, externalities and welfare losses.

Competences:

The students

- will have knowledge of the basic, comprehensive concepts, theories, facts, national economic and international contexts of economics, with regard to the relevant economic actors, functions and processes.
- will have mastered the basic theories and characteristics of the micro and macro levels of organization of the economy, and will be in possession of the basic methods of information collection, mathematics and statistical analysis.
- will be receptive to new information, new professional knowledge and methodologies, and open to taking on new, independent and cooperative tasks and responsibilities.

Teaching methodology:

The curriculum is processed through lectures, seminars, and on the basis of the student's work done individually or in groups. The seminars are aimed at the practical application of theoretical knowledge, during which students solve tasks under the guidance of the instructor, process case studies, and develop and present proposals for solving problems in different situations. The processing of the curriculum is supported by modern ICT tools, self-assessment tasks, examples and other educational aids developed by the instructor.

Compulsory and Recommended Literature:

Thomas Showell: Basic Economics
ppt-s, notes and handouts from the lessons

Subject: General English 1

Professor in charge: Dr. Magdolna Kimmel

Number of hours: 45

Credits: 0 (zero)

Assessment: Signature

The aim of the subject:

For the students to improve their competences through the knowledge, skills and attitudes as specified in the training and output requirements.

Knowledge:

- Getting to know each other; completing a form. Revision of basic grammar, to be, asking yes-or-no questions, personal and possessive pronouns
- Talking about jobs and family. Booking a room. Writing an informal e-mail. The Present Simple Tense.. The possessive 's'
- Daily routine. Telling the time. Ordering food. Asking wh-questions. Adverbs of frequency. Giving the date, telling the time.
- Talking about ability. Talking about likes and dislikes, hobbies. Free time activities. Possessive pronouns, object pronouns. The auxiliary 'can'; Verb phrases.

Competences:

At the end of the course, the student will review and expand basic grammatical structures, linguistic functional elements and vocabulary. Possessing these, they will be able to handle basic communication situations in writing and orally, and move forward towards learning professional language.

Teaching methodology:

The classes are based on the traditions of communicative language teaching. The curriculum is processed in seminars and on the basis of the student's work done individually or in a group. The processing of the curriculum is supported by modern ICT tools, self-monitoring tasks and other educational aids developed by the instructor.

Compulsory and Recommended Literature:

Oxenden, C. & Latham-Koenig, C.: New English File Intermediate Student's Book and Workbook plus 4th edition online practice

Subject: Operation Systems

Professor in charge: Dr. István Gerják

Number of hours: 30

Credits: 5

Assessment: mid-term grade

The aim of the subject:

For the students to improve their competences through the knowledge, skills and attitudes as specified in the training and output requirements.

Knowledge:

Introduction to the Linux operating system. User management and file system in Linux. Kernel and process management in Linux. Filters in Linux. Regular expressions in system operations. Shells, shell programming. Introduction to Windows operating systems. User and group management, permission system in Windows.
Kernel, device drivers, and hardware configuration. Scripts in Windows. Active Directory Service (AD DS) Active Directory Service (AD DS) II. Practice Tasks.

Competences:

The students

- will be able to perform tasks related to database management and solve simple data migration tasks;
- will be able to adapt economic applications, initiate organizational changes necessary for the introduction of IT applications, and cooperate in implementation,
- will look at their own professional competencies and activities in a reflective way;
- will strives for continuous professional training and general self-education;
- will strive to make self-education one of the tools for achieving their professional goals.

Teaching methodology:

The curriculum is processed through lectures, seminars, and on the basis of the student's work done individually or in groups. The seminars are aimed at the practical application of theoretical knowledge, during which students solve tasks under the guidance of the instructor, process case studies, and develop and present proposals for solving problems in different situations. The processing of the curriculum is supported by modern ICT tools, self-assessment tasks, examples and other educational aids developed by the instructor.

Compulsory and Recommended Literature:

Arpaci-Dusseau, R. H., & Arpaci-Dusseau, A. C. (2018). *Operating systems: Three easy pieces* (Vol. 1, p. 15). Madison, WI, USA: Arpaci-Dusseau Books, LLC.
https://pages.cs.wisc.edu/~remzi/OSTEP/
Hailperin, M. (2007). *Operating Systems and Middleware: Supporting Controlled Interaction*. Max Hailperin.
https://open.umn.edu/opentextbooks/textbooks/operating-systems-and-middleware-supporting-controlled-interaction

Subject: Operations Research

Professor in charge: Dr. Imre Balogh

Number of hours: 45

Credits: 4

Assessment: Exam

The aim of the subject:

For the students to improve their competences through the knowledge, skills and attitudes as specified in the training and output requirements.

