Study guide for Creative Technology 2012/2013

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Colophon

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CREATIVE TECHNOLOGY
1.1 We call it CreaTe

Staff and students use the name CreaTe to refer to the Creative Technology curriculum.

1.2 Aims and objectives of the CreaTe programme

There is a fading boundary between the natural physical world and the world of (interactive, intelligent, understanding) human constructions. Creative Technology strives for designers who are fluent speakers of the languages of both worlds, and who can unite the two. We educate designers in a community of students with different backgrounds, and with different interests and motivation. These designers will be valuable in application areas of any kind.

The design goals of Creative Technology are similar to goals in Industrial Design, with one major difference: CreaTe concentrates on “design for the digital world” (game design, web design, interaction design, motion design and motion graphic design, and visual communication).

The engineering goals of Creative Technology cover aspects of Computer Science and Electrical Engineering (programming, web technology, sensors, communicating systems, dynamical systems and system control).

Obviously, Creative Technology aims at applications in Creative Industry and entertainment. But learning, training and persuasion through serious games are equally important. And so is enhancing reality for various purposes, e.g. to stage interaction while participants are at different locations, to create distraction, to create a feeling of well-being, to improve perception, or to improve safety and security. One finds ideas and concepts for enhanced reality in interior design, in architecture, in public space, in health care and in many other areas.

As a Creative Technology graduate you qualify as a designer in the sense of Herbert Simon, who defines design as “a way to improve situations”. A designer needs not only rational and analytical ways of thinking, but also “design thinking”, where emotional and cultural aspects become important. Design thinking often comes up in the context of “experience design.” Experience design is primarily a way of looking at design. It is the practice of designing products, processes, services, events, and environments with a focus placed on the quality of the user experience and culturally relevant solutions. Less emphasis is placed on increasing and improving functionality of the design. Creative Technology is an university programme with ample attention for design thinking and experience design.

Creative Technology aims at graduates who are capable of innovation by the introduction of artefacts for new and sometimes unexpected purposes. New and better use of existing technology is more important than the introduction of new technology. Their fantasy concentrates on making life safer, healthier, easier, more exciting or just more fun. They need science, but also understanding of human behaviour, and affinity with the creation of visual (and other) experience.

1.3 The final qualifications

The intended learning outcomes of the Creative Technology curriculum are captured by the following 12 final qualifications for the Creative Technology graduates.

1. Graduates are skilled in problem-finding, idea and concept generation, and in the identification of opportunities for the exploitation of new technology; they can develop concepts and ideas, using the latest tools, into key prototypes. (Concept generation and prototype development)

2. Graduates can evaluate concepts and ideas from the viewpoints of functionality, performance, experience, user acceptance and usability, marketing and societal implications (issues like privacy and security); they can present the results of their evaluation in an understandable manner. (Evaluation of concepts)

3. Graduates understand the workflow of a design process, can plan such a design process, and are aware of the effects that unforeseen circumstances (new ideas, new requirements, lack of resources) may have on this planning. (Understanding and planning the design process)

4. Graduates can assume a role in a multi-disciplinary team, are aware of personal strengths and weaknesses, can develop a personal vision and can capture requirements and knowledge from different fields of specialization. (Collaboration and multidisciplinarity)
5. Graduates know the relevant theories underpinning graphic design in all its aspects (including the use of colour and motion, the combination of text and other visual means, and even the combination of graphics and sound) (Skills and knowledge in graphic design)

6. Graduates know the relevant (web technology, databases, dynamic and control systems) technologies to be used, and the relationships they have to one another and to graphic and motion design (qualification 5), concerning both principles and functionality. In addition to this, each student has additional technological knowledge, which concerns, depending on his specialization, either knowledge of (serious) games and 3D (virtual) environments or knowledge of sensors, wireless communication and electronics. (Knowledge of technology)

