TÆKNI- OG VERKFRÆÐIDEILD
SCHOOL OF SCIENCE AND ENGINEERING

Diploma in Technology

Construction Technology
Electrical Technology
Mechanical Technology

Course Catalogue 2015-2016

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DIPLOMA PROGRAMS IN TECHNOLOGY

The School of Science and Engineering offers three diploma programs in Technology:
Construction Technology, Mechanical Technology and **Electrical Technology.**

These are practically orientated diploma programs at post-secondary level, rooted in traditional trades. The programs have a strong tradition of practical orientation in cooperation with the industry. Practically oriented project work plays a large role in the studies and most of the teachers have a background of experience in the industry.

The objective of the programs is to qualify the students for jobs in the relevant sectors of industry as intermediate professionals, i.e. filling the gap between the certified tradesman and higher level technical staff such as engineers. Their qualifications are intended to be suitable for work in planning and production in its broadest sense.

In order to emphasize the necessity for profound knowledge of the practical aspects of work in industry the completion of a suitable vocational training is a prerequisite for admission. An additional prerequisite is one term at Reykjavik University´s preparatory department or equivalent. Preparatory courses can be taken as distance learning. The Diploma in Construction Technology, Mechanical Technology or Electrical Technology gives the student the right to the relevant master tradesman´s certificate.

The Study Programs
Each diploma program is 90 ECTS credits and is operated solely as distance learning. The program is planned to have a duration of 3 years alongside work, but as full time study it can be completed in 1,5 years.

In the last semester, the students complete a final project wherein they demonstrate the practical knowledge and professional competence they have gained, dealing with technical solutions in design, planning and development.

Learning Methology in Distance Learning
The students get lectures, problems and other study materials electronically on the teaching web of the university and their communications with teachers and other students are mostly through this web. In addition to traditional teaching material, use is made of electronic slides, video recordings and remote conference facilities. Students outside the Reykjavik area get access to local education centres, but students in the Reykjavik area are offered study facilities for group work on the university premises. Twice during each term, students attend working sessions over a long weekend where they perform laboratory exercises and projects which are not suited for distance learning.

Diploma in Construction Technology (fyrst cycle, level 1)

The programme leading to a Diploma in Construction Technology is 90 ECTS credits, 3 years (6 semesters) part-time study through distance learning. The requirements for the Diploma in Construction Technology reflect the requirements for the professional title of Certified Technician (Icelandic: iðnfræðingur), as accredited by the Icelandic Ministry of Industries.

The programme is practically orientated, rooted in the construction and civil engineering industry. Emphasis is placed on practical project work and the application of computer design tools. Most of the teachers have extensive industrial experience. In the final semester, students complete a final project of 12 ECTS dealing with technical solutions in development, design and planning, wherein they demonstrate the knowledge and professional competence they have gained.

The main objective of the programme is to qualify students for jobs as intermediate professionals, filling the gap between certified tradesmen and higher level technical staff.

Students who graduate with a Diploma in Construction Technology take a further 120 ECTS in constructing architecture and graduate with a BSc degree in Constructing Architecture, a total of 210 ECTS credits.

Upon completion of the programme, the following criteria shall be fulfilled.

KNOWLEDGE

Upon completion of the programme, the student should have gained general knowledge and understanding of basic principles of the following:

	• Structural mechanics, structural design, building technology, building construction, installations, geotechnics, surveying, and material properties of concrete, steel and timber. • Computer-aided drawing and design, including the methods and tools most commonly used i.e. AutoCad and Revit/BIM. • Project management, including the methods and software most commonly used in scheduling and planning i.e. MS Project. • The general structure of design projects in the building industry. • The provisions of Icelandic laws, regulations, standards and ethics relating to the construction industry. • Basic principles of finance, management, administration, and operational safety related to the management of smaller industrial enterprises. • Didactics, especially pertaining to the instruction of apprentices.

SKILLS

Upon completion of the programme, the student should have gained the skills to:

Disciplinary skills	• Work with design software such as AutoCad and Revit/BIM. • Make technical drawings according to standards. • Assess the load bearing capacity of simple building elements. • Prepare tender documents and offers for construction projects, as well as project plans, schedules and cost estimates. • Draft the size and design of simple structural elements and building parts. • Draft the size, type and location of simple water, heating and sewage utility systems. • Perform customary surveying, measurements and setting out on site for common buildings and earthworks. • Utilize the basics of soil mechanics to draft geotechnical solutions for foundations of smaller buildings and installations. • Do accounting for small businesses, both by hand and using appropriate software. • Make calculations relating to administration, salaries, taxes, cash-flow, indexation and bonds for small businesses. • Apply knowledge of safety standards and procedures, administration and management to processes in production and industrial enterprises. • Integrate knowledge from all subjects taught in the Construction Technology programme to analyse problems in the field, suggest solutions and evaluate the need for expert assistance.
Personal skills	• Express him-/herself orally and in writing, and convey knowledge in a concise and professional manner. • Use practical knowledge to solve technical problems.. • Apply technical methods in a systematic manner to define problems, and to collect and assess information. • Use independent and effective procedures to solve problems in practical project work for the industry. • Present possible solutions and results in a professional manner.

Interpersonal skills	• Work and communicate effectively in a team, also in interdisciplinary teams, and share knowledge. • Collect information relevant to a specific task by using personal and professional contacts, libraries, and search engines. • Use freehand sketches for explaining and communicating on site. • Make presentations of technical projects, using appropriate technical language and software. • Associate with owners, employers and employees in accordance with the laws, regulations, ethics, and codes of conduct that are applicable in the industry.
COMPETENCE Upon completion of the programme, the student should be able to utilize the knowledge and skills he/she has aquired to:	
	• Work on traditional and common tasks in the design of buildings and building elements, alongside civil engineers and architects. • Work as supervisors and inspectors on construction sites and in industry. • Work in manufacturing, production and maintenance in the building industry. • Work on accounting in industrial enterprises, albeit with professional assistance in more complex tasks. • Instruct and be responsible for apprentices, as a master tradesman. • Pursue further studies, through life-long learning or towards a more advanced degree i.e. at BSc level.

Diploma in Electrical Technology (fyrst cycle, level 1)

The programme leading to a Diploma in Electrical Technology is 90 ECTS credits, 3 years (6 semesters) part-time study through distance learning. The requirements for the Diploma in Electrical Technology reflect the requirements for the professional title of Certified Technician (Icelandic: iðnfræðingur), as accredited by the Icelandic Ministry of Industries.

The programme is practically orientated, rooted in the electrical and electronics industry. Emphasis is placed on practical project work and the application of computer design tools. Most of the teachers have extensive industrial experience. In the final semester, students complete a final project of 12 ECTS dealing with technical solutions in development, design and planning, wherein they demonstrate the knowledge and professional competence they have gained.

The main objective of the programme is to qualify students for jobs as intermediate professionals, filling the gap between certified tradesmen and higher level technical staff.

Upon completion of the programme, the following criteria shall be fulfilled.

KNOWLEDGE

Upon completion of the programme, the student should have gained general knowledge and understanding of basic principles of the following:

	• Electric circuits, electronics, digital technology, electrical machinery, power distribution systems, programmable controllers and control systems, and the design of lighting and electrical installations. • Computer-aided drawing and design, including the methods and tools most commonly used i.e. AutoCad. • The general structure of design projects in the electric power and electronics industry. • The provisions of Icelandic laws, regulations, standards and ethics relating to the electric power and electronics industry. • Basic principles of finance, management, administration, and operational safety related to the management of smaller industrial enterprises. • Didactics, especially pertaining to the instruction of apprentices.
SKILLS Upon completion of the programme, the student should have gained the skills to:	
Disciplinary skills	• Work with design software such as AutoCad. • Make technical drawings according to standards. • Assess the function and capacity of electric circuits. • Assess the electric power requirement of buildings, machines and power distribution systems. • Draft the size and design of common and traditional lighting and electric installations systems, and select spare parts. • Install digital equipment, work on maintenance tasks and analyse breakdowns. • Design programmable, individual controllers. • Do accounting for small businesses, both by hand and using appropriate software. • Make calculations relating to administration, salaries, taxes, cash-flow, indexation and bonds for small businesses. • Apply knowledge of safety standards and procedures, administration and management to processes in production and industrial enterprises. • Integrate knowledge from all subjects taught in the Electrical Technology programme to analyse problems in the field, suggest solutions and evaluate the need for expert assistance.

Personal skills	• Express him-/herself orally and in writing, and convey knowledge in a concise and professional manner. • Use practical knowledge to solve technical problems.. • Apply technical methods in a systematic manner to define problems, and to collect and assess information. • Use independent and effective procedures to solve problems in practical project work for the industry. • Present possible solutions and results in a professional manner.
Interpersonal skills	• Work and communicate effectively in a team, also in interdisciplinary teams, and share knowledge. • Collect information relevant to a specific task by using personal and professional contacts, libraries, and search engines. • Make presentations of technical projects, using appropriate technical language and software. • Associate with owners, employers and employees in accordance with the laws, regulations, ethics, and codes of conduct that are applicable in the industry.
COMPETENCE Upon completion of the programme, the student should be able to utilize the knowledge and skills he/she has aquired to:	
	• Work on traditional and common tasks in the designing of electrical systems, installations and equipment, alongside electrical engineers. • Work as supervisors and inspectors in the electric power and electronics industry, and on sites. • Work in manufacturing, production and maintenance of electric and electronic machines and equipment. • Work on accounting in industrial enterprises, albeit with professional assistance in more complex tasks. • Instruct and be responsible for apprentices, as a master tradesman. • Pursue further studies, through life-long learning or towards a more advanced degree i.e. at BSc level.

Diploma in Mechanical Technology (fyrst cycle, level 1)

The programme leading to a Diploma in Mechanical Technology is 90 ECTS credits, 3 years (6 semesters) part-time study through distance learning. The requirements for the Diploma in Mechanical Technology reflect the requirements for the professional title of Certified Technician (Icelandic: iðnfræðingur), as accredited by the Icelandic Ministry of Industries.

The programme is practically orientated, rooted in the machine, metal and energy industry. Emphasis is placed on practical project work and the application of computer design tools. Most of the teachers have extensive industrial experience. In the final semester, students complete a final project of 12 ECTS dealing with technical solutions in development, design and planning, wherein they demonstrate the knowledge and professional competence they have gained.

The main objective of the programme is to qualify students for jobs as intermediate professionals, filling the gap between certified tradesmen and higher level technical staff.

Upon completion of the programme, the following criteria shall be fulfilled.

KNOWLEDGE

Upon completion of the programme, the student should have gained general knowledge and understanding of basic principles of the following:

	• Mechanics, materials science, thermodynamics, hydraulics, machine elements and design, digital technology and programmable controllers. • Computer-aided drawing and design, including the methods and tools most commonly used i.e. AutoCad, and Inventor or SolidWorks. • Project management, including the methods and software most commonly used in scheduling and planning i.e. MS Project. • The general structure of design projects in the metal and energy industry. • The provisions of Icelandic laws, regulations, standards and ethics relating to the metal, machine and energy industry. • Basic principles of finance, management, administration, and operational safety related to the management of smaller industrial enterprises. • Didactics, especially pertaining to the instruction of apprentices.

SKILLS

Upon completion of the programme, the student should have gained the skills to:

Disciplinary skills	• Work with design software such as AutoCad and Inventor/SolidWorks. • Make technial drawings according to standards. • Assess the load bearing capacity of relatively simple machine elements in Inventor. • Prepare tender documents and offers for construction projects, as well as project plans, schedules and cost estimates. • Draft the size and design of individual and assembled machine elements, and choose spare parts. • Calculate energy and pressure losses in pipes and simple installation systems. • Draft the size and type of heat transformers, and choose pumps. • Utilize basic knowledge of digital technology and programmable controllers to solve problems. • Do accounting for small businesses, both by hand and using appropriate software. • Make calculations relating to administration, salaries, taxes, cash-flow, indexation and bonds for small businesses. • Apply knowledge of safety standards and procedures, administration and management to processes in production and industrial enterprises. • Integrate knowledge from all subjects taught in the Mechanical Technology programme to analyse problems in the field, suggest solutions and evaluate the need for expert assistance.
Personal skills	• Express him-/herself orally and in writing, and convey knowledge in a concise and professional manner. • Use practical knowledge to solve technical problems.. • Apply technical methods in a systematic manner to define problems, and to collect and assess information. • Use independent and effective procedures to solve problems in practical project work for the industry. • Present possible solutions and results in a professional manner.

Interpersonal skills	• Work and communicate effectively in a team, also in interdisciplinary teams, and share knowledge. • Collect information relevant to a specific task by using personal and professional contacts, libraries, and search engines. • Use freehand sketches for explaining and communicating on site. • Make presentations of technical projects, using appropriate technical language and software. • Associate with owners, employers and employees in accordance with the laws, regulations, ethics, and codes of conduct that are applicable in the industry.
COMPETENCE Upon completion of the programme, the student should be able to utilize the knowledge and skills he/she has aquired to:	
	• Work on traditional and common tasks in the designing of machines, machine elements and instillation systems, alongside mechanical engineers. • Work as supervisors and inspectors in the metal and machine industry, and on sites. • Work in manufacturing, production and maintenance of machines and equipment. • Work on accounting in industrial enterprises, albeit with professional assistance in more complex tasks. • Instruct and be responsible for apprentices, as a master tradesman. • Pursue further studies, through life-long learning or towards a more advanced degree i.e. at BSc level.

CONSTRUCTION TECHNOLOGY

Construction Technologists work in architecture and engineering firms, as inspectors or supervisors in the building industry and as managers on construction sites. The main subjects are building construction, computer aided design, strength of materials,
structural design, materials science, management and administration, as well as a practical final project.

The study program is mainly planned for those who commence their studies in the fall semester (August) but for part-time students it is also possible to commence studies in the spring semester (January). The program director for the study programs in technology is Jens Arnljótsson jensarn@ru.is . Curriculum supervisor in Construction Technology is Jónas Þór Snæbjörnsson.