Knowledge:

Model creation. Formulation of the Linear Programming Problem. Transformations of LP tasks. Duality Transport task. Formulate the task as an LP task. Balancing the task. Possible production of a base solution. Degeneration. Improve the program. Mathematical Model of Game Theory Basic Concepts of Graph Theory. Minimal stretching wood.

Competences:

The students

- will know and understand the basic concepts and relationships of analysis, probability theory, linear algebra, operations research, statistics and computer science, as well as the formal models of routine problems related to the fields of application;
- will look at their own professional competencies and activities in a reflective way;
- will strives for continuous professional training and general self-education,
- will strive to make their self-education one of the tools for achieving their professional goals.

Teaching methodology:

The curriculum is processed through lectures, seminars, and on the basis of the student's work done individually or in groups. The seminars are aimed at the practical application of theoretical knowledge, during which students solve tasks under the guidance of the instructor, process case studies, and develop and present proposals for solving problems in different situations. The processing of the curriculum is supported by modern ICT tools, self-assessment tasks, examples and other educational aids developed by the instructor.

Compulsory and Recommended Literature:

university lecture notes, compiled by the professor in charge, Dr. Imre Balogh

Subject: Programming 1

Professor in charge: Dr. István Gerják

Number of hours: 45

Credits: 4

Assessment: Mid-term grade

The aim of the subject:

For the students to improve their competences through the knowledge, skills and attitudes as specified in the training and output requirements.

Knowledge:

Programming as an activity, the tasks of the programmer. A brief history of Python, Python 2 and 3. Install the Thonny development tool. Basic types: int, float, bool, str; operations with basic types. Integer division, modulo operator, divmod function, not, and. Some built-in functions and their use: print, id, help, dir. Interactive use of the Python interpreter. Python and objects. Use of variables, assign values, act of equality and identity. List, tuple, set, frozen set, dictionary; numbering in Python. Control devices: if, elif, else, for, while (and else that can be used with the two); range; the outline of the code written in Python, line breaks. Internal conversions: what does Python take as False or True in the conditions; conditional expression

Competences:

The students

- will be familiar with the basic programming structures, the methodology of software development and the most important programming environments in the context of programming;
- will have basic knowledge of all areas of information management, including IT strategy, process management, system development, knowledge management, IT service management, project management, risk management, performance management, IT asset management, IT security and IT audit;
- will, with the help of the acquired IT procedures and methods, be able to explore the operating conditions of applications in real business and organizational conditions, to weigh and communicate the benefits, dangers and risks.

Teaching methodology:

The curriculum is processed through lectures, seminars, and on the basis of the student's work done individually or in groups. The seminars are aimed at the practical application of theoretical knowledge, during which students solve tasks under the guidance of the instructor, process case studies, and develop and present proposals for solving problems in different situations. The processing of the curriculum is supported by modern ICT tools, self-assessment tasks, examples and other educational aids developed by the instructor.

Compulsory and Recommended Literature:

Tuffley, D. (2025). *InfoTech Governance, Policy, Ethics & Law*. Griffith University. https://griffithuniversity.pressbooks.pub/infotech-governance-policy-ethics/
Goericke, S. (2020). *The future of software quality assurance*. SpringerOpen. https://link.springer.com/book/10.1007/978-3-030-29509-7

Subject: Infrastructure Management

Professor in charge: Dr. Rózsa Horváth-Bokor

Number of hours: 30

Credits: 3

Assessment: Exam

The aim of the subject:

For the students to improve their competences through the knowledge, skills and attitudes as specified in the training and output requirements.

Knowledge:

Network management. Organization of networks. Automatic resource allocation. Network security. Access restriction, traffic filtering. Network security architectures. Data security, intrusion protection. Virus protection basics. System security models. System safety standards and regulations. User management. Authentication systems. Representation of access rights. Maintain a user database. User identity management. Data storage. Basic concepts of data management. Virtual storage structures. Storage networks. Data backup and restore. Monitoring. Performance measurement, monitoring. Benchmarking. Capacity planning. Event handling. Change management. Identify problems. Disaster management. Creating management environments. Management structure. Centralized and distributed system management solutions. System management standards.