7. Graduates can implement algorithms and combine principles from physics and mathematics at the level required to demonstrate an application. (Skills in technology)

8. Graduates can analyze and classify system behaviour and express the analysis in mathematical models; they can use tools to perform simulations, they are capable of critical evaluation of their simulations. (Skills and knowledge in modelling and simulation)

9. Graduates know how to develop a business plan. (Business knowledge)

10. Graduates are aware of the roles of designers in society, and the standards (ethically and legally) for professional behaviour. (Roles in society)

11. Graduates can communicate with experts and non-experts about all aspects of his field, i.e. firstly concerning concepts, ideas, opportunities, and design workflow (qualifications 1, 3), secondly concerning evaluation of concepts (qualification 2), and finally concerning prototype development and technological and modelling issues (1, 6, 7, 8); this communication covers presentation, justification and documentation, and (to a limited extent) scientific debate; in this communication the graduate knows how to employ modern media. (Communication)

12. Graduates are capable of logical reasoning; they are inquisitive and capable of posing proper questions; they can critically evaluate results obtained (by themselves and others); they are capable of critical reflection and can adapt their behaviour on the basis of that reflection, and are aware of gaps in their own knowledge and skills; they are prepared to learn and capable of learning. (Basic academic attitude)
2.1 Management

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2.2 Curriculum overview

2.2.1 Curriculum

The CreaTe curriculum is a three year curriculum at Bachelor’s level, with a study load of 180 credits (EC) in total. Each year comprises 60 EC. The programme is taught in English.

2.2.2 Curriculum construction

The curriculum is built from units of study. There is a distinction between explorative and directive units.

In explorative units students work in groups on the exploration of a design process. Their exploration leads to a prototype of a product or service. Various aspects of the design process are explored: idea and concept generation, evaluation of concepts, presentation, defence and justification of a product or service, the planning of the process of turning an idea into a prototype, the organization of the actual process of prototype development, etc. The learning goals of the explorative units cover (aspects) of all final qualifications. The explorative units support the learning by doing approach towards teaching. There are five explorative units, three in the first year, and two in the second.

In the directive units students are guided towards learning goals by lectures, tutorials and assignments. The learning goals of directive units generally cover only parts of specific qualifications, like skills and knowledge in technology, skills and knowledge in graphic design, or skills and knowledge in concept and idea evaluation from a user perspective.

The directive units are classified by the area of their learning goals. We distinguish six areas. They are Design, Business, Smart Technology, New Media, Computer Science and Mathematics and Modelling.

The first year of the curriculum is identical for all participating students. Approximately one quarter of the first year is filled with explorative units, and there is a single portfolio unit of 4 credits. The remainder of that first year is filled with directive units in the areas Design, New Media, Computer Science, Smart Technology and Mathematics and Modelling.

One quarter of the second year is devoted to specialization. As a second year student you choose either the Smart Technology, or the New Media subjects to specialize in. In the remainder of the second year all students take three more explorative units, a portfolio unit of 2EC, and directive units in the areas Design, Computer Science, Business and Mathematics and Modelling.

The first half of the third year is for further personal development in a direction of your own choice. It serves e.g. to prepare for a Master’s programme. But you can also opt for a semester of study abroad. This semester is called “profielingsruimte” in Dutch, i.e. free space to establish a profile.

In the second half of the third year you choose electives, aimed at human technology interaction and ethics and professional conduct.

In this last semester of the final year you also do the Bachelor’s graduation project.
2.3 Selection of prospective students

To be eligible for admission to the Creative Technology programme you must meet the following two requirements:

1. You have a Dutch VWO diploma ("profile" is irrelevant), or you have a dispensation of this requirement. A dispensation can be either:
   • a Dutch HBO(a)-diploma (either a first year’s or a bachelor’s diploma), or
   • an official statement of the university that it considers your (foreign) certificate(s) as an adequate substitute of the Dutch vwo diploma.
2. Your English proficiency is adequate.
   If your diploma is issued in a country which participates in the Lisbon treaty this means that you must have English as a subject of your final examination, or if your diploma is issued in a country where English is the language of education (in secondary school, your proficiency is considered to be adequate anyhow, otherwise you must produce proof of proficiency at IELTS level 6.0).