A student who graduates with a Diploma in Construction Technology can go on to a 120 ECTS program and graduate after that in Constructing Architecture BS (a total of
210 ECTS).

Study plans in Construction Technology - 90 ECTS credits

Construction Technology - Part-time study, 12 - 18 ECTS per semester
All courses are 6 ECTS credits unless otherwise stated

1.semester - fall	18 ECTS		**2.semester - spring**	18 ECTS
AI BUÞ 1003	Statics and Mechanics of Materials		BI BUÞ 2013	Mechanics of Structures*
AI TEI 1001	Computer-Aided Drawing (3 ECTS)		BI BFR 1013	Building Technology*
BI HON 1001	Computer-Aided Design (3 ECTS)		AI STJ 1003	Management, Didactics and Safety
AI REH 1003	Financial Accounting			
3.semester - fall	12 ECTS		**4.semester - spring**	18 ECTS
BI HVL 1003	Heating and Installations		BI EBE 1003	Materials Science and Building Physics
BI EFN 1013	Concrete – Properties and Maintenance		AI FRK 1003	Construction and Project Management
			BI JTÆ 1003	Geotechnical Engineering
5.semester - fall	12 ECTS		**6.semester - spring**	12 ECTS
BI LAM1003	Surveying (4 ECTS)			
BI GÆÐ 1001	Quality Control in Construction (2 ECTS)		BI LOK 1006	Final Project (12 ECTS)**
AI LOG 1003	Law			

* Prerequisites are required for this course
** The final project may be completed in fall or spring semester

Construction Technology - Full-time study, 24 - 36 ECTS per semester
All courses are 6 ECTS credits unless otherwise stated

1.semester – fall	30 ECTS	**2.semester - spring**	36 ECTS
AI BUÞ 1003	Statics and Mechanics of Materials	BI BUÞ 2013	Mechanics of Structures*
AI TEI 1001	Computer-Aided Drawing (3 ECTS)	BI BFR 1013	Building Technology*
BI HON 1001	Computer-Aided Design (3 ECTS)	AI STJ 1003	Management, Didactics and Safety
AI REH 1003	Financial Accounting	BI EBE 1003	Materials Science and Building Physics
BI HVL 1003	Heating and Installations	AI FRK 1003	Construction and Project Management
BI EFN 1013	Concrete – Properties and Maintenance	BI JTÆ 1003	Geotechnical Engineering
3.semester – fall	24 ECTS		
BI LAM1002	Surveying (4 ECTS)		
BI GÆÐ 1001	Quality Control in Construction (2 ECTS)		
AI LOG 1003	Law		
BI LOK 1006	Final Project (12 ECTS)**		

* Prerequisites are required for this course
** The final project may be completed in fall or spring semester

COURSE DESCRIPTIONS IN CONSTRUCTION TECHNOLOGY

AI BUÞ 1003 STATICS AND MECHANICS OF MATERIALS 6 ECTS
Year of study: First year.
Semester: Fall.
Level of course: First cycle - Introductory.
Type of course: Core.
Prerequisites: None.
Schedule: Distance learning for 15 weeks, two weekend sessions on campus.
Supervising teacher: Jónas Þór Snæbjörnsson.
Teacher: Jóhann Albert Harðarson.
Learning outcome: On completion of the course students should:

- Possess the basic theoretical knowlwdge of forces and statics.
- Be able to find rectangular components of forces and calculate resultant forces.
- Can identify supports of beams and equilibrium of forces.
- Can calculate internal forces (moment, shear force an n ormal force) on the basis of external forces.
- Can calculate memeber forces
- Can find the centroid of a cross section.
- Possess the necessary knowlwdge for learning design of structures and machine elements.

Content:
Forces and moments in the plane. Force systems and simplification of those (analytical and graphical solutions). Centroid. Beams and loading on beams. Support types. Determination of support reactions. External and internal forces. Graphs of internal forces.Relationship between shear – and moment graphs. Trusses. Determination of member forces. Method of joints. Determination of internal forces in statically determinate simple frames. Structures with joints. Students solve 7 assignments during the term and take an examination at the end of the term.

Reading material: Preben Madesen: *Statik og styrkelære.* Erhvervsskolernes forlag, 2nd edition, 2013
Teaching and learning activities:
Lectures, sample problems, assignments and problem solving. Reading materials on the web, followed up with regular assignments during the term. Further materials from teacher on the web. Instruction from teacher on the web.

Assessment methods:
A 4 hr. Written examination accounts for 80% and assignments for 20% of final grade. 7 assignments weighing according to a list submitted by teacher.

Language of instruction: Icelandic.

AI TEI 1001 COMPUTER-AIDED DRAWING 3 ECTS
Year of study: First year.
Semester: Fall/Spring.
Level of course: First cycle - Introductory.
Type of course: Core.
Prerequisites: None.
Schedule: Distance learning for 7,5 weeks, one weekend sessions on campus.
Supervising teacher: Indriði Sævar Ríkharðsson.
Teacher: Ingibjörg Birna Kjartansdóttir.
Learning outcome: On completion of the course students should:
In descriptive geometry the student should:

- Understand the importance of drawings in the presentation of technical design and information.
- Understand the importance of information presented on drawings being presented so that they can be used for production
- Be able to prepare drawings that fulfill the requirements of drawings prepared by professionals in the field.
- Know of the existence of rules and standards and know ways of acquering and using information in such documents.
- Know the main types of lines and how these are used in the preparation of drawings.
- Have knowledge of the basic principles of descriptive geometry and how these are used in technical design.

In Computer aided design the student shall:

- Be able to use software like AutoCad in the preparation of drawings and be able to acquaint himself with the software and enhance ones knowledge, e. g. by using the “help” feature of the software.
- Be able to set up his own working environment in AutoCad.
- Be able to adjust AutoCad to ones own needs.
- Be able to make symbols and files of symbols.
- Be able to make templates, text and measurement styles.
- Know how to use the main commands.
- Be able to produce simple drawings.
- Be able to use Xref.
- Be able to place drawings on sheets and print those.

Content:

The objective of the course is to provide insight into the general descriptive geometry and how it is used in technical design. The students get instruction in

using the software AutoCad in the preparation of drawings. The course is divided in two, the usage of AutoCad and on the other hand, the basic principles of descriptive geometry and the principles of technical drawings.

The CAD part is presented via tutorial videos where the user interface of the software is explained, the main commands and setting up of drawings for printing. It is intended for the student, on completion of the course, be able to become familiar with the software, make use of the „help“ features, and deliver drawings made in AuotCad.

The descriptive geometry part of the course is intended to impart insight into the theory that is the basis the traditional drawing, where two dimensions are used to present a three dimensional objec/structure. The rukles, standards and traditions applicable to drawings are introduced. Scales, precision, line types, legned, references and other information requiered on drawings. At the end of the course the student is expected to be able to draw projections and sections, in addition to show measurements as appropriate.

Reading material: Material from teacher.

Teaching and learning activities:
Lectures, sample problems, assignments and projects during on-campus periods, and through the electronic teaching system. Materials on the web are followed up by regular assignments during the term. Materials from the teacher on the web, audiovisual aids.

Assessment methods:
Electronic status assesment, 10%. Assignments 45%. Participation in discussions 5%. Final project 40%. Assignments to be delivered according to instructions.

Language of instruction: Icelandic.

BI HON 1001 COMPUTER-AIDED DESIGN 3 ECTS
Year of study: 1.ár. First year.
Semester: Fall/Spring.
Level of course: First cycle - Introductory.
Type of course: Core.
Prerequisites: Computer-Aided Drawing (AI TEI 1001).
Schedule: Distance learning for 7,5 weeks, one weekend sessions on campus.
Supervising teacher: Jónas Þór Snæbjörnsson.
Teacher: Reynir Þorvaldsson.
Learning outcome: On completion of the course students should:

- Learn object-oriented programming by the use of the Autodesk Revit design programme.
- Be familiar with the main commands in Autodesk Revit and be able to use these for designing most traditional types of buildings.
- Acquire basic knowledge of the BIM method.
- Be able to extract and use information from models such as drawings and quantities.

Content:
In this course the basics of the use of Revit Architecture are presented in order to impart to the students an insight into object-oriented design. In order to take this course the student has to have completed the course AI TEI 1001.

Reading material: Material from teacher.

Teaching and learning activities:
Lectures, sample projects, assignments during on campus sessions and on the web. Material on the web being followed up through regular assignments during the term. Instructions from the teacher on the web.

Assessment methods:
Two assignments weighing 20% each and one weighing 10%. At the end of the course the students deliver one final assignment weighing 50%.

Language of instruction: Icelandic.

AI REH 1003 FINANCIAL ACCOUNTING 6 ECTS
Year of study: 1.ár. First year.
Semester: Fall.
Level of course: First cycle - Introductory.
Type of course: Core.
Prerequisites: None.
Schedule: Distance learning for 15 weeks, two weekend sessions on campus.
Supervising teacher: Jens Arnljótsson.
Teacher: Sigurjón Valdimarsson.
Learning outcome: On completion of the course students should:

Upon completion of the course the students should possess knowledge of:
- The basic principles of laws about accounting and financial statements.
- The main accounts of expenses, income, assets and debts in accounts and financial statements.
- The main entries in financial accounts and classification of customers
- The main rules on accounts and VAT payments

- Interest and index regulation in loan transactions and how these enter the acconuts.
- The main rules on depreciation of assets.
- The booking of short term and long term assets in the form of shares and obligations.
- The main items of wage accounting.
- Computerized accounting, ie. Financial accounts, sales systems and wage systems.
- The results of accounts and cash flow.
- Cash flow and the characteristic values in financial statements.

The student is supposed to be able to:

- Work out the main entries in financial accounts.
- Calculate VAT according to the applicable rules.
- Calculate interest and index regulation of loans and enter these quantities in the accounts.
- Calculate and book depreciation or write-off of properties, equipment and tools according to the rules of the tax directorate.
- Calculate the increase or decrease of the value of shares and enter reassessment into the financial statement.
- Calculate and book the main entries in the wage accounts, among others pension funds, union dues, tax payment, employers contribution to pension funds and insurance tax.
- Finalize the accounts and prepare the annual financial statementand set uð cash flow in manual accounting systems.
- Book the entries of financial accounts, wage accounts and sales system using a recognized computer accounting system.
- Assess the principal items in accounts using a recognized computer software, VAT, detail information on customers and final results.
- Calculate the principal characteristic values of annual financial statements.

- Be financially responsible for managing small enterprises.
- Preparing accounts manually or by using computer software, for a small enterprise and prepare financial statements.
- Evaluate financial statements and interpret information contained therein.

Content:

The basic principles of laws on accounting and financial staatements, depreciation and practices of accounting. Entries of transactions in financial accounts, sales systems and wage accounts. Itemisation of bills into expenses, income, assetsa and debts.

Calculation, booking and payment of VAT, depreciation of assets and reassessment of shares. Calculation and booking of pension funds, union dues, tax payments, employers pension contribution and insurance dues in wage account. Calculation of interest adn price index regulation in loan transactions and entries in accounts of these items.
The booking of financial account, sales system and wage system using a recognised computerized accounting system.
The evaluation of annual financial statement and cash flow. The calculation of the main characteristic values in the enterprises annual financial statement.

Reading material: Sigurjón Valdimarsson, *Bókfærsla og reikningshald.* 2013 edition (older editions are not acceptable).

Teaching and learning activities:

Lectures, sample problems, assignments and problem solvin in sessions on campus and via the electronic system of tuition. Material on the webb, being followed up through regular assignments during the term. Further instructions from the teacher on the web.

Assessment methods:
A written 4 hour examination accounts for 52% and the grade shall be 5,0 at least. Assignments (5) 24% and the grade shall be 5,0 at least. Assignments on the web account for 24%, and these have to be completed meaning that the student has to rectify eventual errors untill the result is correct. All assignments shall be workwd out.

Language of instruction: Icelandic.

BI BUÞ 2013 MECHANICS OF STRUCTURES 6 ECTS

Year of study: First year.
Semester: Spring.
Level of course: First cycle - Intermediate.
Type of course: Core.
Prerequisites: None.
Schedule: Distance learning for 15 weeks, two weekend sessions on campus.
Supervising teacher: Jónas Þór Snæbjörnsson.
Teacher: Jóhann Albert Harðarson.
Learning outcome: On completion of the course students should:

- Can solve common and simple tasks in structural mechanics.
- Learn to design simple structural elements
- Can identify problems in structures
- Can identify the need for assistance and seek specialist assistance

- Can calculate moments of inertia and section moduli of cross sections
- Can calculate internal forces (moment, shear force and normal force)
- Can design simple beams in accordance with the load applied.
- Become acquainted with design in steel, timber and concrete.
- Can design simple weledd and bolted connections between steel beams.
- Can take care of work supervision on site and carry out building inspection.

Content: Properties of cross sections (area moment, moment of inertia and section modulus). Normal stress, shear stress, bending stress. Stress distribution, deformations, strain and deflection. Safety classes, characteristic values and design values of loads. Partial factors and loading cases. Process of loads in bearing structures, permanent load, variable load, imposed load, snow load, wind load. Internal forces in simple frames. Structures in steel and timber. Design resistanca, strength classes in steel and timber. Tensile members, columns subject to axial force, cross section subject to bending. Allowable deflections of beams. Length changes in tensile members. Welded and bolted connections. Concrete: Definition of main characteristic values. Calculation model for plastic bending. Moment capacity. Design rules. Presentation of reinforcement drawings.

Reading material: Preben Madsen: *Statik og styrkelære, Erhvervsskolernes forlag,* 2nd edition 2013.

Teaching and learning activities:
Lectures, sample problems, assignments and problem solvin in sessions on campus and via the electronic system of tuition. Material on the webb, being followed up through regular assignments during the term. Further instructions from the teacher on the web.

Assessment methods
4 hour written examination weighs 80% and assignments 20% according to a list supplied by the teacher.
Language of instruction: Icelandic.