Competences:
The students

- will have the basic knowledge of information systems, will understand the principles of architecture organization, and will be able to interpret the components of computer and information architecture in context;
- will have basic knowledge of all areas of information management, including IT strategy, process management, system development, knowledge management, IT service management, project management, risk management, performance management, IT asset management, IT security and IT audit;
- will be able, with the help of the acquired IT procedures and methods, to explore the operating conditions of applications in real business and organizational conditions, to weigh and communicate the benefits, dangers and risks.

Teaching methodology:

The curriculum is processed through lectures, seminars, and on the basis of the student's work done individually or in groups. The seminars are aimed at the practical application of theoretical knowledge, during which students solve tasks under the guidance of the instructor, process case studies, and develop and present proposals for solving problems in different situations. The processing of the curriculum is supported by modern ICT tools, self-assessment tasks, examples and other educational aids developed by the instructor.

Compulsory and Recommended Literature: Bruce Davie, V. (2019). Computer Networks: A Systems Approach.

https://open.umn.edu/opentextbooks/textbooks/771

Van Horn, M. J. H. (2024). Mastering Enterprise Networks: Step-by-step labs to create, attack and defend enterprise networks NETWORKS.

Subject: Mathematical Statistics 2

Professor in charge: Dr. Imre Balogh

Number of hours: 30

Credits: 3

Assessment: Mid-term grade

The aim of the subject:

For the students to improve their competences through the knowledge, skills and attitudes as specified in the training and output requirements.

Knowledge:

Crosstab analysis. Create and analyse pivot tables in Excel. Supervised and unsupervised learning algorithms. Hierarchic cluster analysis. Non-hierarchical cluster analysis. Multivariate regression calculation. Logarithmic regression. Factor analysis. Principal component analysis. Other Factor Analysis Procedures. Discrimination analysis. Multidimensional scaling.

Competences:

The students

- will know and understand the basic concepts and relationships of analysis, probability theory, linear algebra, operations research, statistics and computer science, as well as the formal models of routine problems related to the fields of application;
- will strives for continuous professional training and general self-education,
- will strive to make his self-education one of the tools for achieving their professional goals.

Teaching methodology:

The curriculum is processed through lectures, seminars, and on the basis of the student's work done individually or in groups. The seminars are aimed at the practical application of theoretical knowledge, during which students solve tasks under the guidance of the instructor, process case studies, and develop and present proposals for solving problems in different situations. The processing of the curriculum is supported by modern ICT tools, self-assessment tasks, examples and other educational aids developed by the instructor.

Compulsory and Recommended Literature:

university lecture notes, compiled by the professor in charge, Dr. Imre Balogh

Subject: Finance

Professor in charge: Dr. Gergely Tóth

Number of hours: 45

Credits: 6

Assessment: Exam

The aim of the subject:

For the students to improve their competences through the knowledge, skills and attitudes as specified in the training and output requirements.

Knowledge:

The concept and development of money. Forms and functions of money. The development of monetary systems. The process of money creation. The relationship between economic policy and financial policy. Monetary policy and its toolkit. Banking system and its institutions. One-tier banking system, two-tier banking system. The role of the central bank and commercial banks. Banking operations, financial services. Cash flow. General rules of payment flow. Types of payment methods. Domestic payment systems. Fiscal policy, the institutions of the fiscal system. Institutional system of financial control. Securities, concept, grouping. Securities market participants. Investment and ancillary investment services, financial instruments. Institutions providing investment services. The concept and operation of the stock exchange. Development, structure and institutions of international financial systems The financial system of the European Union, EMU and financial stability issues. The EU's fiscal system. Financial crises and problems in the financial systems.

Competences:

The students

- will have knowledge of the basic, comprehensive concepts, theories, facts, national economic and international contexts of economics, with regard to the relevant economic actors, functions and processes,
- will master the basic theories and characteristics of the micro and macro levels of organization of the economy, and will be in possession of the basic methods of information collection, mathematics and statistical analysis;
- will follow and interpret the global economic and international business processes, the changes in the related policies and legislation relevant to the economic policy and the field, and their effects, and will take these into account in their analyses, proposals and decisions.
- will have the ability to cooperate with other fields of knowledge and socio-economic subsystems.

Teaching methodology:

The curriculum is based on seminars and work done by the student individually or in a group. The seminars are aimed at the practical application of theoretical knowledge, during which students solve tasks under the guidance of the instructor, process case studies, and develop and present proposals for solving problems in different situations. The processing of the curriculum is supported by modern ICT tools, self-assessment tasks, examples and other educational aids developed by the instructor.