There are 120 places available to enrol students who are eligible for admission. Applicants are selected for enrolment on the basis of the following selection criteria:

1. Affinity with creativity
2. Affinity with technology
3. Working in teams
4. School achievements
5. Orientation on study programme

For each criterion applicants get scored on the basis of their motivation letter, their application portfolio, and their application interview. The minimum score will be around 30, the maximum score will be 100.

The 120 highest ranked students get a notice of admission (provided they are eligible, of course), and can be enrolled.

2.4 After graduation

2.4.1 Access to Master’s programmes

The Creative Technology graduates have (or can acquire) the qualifications that make them eligible for admission to programmes at academic Master’s level (WO master).

Among the programmes for which Creative Technology graduates may apply are at least the following. When additional courses are required to show on your diploma supplement, you can take these courses in your "profileringsruimte", cf section 3.5.

- Human Media Interaction (HMI, University of Twente)
  The Creative Technology diploma makes you eligible for admission to HMI

- Philosophy of Science, Technology and Society (PSTS, University of Twente)
  The Creative Technology diploma makes you eligible for admission to PSTS

- Media Technology* (Leiden University)
  The Creative Technology diploma makes you eligible for admission to Media Technology

- Game and Media Technology* (Utrecht University)
  The Creative Technology diploma makes you eligible for admission to Game and Media Technology upon the condition that your diploma supplement shows that you have taken sufficient courses in elementary Computer Science (especially algorithms and datastructures) and in Combinatorial Mathematics and Logic. You can take such courses in your "profileringsruimte", cf section 3.5.

- Industrial Design, track ETD-SE* (IDE-ETD-SE, University of Twente)
  The Creative Technology diploma makes you eligible for admission to IDE, track Smart Environments within ETD, upon the condition that your diploma supplement shows that you have taken the following courses: Technisch Product Modeleren, Fysieke Ergonomie, Project O, Cognitieve Ergonomie

- Computer Science, track WiSe* (CSC-WiSe, University of Twente)
  The Creative Technology diploma makes you eligible for admission to CSC, track Wireless and Sensor networks, upon the condition that your diploma supplement shows that you have taken the
following courses: Computer Organization, Computer Systems, Operating Systems, WiSe specific electives and/or a project

Systems and Control* (S&C, Programme of the 3TU federation)
The Creative Technology diploma makes you eligible for admission to S&C upon the condition that your diploma supplement shows that you have taken the following courses: Calculus A, Lineaire Algebra A, Calculus B, Kansrekening voor EL, Statika WB, Lineaire Systemen, Lineaire Algebra B, Stijfheid en Sterkte I

Embedded Systems* (EmSys, Programme of the 3TU federation)
The Creative Technology diploma makes you eligible for admission to EmSys upon the condition that your diploma supplement shows that you have taken the following courses: Calculus A, Lineaire Algebra A, Calculus B, Lineaire Systemen, Lineaire Algebra B, Instrumenation for Embedded Systems

Industrial Design*, (IDE, University of Twente)
The Creative Technology diploma makes you eligible for admission to IDE, tracks other than ETD-SE, upon the condition that your diploma supplement shows that you have taken the following courses: Materiaal, Manufacturing 3, Technisch Product Modeleren 2, Technisch Product Modeleren 1, Manufacturing 1, Fysische Ergonomie, Product presentatietekenen, Constructietechniek, Project O, Cognitieve Ergonomie

Note that the list is not exhaustive. Please consult your tutor about other programmes.

Note also that Creative Technology has no authority to grant admission to Master’s programmes. The Admissions Board of the Master’s programme decides about your application for admission.