BI BFR 1013 BUILDING TECHNOLOGY 6 ECTS

Year of study: First year.
Semester: Spring.
Level of course: First cycle - Introductory.
Type of course: Core.
Prerequisites: Computer-Aided Drawing (AI TEI 1001), Computer-Aided Design (BI HON 1001).
Schedule: Distance learning for 15 weeks, two weekend sessions on campus.
Supervising teacher: Jónas Þór Snæbjörnsson.

Teacher: Þormóður Sveinsson.
Learning outcome: On completion of the course students should:

- Obtain skills in the assembly of building elements based on the main structural system of the structure.
- Acquire basic knowlwdge various building materials for preparing detailed drawings
- Draw simple building elements (details/special drawings)
- Develop understanding of eventual need for specialist advice when solving problems in building technology.
- Get acquainted with technical solutions in the man made environment of modern times, as well as regarding history.
- Gets insight into the law and regulation environment pertinent to detail and special drawings.
- Know the communication processes needed with the relevant authorities of construction.
- Can work independently on basis of primary documents, eg architectural drawings.
- Can work independently on technical solutions in buildings.
- Can present choices concerning technical details.

Content:

The objective of this course is for the student to become acquainted with and be able to design technical solutions in building constructions. On the basis of physics and chemistry the student shall be able to solve tasks relating to a multitude of detail solutions. The student shall, working with primary documents, be able to access solutions of technical details pertaining to physics and not least to the aesthetics of the construction. Solutions in building tehcnology are presented in a historical context and based on modern technology. Classical forms in architecture and the requirement for technical solutions will be presented.

Reading material: Material from teacher. A list of recommended handbooks will be published.

Teaching and learning activities:
Lectures, sample problems, assignments and problem solvin in sessions on campus and via the electronic system of tuition. Material on the webb, being followed up through regular assignments during the term. Further instructions from the teacher on the web. Weekly conultations.

Assessment methods:

The student hands in a total of five projects/assignments. All assignments presented come up for assessment. The student must return solutions to all assignments. Each project weighs 20% of the final grade.

Language of instruction: Icelandic.

AI STJ 1003 MANAGEMENT, DIDACTICS AND SAFETY 6 ECTS

Year of study: First year.
Semester: Spring.
Level of course: First cycle - Introductory.
Type of course: Core.
Prerequisites: None.
Schedule: Distance learning for 15 weeks, two weekend sessions on campus.
Supervising teacher: Jens Arnljótsson.
Teacher: Karl Guðmundur Friðriksson.
Learning outcome: On completion of the course students should:

- Possess basic knowlwdge of practical management and the operation of enterprises.
- Is concscious of the social responsibility of managers of enterprises and their environment considering different views and set of values.
- Understand the importance of human relations in the workplace and is familiar with safety issues and the importance of a sound work environment.
- Understand the importance of innovation and reforms in the running of an enterprise.
- Has sound knowledge of the concepts and methods of quality management.
- Is conscious of the main characteristic values in the financial operation of enterprises and ubderstands the importance of these indicators.
- Has knowledge of different styles of management.
- Has sufficient knowledge of didactics to be able, as a master tradesman, to instruct and be responsible for apprentices.
- Has sufficient knowledge of management, administration and safety issues to be able to lead the running of small enterprises.

Content: Management as a science, the basis of understanding management. The operatinal environment, company profile and business ethics. The individual at work considering different values and views. The types of social groups, social relations and factors affecting the efficiency of groups. Conflicts, the development of such and solutions of disputes and the manager´s role in that context. The needs of the individual at work and the main theories on encouragement in the workplace. Estrangement in the workplace and attempts at alleviating

estrangement by social aspects and modifiications of work procedures.The manager´s role as a leader, policymaking, planning, practical aspects of managing teams, writing minutes of meetings, and foremanship. Some types og management styles and different types of organization and the build-up of organizational entities. Safety in the workplace is treated in detail and the students work on assignments related to safety audit in the workplace and preparation of evacuation plans.some important aspects of human resources management with emphasis on didactics and on the job training useful to master tradesmen taking care of work training of apprentices. Laws and regulations about training, preparation of examinatins and of teaching plans.

Reading material: Karl Friðriksson, Richard Keegan og Eddie O´Kelly, *Fyrirmyndarstjórnun. Hagnýt viðmið og samkeppnisforskot,* NMI 2014.

Teaching and learning activities:
Lectures, sample problems, assignments and problem solvin in sessions on campus and via the electronic system of tuition. Material on the webb, being followed up through regular assignments during the term. Further instructions from the teacher on the web.

Assessment methods:

A 3 hour written examination counts 70% and exercises 30% of finaæ grade.
Language of instruction: Icelandic.

BI HVL 1003 HEATING AND INSTALLATIONS 6 ECTS

Year of study: Second year.
Semester: Fall.
Level of course: First cycle - Introductory.
Type of course: Core.
Prerequisites: None.
Schedule: Distance learning for 15 weeks, two weekend sessions on campus.
Supervising teacher: Jónas Þór Snæbjörnsson.
Teacher: NN.
Learning outcome: On completion of the course students should:

- Know the basic principles of the thermal characteristics of building components.
- Know the composition and properties of insulation of residential buildings and the requirements imposed by the regulations.
- Know the basis of designing installations in residential buildings.

- Know different types of energy supply for heating of buildings, such as district heating,electrical heating and heat pumps.
- Know the most common types of heating systems in residential buildings.
- Can calculate the heating requirement of buildings.
- Can make quick estimates of conduit sizes needed for heating systems and water supply.
- Know the types of radiator valves and radiators and how to select these components.
- Can use simple computer software for assessing the performance of insatallation systems.
- Know the main types of materials for installation systems.
- Know the ways of praparing drawings of installation systems.
- Can draft installation systems for residential buildings.

Content:

he course is heating and installation systems emphasizing technology used in residential buildings. The objective of the course is to impart to the students the skills to recognize common types of installation systems, their role and basic properties. The students gain an insight into design of heating, water and wastewater installations along with the basis of the physics of heat. There is an emphasis on the students being able to recognize and understand the construction of installation systems of residential buildings and be aware of the basic reqiuerement of the building regulation. The preparation and detailing of installation drawings is introduced. The students work out a report on radiator and floor heating system in a residential building.

Theory of heating accounts for 70%: The thermal insulation of buildings, and the heat and energy need. Different types of heating systems such as radiator and floor heating systems and their main characteristics. Installations account for 30%: The construction and layout of water, wastewater, snow melting systems for residential buildings. The reading of drawings and rules and code concerning installations.

Reading material: Sigurður Grétar Guðmundsson, *Hita- og neysluvatnskerfi*, Iðnú. Sveinn Áki Sverrisson, *Teikningar og verklýsingar*, Iðnú. Sveinn Áki Sverrisson, *Fráveitukerfi og hreinlætistæki*, Iðnú. Material from teacher (6. Kafli úr *Varmaeinangrun húsa rit 30*). Handbooks on installations (Lagnafélag Íslands www.lafi.is)

Teaching and learning activities:

Lectures, sample problems, assignments and problem solvin in sessions on campus and via the electronic system of tuition. Material on the webb, being followed up through regular assignments during the term. Further instructions from the teacher on the web.

Assessment methods: 5 assignments weigh 40%. Two „home exams“ weigh 10%. Good participation in net discussions weighs 5%. A two hour written examination weighs 35%.
Language of instruction: Icelandic.

BI EFN 1013 CONCRETE – PROPERTIES AND MAINTENANCE 6 ECTS

Year of study: Second year.
Semester: Fall.
Level of course: First cycle - Introductory.
Type of course: Core.
Prerequisites: None.
Schedule: Distance learning for 15 weeks, two weekend sessions on campus.
Supervising teacher: Jónas Þór Snæbjörnsson.
Teacher: Guðni Jónsson and Helgi Hauksson.
Learning outcome: On completion of the course students should know:

- The properties of fresh concrete.
- The properties of hardened concrete
- All main component materials of concrete

The student shall be able to report on the properties of concretet and repairs and maintenance of concrete structures.

- Can solve common tasks and problems occurring in concrete.
- Can perform tasks relating to inspection/control in concreting.
- Is able to perform tasks relating to inspection and maintenance of concrete structures.
- Can assess the need for assistance and seek expert assistance.

Content:

Concrete as one of the main construction materials in this country. Raw materials and production.The physical properties of fresh and hardened condrete. Concrete work and control of concrete work. Repair and renovation of concrete buildings. General maintenance, maintenance plans. Planned search for concrete damages. Checklists, assessment an assesment reports. Most common tests of concrete. Students perform lab exercises. Full paricipation in lab exercises and reporting on these is required for permission to sit examination. Students work an assignment on maintenance and repair of buildings. They

analyse and evaluate concrete damages in a structure and hand in a report containing the results of their investigation and suggested remedies.

Reading material: Neville og Brooks, *Concrete Technology.* Helgi Hauksson, *Steinsteypa – viðhald og viðgerðir – Rb rit nr. 83.* Teachers notes.

Teaching and learning activities:
Lectures, sample problems, assignments and problem solvin in sessions on campus and via the electronic system of tuition. Material on the webb, being followed up through regular assignments during the term. Further instructions from the teacher on the web.

Assessment methods: A 3 hour written examination, 65%. Lab exercises 10%. Assignment on maintenance and repair 15%. Assignments on the web 15%.

Language of instruction: Icelandic.

BI EBE 1003 MATERIALS SCIENCE AND BUILDING PHYSICS 6 ECTS

Year of study: First year/Second year.
Semester: Spring.
Level of course: First cycle - Introductory.
Type of course: Core.
Prerequisites: None.
Schedule: Distance learning for 15 weeks, two weekend sessions on campus.
Supervising teacher: Eyþór Rafn Þórhallsson.
Teacher: Eyþór Rafn Þórhallsson.
Learning outcome: On completion of the course students should:

- Understand the scientific reasons for the various aspects of the behavior of building materials.
- Know the basic concepts in elastic behavior of steel, aluminium, timber and fiber materials.
- Know the maufacturing and processing techniques used to manufacure structural metals, timber and fibres.
- Be able to select the approriate material for a particular application.
- Know how to test the properties of materials.
- Be familiar with welding procedures and properties and be able to undertake simple welding jobs.

Content: The properties of the following materials: Metals: Steel, cast iron, aluminium and rust free steel, composition, production and properties. Timber: the structure of timber, it´s properties as a building material, timber products. Fibrous materials: the most common types, strength and elastic properties,

possible uses. Students perform lab exercises. Full paruicipation in lab exercises and writing lab reports gives the right to take the examination.

Reading material: Mamlouk og Zaniewski, *Materials for Civil and Construction Engineers,* International 3rd edition, 2011.

Teaching and learning activities:
Lectures, sample problems, assignments and problem solvin in sessions on campus and via the electronic system of tuition. Material on the webb, being followed up through regular assignments during the term. Further instructions from the teacher on the web.

Assessment methods:
Written examination, 3 hours, 60%. Assignments 30%. Lab exercises 10%.

Language of instruction: Icelandic.

AI FRK 1003 CONSTRUCTION AND PROJECT MANAGEMENT 6 ECTS

Year of study: First year/Second year.
Semester: Spring.
Level of course: First cycle - Introductory.
Type of course: Core.
Prerequisites: None.
Schedule: Distance learning for 15 weeks, two weekend sessions on campus.
Supervising teacher: Jónas Þór Snæbjörnsson.
Teacher: Kristinn Alexandersson, Ólafur Hermannsson, Guðbjartur Magnússon..
Learning outcome: On completion of the course students should:

- Tender documents and different forms of tendering.
- Bidding
- The preparation of work and payment schedules.
- Preparation of cost estimates.
- Use of indexes.
- Quantity and performance calculations.
- Control procedures in smaller projects
- The managenent of smaller projects: time, cost, quality.

Content:
The nature of tender documents and preparing bids for construction projects. Tender, description, offer list, execution surety and project contracts. Different tender forms. Preparation of work schedules for projects. The computer programme MS Project. Quantities and quantity calculations. Performance and

work time. Performance, manpower an equipment needs. Performance inciting wage systems. Organization of the work site. Cost calculations and cost estimates. Calculation of index and price escalation. Inspection and control.

Reading material: Eðvald Möller, *Verkefnastjórnun og verkfærið Project,* 2013*. ÍST30:2012 - Almennir útboðs- og samningsskilmála um verkframkvæmdir*, Staðlaráð Íslands, 2012. Other material as recommended by teacher.

Teaching and learning activities:
Lectures, sample problems, assignments and problem solvin in sessions on campus and via the electronic system of tuition. Material on the webb, being followed up through regular assignments during the term. Further instructions from the teacher on the web. Guidance via E-mail and telephone.

Assessment methods:
A final examination, 3 hours, weighs 40% and assignments weigh 60%.

Language of instruction: Icelandic.

BI JTÆ 1003 GEOTECHNICAL ENGINEERING 6 ECTS

Year of study: First year/Second year.
Semester: Spring.
Level of course: First cycle - Introductory.
Type of course: Core.
Prerequisites: None.
Schedule: Distance learning for 15 weeks, two weekend sessions on campus.
Supervising teacher: Jónas Þór Snæbjörnsson.
Teacher: Aldís Ingimarsdóttir.
Learning outcome: On completion of the course students should:

- Know the properties of Icelandic rock and common earth materials and how these are used in construction.
- Become acquainted with research methods and testing of earth materials and rock, and when such research is applicable.
- Possess sufficient knowledge of Geotchnics to be able to solve common and traditional tasks concerning the processing of building materials, design of simple elements, on-site supervision and inspection.
- Have sufficient knowledge of Geotechnics, foundation design and road construction to identify common problems in that field, assess the need for assistance and seek expert advice.