Compulsory and Recommended Literature:

Dahlquist, J. – Knight, R. – Adams, A. S. (2023): Principles of Finance. OpenStax. (Open-access textbook)

Nguyen, A. (2024): Fundamentals of Finance. Deakin University. (Open-access textbook)

Subject: Business English 1

Professor in charge: Dr. Magdolna Kimmel

Number of hours: 45

Credits: 3

Assessment: mid-term grade

The aim of the subject:

For the students to improve their competences through the knowledge, skills and attitudes as specified in the training and output requirements.

Knowledge:

1. Labour market.
   Skills, knowledge and attitudes needed to do different jobs; job descriptions: activities, responsibilities, duties.
   Basic parts of job advertisements. Writing job advertisements. Composing a CV and a covering letter: formal requirements.
   Simulation: choosing the most suitable candidate for a vacancy.

2. Commerce
   Describing products, highlighting distinct features of products. The most frequent commercial services.
   Naming and describing forms of trading and types of retail establishments. (barter transactions, e-commerce, wholesalers and retailers, domestic and multinational chain stores, etc.) Comparing their services and listing their advantages and disadvantages.
   Simulation of a sales situation: presenting a product, comparing it with similar products, setting the price, recommending related services, agreeing on payment method. Functional language, phrases and expressions needed to conduct sales negotiations,
   Methods and procedures used to analyse commercial activities: analysing data, understanding and describing trends based on different types of charts, graphs, diagrams. Vocabulary used to describe trends.
   Presentation: analysing sales trends based on a graph.
   Simulation. organizing a business trip (booking an air ticket, choosing a hotel based on hotel descriptions, booking a room, contacting the partners via phone, discussing the potential program, confirming details in e-mails with the partners).

3. Enterprises
   Types of enterprises. Company history. Comparing businesses. Conditions of starting a business. Organograms. The structure of an organization, jobs, positions and responsibilities within the hierarchy, responsibilities, chain of command.
   Simulation: handling conflicts at the workplace. (e.g. expressing dissatisfaction with an employee, or asking for a pay-rise.)
   Individual presentation: presenting a company. Collecting information. Structuring information. Functional language needed to create an effective presentation.

Competences:

The students

- will possess the basic professional vocabulary of economics in your native language and at least one foreign language.
- will understand and use the typical online and printed literature of the field in Hungarian and foreign languages;
- will be able to communicate in writing, orally and with modern info-communication tools, in a foreign language.

Teaching methodology:

The curriculum is processed in seminars and on the basis of the student's work done individually or in a group. At the seminars, students solve tasks under the guidance of the instructor, acquire professional linguistic vocabulary, practice adequate foreign language behaviour in various business situations, process case studies, and develop and present proposals for solving problems in different situations. The processing of the curriculum is supported by modern ICT tools, self-assessment tasks, examples and other educational aids developed by the instructor.

Compulsory and Recommended Literature:

- Cotton, D., Falvey, D. Kent, S: New Market Leader Upper-Intermediate. Harrow, Pearson-Longman. Harrow, 2006. 176 p. ISBN 978-1-4058-1309-09
- Duckworth, M., Turner, R.: Business Results Upper-Intermediate. OUP, Oxford, 2008 . 167 p. ISBN 978 0 19 476810 8
- Online kiegészítő anyagok
  https://www.pearsonelt.com/myenglishlab.html
  https://elt.oup.com/student/result/?mode=student&cc=hu&selLanguage=hu

Subject: Physical Education

Professor in charge: Levente Fosztó

Number of hours: 30

Credits: 0 (zero)

Assessment: Signature

The aim of the subject:

To get to know and learn the conditions of a healthy lifestyle and to apply them in practice.

Knowledge:

The basics of health promotion. The physical and mental aspects of health. Health as a value is disease prevention, prevention. Healthy eating, leisure activities, mental and physical activity. The role of sport in the preservation and development of health. Health-related tasks (development of resistance and fitness, counterbalancing orthopaedic changes. Independent relaxation exercises). Tasks related to the development of movement culture (development of conditioning and coordination skills adapted to individual abilities. Develop movement skills at the right level. Priority tasks: simple exercises, series of exercises (neck, torso, arms, legs), skill development exercises (endurance development, strength, stretching-relaxing, speed, dexterity and movement coordination exercises).

