**Tourism and recreation**

- Tourism geography

The aim of this subject is to familiarise the students with valorisation of geographical areas for tourist purposes. The ability to use cartographic documents in tourism. Applying geographical knowledge to creating a tourist product. The knowledge of spatial distribution of sightseeing attractions and protected areas in Poland as well as all over the world.

- Introduction to tourism

The aim of this subject is to familiarise the students with issues and knowledge concerning tourism, understanding problems of modern tourism issues, recognising phenomena occurring in modern tourism, identifying factors determining tourism development and acquiring the skill of analysing phenomena and processes taking place in tourism.

- Tourism services

Introducing the students to the topic of the tourism service market, its structure and specific features.

- History of art and architecture

The aim of this subject is presentation and explanation of basic terms and definitions from the scope of history of architecture and art. Providing general knowledge on the history of European architecture and art from the times of great ancient civilizations to the 20th century. Providing general knowledge on the history of Polish architecture and art seen as a branch of pan-European art. Developing the ability to assess styles and indicate the place and role of cultural heritage in tourism.

- Anatomy and physiology

General principles of how the human body functions. Basic mechanisms and physiological laws concerning the functioning of particular organs and systems as well as the influence of external environment. Reactions of the human body to physical exertion.

- Law in tourism and recreation

Familiarising the students with the issues concerning tourism law. Offering an insight into legal issues related to providing tourism services. Familiarising the students with the legislation related to tourism activity and its influence on the process of shaping modern tourism and recreation. Acquiring the ability to find, interpret and apply laws.

- Creating a tourism product

Familiarising the students with the knowledge of a tourism product, its types and features as well as activities related to shaping its marketing policy.

- Basics of accommodation

- Infrastructure for travel and recreation

Familiarising the students with current tendencies and trends in the development and arrangement of recreational and tourist areas, including the principles of designing and programming those areas for everyday rest, festive holidays and vacations. The ability to perform the valorisation of geographical environment with regard to its tourist attractiveness.

- Marketing in travel and tourism

Familiarising the students with the essence, goals and current trends in the area of tourism services marketing.

- Ecotourism and ecology

Acquiring skills necessary for understanding and analysis of processes that occur in the natural environment. Identification of ecological threats. Knowledge of the spatial distribution of nature protection solutions in Poland, with particular reference to the Low Beskids, the Bieszczady Mountains and the Carpathian Foothills. Shaping the ability of independent observation and registration of the environment’s condition.

- Local history

The aim of this subject is to present basic terms and definitions concerning local history, its evolution and meaning. Providing basic knowledge of the history of this subject in Poland from the times of the Enlightenment to modern times. Familiarising the students with the organisation of local history in Poland, with its place in leisure culture and presentation of basic trends and forms of local history-related activities. Presenting basic methods and forms applied in the area of local history as well as in organising and programming local-history related tourism. Discussing the rule of tourist staff in realising goals related to local history.

- Tourism services management

Familiarising the students with the issues of tourism service management. Shaping abilities related to various aspects of the activity of tourism organisers (tour operating activity, travel services, tour leadership and tour guidance). Introducing rules of and shaping the ability to program and calculate the cost of tourist events.

- Information and tourism promotion

The aim of this course is for the students to acquire skills and knowledge concerning tourism information, beginning with the basics of information theory, through the evolution of organisational solutions, finishing with the presentation of current tendencies in tourism information and marking. An important part of this course is individual student’s project which consist of a presentation of a selected special unit.

- Economics in tourism and recreation

The aim of this course is to familiarise the students with knowledge concerning economic issues of unit functioning in the tourism and recreation business as well as developing awareness of economic processes that may be observed in the tourism and recreation business.

- Travel industry

Providing knowledge concerning functioning and organisation of the modern tourism market as well as organisation of tourism in Poland and in the world.

**Translation and intercultural communication**

**Translation Studies**

- Practical Stylistics

Ability to analyse texts that undertake the issues of functioning of language in social and cultural space, especially in the process of communication, and discuss various types of language (spoken and written), style registers, and the ability to use the acquired knowledge in creating one’s own texts such as a thesis, an essay or functional texts: an application, a resume, a note, press genres: a report, an article, a review, etc.; and the skill necessary for describing and analysing texts with regard to stylistic standards and effectiveness.