For Master’s programmes marked with an asterisk in the list above, the information is tentative; please check the correctness of the information in this study guide with the admissions Board of the programme.

2.4.2 The qualification to teach
The possibilities for Creative Technology students to opt for a so called “educatieve minor” (minor programme for teaching skills) in the “profileringsruimte” (free space to establish a profile) of their third year, and to enter the Computer Science specialization within the SEC master after graduation (in order to become a qualified Computer Science teacher in secondary education), are still under investigation.

2.4.3 Labour market options
The Creative Technology graduates have the option to enter the labour market. To prepare for a role on the labour market, they can use their “profileringsruimte” (free space to establish a profile) to take courses (and projects) of the minor programmes for Ondernemerschap or Management.

The following job scenarios are typical for this type of professional, with an academic background at Bachelor’s level.

Creative genius
As a creative genius you are the creative mind behind technological breakthroughs. On a daily basis, you will work with a team of designers, developers, and producers to design playful solutions by using state of the art technology.

Application designer
As an application designer you will design new applications for today’s products. You will be involved in different aspects of the design process: visual design (giving aesthetic appeal), concept development (accommodating human needs) or active promotion (promoting the advantages and ideas).

Game designer
Games are increasingly being recognized as valuable tools for education, training and well-being. With the growing attention for ‘serious games’ you can become a specialist in storytelling, styles & visuals or interaction and experience design.

Ambient Systems developer
As an ambient systems developer you work on the development of large scale intelligent systems that can interact with people and the physical environment. Such systems are often part of larger structures and can respond to people’s need for safety, comfort, and information.

Robotics developer
As a robotics developer you participate in the creation of consumer robot systems. Think of robot lawn mowers and vacuum cleaners, but also of robots to help you find and recollect information, to support you in tasks, to wake you up, to guard your properties, or simply to provide fun and pleasure.
2.4.4 Extra curricular activities

2.4.4.1 Honours programme
If you’re looking for more than the usual academic challenges, you may want to apply to the UT honours programme. The Honours programme is designed for talented, interested and highly motivated students. In almost one and a half year we offer you a 30 EC programme. The programme is for first year students from all faculties. You will enjoy a challenging and nurturing environment, where you receive personal attention from academics with various backgrounds. You will become acquainted with great scientist and train your research skills. You will get to work on an individual project where you write a research proposal within your field of study.
www.utwente.nl/honours

2.4.4.2 Mathematics Excellence stream
The Excellence stream is a mathematical programme with a high level of abstraction. It is intended to deepen your mathematical level. The Excellence stream offers a complete parallel programme for mathematical courses in your Bachelor’s programme. The best (and motivated) students of various technical Bachelor programmes (approx. 10%) qualify for the Excellence programme, provided by the Bachelor Applied Mathematics.
www.utwente.nl/excellence
3.1 General observations about the CreaTe curriculum

Mandatory and optional units of study of the curriculum of the first two years are classified in areas.

The areas are:

1. Design (DE)
   The five DE-units (DE for Design), four in the first year and one in the second year, are devoted to design knowledge and skills.

2. Business (BI)
   The two BI-units (BI for Business), both in the second year, develop knowledge about bringing design to market, and about “running a business.”

3. Smart Technology (ST)
   The three ST-units (ST for Smart Technology), two in the first year and one (15EC) in the second year, are devoted to engineering skills and knowledge (and their integration) in the fields of dynamical and control systems, sensors, (wireless) communication systems and electronics. The two ST items of the first year are compulsory for all students. The ST item of the second year can be chosen by students who want to specialize in experience, communication and products by “smart technology”.

4. New Media (NM)
   The three NM units (NM for New Media), two in the first year and one (15EC) in the second year, are devoted to engineering skills and knowledge in the area of new media, web technology and games. The two NM-items of the first year are compulsory for all students. The NM-item of the second year can be chosen by students who want to specialize in experience, communication and products by “new media”.