Content: Classification and properties of loose materials. The usability of different soila materials. Grondwater, permeability and frost susceptibility. Stresses in soils. Shear strength and bearing capacity of earth fills. Compaction

and subsidence. Foundation of buildings. Earth pressure on basement walls and retaining walls. Structures made of earth materials, such as roads, dams and quays. Descritions/specifications for earth works. Blasting techniques. Soil investigation and drilling. Soil research and sampling.
Reading material: Material from teacher.

Teaching and learning activities:

Lectures, sample problems, assignments and problem solvin in sessions on campus and via the electronic system of tuition. Material on the webb, being followed up through regular assignments during the term. Further instructions from the teacher on the web. Guidance via E-mail.

Assessment methods:
A written examination of 3 hours weighs 70% of final grade and assignments 30%.

Language of instruction: Icelandic.

BI LAM 1002 SURVEYING 4 ECTS

Year of study: Third year.
Semester: Fall.
Level of course: First cycle - Introductory.
Type of course: Core.
Prerequisites: None.
Schedule: Distance learning for 15 weeks, two weekend sessions on campus.
Supervising teacher: Jónas Þór Snæbjörnsson.
Teacher: Rúnar Gísli Valdimarsson.
Learning outcome: On completion of the course students:

- Know the most common instruments used in surveying.
- Know the main coordinate systems and levels used in Iceland.
- Know the main causes of errors in surveying.

- Can calculate altitude measurements.
- Can calculate the coordinates from measurements.
- Can calculate distances and directions between points.

- Can interpret the results of measurements.
- Can perform altitude measurements by using levels and laser.
- Can verify and correct levelling instruments if the need arises.

- Can identify problems related to surveying and mapping, assess the need for assistance and seek expert assistance.

Content
Measurements. Altitudes and coordinates. Levelling exercises, verification of instruments, correction, data registration and altitude calculations. Inclination. Calculation of distances and direction. Trigonemetry/triangulation. Introduction to diverse instruments and methods of surveying. Exercises in surveying.

Reading material: Magne Brandshaug, *Landmåling VK1.* 1st edition.
Teaching and learning activities:

Lectures, sample problems, assignments and problem solvin in sessions on campus and via the electronic system of tuition. Material on the webb, being followed up through regular assignments during the term. Further instructions from the teacher on the web.

Assessment methods:
A written final examination (2 hrs.) 50%; assignments 30%, team assignments and participation in second on-campus session 20%.

Language of instruction: Icelandic.

BI GÆÐ 1001 QUALITY CONTROL IN CONSTRUCTION 2 ECTS
Semester: Fall.
Level of course: First cycle - Introductory.
Type of course: Core.
Prerequisites: None.
Schedule: Distance learning for 15 weeks, two weekend sessions on campus.
Supervising teacher: Jónas Þór Snæbjörnsson.
Teacher: Ferdinand Hansen.
Learning outcome: On completion of the course students should:

- Acquire the competence to fulfill the requirements set forth in laws on construction about quality management systems of master tradesmen, sit chiefs and designers.
- Acquire the ability to set up ones own internal control as master tradesmen and site chief.

Content:

- Concepts and objectives of quality management in construction with emphasis on requirements set forth in the law.

- The role, resposnibilities and dutiers of master tradesmen, sit chiefs and owner of structure.
- The purpose and importance of CE markings on building products.
- The importance of archiving documents and files along with the surety of traceability.
- Requirements posed by public purchasers on quality assurance.

The students work out projects on the scrutiny of design documents, seek for requirements and set up their own internal control in order to comply with the requirements.
There is an emphasis on preparation and utilization of plans for measuring results as a part of the internal control.
Upon completion of the course the students shall be in possession of a draft quality management system fulfilling the requirements set forth in the law.

Reading material: Material from teacher.

Teaching and learning activities:
Lectures, sample problems, assignments and problem solvin in sessions on campus and via the electronic system of tuition. Material on the webb, being followed up through regular assignments during the term. Further instructions from the teacher on the web.

Assessment methods:
Evaluation of assignments work count for 100%.

Language of instruction: Icelandic.

AI LOG 1003 LAW 6 ECTS

Year of study: First year/Third year.
Semester: Fall.
Level of course: First cycle - Introductory.
Type of course: Core.
Prerequisites: None.
Schedule: Distance learning for 15 weeks, two weekend sessions on campus.
Supervising teacher: Jens Arnljótsson.
Teacher: Bjarki Þór Sveinsson.
Learning outcome: On completion of the course students should:

-
- The basis of the Icelandic system of administration and have an insight into laws and regulations forming the basis of industry.
- The rights and duties of those engaged in running enterprises.

- The main rules applying to contracting and tendering, work legislation as well as rules of purchase in general.
- Purchases of property.

- Solving simple disputes.
- Identifying possible disagreements.
- Preparation and setting up demands.
- Correspondence.

Content:
A general introduction to legal aspects and the basic rules in Icelandic public administration, judiciary etc. Contracts and contract writing in the field of financial laws.
General purchases. Property purchases. Rent/lease. Demands. Business correspondence. Responsibilities. Mortgages. Founding and form of enterprises. Work contracts. Lawes on tendering. Employment contracts
Reading material: Sigríður Logadóttir, *Lög á bók – Yfirlitsrit um lögfræði.*

Teaching and learning activities:
Lectures, sample problems, assignments and problem solvin in sessions on campus and via the electronic system of tuition. Material on the webb, being followed up through regular assignments during the term. Further instructions from the teacher on the web.
Assessment methods:
Final examination weighs 70% and 3 assignments weigh 10 % each.

Language of instruction: Icelandic.

BI LOK 1006 FINAL PROJECT 12 ECTS

Year of study: Third year.
Semester: Spring/Fall.
Level of course: First cycle - Intermediate.
Type of course: Core.
Prerequisites: The student must have completed at least 60 ECTS credits of courses in the Construction Technology program before he can start working on the final project.
Schedule: Distance learning for 15 weeks. Scheduled meetings with supervisors/teachers, see *Rules on final projects in the technology programs.*
Supervising teacher: Jónas Þór Snæbjörnsson.
Teacher: Ágúst Þór Gunnarsson, Eyþór Rafn Þórhallsson.

Learning outcome: On completion of the course students should:

- Develop independence and rational ways of working out solutions in the construction industry.
- Acquire a overview of the discipline by combining individual subjects using knowledge gained through al subjects in construction technology.

Content:
The students solve projects which are based on the syllabuses of other courses in the Construction Technology Program, such as design work,elementary structures, cinstruction, project planning and implementation. The students solve the projects in groups of 3 – 4 students.

Reading material: As recommended by teacher.

Teaching and learning activities: A team project worked out in cooperation with the teacher responsible. The students work independently with teacher guidance. Regular meetings with the teacher responsible and the instructors.
Assessment methods: Project work and oral examination count 100%.
Language of instruction: Icelandic.

ELECTRICAL TECHNOLOGY

In industry, electrical technicians work on a variety of tasks such as supervision, production management, operation and administration of enterprises in the field of electrical engineering, and electrical installation design. In addition they design controls for factory equipment, power stations and ships.

In the program there is emphasis on the subjects of electrical power distribution, electrical machinery, and electrical and electronic control technology, computer aided design, management and administration of enterprises, and regulation covering the safe operation of electrical equipment. An emphasis is put on practical projects and the application of computer software to the solution of common design problems.

The study program is mainly planned for those who commence their studies in the fall semester (August) but for part-time students it is also possible to commence studies in the spring semester (January). The program director for the study programs in technology is Jens Arnljótsson jensarn@ru.is. Curriculum supervisors in Electrical Technology are Baldur Þorgilsson and Kristinn Sigurjónsson.

Study plans in Electrical Technology - 90 ECTS credits

Electrical Technology - Part-time study, 12 - 18 ECTS per semester
All courses are 6 ECTS credits unless otherwise stated

1.semester - fall	18 ECTS	**2.semester - spring**	18 ECTS
RI RAF 1003	Electric Circuits	RI REI 1003	Electronics
AI TEI 1001	Computer-Aided Drawing (3 ECTS)	RI RFR 1003	Electric Machines and Power Networks*
RI HON 1001	Computer-Aided Design (3 ECTS)	AI STJ 1003	Management, Didactics and Safety
AI REH 1003	Financial Accounting		
3.semester - fall	18 ECTS	**4.semester - spring**	12 ECTS
RI STA 1003	Digital Technology	RI PLC 2003	PLC Control and Process Instrumentation*
RI PLC 1003	Programmable Controllers	RI RLH 1003	Electrical Installations Design
RI LÝR 1003	Lighting and Regulations		
5.semester - fall	12 ECTS	**6.semester - spring**	12 ECTS
RI REK 1003	Feedback Control Systems and Power Electronics*	RI LOK 1006	Final Project (12 ECTS)**
AI LOG 1003	Law		

* Prerequisites are required for this course
** The final project may be completed in fall or spring semester

	Electrical Technology - Full time study, 30 ECTS per semester		
1.önn - haust	30 ECTS		**2.önn - vor** 30 ECTS
RI RAF 1003	Electric Circuits		RI REI 1003 Electronics
AI TEI 1001	Computer-Aided Drawing (3 ECTS)		RI RFR 1003 Electric Machines and Power Networks*
RI HON 1001	Computer-Aided Design (3 ECTS)		AI STJ 1003 Management, Didactics and Safety
AI REH 1003	Financial Accounting		RI PLC 2003 PLC Control and Process Instrumentation*
RI LÝR 1003	Lighting and Regulations		RI RLH 1003 Electrical Installations Design
RI PLC 1003	Programmable Controllers		
3.önn - haust	30 ECTS		
RI REK 1003	Feedback Control Systems and Power Electronics*		
AI LOG 1003	Law		
RI STA 1003	Digital Technology		
RI LOK 1006	Final Project (12 ECTS)**		

* Prerequisites are required for this course
** The final project may be completed in fall or spring semester

COURSE DESCRIPTIONS IN ELECTRICAL TECHNOLOGY

RI RAF 1003 ELECTRIC CIRCUITS 6 ECTS
Year of study: First year.
Semester: Fall.
Level of course: First cycle - Introductory.
Type of course: Core.
Prerequisites: None.
Schedule: Distance learning for 15 weeks, two weekend sessions on campus.
Supervising teacher: Kristinn Sigurjónsson.
Teacher: Jón Bjarnason.
Learning outcome: On completion of the course students should:

Acquire knowledge in these basic principles of theory of electricity:

- The analysis of simple circuits.
- The laws og Ohm and Kirchhoff.
- Methods of curcuit analysis of Thevennin and Norton as well as the method of superposition.
- The conservation of energy in electrical an magnetic fields.
- DC circuits
- AC curcuits.
- The use of complex numbers in analysing AC circuits.

Solving problems and assignments based on the above mentioned theories, among other things contaiining:

- Equivalence calculations of passive components in serial and parallel connections.
- Calculation of current, voltage, resistance, energy and power in DC curcuits.
- Calculation of current, voltage, complex resistance and phase margin in AC circuits.

- Understanding electrotechnical tasks and related solutions.
- Formulating electrotechnical tasks and solve these.
- Discussing and explaining electrotechnical tasks.

Content:
Graphic presentation of curves, diverse rules of calculation, linear equations, inequlaities, power and root, equations of 2nd and higher order, logarithms, trigonometry, complex numbers, the basics og differentiation and integration. Theory of electricity, resistance, voltage- and current distributors, measuring instruments, Kirchhoffs law, rule of superposition, mesh calculation, Tvevenin´s law, Norton and Millmans rule. Conductors, insulators, batteries, magnetic properties, induction, AC voltage, coils, induction resistance, coil circuits, condensers, capacity, capacity resistance, capacitance circuits, RC and L/R time constants, AC circuits and the use of complex nubers when calculating AC circuits.

Reading material: Schultz, *Grob´s Basic Electronics,* 11th edition.

Teaching and learning activities:
Lectures, sample problems, assignments and projects during on-campus periods, and through the electronic teaching system. Materials on the web are

followed up by regular assignments during the term. Materials from the teacher on the web, audiovisual aids.

Assessment methods: Námsmat: 3 klst. skriflegt próf gildir 80%, skilaverkefni gilda samtals 20%.
Written examination,3 hours, weighs 80% and assignments weigh 20%.
Language of instruction: Icelandic.

AI TEI 1001 COMPUTER-AIDED DRAWING 3 ECTS

Year of study: First year.
Semester: Fall/Spring.
Level of course: First cycle - Introductory.
Type of course: Core.
Prerequisites: None.
Schedule: Distance learning for 7,5 weeks, one weekend sessions on campus.
Supervising teacher: Indriði Sævar Ríkharðsson.
Teacher: Ingibjörg Birna Kjartansdóttir.
Learning outcome: On completion of the course students should:

In descriptive geometry the student should:

- Understand the importance of drawings in the presentation of technical design and information.
- Understand the importance of information presented on drawings being presented so that they can be used for production
- Be able to prepare drawings that fulfill the requirements of drawings prepared by professionals in the field.
- Know of the existence of rules and standards and know ways of acquering and using information in such documents.
- Know the main types of lines and how these are used in the preparation of drawings.
- Have knowledge of the basic principles of descriptive geometry and how these are used in technical design.

In Computer aided design the student shall:

- Be able to use software like AutoCad in the preparation of drawings and be able to acquaint himself with the software and enhance ones knowledge, e. g. by using the “help” feature of the software.
- Be able to set up his own working environment in AutoCad.
- Be able to adjust AutoCad to ones own needs.
- Be able to make symbols and files of symbols.
- Be able to make templates, text and measurement styles.
- Know how to use the main commands.
- Be able to produce simple drawings.
- Be able to use Xref.

- Be able to place drawings on sheets and print those.

Content:

The objective of the course is to provide insight into the general descriptive geometry and how it is used in technical design. The students get instruction in using the software AutoCad in the preparation of drawings. The course is divided in two, the usage of AutoCad and on the other hand, the basic principles of descriptive geometry and the principles of technical drawings.

The CAD part is presented via tutorial videos where the user interface of the software is explained, the main commands and setting up of drawings for printing. It is intended for the student, on completion of the course, be able to become familiar with the software, make use of the „help“ features, and deliver drawings made in AuotCad.