- European Intercultural Relations

- Text Editing

Developing basic skills concerning text editing, proofreading and editorial analysis of one’s own or someone else’s text as well as editing of translation editing and text editing, editorial correction and analysis concerning one’s own and someone else’s text and translation edits. The basics of text editing.

- Introduction to Translation Studies

- Practical Knowledge of Language – English

- Practical Knowledge of Language – Russian/German

- Computer as a Translator’s Tool

- Translation Practice – English

- Translation Practice – Russian

- Society, Institutions and Traditions of English-Speaking Countries

- Society, Institutions and Traditions of German/Russian-Speaking Countries

- Literature and introduction to literary studies – English

- Literature and introduction to literary studies – Russian/German

- Intercultural communication practice English

- Intercultural communication practice – German/Russian

**International Language Communication**

- Text Editing

Developing basic skills concerning text editing, proofreading and editorial analysis of one’s own or someone else’s text as well as editing of translation editing and text editing, editorial correction and analysis concerning one’s own and someone else’s text and translation edits. The basics of text editing.

- Information Storage and Processing

Preparation for independent search for information, its conscious reception, especially of the information spread by media, and familiarisation with sources of information as well as tools used in creative gathering and processing of information, as the basics of professional technique in the context of the information society.

- Computer Graphics and Animation, and Visual Communication

Familiarising the students with basic issues of practical graphics and computer animation as well as with the issues of visual communication. Introducing necessary terminology and classification of graphics and computer animation, together with the presentation of the theoretical basics, necessary for the whole course and further self-development. Providing the students with an opportunity to use the acquired knowledge and gain experience while working on graphic projects, in particular on animation projects. Connecting and subordinating theoretical and technical aspects of computer graphics to the goals of visual communication.

- Internet and hypertextual documents

Introducing students to the basic technologies used in creating websites: HTML and CSS language, programming in the browser environment: JavaScript, Flash, Silverlight and Java FX. Website editing, adding subpages and links, blog design.

- Specialized Language: English

Development and improvement of linguistic competences necessary for professional purposes, expanding the student’s knowledge of a foreign language by adding the ability to use specialistic vocabulary characteristic of certain fields compatible with the course of study, preparing the students to use foreign sources in the course of studies as well as preparing the students to use the foreign language in the professional environment.

- Specialized Language: Spanish

- Business Correspondence with Specialist Translation: English

- Business Correspondence with Specialist Translation: Spanish

- Organizational Culture - Business Communication in English

- Business Communication: Spanish

**Automatics and robotics**

- Diploma seminar and thesis I

Basic principles of diploma thesis from the field of engineering and technical fields related to automatics and robotics. Basic rules of copyright law application.

- Diploma seminar and thesis II

- Industrial automation

Provides the student with basic knowledge of industrial automation systems design, installation, modification, maintenance, and repair.

- Engineering project in automation

During the realization of the engineering project, the student sums up the knowledge acquired during the studies and acquires skills necessary to solve a given engineering problem and to prepare the project.

- Industrial robotics

Structure, modelling technique, motion programming and testing methods of positioning mechatronic devices on the example of manipulating robots.

- Engineering project in robotics

During the realization of the engineering project, the student sums up the knowledge acquired during the studies and acquires skills necessary to solve a given engineering issue and to prepare the project.

**Civil Engineering**

1. Foundations

Working out the idea of setting buildings depending on the type of building and limit states. Verifying limit states for foundation soil.

1. Metal structures

Understanding the essence of metal structures as well as theoretical and technological basis of their design. Learning design methods for typical elements and metal construction connections, as well as understanding the validation rules of limit states with appliance to the design standards in force.

Acquisition of skills, such as material selection, shaping, calculating and constructing elements, nodes and simple metal structures, increasing competences in terms of autonomous and team work on a given task. In terms of social skills, awareness of the responsibility for validation of acquired results and awareness of continuous improvement of professional competences, responsibility for one’s own as well as for one’s team’s safety, and the ability to act according to the rules that govern professional ethics.

1. Technology of construction works

Familiarising the students with technologies applied in construction works and finishing works. Teaching the principles and learning the skills needed to apply appropriate technologies to particular works. Learning the ability to design earthworks. Learning the skills needed in the design of equipment forming reinforced concrete elements. Learning the principles and methods of performing assembly work. Learning the principles governing the selection of equipment for earthworks, transport and assembly work. Learning the rules of drawing up technical specifications of the performance and acceptance of construction works.