Teaching methodology:

Theoretical knowledge transfer by the instructor, exercises that stabilize and develop health, physical fitness and condition.

Compulsory and Recommended Literature:

- Role of Warm-up and Stretching in Reducing Sports Injuries (PDF)
- Warming-Up and Stretching for Improved Physical Performance (PDF)
- CNAT Sport Science – Warm-up and Cool-down (PDF)
- Gymnastics – IOC Handbook (PDF megnyitása)
- Gymnastics in the Olympic Games (PDF)
- Gymnastics Physiology fejezet (PDF)

Subject: Computer Science (Algorithm Theory) 1

Professor in charge: Dr. Rózsa Horváth Bokor

Number of hours: 15

Credits: 3

Assessment: Exam

The aim of the subject:

For the students to improve their competences through the knowledge, skills and attitudes as specified in the training and output requirements.

Knowledge:

Euclidean Algorithm, Properties of the Algorithm, Good and Better Algorithms, Small Ordos and Large Ordos, External Element Search, Internal Element Search, Binary Search, Insert Sorting, Divide and Conquer, Basic Graph Theory Concepts, Heap, Linear Time Sorting, Countdown Sorting (Chest Sorting), Radix Sorting, External Sorting.

Competences:

The students

- will know and understand the basic concepts and relationships of computer science, as well as formal models of routine problems related to application areas; will know the basic programming structures, software development methodology, and major programming environments in the context of programming;
- with the help of the acquired IT procedures and methods, will be able to explore the operating conditions of applications in real business and organizational conditions, and to weigh the benefits, dangers and risks;
- will be able to understand and analyse business processes, to develop software applications that help with the implementation of simpler programming tasks.

Teaching methodology:

The curriculum is processed on the basis of a lecture. The instructor presents the curriculum in an interactive way, the processing of which is supported by modern ICT tools, self-test tasks and other educational aids developed by the instructor.

Compulsory and Recommended Literature:

Dinneen, M. J., Gimel′farb, G. L., & Wilson, M. C. (2009). *Introduction to Algorithms, Data Structures and Formal Languages*. Pearson Education New Zealand. https://www.cs.auckland.ac.nz/textbookCS220/ebook/DGW2.pdf
Bible, P. W., & Moser, L. (2023). An Open Guide to Data Structures and Algorithms. https://open.umn.edu/opentextbooks/textbooks/an-open-guide-to-data-structures-and-algorithms

Subject: Project Work 1

Professor in charge: Dr. Rózsa Horváth Bokor

Number of hours: 15

Credits: 2

Assessment: Mid-term grade

The aim of the subject:

For the students to improve their competences through the knowledge, skills and attitudes as specified in the training and output requirements.

Knowledge:

In the framework of the project work course, students work out the solution of an imaginary or real problem from an economic and IT point of view. During the work, the learned knowledge and methods are applied in a targeted manner, adapted to the project, and then the achieved results are presented.

Competences:

The students

- will be able to understand and analyse business processes, prepare and perform the requirement specification of software applications supporting implementation, and perform simple programming tasks;
- will be able to plan and manage small development projects.

Teaching methodology:

The instructor helps the planning and implementation of the project with consultation and suggestions.

Compulsory and Recommended Literature:

Watt, A. (2014). *Project management*. BCcampus.

https://open.umn.edu/opentextbooks/textbooks/456

Gelinas, U. J., Jr., Sutton, S. G., & Fedorowicz, J. (2008). *Business processes and information technology*. Global Text Project.

https://www.opentextbooks.org.hk/tertiary-institutions/27218

Subject: Management and Organization

Professor in charge: Dr. Ferenc Bognár

Number of hours: 30

Credits: 3

Assessment: Mid-term grade

The aim of the subject:

For the students to improve their competences through the knowledge, skills and attitudes as specified in the training and output requirements.

Knowledge:

The position and role of the leader in the organization, the differences between the manager, the leader and the governor. Characteristics and resources of managerial work. Leadership skills, leadership roles and activities. The life cycles and functions of the organization, the reasons and challenges of organizational development. The organization and its environment. Problem-solving, decision-making. Types of decisions. Advantages and disadvantages of group decision-making. Types, advantages and disadvantages of decision-making procedures. Leadership Tasks. Authority and responsibility. Managing people, motivation, communication, control. The manifestations of managerial power and the sources of power. Interpretations and models of leadership style.