The descriptive geometry part of the course is intended to impart insight into the theory that is the basis the traditional drawing, where two dimensions are used to present a three dimensional objec/structure. The rukles, standards and traditions applicable to drawings are introduced. Scales, precision, line types, legned, references and other information requiered on drawings. At the end of the course the student is expected to be able to draw projections and sections, in addition to show measurements as appropriate.

Reading material: Material from teacher.

Teaching and learning activities:
Lectures, sample problems, assignments and projects during on-campus periods, and through the electronic teaching system. Materials on the web are followed up by regular assignments during the term. Materials from the teacher on the web, audiovisual aids.

Assessment methods:
Electronic status assesment, 10%. Assignments 45%. Participation in discussions 5%. Final project 40%. Assignments to be delivered according to instructions.

Language of instruction: Icelandic.

RI HON 1001 COMPUTER-AIDED DESIGN 3 ECTS

Year of study: 1.ár. First year.
Semester: Fall/Spring.
Level of course: First cycle - Introductory.
Type of course: Core.
Prerequisites: Computer-Aided Drawing (AI TEI 1001).
Schedule: Distance learning for 7,5 weeks, one weekend sessions on campus.
Supervising teacher: Indriði Sævar Ríkharðsson.
Teacher: Helgi Már Hannesson.
Learning outcome: On completion of the course students should:
N/A
Content:
Drawing with Autodes AutoCad: Setting up frame and drawing head that connects to sheet set. Preparation of drawing templates and sheet set template. Symbols for electric circuits and making symbols, blocks an block editor. Learning to use Xref and setting up drawings. Drafting standards. Commonly used numbering systems for drawings and documents. The student shall have passed the course AI TEI 1001 in order to be allowed to take the course RI HON 1001.
Reading material: Material from teacher.

Teaching and learning activities:
Lectures, sample problems, assignments and projects during on-campus periods, and through the electronic teaching system. Materials on the web are followed up by regular assignments during the term. Materials from the teacher on the web, audiovisual aids.

Assessment methods: Assignment 1 40%, assignment 2 10%, final assignment 50%.
Language of instruction: Icelandic.

AI REH 1003 FINANCIAL ACCOUNTING 6 ECTS
Year of study: 1.ár. First year.
Semester: Fall.
Level of course: First cycle - Introductory.
Type of course: Core.
Prerequisites: None.
Schedule: Distance learning for 15 weeks, two weekend sessions on campus.
Supervising teacher: Jens Arnljótsson.
Teacher: Sigurjón Valdimarsson.
Learning outcome: On completion of the course students should possess knowledge of:

- The basic principles of laws about accounting and financial statements.

- The main accounts of expenses, income, assets and debts in accounts and financial statements.
- The main entries in financial accounts and classification of customers
- The main rules on accounts and VAT payments
- Interest and index regulation in loan transactions and how these enter the acconuts.
- The main rules on depreciation of assets.
- The booking of short term and long term assets in the form of shares and obligations.
- The main items of wage accounting.
- Computerized accounting, ie. Financial accounts, sales systems and wage systems.
- The results of accounts and cash flow.
- Cash flow and the characteristic values in financial statements.

The student is supposed to be able to:

- Work out the main entries in financial accounts.
- Calculate VAT according to the applicable rules.
- Calculate interest and index regulation of loans and enter these quantities in the accounts.
- Calculate and book depreciation or write-off of properties, equipment and tools according to the rules of the tax directorate.
- Calculate the increase or decrease of the value of shares and enter reassessment into the financial statement.
- Calculate and book the main entries in the wage accounts, among others pension funds, union dues, tax payment, employers contribution to pension funds and insurance tax.
- Finalize the accounts and prepare the annual financial statementand set uð cash flow in manual accounting systems.
- Book the entries of financial accounts, wage accounts and sales system using a recognized computer accounting system.
- Assess the principal items in accounts using a recognized computer software, VAT, detail information on customers and final results.
- Calculate the principal characteristic values of annual financial statements.

- Be financially responsible for managing small enterprises.
- Preparing accounts manually or by using computer software, for a small enterprise and prepare financial statements.
- Evaluate financial statements and interpret information contained therein.

Content:
The basic principles of laws on accounting and financial staatements, depreciation and practices of accounting. Entries of transactions in financial

accounts, sales systems and wage accounts. Itemisation of bills into expenses, income, assetsa and debts.
Calculation, booking and payment of VAT, depreciation of assets and reassessment of shares. Calculation and booking of pension funds, union dues, tax payments, employers pension contribution and insurance dues in wage account. Calculation of interest adn price index regulation in loan transactions and entries in accounts of these items.
The booking of financial account, sales system and wage system using a recognised computerized accounting system.
The evaluation of annual financial statement and cash flow. The calculation of the main characteristic values in the enterprises annual financial statement.

Reading material: Sigurjón Valdimarsson, *Bókfærsla og reikningshald.* 2013 edition (older editions are not acceptable).

Teaching and learning activities:

Lectures, sample problems, assignments and problem solvin in sessions on campus and via the electronic system of tuition. Material on the webb, being followed up through regular assignments during the term. Further instructions from the teacher on the web.

Assessment methods:
A written 4 hour examination accounts for 52% and the grade shall be 5,0 at least. Assignments (5) 24% and the grade shall be 5,0 at least. Assignments on the web account for 24%, and these have to be completed meaning that the student has to rectify eventual errors untill the result is correct. All assignments shall be workwd out.

Language of instruction: Icelandic.

RI REI 1003 ELECTRONICS 6 ECTS

Year of study: First year.
Semester: Spring.
Level of course: First cycle - Introductory.
Type of course: Core.
Prerequisites: Electric Circuits (RI RAF 1003).
Schedule: Distance learning for 15 weeks, two weekend sessions on campus.

Supervising teacher: Baldur Þorgilsson.
Teacher: Stefán Arnar Kárason.
Learning outcome: On completion of the course students should:

- Have a firm knowlwdge of electronics technology.
- Be able to design electronic devices.
- Be able to install and maintain electronic devices.
- Be able to solve problems arising during installation and operation of electronic devices.

Content:
Semiconductor physics, diode connections, the diode equation, sener diode, equivalent circuits of diodes, decycling, bipolar transistors, Darlington-connection, difference amplifier, amplification nose and frequency response, FET transistor circuits, power source circuits, working point and load curve, equivalence circuits of transistors, negative reaction, amplifier degree, connected amplifier degrees, operation amplifiers, instrument magnifiers, noice and distortion and frequency response, measuring detectors, collection of measured values, alias, errors, the thyristor, diac and triac.

Reading material: Floyd*, Electronic Devices,* 9th edition (conventional current version).

Teaching and learning activities:
Lectures, sample problems, assignments and projects during on-campus periods, and through the electronic teaching system. Materials on the web are followed up by regular assignments during the term. Materials from the teacher on the web, audiovisual aids.

Assessment methods
A 3 hour written examinatin weighs 80% and 6 star assignments weigh 20%. The student must have obtained a passing grade in the examination before the grade for the assignments counts.
Language of instruction: Icelandic.

RI RFR 1003 ELECTRIC MACHINES AND POWER NETWORKS 6 ECTS

Year of study: First year.
Semester: Spring.
Level of course: First cycle - Introductory.
Type of course: Core.
Prerequisites: Electric Circuits (RI RAF 1003).
Schedule: Distance learning for 15 weeks, two weekend sessions on campus.
Supervising teacher: Kristinn Sigurjónsson.

Teacher: Kristinn Sigurjónsson.
Learning outcome: On completion of the course students should:

- Determine the output of a motor and calculate its power from the net assuming variable loads and how the speed changes with variable load.
- Determine when 3 phase current is needed and the relevant solutions and how zero current depends on load variation between phases.
- Calculate the effect of transmission lines on voltage and power losses.
- Calculate losses in transformers and how these are used in transporting electrical energy and the measuring of that energy.

Content:
The basic efficiency of DC generators and motors. Their equivalent circuit and how voltage and resistance change with speed and load. How electrical power is transformed into mecanical power and where in these machines the losses occur.
Alternating curent, phase angles between current and voltage and how real-, induction- and capacitiv impedanses change this phase angle. Making a phase diagram with voltages as well as currents and how apparent- , reactive- and real power depends on phase angle of voltage and current.
Three – phase electricity, phase angle between voltage and current. Transmission capacity of three phase electricity in relation to single phase electricity, □ and Y connections, voltage and current distribution in those connections. Lossese of voltage and how voltages, currents and phase angle are compared wit □/Y connections. Asynchronous AC motors, power flow in these and how they react to increased load. Synchronous generators, their efficiency and power flow with reference to increased magnetic exciting current, phase angle and connection to a infinite bus.

Reading material: Wilde, Theodore, *Electrical Machines, Drives, and Power Systems*,

Teaching and learning activities:
Lectures, sample problems, assignments and projects during on-campus periods, and through the electronic teaching system. Materials on the web are followed up by regular assignments during the term. Materials from the teacher on the web, audiovisual aids.

Assessment methods:
Final writen examination 3 hours. Assignments are not accounted for but at mid – term session an examination of 45 min takes place and that can, if the student´s performance is better than in the final exsminstion, this weighs 20%, otherwise the final examination weighs 100% of final grade.
Language of instruction: Icelandic.

AI STJ 1003 MANAGEMENT, DIDACTICS AND SAFETY 6 ECTS

Year of study: First year.
Semester: Spring.
Level of course: First cycle - Introductory.
Type of course: Core.
Prerequisites: None.
Schedule: Distance learning for 15 weeks, two weekend sessions on campus.
Supervising teacher: Jens Arnljótsson.
Teacher: Karl Guðmundur Friðriksson.
Learning outcome: On completion of the course students should:

- Possess basic knowledge of practical management and the operation of enterprises.
- Is concscious of the social responsibility of managers of enterprises and their environment considering different views and set of values.
- Understand the importance of human relations in the workplace and is familiar with safety issues and the importance of a sound work environment.
- Understand the importance of innovation and reforms in the running of an enterprise.
- Has sound knowledge of the concepts and methods of quality management.
- Is conscious of the main characteristic values in the financial operation of enterprises and ubderstands the importance of these indicators.
- Has knowledge of different styles of management.
- Has sufficient knowledge of didactics to be able, as a master tradesman, to instruct and be responsible for apprentices.
- Has sufficient knowledge of management, administration and safety issues to be able to lead the running of small enterprises.

Content: Management as a science, the basis of understanding management. The operatinal environment, company profile and business ethics. The individual at work considering different values and views. The types of social groups, social relations and factors affecting the efficiency of groups. Conflicts, the development of such and solutions of disputes and the manager´s role in that context. The needs of the individual at work and the main theories on encouragement in the workplace. Estrangement in the workplace and attempts at alleviating estrangement by social aspects and modifiications of work procedures.The manager´s role as a leader, policymaking, planning, practical aspects of managing teams, writing minutes of meetings, and foremanship. Some types og management styles and different types of organization and the build-up of organizational entities. Safety in the workplace is treated in detail and the students work on assignments related to safety audit in the workplace and preparation of evacuation plans.some important aspects of human resources management with emphasis on didactics and on the job training useful to master

tradesmen taking care of work training of apprentices. Laws and regulations about training, preparation of examinatins and of teaching plans.

Reading material: Karl Friðriksson, Richard Keegan og Eddie O´Kelly, *Fyrirmyndarstjórnun. Hagnýt viðmið og samkeppnisforskot,* NMI 2014.

Teaching and learning activities:
Lectures, sample problems, assignments and problem solvin in sessions on campus and via the electronic system of tuition. Material on the webb, being followed up through regular assignments during the term. Further instructions from the teacher on the web.

Assessment methods:

A 3 hour written examination counts 70% and exercises 30% of finaæ grade.

Language of instruction: Icelandic.

RI STA 1003 DIGITAL TECHNOLOGY 6 ECTS

Year of study: First year/Second year.
Semester: Fall.
Level of course: First cycle - Introductory.
Type of course: Core.
Prerequisites: None.
Schedule: Distance learning for 15 weeks, two weekend sessions on campus.
Supervising teacher: Baldur Þorgilsson.
Teacher: Stefán Arnar Kárason.

Learning outcome: On completion of the course students should:

- Has a profound knowlwdge of the basis of digital technology.
- Can seek and assimilate the newest technology via the internet.
- Can install and maintain digital equipment.
- Can take care of production of simple digital circuits, be in charge of the work and inspection.
- Can identify failures, evaluate the need for assistance and seek expert advice.

Content:
Logic circuits, NAND andd NOR, solutions of real tasks using logic circuits, Boolean algebra, Karnaugh solutions, use of logig circuit manuals, connected logic circuits, overview of TTL and CMOS circuits, in/out in TTL circuits, CMOS

circuits, multiplex, data selection, multiple outputs and data distribution (decoder), the relation between draweings of electric circuits and logic circuits, examples of practical solutions of logic control devices, counters and memory.
Reading material: Tomas Floyd, *Digital Fundamentals,* 10 edition (Pearson New International Edition).

Teaching and learning activities:
Lectures, sample problems, assignments and projects during on-campus periods, and through the electronic teaching system. Materials on the web are followed up by regular assignments during the term. Materials from the teacher on the web, audiovisual aids.

Assessment methods:
Written examination 3 hours weighs 80% and weekly assignments 20%.. In order to have the right to take the examination 75% of assignments have to be handed in. The assignments are accounted for only if the student has passed the examination.

Language of instruction: Icelandic.

RI PLC 1003 DIGITAL TECHNOLOGY 6 ECTS

Year of study: First year/Second year.
Semester: Fall.
Level of course: First cycle - Introductory.
Type of course: Core.
Prerequisites: None.
Schedule: Distance learning for 15 weeks, two weekend sessions on campus.
Supervising teacher: Baldur Þorgilsson.
Teacher: Richard Már Jónsson.
Learning outcome: On completion of the course students should:

- Have sufficient knowledge of industrial computers to be able to solve common and traditional tasks in the design of simple elements.
- Have sufficient knowledge of industrial computer operating systems to be able to identify problems in that field, assess the need for assistancea and seek expert advice.