1. Soil mechanics

Familiarising the student with the basic knowledge of soil science and soil mechanics, which allow the determination of physical and mechanical properties of building grounds, as well as the conditions of cooperation between the building grounds and the construction.

1. Organisation of construction production

Familiarising the student with the principles and methods that apply in the organisation of construction production. Learning the rules and the skills related to designing the schedule of construction works and the network of dependencies in the field of implementing construction projects. Learning the principles and the skills of drafting construction site management designs; learning the principles of drafting Protection and Security plans for construction projects.

1. Structure mechanics

Determining and using the influence of static values in line design. Solving statistically indeterminate bar systems and the assessment of calculations. The assessment of bar system stability.

1. Selected technologies of construction work – student’s choice

The aim of the course is to familiarise the students with technologies of construction works that apply in contemporary construction works; to acquire skills required to search for the necessary data in the literature and on the internet; to improve professional competences in the scope of individual and team work on a given task and the awareness of the constant development of professional competences.

**Commodity Studies -> Physical Education**

1. Anatomy

Acquiring skills in the scope of macroscopic build of the human body, with reference to systems and organs, their role and the relationship between the build and the function (functional anatomy). Special emphasis is placed on the musculoskeletal system. This course is also supposed to prepare the students for other subjects from the curriculum (physiology, prevention of injuries in physical education and sport, compensation-corrective exercises, pre-medical first aid and others).

1. Physiology

General principles of the functioning of the human body. Basic mechanisms and physiological laws that concern the functioning of particular organs and systems and the impact of the external environment. Body reaction to physical effort and the influence of sports training. Ways of monitoring vital signs, performance of function tests and their interpretation.

1. Compensatory and corrective exercises

Introduction to aspects of posturology and posture faults and defects that influence the health condition and development of children. Analysing compensatory and corrective methods, with emphasis on individualisation in the corrective process.

1. Fitness and aerobics

Preparing the student, as a future teacher, to conduct music and movement classes. Developing in the students the ability to function in the field of fitness and aerobics. Familiarising the students with the classification of exercises, aerobic steps, choreography, selection of music and the use of accessories in fitness classes. Providing knowledge of the basic types of fitness as well as of the methods and ways of implementing them.

1. Methodology of Physical Education

Methodological preparation of the students, as future teachers or instructors, for conducting classes independently within the broad sense of physical education, that is within obligatory lessons and extracurricular activities. Familiarising the students with the core curriculum for the first two stages of physical education and teaching them to plan the course, prepare lesson scenarios and detailed, didactic and educational curricula for physical education classes. Equipping the students with the knowledge and competences necessary to perform the process of control and assessment of the pupils’ educational effects in physical education. Preparing the students to promote school physical culture through extracurricular activities and cooperation with units and organisations dealing with promotion of physical culture. Familiarising the students with educational and health aspects of school-based sport.

1. Music, rhythm, dance

Familiarising the student, as a future teacher or instructor, with different forms of dance and music-movement activities and with the possibility of using them in the field of physical education. Methodology of music and movement as well as dance classes for various age and ability groups. The role and place of dance in physical education and dance activity in the school context.

1. Theory and methodology of gymnastics

Familiarising the student with the basic terminology of gymnastics. Teaching and improving basic gymnastic exercises, protection and self-protection in gymnastics. Familiarising the student with the methodology of teaching basic gymnastic exercises and terminology of accessory-based gymnastics. Teaching and practising basic accessory-based gymnastics. Teaching and practising protection and self-protection while doing accessory-based gymnastics. Conducting classes and organising sporting and recreational events.

1. Theory and methodology of athletics

Training the student, as a future teacher or instructor, to conduct athletics classes in schools, sports clubs or other institutions related to physical education. Teaching the technique of running, jumping and throwing. Familiarising the student with the categories of exercises and the methodology of teaching of selected sports and the principles of OHS while working with the athletics equipment and accessories. Providing the knowledge of the regulations in force in the sports discipline being taught as well as the methods, forms, means and rules used in teaching particular skills in athletics.