Competences:

The students

- will know and understand the principles and methods of the management, organization and operation of management processes, the methodology of the analysis of management processes, and the methodological bases of decision-making, preparation and decision support,
- will possess basic management and organizational knowledge as well as preparation, start-up and management of project and small and medium-sized enterprise start-ups;
- will participates in a project or group task solving, and after gaining practical knowledge and experience, will be able to lead, organize, evaluate and control the activity as a leader;
- in order to achieve quality work, will be problem-sensitive, proactive, constructive, cooperative and proactive in projects or group assignments;
- will independently lead, organize and manage an organizational unit, a working group, or a business or a smaller business organization in a business organization, taking responsibility for the organization and the employees.

Teaching methodology:

The curriculum is processed through lectures, seminars, and on the basis of the student's work done individually or in groups. The seminars are aimed at the practical application of theoretical knowledge, during which students solve tasks under the guidance of the instructor, process case studies, and develop and present proposals for solving problems in different situations. The processing of the curriculum is supported by modern ICT tools, self-assessment tasks, examples and other educational aids developed by the instructor.

Compulsory and Recommended Literature: Robbins – Coulter: Management Edition 11

Subject: Web Systems Programming

Professor in charge: Iván Seres

Number of hours: 30

Credits: 4

Assessment: Mid-term grade

The aim of the subject:

For the students to improve their competences through the knowledge, skills and attitudes as specified in the training and output requirements.

Knowledge:

The basic concepts of the World Wide Web, Internet, social portals. HTML and XHTML are languages, use of style sheets, the core is JavaScript, client-side JavaScript. Basic JavaScript concepts. Creation and application of DHTML with JavaScript, Java applets, XML. General techniques of server-side web programming. Ajax, Java Servlets, JSP, PHP programming.

Competences:

The students

- will be capable of operating economic applications and providing user services;
- will be able to resolve IT conflict situations that arise in the economic environment.

Teaching methodology:

The curriculum is processed through lectures, seminars, and on the basis of the student's work done individually or in groups. The seminars are aimed at the practical application of theoretical knowledge, during which students solve tasks under the guidance of the instructor, process case studies, and develop and present proposals for solving problems in different situations. The processing of the curriculum is supported by modern ICT tools, self-assessment tasks, examples and other educational aids developed by the instructor.

Compulsory and Recommended Literature:

Mendez, M. (2014). *The Missing Link*. Open SUNY Textbooks.

https://open.umn.edu/opentextbooks/textbooks/the-missing-link-an-introduction-to-web-development-and-programming

Gerland, J. (2021). *Guide to HTML, CSS and JavaScript*. Milne Open Textbooks.

https://milneopentextbooks.org/guide-to-html-css-and-javascript

Subject: Software Management

Professor in charge: Dr. István Gerják

Number of hours: 30

Credits: 4

Assessment: Mid-term grade

The aim of the subject:

For the students to improve their competences through the knowledge, skills and attitudes as specified in the training and output requirements.

Knowledge:

The concept of software, its types, the properties of good software, the concept of system design and software design, the concept and models of software process. Project management, characteristics of software projects, project planning, scheduling, risk management, time and cost planning. Software requirements, planning of requirements. System models, software prototyping, formal specification. Software systems design, architectural design. Architectures of distributed systems, object-oriented design. Design real-time software, design with reuse, design user interfaces. Verification and validation, software testing, validation of critical systems. Software management, people management, teamwork, estimating software costs, quality management, software measurement, metrics. Software evolution, ancestral systems, software maintenance, software redesign, configuration management. Software documentation, qualitative and quantitative requirements, tools to help with documentation, security planning. Service-oriented software design, aspect-oriented software design. Agile software development.

Competences:

The students

- will be capable of operating economic applications and providing user services;
- will be able to resolve IT conflict situations that arise in the economic environment.

Teaching methodology:

The curriculum is processed through lectures, seminars, and on the basis of the student's work done individually or in groups. The seminars are aimed at the practical application of theoretical knowledge, during which students solve tasks under the guidance of the instructor, process case studies, and develop and present proposals for solving problems in different situations. The processing of the curriculum is supported by modern ICT tools, self-assessment tasks, examples and other educational aids developed by the instructor.

Compulsory and Recommended Literature:

O'Regan, G. (2014). *Introduction to software quality*. Springer.

https://link.springer.com/book/10.1007/978-3-319-06106-1

Marsic, I. (2012). *Software engineering*. Rutgers University.

https://eceweb1.rutgers.edu/~marsic/books/SE/book-SE_marsic.pdf

Subject: Data Mining Algorithms 1

Professor in charge: Dr. István Gerják

Number of hours: 30

Credits: 3

Assessment: Mid-term grade

The aim of the subject:

For the students to improve their competences through the knowledge, skills and attitudes as specified in the training and output requirements.