Content:

Industrial computer operating systems: The construction of PLC industrial computers and associated hardware. In this course use is made of a Zelio computer and the software Zelio soft, made by “sneider electric”. Connection of the industrial computer to other equipmetn as well as the main types of input and output ports, digital as well as analog. Also some types of sensors that may be

used in PLC systems. Thye auxiliaries used in designing programmes for mPLC computers, such as: flow diagrams, phase diagrams and more. The programming languages “Ladder” and “FBD Function Block Diagram” are introduced and used in programming. Use is made of audio-visual materials and other documents from the teacher and also using information and instructions from the mmanufacturer of Zelio, Schneider Electric. There is an emphasis on independent student work when solving tasks.

Reading material: Materials from teacher.

Teaching and learning activities:
Lectures, sample problems, assignments and projects during on-campus periods, and through the electronic teaching system. Materials on the web are followed up by regular assignments during the term. Materials from the teacher on the web, audiovisual aids.

Assessment methods:
Written examination 3 hours weighs 60% and assignments 40% of final grade. The student must have attained a passing grade in the examination before assignments are considered.
Language of instruction: Icelandic.

RI LÝR 1003 LIGHTING AND REGULATIONS 6 ECTS

Year of study: First year/Second year.
Semester: Fall.
Level of course: First cycle - Introductory.
Type of course: Core.
Prerequisites: None.
Schedule: Distance learning for 15 weeks, two weekend sessions on campus.
Supervising teacher: Kristinn Sigurjónsson.
Teacher: NN.
Learning outcome: On completion of the course students should:

- Know the main methods and codes concerning the measurements of indoors and otdoors lighting.
- Can use the Dialux software for calculating brightness.
- Obtain practice in design of lighting in varous types of building and can design kighting systems.
- Know the pricipal producers of lighting equipment and the inporters of these in Iceland.
- Become acquainted with lighting control systema: DALI, Funk-Bus, EIB and others.
- Get to know the main principles in design of emergency lighting systems.
- Get to know the „Ljóstæknifélag“ and what this association is doing.

- Know the main contents of regulations applying to electrical energy systems.

Content
Measurements, measurements in lighting technology, illuminators, design of lighting systems indoors and outdoors. Definition of concepts. Lighting controls DALI, Funk-Bus, EIB and others. The mainproducers of lighting equipment and importers of these. The Dialux software, calculations and use with the AutoCad software. Regulation for emergency lighting and selection of emergency lights. „Ljóstæknifélagið“. Regulations, methods of measurements and testing of preventive measures. Rules of work on electrical installations. Materials for electric installations and electrical equipment, main producers and retailers in Iceland.

Reading material: Handbook: *Lýsingartækni, tæknilegir tengiskilmálar og orðsendingar.* Other material upon teachers recommendations.

Teaching and learning activities:
Lectures, sample problems, assignments and projects during on-campus periods, and through the electronic teaching system. Materials on the web are followed up by regular assignments during the term. Materials from the teacher on the web, audiovisual aids.

Assessment methods: Námsmat Five assignments, 65% and final project in lighting design 35% og final grade.
Language of instruction: Icelandic

RI PLC 2003 PLC CONTROL AND PROCESS INSTRUMENTATION 6 ECTS

Year of study: First year/Second year.
Semester: Spring.
Level of course: First cycle - Intermediate.
Type of course: Core.
Prerequisites: Programmable Controllers (RI PLC 1003).
Schedule: Distance learning for 15 weeks, two weekend sessions on campus.
Supervising teacher: Baldur Þorgilsson and Jens Arnljótsson.
Teacher: Richard Már Jónsson, Gísli Freyr Þorsteinsson
Learning outcome: On completion of the course students should:
- Have comprehensive knowledge of indusrisal computers and related equipment.
- Can design and program smaller PLC controls
- Have basic knowledge of the design and layout of screen display systems and their possibilities of application.
- Know the operation of common refrigeration systems and be able to design controls for those.

Content:

Industrial computer controls. Work with the Modicon by Telemecanique using the UnityPro software for programming. Ladder-, FBD- SFC programming along with PI regulation. Setting up of screen displays along with lab exercises in setting up and designing such systems. Refrigeration technology is introduced and assignments/examination in refrigeration accounts for 5% of final grade.
Reading material: Material from teachers

Teaching and learning activities:
Lectures, sample problems, assignments and projects during on-campus periods, and through the electronic teaching system. Materials on the web are followed up by regular assignments during the term. Materials from the teacher on the web, audiovisual aids.

Assessment methods:
Assignments and examination in refrigerationweigh 40% of final grade. Final examination weighs 60%.

Language of instruction: Icelandic.

RI RLH 1003 ELECTRICAL INSTALLATIONS DESIGN 6 ECTS

Year of study: First year/Second year.
Semester: Spring.
Level of course: First cycle - Intermediate.
Type of course: Core.
Prerequisites: (RI LÝR 1003).
Schedule: Distance learning for 15 weeks, two weekend sessions on campus.
Supervising teacher: Kristinn Sigurjónsson.
Teacher: NN.
Learning outcome: On completion of the course students should:

- Become proficient in the design of the most common electrical and special systems and can use the appropriate software.

Content: Design of electrical linstallation, smaller and larger, signal systems, choice of materials, price calculation, specifications and bill of quantities. Drawing, using computers, design of switchboards with traditional lighting controls, Dali and KNX and the layout of lighting control in drawings of electrical installations.

Reading material: Material from teacher.
Teaching and learning activities: Lectures, sample problems, assignments and projects during on-campus periods, and through the electronic teaching system. Materials on the web are followed up by regular assignments during the term. Materials from the teacher on the web, audiovisual aids.

Assessment methods: Final project.
Language of instruction: Icelandic

RI REK 1003 FEEDBACK CONTROL SYSTEMS AND POWER ELECTRONICS 6 ECTS

Year of study: First year/Third year.
Semester: Fall.
Level of course: First cycle - Intermediate.
Type of course: Core.
Prerequisites: Electric Circuits (RI RAF1003), (RI RFR 1003).
Schedule: Distance learning for 15 weeks, two weekend sessions on campus.
Supervising teacher: Kristinn Sigurjónsson.
Teacher: Kristinn Sigurjónsson.
Learning outcome: On completion of the course students should

- Can identify the advantages og frequency modulators in controlling AC motors, both concerning “soft starting”, current from the net and startup torque of motors.

- Can calculate, on the basis of power control and how reactive power from the net change according to real power to the motor

- Understands the basic (workings) prinsiple of frequence modifiers and how switch frequqncy effects the harmonics and their filtering.

- Can adjust the response time of regulating circuits taking into account speed and the properties of the system.

Content:
Power electronics: How variable frequency affects the torque and power of induction motors. Basic principles of rectifiers and how dc voltage is controlled without power losses and how losses of active power and reactive power from the net depending on the dc voltage. Basic principles of dc/dc transformers and how voltage is regulated to lower as well as a higher voltage. How voltage is altered in order to provide ac voltage and how three phase voltage is produced and how the frequency is controlled.

Regulating: How output signals are controlled by input signals. How the differentiation and integration of output signals affects the adjustments of output signals and how Laplace projection solves the differential equation by an algebraic equation. Howe PID regulation deals with these factors and how

different factors of adjustments affect how fast the system reaches equilibrium and how harmonics can occur.

Reading material: Theodore Wilde, *Electrical Machines, Drives, and Power Systems,*
Bolton, *Control Systems*. Harbor, *Feedback Control Systems*.

Teaching and learning activities: Lectures, sample problems, assignments and projects during on-campus periods, and through the electronic teaching system. Materials on the web are followed up by regular assignments during the term. Materials from the teacher on the web, audiovisual aids.

Assessment methods:
Written examination 3 hours. During mid-winter on-campus session a 45 minute examination takes place and weighs 20% of final grade.

Language of instruction: Icelandic.

AI LOG 1003 LAW 6 ECTS

Year of study: First year/Third year.
Semester: Fall.
Level of course: First cycle - Introductory.
Type of course: Core.
Prerequisites: None.
Schedule: Distance learning for 15 weeks, two weekend sessions on campus.
Supervising teacher: Jens Arnljótsson.
Teacher: Bjarki Þór Sveinsson.
Learning outcome: On completion of the course students should:

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- The basis of the Icelandic system of administration and have an insight into laws and regulations forming the basis of industry.
- The rights and duties of those engaged in running enterprises.
- The main rules applying to contracting and tendering, work legislation as well as rules of purchase in general.
- Purchases of property.

- Solving simple disputes.
- Identifying possible disagreements.
- Preparation and setting up demands.
- Correspondence.

Content:
A general introduction to legal aspects and the basic rules in Icelandic public administration, judiciary etc. Contracts and contract writing in the field of financial laws.

General purchases. Property purchases. Rent/lease. Demands. Business correspondence. Responsibilities. Mortgages. Founding and form of enterprises. Work contracts. Lawes on tendering. Employment contracts
Reading material: Sigríður Logadóttir, *Lög á bók – Yfirlitsrit um lögfræði.*

Teaching and learning activities:
Lectures, sample problems, assignments and problem solvin in sessions on campus and via the electronic system of tuition. Material on the webb, being followed up through regular assignments during the term. Further instructions from the teacher on the web.
Assessment methods:
Final examination weighs 70% and 3 assignments weigh 10 % each.
Language of instruction: Icelandic.

RI LOK 1006 FINAL PROJECT 12 ECTS

Year of study: Third year.
Semester: Spring/Fall.
Level of course: First cycle - Intermediate.
Type of course: Core.
Prerequisites: The student must have completed at least 60 ECTS credits of courses in the Construction Technology program before he can start working on the final project.
Schedule: Distance learning for 15 weeks. Scheduled meetings with supervisors/teachers, see *Rules on final projects in the technology programs.*
Supervising teacher: Kristinn Sigurjónsson.
Learning outcome: On completion of the course students should:

- be able to use technical methoods to solve simple project in the field of electrical design
- carry out supervisory of projects in the field of electricity
- have learned to use indipendent and goal oriented methoods in practical project works
- have obtained a overview through the interactive courses where they apply knowledge from many subjects previously studiet in the program of electrical thechnology
- be able to perform and introduce projetcs both written and orally

Content:
When students work on their final project they should use the knowledge they have acquired in their studies to solve practical projects they could face in practice. They need to acquire independence, search data, record the results

and put up in a report and present their result. Highly desirable is the choice of the final project is in close collaboration with industry.

Reading material:
By consultation with the teacher.

Teaching and learning activities:
The students work individually guided by the teacher. Regular meetings with the teacher responsible and the instructors.

Assessment methods:
The grade is based on the solution of the project and an oral presentation.

Language of instruction: Icelandic.
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MECHANICAL TECHNOLOGY

In the industry, mechanical technologists work on a variety of tasks such as supervision,
production management, operation and administration of enterprises in the field of mechanical engineering. In addition they perform inspection and control in construction,
equipment in factories, power stations and ships.

In the program there is an emphasis on the subjects of mechanical/machine technology,
computer aided design, management and administration of enterprises, with a practical final
project. Also environmental science is dealt with as well as recycling. An emphasis is put on
practical projects and the application of computer software.

The study program is mainly planned for those who commence their studies in the fall semester (August) but for part-time students it is also possible to commence studies in the spring semester (January). The program director for the study programs in technology is Jens Arnljótsson jensarn@ru.is. Curriculum supervisor in Mechanical Technology is Jens Arnljótsson.

STUDY PLANS IN MECHANICAL TECHNOLOGY - 90 ECTS

Mechanical Technology - Part-time study, 12 - 18 ECTS per semester
All courses are 6 ECTS credits unless otherwise stated

1.önn		2.önn	
AI BUÞ 1003	Statics and Mechanics of Materials	VI VHF1003	Mechanical Engineering Design (6 ECTS)*
AI TEI 1001	Computer-Aided Drawing (3 ECTS)	VI TEI 2013	Computer-Aided Design II (6 ECTS)*
VI HON 1001	Computer-Aided Design (3 ECTS)	AI STJ 1003	Management, Didactics and Safety (6 ECTS)
AI REH 1003	Financial Accounting		
3.önn		**4.önn**	
RI STA 1003	Digital Technology	VI VAR 1003	Thermodynamics and Fluid Flow (6 ECTS)
VI EFN 1003	Materials and Manufacturing Processes (6 ECTS)	AI FRK 1003	Construction Managment (6 ECTS)
VI HUN 1003	Machine Design (6 ECTS)*		
5.önn		**6.önn**	
RI PLC 1003	Programmable Controllers (6 ECTS)	VI LOK 1006	Final Project (12 ECTS)**
AI LOG 1003	Law		

* Prerequisites are required for this course
** The final project may be completed in fall or spring semester

Mechanical Technology - Full-time study, 30 ECTS per semester All courses are 6 ECTS credits unless otherwise stated

1.önn – haust	30 ECTS	2.önn - vor	30 ECTS
AI BUÞ 1003	Statics and Mechanics of Materials	VI VHF 1003	Mechanical Engineering Design (6 ECTS)*
AI TEI 1001	Computer-Aided Drawing (3 ECTS)	VI TEI 2013	Computer-Aided Design II (6 ECTS)*
VI HON 1001	Computer-Aided Design (3 ECTS)	AI STJ 1003	Management, Didactics and Safety (6 ECTS)
AI REH 1003	Financial Accounting	VI VAR 1003	Thermodynamics and Fluid Flow (6 ECTS)
RI STA 1003	Digital Technology	AI FRK 1003	Construction and Project Management

VI EFN 1003	Materials and Manufacturing Processes (6 ECTS)		
3.önn - haust	30 ECTS		
VI HUN 1003	Machine Design (6 ECTS)*		
RI PLC 1003	Programmable Controllers (6 ECTS)		
AI LOG 1003	Law		
VI LOK 1006	Final Project (12 ECTS)**		

* Prerequisites are required for this course
** The final project may be completed in fall or spring semester

COURSE DESCRIPTIONS IN MECHANICAL TECHNOLOGY

AI BUÞ 1003 STATICS AND MECHANICS OF MATERIALS 6 ECTS

Year of study: First year.
Semester: Fall.
Level of course: First cycle - Introductory.
Type of course: Core.
Prerequisites: None.
Schedule: Distance learning for 15 weeks, two weekend sessions on campus.
Supervising teacher: Jónas Þór Snæbjörnsson.
Teacher: Jóhann Albert Harðarson.
Learning outcome: On completion of the course students should:

- Possess the basic theoretical knowlwdge of forces and statics.
- Be able to find rectangular components of forces and calculate resultant forces.
- Can identify supports of beams and equilibrium of forces.
- Can calculate internal forces (moment, shear force an n ormal force) on the basis of external forces.
- Can calculate memeber forces
- Can find the centroid of a cross section.
- Possess the necessary knowlwdge for learning design of structures and machine elements.