1. Theory and methodology of swimming

Familiarising the student with safety regulations in swimming classes and the regulations of the swimming pool. Familiarising the student with games and activities in the water. Teaching the technique and the methodology of teaching swimming styles and improving swimming skills. Teaching the student how to organise and run a swimming event.

1. Theory and methodology of volleyball

Preparing the student, as a future teacher or instructor, to run volleyball classes in schools, sports clubs and other institutions related to physical education. Familiarising the student with the categories of exercises as well as with the methods, forms, rules and means applied to teaching skills characteristic of volleyball. Teaching elements of volleyball technique and the basics of individual and team tactics. Presenting sample tests serving the purpose of checking the pupils’ skills. Providing knowledge of the regulations in force in the discipline being taught.

1. Theory and methodology of football

Preparing the student, as a future teacher or instructor, to conduct football classes in schools, sports clubs or other institutions related to physical education. Familiarising the student with the classification of exercises as well as with the methods, forms, rules and means used in teaching football-specific skills. Practical teaching of the elements of football technique, basics of individual and team tactics. Presenting sample tests serving the purpose of assessing the pupils’ skills. Providing the knowledge concerning the rules of football and futsal.

1. Theory and methodology of basketball

Preparing the student, as a future teacher and instructor, to teach basketball in a school or in a sports club. Familiarising the student with the methodology and classification of exercises, teaching technique and tactics of basketball. Providing the knowledge concerning basketball rules as well as methods, forms, means and rules applied in teaching basketball.

1. Theory and methodology of handball

Preparing the students for the work of a teacher or instructor. Developing the following competences:

- shaping the personality of a child through games and activities,

- applying appropriate didactic principles to teaching basic technical elements,

- knowing and applying methods, forms and means of teaching appropriate to the educational level,

- ability to use various forms of lesson organisation,

- mastering the technique and methodology of teaching basic elements of handball,

- ability to classify elements of the game in the attack and in the defence,

- ability to write a handball lesson plan and conduct part of the lesson,

- refereeing ‘ the lesson outline of handball and conducting a part of the course,

- refereeing “small-sided games” and the main game,

- organising handball tournaments.

1. Physical games and activities

Preparing the student, as a future teacher or instructor, to conduct classes with the use of physical games and activities in school education and while organising leisure time for children and youth in institutions related to physical education. Familiarising the student with examples of physical games and activities with regard to the aims and goals of physical and motor activity. Familiarising the student with the course of lessons with physical games and activities. Shaping competences in the scope of planning lessons with physical games and activities. Learning safety regulations applicable during classes with physical games and activities.

1. Strength training and body building

Preparing the student, as a future teacher or instructor, to conduct strength training with elements of body-building in schools, sports clubs and other institutions related to physical education. Familiarising the students with the rules of strength training, its health and utility values. Preparing the students to plan and control the efficiency of the strength training with regard to the age and abilities of the participants of the training. Practical teaching of exercises with the equipment and accessories, following safety regulations.

1. Functional training

Familiarising the students with the specificity and the principles of functional training. Preparing the students to work out a training plan with the use of various tools and accessories. Familiarising the students with training technique and the possibilities of applying functional training in shaping motor skills on the example of various sports disciplines.

1. Methodology of health training

The goal of this course is to raise the students’ interest in health matters and to show the leading role of physical activity in a healthy lifestyle, as well as the dangers that come with the lack of physical activity. Indicating the need to promote healthy behaviours in various environments. Familiarising the students with the methods, forms and measures used in health training aimed at improving the level of particular motor skills. Providing the students with the ability to diagnose and interpret the results of fitness and activity tests for people at different ages. Familiarising the students with the principles of planning and programming training units in the course of the health training.

1. Senior training

Familiarising the student with the general knowledge concerning physical activity of seniors in their leisure time and programming senior trainings. Teaching the student to plan and conduct general-fitness classes with seniors.

1. Kinesiotherapy

Presenting the connection with and the role of kinesiotherapy in biological regeneration and physical culture. Understanding the role of physical activity in human life. Practical teaching of selected therapeutic exercises.

1. Sports massage

Learning basic terms of sports massage, learning the methodology and rules of performing sports massage and the ability to perform the sports massage in selected disciplines.

1. Workshop in corrective gymnastics

Developing skills needed to function in the field of corrective gymnastics. Developing skills needed to organise corrective gymnastics classes, use the equipment and accessories, select starting and exercising positions and adjusting games and activities to particular defects, preparing lesson plans and observing lessons.