Knowledge:

Concept, history, tasks of data mining, statistics versus data mining, the process of knowledge exploration Application areas, successful applications, data mining software, WEKA, ethical issues, expectations. Pre-processing, similarity-difference determination, weighting, normalization, handling missing values, discretization, sampling. Dimensional reduction: singular value resolution (SVD), principal component analysis (PCA). Task of the extraction of common element sets (FAQs), main characteristics and concepts of FAQ algorithms (e.g. candidate generation without repetition). A priori algorithm, a sofa to store common sets of elements, minimal sofa problem. The structure of modern processors and its impact on algorithms (memory hierarchy, data locality, block processing, branch prediction, read ahead, data independence,
Classification and forecasting, decision trees.

Competences:

The students

- will be familiar with the theoretical components of computing infrastructure, the theoretical structure of hardware components, communication and system software, and the areas of data management, including the basic concepts of databases, data processing, representation and visualization;
- will be able to perform tasks related to database management and solve simple data migration tasks.

Teaching methodology:

The curriculum is processed through lectures, seminars, and on the basis of the student's work done individually or in groups. The seminars are aimed at the practical application of theoretical knowledge, during which students solve tasks under the guidance of the instructor, process case studies, and develop and present proposals for solving problems in different situations. The processing of the curriculum is supported by modern ICT tools, self-assessment tasks, examples and other educational aids developed by the instructor

Compulsory and Recommended Literature:

Birant, D. (Ed.). (2021). *Data mining: methods, applications and systems*. BoD–Books on Demand.
https://www.intechopen.com/books/9961
Hahsler, M. (2025). An R companion for introduction to data mining.
https://mhahsler.github.io/Introduction_to_Data_Mining_R_Examples/book/R-Companion-Data-Mining.pdf

Subject: Data Analysis, Data Visualization 1

Professor in charge: Dr Rózsa Horváth Bokor

Number of hours: 45

Credits: 4

Assessment: Mid-term grade

The aim of the subject:

For the students to improve their competences through the knowledge, skills and attitudes as specified in the training and output requirements.

Knowledge:

Introduction to Data Analysis using Python. Python data structures, and database connections, complex data types. Analysing stock market data. Using Python for complex linked calculations. Exploratory data analysis.

Competences:

The students

- will be familiar with the theoretical components of computing infrastructure, the theoretical structure of hardware components, communication and system software, and the areas of data management, including the basic concepts of databases, data processing, representation and visualization,
- will be able to perform tasks related to database management and solve simple data migration tasks,
- will Undertake and credibly represent the professional principles of their IT and application field (company, public administration or public service organization).

Teaching methodology:

The curriculum is processed through lectures, seminars, and on the basis of the student's work done individually or in groups. The seminars are aimed at the practical application of theoretical knowledge, during which students solve tasks under the guidance of the instructor, process case studies, and develop and present proposals for solving problems in different situations. The processing of the curriculum is supported by modern ICT tools, self-assessment tasks, examples and other educational aids developed by the instructor.

Compulsory and Recommended Literature:

Ault, S. V., Liao, S. N., & Musolino, L. (2025). *Principles of data science*. OpenStax.

https://openstax.org/details/books/principles-data-science

Das, U., Lawson, A., Mayfield, C., & Norouzi, N. (2024). *Introduction to Python Programming*. OpenStax.

https://eng.libretexts.org/Bookshelves/Computer_Science/Programming_Languages/Python_Programming_%28OpenStax%29/15%3A_Data_Science

Subject: Database Management Systems 2

Professor in charge: Dr. István Gerják

Number of hours: 30

Credits: 4

Assessment: Mid-term grade

The aim of the subject:

For the students to improve their competences through the knowledge, skills and attitudes as specified in the training and output requirements.

Knowledge:

The structure of a redundancy-free database. Orientation in foreign databases. Steps required for normalization and their mathematical tools. In lifelike databases: regular data processes of administrative functions. SQL capabilities. Basic concepts, relationships between stored data. Appearance of business logic in different databases.

Competences:

The students

- will be familiar with the theoretical components of computing infrastructure, the theoretical structure of hardware components, communication and system software, and the areas of data management, including the basic concepts of databases, data processing, representation and visualization;
- will be able to adapt economic applications, initiate organizational changes necessary for the introduction of IT applications, and cooperate in implementation.