Content:

Forces and moments in the plane. Force systems and simplification of those (analytical and graphical solutions). Centroid. Beams and loading on beams. Support types. Determination of support reactions. External and internal forces. Graphs of internal forces.Relationship between shear – and moment graphs. Trusses. Determination of member forces. Method of joints. Determination of internal forces in statically determinate simple frames. Structures with joints. Students solve 7 assignments during the term and take an examination at the end of the term.

Reading material: Preben Madesen: *Statik og styrkelære.* Erhvervsskolernes forlag, 2nd edition, 2013

Teaching and learning activities:
Lectures, sample problems, assignments and problem solving. Reading materials on the web, followed up with regular assignments during the term. Further materials from teacher on the web. Instruction from teacher on the web.

Assessment methods:
A 4 hr. Written examination accounts for 80% and assignments for 20% of final grade. 7 assignments weighing according to a list submitted by teacher.

Language of instruction: Icelandic.

AI TEI 1001 COMPUTER-AIDED DRAWING 3 ECTS

Year of study: First year.
Semester: Fall/Spring.
Level of course: First cycle - Introductory.
Type of course: Core.
Prerequisites: None.
Schedule: Distance learning for 7,5 weeks, one weekend sessions on campus.
Supervising teacher: Indriði Sævar Ríkharðsson.
Teacher: Ingibjörg Birna Kjartansdóttir.
Learning outcome: On completion of the course students should:

In descriptive geometry the student should:

- Understand the importance of drawings in the presentation of technical design and information.
- Understand the importance of information presented on drawings being presented so that they can be used for production
- Be able to prepare drawings that fulfill the requirements of drawings prepared by professionals in the field.
- Know of the existence of rules and standards and know ways of acquering and using information in such documents.
- Know the main types of lines and how these are used in the preparation of drawings.

- Have knowledge of the basic principles of descriptive geometry and how these are used in technical design.

In Computer aided design the student shall:

- Be able to use software like AutoCad in the preparation of drawings and be able to acquaint himself with the software and enhance ones knowledge, e. g. by using the “help” feature of the software.
- Be able to set up his own working environment in AutoCad.
- Be able to adjust AutoCad to ones own needs.
- Be able to make symbols and files of symbols.
- Be able to make templates, text and measurement styles.
- Know how to use the main commands.
- Be able to produce simple drawings.
- Be able to use Xref.
- Be able to place drawings on sheets and print those.

Content:

The objective of the course is to provide insight into the general descriptive geometry and how it is used in technical design. The students get instruction in using the software AutoCad in the preparation of drawings. The course is divided in two, the usage of AutoCad and on the other hand, the basic principles of descriptive geometry and the principles of technical drawings.

The CAD part is presented via tutorial videos where the user interface of the software is explained, the main commands and setting up of drawings for printing. It is intended for the student, on completion of the course, be able to become familiar with the software, make use of the „help“ features, and deliver drawings made in AuotCad.

The descriptive geometry part of the course is intended to impart insight into the theory that is the basis the traditional drawing, where two dimensions are used to present a three dimensional objec/structure. The rukles, standards and traditions applicable to drawings are introduced. Scales, precision, line types, legned, references and other information requiered on drawings. At the end of the course the student is expected to be able to draw projections and sections, in addition to show measurements as appropriate.

Reading material: Material from teacher.

Teaching and learning activities:
Lectures, sample problems, assignments and projects during on-campus periods, and through the electronic teaching system. Materials on the web are

followed up by regular assignments during the term. Materials from the teacher on the web, audiovisual aids.

Assessment methods:
Electronic status assesment, 10%. Assignments 45%. Participation in discussions 5%. Final project 40%. Assignments to be delivered according to instructions.

Language of instruction: Icelandic.

VI HON 1001 COMPUTER-AIDED DESIGN 3 ECTS

Year of study: 1.ár. First year.
Semester: Fall/Spring.
Level of course: First cycle - Introductory.
Type of course: Core.
Prerequisites: Computer-Aided Drawing (AI TEI 1001).
Schedule: Distance learning for 7,5 weeks, one weekend sessions on campus.
Supervising teacher: Indriði Sævar Ríkharðsson.
Teacher: Gunnar Kjartansson.
Learning outcome: On completion of the course students should:

- Standards, rules of drawing and requirements imposed on drawing og machines and equipment
- Various unit systems and scales used in preparing drawings of machines and equipment.
- Layers, numbering systems, markings and line types in drawings of machines and equiment,
- The importance of projection and section figures.

- Produce simple drawings of machines, machine parts and equipment.
- Draw simple machine elements in three dimensions.
- Draw connection/asseblies of individual machine elements and make production drawings with sections and measurements.

- Read and identify the common symbols used in machine drawings and have an insight into the most common sotware for making these drawings.
- Work on basic types of drawing sof machines and equipment and have knowledge of general rules and specification.

Content:

Introduction to the software Autodesk inventor. Students are taught to draw machine element, connect/assemble machine elements, prepare drawings and presentation videos.
The student has to have passed the course AI TEI 1001 in order to take this course.

Reading material: Material from teacher.

Teaching and learning activities:
Lectures, sample problems, assignments and projects during on-campus periods, and through the electronic teaching system. Materials on the web are followed up by regular assignments during the term. Materials from the teacher on the web, audiovisual aids.

Assessment methods:

3 assignment accounts for 100%
Language of instruction: Icelandic.

AI REH 1003 FINANCIAL ACCOUNTING 6 ECTS

Year of study: 1.ár. First year.
Semester: Fall.
Level of course: First cycle - Introductory.
Type of course: Core.
Prerequisites: None.
Schedule: Distance learning for 15 weeks, two weekend sessions on campus.
Supervising teacher: Jens Arnljótsson.
Teacher: Sigurjón Valdimarsson.
Learning outcome: On completion of the course students should:

Upon completion of the course the students should possess knowledge of:

- The basic principles of laws about accounting and financial statements.
- The main accounts of expenses, income, assets and debts in accounts and financial statements.
- The main entries in financial accounts and classification of customers
- The main rules on accounts and VAT payments
- Interest and index regulation in loan transactions and how these enter the acconuts.
- The main rules on depreciation of assets.
- The booking of short term and long term assets in the form of shares and obligations.
- The main items of wage accounting.
- Computerized accounting, ie. Financial accounts, sales systems and wage systems.
- The results of accounts and cash flow.

- Cash flow and the characteristic values in financial statements.

The student is supposed to be able to:

- Work out the main entries in financial accounts.
- Calculate VAT according to the applicable rules.
- Calculate interest and index regulation of loans and enter these quantities in the accounts.
- Calculate and book depreciation or write-off of properties, equipment and tools according to the rules of the tax directorate.
- Calculate the increase or decrease of the value of shares and enter reassessment into the financial statement.
- Calculate and book the main entries in the wage accounts, among others pension funds, union dues, tax payment, employers contribution to pension funds and insurance tax.
- Finalize the accounts and prepare the annual financial statementand set uð cash flow in manual accounting systems.
- Book the entries of financial accounts, wage accounts and sales system using a recognized computer accounting system.
- Assess the principal items in accounts using a recognized computer software, VAT, detail information on customers and final results.
- Calculate the principal characteristic values of annual financial statements.

- Be financially responsible for managing small enterprises.
- Preparing accounts manually or by using computer software, for a small enterprise and prepare financial statements.
- Evaluate financial statements and interpret information contained therein.

Content:

The basic principles of laws on accounting and financial staatements, depreciation and practices of accounting. Entries of transactions in financial accounts, sales systems and wage accounts. Itemisation of bills into expenses, income, assetsa and debts.

Calculation, booking and payment of VAT, depreciation of assets and reassessment of shares. Calculation and booking of pension funds, union dues, tax payments, employers pension contribution and insurance dues in wage account. Calculation of interest adn price index regulation in loan transactions and entries in accounts of these items.

The booking of financial account, sales system and wage system using a recognised computerized accounting system.

The evaluation of annual financial statement and cash flow. The calculation of the main characteristic values in the enterprises annual financial statement.

Reading material: Sigurjón Valdimarsson, *Bókfærsla og reikningshald.* 2013 edition (older editions are not acceptable).

Teaching and learning activities:

Lectures, sample problems, assignments and problem solvin in sessions on campus and via the electronic system of tuition. Material on the webb, being followed up through regular assignments during the term. Further instructions from the teacher on the web.

Assessment methods:
A written 4 hour examination accounts for 52% and the grade shall be 5,0 at least. Assignments (5) 24% and the grade shall be 5,0 at least. Assignments on the web account for 24%, and these have to be completed meaning that the student has to rectify eventual errors untill the result is correct. All assignments shall be workwd out.

Language of instruction: Icelandic.

VI VHF 1003 MECHANICAL ENGINEERING DESIGN 6 ECTS

Year of study: First year.
Semester: Spring.
Level of course: First cycle - Introductory.
Type of course: Core.
Prerequisites: Statics and Mechanics of Materials (AI BUÞ 1003).
Schedule: Distance learning for 15 weeks, two weekend sessions on campus.
Supervising teacher: Jens Arnljótsson.
Teacher: Ásgeir Matthíasson.
Learning outcome: On completion of the course students should:

On completion of the course students should:

- be able to calculate bolted and weldet connections
- be able to calculate beams and shafts
- be able to calculate chain and belt drives, couplings,bearings and transmissions

Content:

The main emphasis is on the main concepts of mechanics and calculation of beams and shafts, bolted and welded connections along with calculating transmissions such as chain and belt drives, couplings and calculation of bearings. In calculating drive and bearings equal emphasis is on calculations and selecting standard elements by making use of selection instructions / software supplied by manufacturers of drive components.

Strength of materials. Combined loads, Safety factors and maximum permissible stress and strain through miscellaneous loads and materials. Bolts and bolted joints, welded joints. Shafts, and couplings. Bearings.

Reading material: Preben Madsen, *Statik og styrkelære.* Ólafur Eiríksson, *Töfluhandbók.* Material from teacher.

Teaching and learning activities:
Lectures, sample problems, assignments and problem solvin in sessions on campus and via the electronic system of tuition. Material on the webb, being followed up through regular assignments during the term. Further instructions from the teacher on the web.

Assessment methods:
Written examination 3 hours conts 66% and assignments 34% of final grade. Passing grade in the examination is required before the assignments count.

Language of instruction: Icelandic.

VI TEI 2013 COMPUTER – AIDED DESIGN II 6 ECTS

Year of study: First year.
Semester: Spring.
Level of course: First cycle - Intermediate.
Type of course: Core.
Prerequisites: Computer-Aided Drawing (AI TEI 1001), Computer-Aided Design (VI HON 1001).
Schedule: Distance learning for 15 weeks, two weekend sessions on campus.
Supervising teacher: Jens Arnljótsson.
Teacher: Gísli Gunnar Pétursson.
Learning outcome: On completion of the course students should:

- Have sufficient knoeledge of computer aided design and maintenance systems to be able to solve common and traditional tasks in designing simple machine elements, usage of materials and equipment, supervision and control.
- Have sufficient knoeledge of computer aided design and maintenance systems to be able to identify problems in that field, assess the need for assistance and seek expert advice.

Content:
Drawing machine elements, use of drawing software. ISO tolerances, fitting and standards. Surface smoothness. data banks. Element drawing, assembly drawings, coordinate systems, adjustments etc. Design projects. Three dimensional design using Autodesk Inventor.

Reading material: Material from teacher.

Teaching and learning activities:
Lectures, sample problems, assignments and problem solvin in sessions on campus and via the electronic system of tuition. Material on the webb, being followed up through regular assignments during the term. Further instructions from the teacher on the web.

Assessment methods: Grade awarded for 6 projects 100%. Individual grades for each project shall be 5,0 or higher for passing.
Language of instruction: Icelandic.

AI STJ 1003 MANAGMENT, DIDACTICS AND SAFETY 6 ECTS

Year of study: First year.
Semester: Spring.
Level of course: First cycle - Introductory.
Type of course: Core.
Prerequisites: None.
Schedule: Distance learning for 15 weeks, two weekend sessions on campus.
Supervising teacher: Jens Arnljótsson.
Teacher: Karl Guðmundur Friðriksson.
Learning outcome: On completion of the course students should:

- Possess basic knowlwdge of practical management and the operation of enterprises.
- Is concscious of the social responsibility of managers of enterprises and their environment considering different views and set of values.

- Understand the importance of human relations in the workplace and is familiar with safety issues and the importance of a sound work environment.
- Understand the importance of innovation and reforms in the running of an enterprise.
- Has sound knowledge of the concepts and methods of quality management.
- Is conscious of the main characteristic values in the financial operation of enterprises and ubderstands the importance of these indicators.
- Has knowledge of different styles of management.
- Has sufficient knowledge of didactics to be able, as a master tradesman, to instruct and be responsible for apprentices.
- Has sufficient knowledge of management, administration and safety issues to be able to lead the running of small enterprises.