1. History of physical culture

Presentation and explanation of basic definitions and terms concerning the history of physical culture. Providing the basic knowledge of the history of sport, physical education, tourism and rehabilitation in Europe from the times of the great ancient civilizations to the 20th century. Providing the general knowledge of the history of physical culture in Poland. Acquisition of skills regarding the correct assessment of evolution in particular fields of physical culture and indicating their place and role in cultural heritage. Acquisition of basic knowledge regarding the heritage of physical culture in our region.

1. Aqua Fitness Workout

Developing the skills concerning the correct selection of exercise and accessories for the aqua fitness workout. Training the students to work out choreographies for shallow and deep water.

1. Diagnostics in individual training

Preparing the students for diagnosing the current condition of a body, its physical activity readiness and interpretation of the results of physical fitness and activity condition of people at different age groups with the aim of selecting appropriate training loads as well as verifying the assumed results of the training.

1. Basics of massage

Introduction to the basic terms concerning massage, methodology and principles of conducting classical massage and learning the skill of massaging.

1. Corrective swimming

Providing knowledge concerning the rules that apply in conducting corrective swimming exercises in the water. Teaching safety regulations, indications and counterindications for attending corrective swimming classes and the selection of exercises appropriate to corrective swimming classes.

**Environmental and Production Engineering**

1. Biofilm and Granular Biomass Based Technologies for Wastewater Treatment

Fundamentals of biofilm and granular biomass-based technologies. Review of the most important and frequently applied devices and technologies based on biomass growth in biofilm and granules.

1. Basics of lean manufacturing

The aim of this subject is to familiarise the students with basic knowledge concerning organisation and effective management.

**Food Production and Safety**

1. The evolution of plants

Understanding the basics of contemporary synthetic theory of evolution. Knowledge of the basic stages of natural history of plants. Awareness of evolutionary changes and threats to existing biodiversity.

**Herbalism**

1. The evolution of plants

Understanding the basics of contemporary synthetic theory of evolution. Knowledge of the basic stages of natural history of plants. Awareness of evolutionary changes and threats to existing biodiversity.

1. Propagation of herbal plants

Basic methods of creating herbal plants. Methods of breeding self-fertile, non-fertile and vegetatively propagated plants. Contemporary biotechnology techniques. Laboratory evaluation of seed and evaluation of biological progress in herbal plant culture.

1. Dietary supplements

Knowledge of the technology of production and use of dietary supplements. Supplementation rules. Processes for producing and preserving functional food. Rules for designing a dietary supplement. EU and Polish legislation on supplementation.

1. Certification and quality systems in herbal processing

Issues regarding management and quality assurance systems, with standards, basic concepts and conditions for the implementation of quality management systems in enterprises dealing in the production of herbal raw materials.

**Information Technology (IT)**

1. Modern programming techniques

Backend and frontend technologies for Web development. Characteristics of selected technologies: JEE, .NET. Consuming Web Services and Web API. JavaScript frontend frameworks. Implementation of the system data, logic and presentation layers. Architectural patterns: MVC, MVVM. Cloud-based services. Data processing with Python language.

1. Low level programming

Introduction to low-level programming environment, compilers, types of programmes, computer architecture, number systems. COM-type programmes, the CPU registers, debugging of the programme code. The 8086 Microprocessor and the 8288 controller. Interruptions. Arithmetical and logical orders. Stacks, bit shifts. Unconditional control orders, labels and procedures. Conditional statements. Loops. Tables. Argument of the functions. Access to disk files. EXE-type structures. Conditional assembly, summary.

1. Utility programmes

The aim of the course is to develop the skill of swift movement in the environment of programmes which are going to be used in various courses in further semesters, with special emphasis on programmes allowing scientific and engineering computations.

1. Algorithms and data structures

Introduction to design and analysis of algorithms, as well as familiarising the students with basic structures of data and sorting algorithms.

1. Operational research

Introduction to the methods used in operational research, including the premises, conditions and limitations of their use. Showing the cognitive value of the methods used and their possibilities in decision-making processes.

1. Programming I

Acquiring the basic knowledge of object-oriented programming in the C++ language.

1. Operating systems

Familiarising the students with the structure of an operating system and with the functionality of all its modules.