Teaching methodology:

The curriculum is processed through lectures, seminars, and on the basis of the student's work done individually or in groups. The seminars are aimed at the practical application of theoretical knowledge, during which students solve tasks under the guidance of the instructor, process case studies, and develop and present proposals for solving problems in different situations. The processing of the curriculum is supported by modern ICT tools, self-assessment tasks, examples and other educational aids developed by the instructor.

Compulsory and Recommended Literature:

Watt, A., & Eng, N. (2016). Database Design. *Retrieved May*, *11*.
https://ecampusontario.pressbooks.pub/databasedesign02/
McFadyen, R. (2022). Relational Databases and Microsoft Access 365.
https://open.umn.edu/opentextbooks/textbooks/442

Subject: Auditing of Information Systems 2

Professor in charge: Dr Rózsa Horváth Bokor

Number of hours: 30

Credits: 4

Assessment: Exam

The aim of the subject:

For the students to improve their competences through the knowledge, skills and attitudes as specified in the training and output requirements.

Knowledge:

Technical control (infrastructure, communication). Auditing of management information technology control procedures. Audit the organizational processes of the IT function/department. Processes of software development and implementation, control of application systems. Testing compliance with international and national standards. Object-oriented system development environments and function point calculation. E-commerce from the perspective of auditing.

Competences:

The students

- will have general knowledge of the regulatory issues and problems of the information society;
- will have basic knowledge of all areas of information management, including IT strategy, process management, system development, knowledge management, IT service management, project management, risk management, performance management, IT asset management, IT security and IT audit;
- will, with the help of the acquired IT procedures and methods, be able to explore the operating conditions of applications in real business and organizational conditions, to weigh and communicate the benefits, dangers and risks.

Teaching methodology:

The curriculum is processed through lectures, seminars, and on the basis of the student's work done individually or in groups. The seminars are aimed at the practical application of theoretical knowledge, during which students solve tasks under the guidance of the instructor, process case studies, and develop and present proposals for solving problems in different situations. The processing of the curriculum is supported by modern ICT tools, self-assessment tasks, examples and other educational aids developed by the instructor.

Compulsory and Recommended Literature:

Mehta, A. M. (2024). 07.01. Identifying IS Audit Findings. *Auditing Information Systems*. https://ecampusontario.pressbooks.pub/auditinginformationsystems/
Tuffley, D. (2025). *InfoTech Governance, Policy, Ethics & Law*. Griffith University. https://griffithuniversity.pressbooks.pub/infotech-governance-policy-ethics/

Subject: Business Data Mining 1

Professor in charge: Dr Imre Balogh

Number of hours: 45

Credits: 3

Assessment: Mid-term grade

The aim of the subject:

For the students to improve their competences through the knowledge, skills and attitudes as specified in the training and output requirements.

Knowledge:

The concept, purpose, and methods of data mining. Basic features of SPSS Modeler. Data management with Modeler. Univariate statistics. Multivariate statistics. Regression models. Practical examples of supervised and unsupervised algorithms: neural networks, decision trees, clusters.

Competences:

The students

- will have the basic knowledge of information systems, understands the principles of architecture organization, and is able to interpret the components of computer and information architecture in context;
- will be familiar with the theoretical components of computing infrastructure, the theoretical structure of hardware components, communication and system software, and the areas of data management, including the basic concepts of databases, data processing, representation and visualization;
- will undertakes and credibly represent the professional principles of their IT and application field (company, public administration or public service organization).

Teaching methodology:

The curriculum is processed through lectures, seminars, and on the basis of the student's work done individually or in groups. The seminars are aimed at the practical application of theoretical knowledge, during which students solve tasks under the guidance of the instructor, process case studies, and develop and present proposals for solving problems in different situations. The processing of the curriculum is supported by modern ICT tools, self-assessment tasks, examples and other educational aids developed by the instructor.

Compulsory and Recommended Literature:

IBM. (n.d.). *IBM SPSS Modeler 19.0 User's Guide*.

https://www.ibm.com/docs/en/SS3RA7_19.0.0/pdf/ModelerUsersGuide.pdf

IBM. (n.d.). *IBM SPSS Modeler CRISP-DM Guide*.

https://www.ibm.com/docs/en/SS3RA7_19.0.0/pdf/ModelerCRISPDM.pdf