Content: Management as a science, the basis of understanding management. The operatinal environment, company profile and business ethics. The individual at work considering different values and views. The types of social groups, social relations and factors affecting the efficiency of groups. Conflicts, the development of such and solutions of disputes and the manager´s role in that context. The needs of the individual at work and the main theories on encouragement in the workplace. Estrangement in the workplace and attempts at alleviating estrangement by social aspects and modifiications of work procedures.The manager´s role as a leader, policymaking, planning, practical aspects of managing teams, writing minutes of meetings, and foremanship. Some types og management styles and different types of organization and the build-up of organizational entities. Safety in the workplace is treated in detail and the students work on assignments related to safety audit in the workplace and preparation of evacuation plans.some important aspects of human resources management with emphasis on didactics and on the job training useful to master tradesmen taking care of work training of apprentices. Laws and regulations about training, preparation of examinatins and of teaching plans.

Reading material: Karl Friðriksson, Richard Keegan og Eddie O´Kelly, *Fyrirmyndarstjórnun. Hagnýt viðmið og samkeppnisforskot,* NMI 2014.

Teaching and learning activities:
Lectures, sample problems, assignments and problem solvin in sessions on campus and via the electronic system of tuition. Material on the webb, being followed up through regular assignments during the term. Further instructions from the teacher on the web.

Assessment methods:

A 3 hour written examination counts 70% and exercises 30% of finaæ grade.
Language of instruction: Icelandic.

RI STA 1003 DIGITAL TECHNOLOGY 6 ECTS

Year of study: First year/Second year.
Semester: Fall.
Level of course: First cycle - Introductory.
Type of course: Core.
Prerequisites: None.
Schedule: Distance learning for 15 weeks, two weekend sessions on campus.
Supervising teacher: Baldur Þorgilsson.
Teacher: Stefán Arnar Kárason.

Learning outcome: On completion of the course students should:

- Has a profound knowlwdge of the basis of digital technology.
- Can seek and assimilate the newest technology via the internet.
- Can install and maintain digital equipment.
- Can take care of production of simple digital circuits, be in charge of the work and inspection.
- Can identify failures, evaluate the need for assistance and seek expert advice.

Content:
Logic circuits, NAND andd NOR, solutions of real tasks using logic circuits, Boolean algebra, Karnaugh solutions, use of logig circuit manuals, connected logic circuits, overview of TTL and CMOS circuits, in/out in TTL circuits, CMOS circuits, multiplex, data selection, multiple outputs and data distribution (decoder), the relation between draweings of electric circuits and logic circuits, examples of practical solutions of logic control devices, counters and memory.
Reading material: Tomas Floyd, *Digital Fundamentals,* 10 edition (Pearson New International Edition).

Teaching and learning activities:
Lectures, sample problems, assignments and projects during on-campus periods, and through the electronic teaching system. Materials on the web are followed up by regular assignments during the term. Materials from the teacher on the web, audiovisual aids.

Assessment methods:
Written examination 3 hours weighs 80% and weekly assignments 20%.. In order to have the right to take the examination 75% of assignments have to be handed in. The assignments are accounted for only if the student has passed the examination.

Language of instruction: Icelandic.

VI EFN 1003 MATERIALS AND MANUGACTURING PROCESSES 6 ECTS

Year of study: First year/Second year.
Semester: Fall.
Level of course: First cycle - Introductory.
Type of course: Core.
Prerequisites: None.
Schedule: Distance learning for 15 weeks, two weekend sessions on campus.
Supervising teacher: Einar Jón Ásbörnsson
Teacher: Einar Jón Ásbjörnssonn

On the completion of the course students should:

- understand material structure and relate to mechanical properties
- know most common metal alloy, utilization, standards, production and corrosion resistance
- know most common polymers, utilization, standards and production
- know most common composites, utilization, standards and production
- being able to perform simple material selection

Content:

- Structure in materials
- Measurement of Mechanical Properties
  Hardening and forming of metals
- Automated machine tools
- Smelting operations
- Corrosion and corrosion control
- Standards
- Polymers
- Ceramics
- Composites

Reading material: James Newell, *Essentials of Modern materials Science and Engineering*, Wiley & Sons, 2009.

Teaching and learning activities:
Lectures, sample problems, assignments and problem solvin in sessions on campus and via the electronic system of tuition. Material on the webb, being followed up through regular assignments during the term. Further instructions from the teacher on the web.

Assessment methods:
Written examination 3 hours 60% and 4 assignments 10% each.

Language of instruction: Icelandic.

VI HUN 1003 MACHINE DESIGN 6 ECTS

Year of study: First year/Second year.
Semester: Fall.
Level of course: First cycle - Intermediate.
Type of course: Core.
Prerequisites: (VI VHF 1003), (VI TEI 2013).
Schedule: Distance learning for 15 weeks, two weekend sessions on campus.
Supervising teacher: Jens Arnljótsson.
Teacher: Ásgeir Matthíasson.
Learning outcome: On completion of the course students should:

- Have sufficient knowledge of mechanical design to solve common and traditional tasks in designing simple machine elements in transmissions.
- Have sufficient knowledge of mechanical design to identify problems in that field and assess the need for assistance and seek expert assistance.

Content:

Solving two assignments in the design of mechanical equipment. On one hand the design of a drive train by designing shafts and selecting drive train components, such as chain drive, belt drive, bearings and others,, and on the other hand the design of a beam crane by designing beams and trolley and selecting hoisting gear. The student must present calculations for the design, prepare production drawings for the equipment and write a report on the project.

Reading material: Preben Madsen, *Statik og styrkelære.* Ólafur Eiríksson, *Töfluhandbók.* Material from teacher.

Teaching and learning activities:
Lectures, sample problems, assignments and problem solvin in sessions on campus and via the electronic system of tuition. Material on the webb, being followed up through regular assignments during the term. Further instructions from the teacher on the web.

Assessment methods: Project work counts 100%.
Language of instruction: Icelandic.

VI VAR 1003 THERMODYNAMICS AND FLUID FLOW 6 ECTS

Year of study: First year/Second year.
Semester: Spring.
Level of course: First cycle - Introductory.
Type of course: Core.
Prerequisites: None.
Schedule: Distance learning for 15 weeks, two weekend sessions on campus.
Supervising teacher: Jens Arnljótsson.
Teacher: Jens Arnljótsson.
Learning outcome: On completion of the course students:

- have sufficient knowledge of thermodynamics and will be able to work out simple and traditional thermodynamics tasks in industry.
- are able to calculate heat losses in pipes and in simple building parts
- are able to pre design tube heat exchanger
- are able to calculate pressure drops in pipeline systems
- know performance and system curves for centrifugal pumps
- are able to select appropriate blowers based on air quantity at a given temperature
- have sufficient knowledge in this field to be able to analyse related problems, assess the need for assistance of more complicated thernodynamic subjects

Content:

The basic principles of thermodynamics. The 1st law. Flow of mass and energy. Thermodynamics of steam, phase conditions of water, quality of steam, steam tables. Rankine circle. Heat transfer by conduction, convection and radiation. Thermal properties of materials. Thermal losses in walls and pipes. Heat exchangers. Hydraulics, the Bernoulli equation, pressure losses in conduit systems. Pumps, connected in series and parallel, pump curves and system curves, choice of materials, choice of pumps. Blowers and blower graphs. Types of water turbines.

Reading material: Material from teacher.

Teaching and learning activities:
Lectures, sample problems, assignments and problem solvin in sessions on campus and via the electronic system of tuition. Material on the webb, being followed up through regular assignments during the term. Further instructions from the teacher on the web.

Assessment methods: Written examination 3 hours 70% and 8 assignments 30%.
Language of instruction: Icelandic.

AI FRK 1003 CONSTRUCTION MANAGEMENT 6 ECTS

Year of study: First year/Second year.
Semester: Spring.
Level of course: First cycle - Introductory.
Type of course: Core.
Prerequisites: None.
Schedule: Distance learning for 15 weeks, two weekend sessions on campus.
Supervising teacher: Jónas Þór Snæbjörnsson.
Teacher: Kristinn Alexandersson, Ólafur Hermannsson, Guðbjartur Magnússon..
Learning outcome: On completion of the course students should:

- Tender documents and different forms of tendering.
- Bidding
- The preparation of work and payment schedules.
- Preparation of cost estimates.
- Use of indexes.
- Quantity and performance calculations.
- Control procedures in smaller projects
- The managenent of smaller projects: time, cost, quality.

Content:
The nature of tender documents and preparing bids for construction projects. Tender, description, offer list, execution surety and project contracts. Different tender forms. Preparation of work schedules for projects. The computer programme MS Project. Quantities and quantity calculations. Performance and work time. Performance, manpower an equipment needs. Performance inciting wage systems. Organization of the work site. Cost calculations and cost estimates. Calculation of index and price escalation. Inspection and control.

Reading material: Eðvald Möller, *Verkefnastjórnun og verkfærið Project,* 2013*. ÍST30:2012 - Almennir útboðs- og samningsskilmála um verkframkvæmdir*, Staðlaráð Íslands, 2012. Other material as recommended by teacher.

Teaching and learning activities:
Lectures, sample problems, assignments and problem solvin in sessions on campus and via the electronic system of tuition. Material on the webb, being followed up through regular assignments during the term. Further instructions from the teacher on the web. Guidance via E-mail and telephone.

Assessment methods:
A final examination, 3 hours, weighs 40% and assignments weigh 60%.

Language of instruction: Icelandic.

RI PLC 1003 PROGRAMMABLE CONTROLLERS 6 ECTS

Year of study: First year/Second year.
Semester: Fall.
Level of course: First cycle - Introductory.
Type of course: Core.
Prerequisites: None.
Schedule: Distance learning for 15 weeks, two weekend sessions on campus.
Supervising teacher: Baldur Þorgilsson.
Teacher: Richard Már Jónsson.
Learning outcome: On completion of the course students should:

- Have sufficient knowledge of industrial computers to be able to solve common and traditional tasks in the design of simple elements.
- Have sufficient knowledge of industrial computer operating systems to be able to identify problems in that field, assess the need for assistancea and seek expert advice.

Content:

Industrial computer operating systems: The construction of PLC industrial computers and associated hardware. In this course use is made of a Zelio computer and the software Zelio soft, made by “sneider electric”. Connection of the industrial computer to other equipmetn as well as the main types of input and output ports, digital as well as analog. Also some types of sensors that may be used in PLC systems. Thye auxiliaries used in designing programmes for mPLC computers, such as: flow diagrams, phase diagrams and more. The programming languages “Ladder” and “FBD Function Block Diagram” are introduced and used in programming. Use is made of audio-visual materials and

other documents from the teacher and also using information and instructions from the mmanufacturer of Zelio, Schneider Electric. There is an emphasis on independent student work when solving tasks.

Reading material: Materials from teacher.

Teaching and learning activities:
Lectures, sample problems, assignments and projects during on-campus periods, and through the electronic teaching system. Materials on the web are followed up by regular assignments during the term. Materials from the teacher on the web, audiovisual aids.

Assessment methods:
Written examination 3 hours weighs 60% and assignments 40% of final grade. The student must have attained a passing grade in the examination before assignments are considered.
Language of instruction: Icelandic.

AI LOG 1003 LAW 6 ECTS

Year of study: First year/Third year.
Semester: Fall.
Level of course: First cycle - Introductory.
Type of course: Core.
Prerequisites: None.
Schedule: Distance learning for 15 weeks, two weekend sessions on campus.
Supervising teacher: Jens Arnljótsson.
Teacher: Bjarki Þór Sveinsson.
Learning outcome: On completion of the course students should:

-
- The basis of the Icelandic system of administration and have an insight into laws and regulations forming the basis of industry.
- The rights and duties of those engaged in running enterprises.
- The main rules applying to contracting and tendering, work legislation as well as rules of purchase in general.
- Purchases of property.

- Solving simple disputes.
- Identifying possible disagreements.
- Preparation and setting up demands.
- Correspondence.

Content:

A general introduction to legal aspects and the basic rules in Icelandic public administration, judiciary etc. Contracts and contract writing in the field of financial laws.
General purchases. Property purchases. Rent/lease. Demands. Business correspondence. Responsibilities. Mortgages. Founding and form of enterprises. Work contracts. Lawes on tendering. Employment contracts
Reading material: Sigríður Logadóttir, *Lög á bók – Yfirlitsrit um lögfræði.*

Teaching and learning activities:
Lectures, sample problems, assignments and problem solvin in sessions on campus and via the electronic system of tuition. Material on the webb, being followed up through regular assignments during the term. Further instructions from the teacher on the web.
Assessment methods:
Final examination weighs 70% and 3 assignments weigh 10 % each.

Language of instruction: Icelandic.

VI LOK 1006 FIANL PROJECT 12 ECTS

Year of study: Third year.
Semester: Spring/Fall.
Level of course: First cycle - Intermediate.
Type of course: Core.
Prerequisites: The student must have completed at least 60 ECTS credits of courses in the Construction Technology program before he can start working on the final project.
Schedule: Distance learning for 15 weeks. Scheduled meetings with supervisors/teachers, see *Rules on final projects in the technology programs.*
Supervising teacher: Jens Arnljótsson.
.
Learning outcome: On completion of the course students should:

 be able to use technical methoods to solve simple project in the field of mechanical design
 have learned to use indipendent and goal oriented methoods in practical project works
 have obtained a overview through the interactive courses where he applies knowledge from many subjects previously studiet in the program of mechanical thechnology
 be able to perform and introduce projetcs both written and orally

Content:

Projects drawn from the mechanical engineering aspects of the Icelandic production and industry. The main emphasis is on organized technical approach to the problem definition, gathering of information, synthesis, analysis and optimisation, evaluation and presentation.

Reading material:
By consultation with the teacher.

Teaching and learning activities:
The students work independently under the teacher´s guidance. Regular meetings with the teacher responsible and instructors.

Assessment methods:
The final grade is based on the solution of the project and an oral presentation.

Language of instruction: Icelandic.