1. Computer architecture

Microprocessors; microcontrollers; structure of systems with microprocessors; function cards.

1. Databases

The aim of the course is the acquisition of knowledge and skills related to the design and implementation of databases using Access as well as the implementation of various functionalities to ready-made databases.

1. Programming II

Object-oriented programming in the C# language.

1. Computer networks

The knowledge of the basics of computer networks. Practical aspects of devices and basic Web protocols.

1. Software engineering

Familiarising the students with contemporary methods of design and implementation of complex information systems. Presenting the life-cycle of software and description of particular phases of the cycle on the example of selected models.

1. Programming languages and paradigms

Discussing paradigms and programming languages.

1. Computer graphics and human-computer communication

The aim of the course is to develop the skill of creating and processing computer graphics based on IT tools, practical preparation in terms of Computer Aided Design, and familiarization with visual communication methods and multimedia content.

1. Artificial intelligence

The aim of the course is to familiarise students with contemporary trends in the development of artificial intelligence in the world, algorithms, methods and computational techniques, structures and neural networks as well as models of neurons, genetic algorithms and fuzzy systems, deep learning.

1. Embedded systems

SP-AVR prototyping environment, programming studio. PB\_SYM simulator. Design of combinational logic (circuit minimisation, Karnaugh map), sequential logic (creating timing charts, graphs and programme codes), timing circuits and sequential-timing circuits. Twin Cat tool for cx9000 Beck Hoff driver. System manager – connection with the driver. PLC Control – program creating. Assignment of variables to i/o channels. PLC Control – a program with the i/o channel in its driver. Control and visualization tool Twin Cat and Wonderware In Touch. CP Dev Program – programming of the PLC driver simulator PLC in the ST language.

1. Programming of database application in C# language

Programming of database applications in the MS Visual Studio C# environment.

1. Database design

The principles of database design. Examples of simple relational databases. Methodology of designing relational databases. Creation of conceptual modes based on Entity Relationship Diagrams (ERD). Examples of ERD. Transition to the implementation model: relational model, hierarchical model and network model. Standard forms and standardisation of the relational data model. Process modelling: the hierarchy of functions, CRUD Diagram. Reverse engineering of database systems. Data flow diagram (DFD). The quality and completeness of process models. Process diagram – definitions and conventions. Quality and completeness of process diagrams. Coherency of data and process models. Computer aided database design. CASE tools used in the creation and management of databases.

1. Programming of mobile devices

Android Studio development environment. Introduction to mobile systems. Android operating system – characteristics. Introduction to mobile application programming in Android OS – programming tools. Basics of XML – Layout programming – ConstraintLayout, LinearLayout, RelativeLayout. Animated action – Java programming – Google Android library. Activities, intentions and services. Programming in the graphic mode. Storage and transfer of data between activities. Basics of SOLite. Components used in the visualisation of data downloaded from database – Lists. Concurrent programming. The procedure of creating a project and publishing applications in Google Play Store. Advertisements in the AD Mod application. Statistics.

1. Information security management

Presenting the essence of information and the issue of its safety, its natural and legal protection and standards of its safety management.

1. Application of the Internet of things

This subject constitutes the introduction to the topic of the Internet of things – the concept regarding network connections of products of everyday use. The Internet of things, by integrating diverse items, leads to the creation of a widely dispersed network of devices that communicate both with humans and with other devices.

1. Decision processes

Presentation of the construction methods and the analysis of decision models.

1. Administration of database servers

Acquiring practical skills in the field of server database management on the example of the PostgreSQL database based on the Linux operating system.

1. Creating secure code

Acquiring the knowledge and the practical skills in the field of programming safe IT systems.

1. Basics of cryptography

Introduction to the basics of cryptographic systems and the methods of securing data.

1. Web applications

Structure of the web application. Technologies of user’s interface implementation, presentation and business logic. Multi-tier architecture. Implementation of database management systems. HTML, CSS, JavaScript, HTML DOM. The use of JavaScript in client-side validation of data. XML, ASP.NET Technology. Creation of web applications based on the WebForms mechanism. The use of the MVC framework on the example of the ASP.NET. O-R Mapping. Entity Framework. LINQ.

1. Graphics design

Developing the ability to create graphic design meant for typical use on the basis of IT tools. Practical preparation in the scope of the handling of software supporting graphic design.