5. Computer Science (CS)
   The four CS-units (CS for Computer Science), two in both years, serve to develop the basic skills and knowledge to understand and build systems of cooperating programmable components. These skills and knowledge support the teaching and learning in the Smart Technology and New Media areas.

6. Mathematics (MA)
   There are five math units, one in the first and four in the second year. Probability and statistics is among the math units of the second year.

Mandatory and optional units of study of the curriculum of the first two years are classified in types. The types are:

1. Explorative
2. Directive
3. Portfolio

The explorative and directive units cover almost the entire curriculum. There are two units which are neither explorative nor directive. These are the portfolio units. They support another aspect of the learning approach of Creative Technology: self-directed learning. Students are supposed to monitor their own progress along the relevant development lines, to collect proofs of this progress in their portfolio, and to take action to improve and/or to excel along the development lines. In portfolio units students take control, they do not wait for someone to tell them what to do in a directive unit. In this pro-active and self-directed learning part of the Creative Technology curriculum, each student is assisted by a tutor, who monitors and assesses the individual actions. There are two portfolio units, one in the first and one in the second year.

Besides the mandatory and optional units of study, the curriculum has in year 3:
- electives;
- free space to establish a profile (“Profileringruimte”);
- a graduation project.

In the tables and lists of section 3.2 you find the units of study of the CreaTe curriculum. Note that the list of year 2 shows units with a total study load of 75 EC. This is due to the fact that each student opts for either the 15 EC in the Smart Technology category, or the 15 EC in the New Media category, but not both.
### 3.2 The CreaTe curriculum in detail

Tables 3.1-3.3 show the units of study of the three years of the CreaTe curriculum.

<table>
<thead>
<tr>
<th>block 1A</th>
<th>block 1B</th>
<th>block 2A</th>
<th>block 2B</th>
</tr>
</thead>
<tbody>
<tr>
<td>[5EC] We Create Identity</td>
<td>(4EC) Smart Environments</td>
<td>(5EC) Living and Working Tomorrow</td>
<td>(5EC) Have fun and Play</td>
</tr>
<tr>
<td>(4EC) Visual Communication</td>
<td>(3EC) Sketching</td>
<td>(3EC) Designing in context</td>
<td>(3EC) Human Factors</td>
</tr>
<tr>
<td>(3EC) Programming and Physical Computing</td>
<td>(3EC) Programming and Physical Computing</td>
<td>(1EC) Interactive Visualization</td>
<td>(3EC) Interactive Visualization</td>
</tr>
<tr>
<td>(1EC) Portfolio 1</td>
<td>(1EC) Portfolio 2</td>
<td>(1EC) Portfolio 3</td>
<td>(1EC) Portfolio 4</td>
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</tbody>
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#### 3.1 CREATE Programme, YEAR 1

<table>
<thead>
<tr>
<th>Type of unit and unit area</th>
<th>study load in EC</th>
</tr>
</thead>
<tbody>
<tr>
<td>We Create Identity</td>
<td>Expansive</td>
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<tr>
<td>Smart Environments</td>
<td>Expansive, ST</td>
</tr>
<tr>
<td>Living and Working Tomorrow</td>
<td>Expansive</td>
</tr>
<tr>
<td>Have Fun and Play!</td>
<td>Expansive</td>
</tr>
<tr>
<td>Visual Communication</td>
<td>Directive, DE</td>
</tr>
<tr>
<td>Sketching for CreaTe</td>
<td>Directive, DE</td>
</tr>
<tr>
<td>Designing in Context</td>
<td>Directive, DE</td>
</tr>
<tr>
<td>Human Factors</td>
<td>Directive, DE</td>
</tr>
<tr>
<td>Introduction to Computer Science</td>
<td>Directive, CS</td>
</tr>
<tr>
<td>Programming and Physical Computing</td>
<td>Directive, CS</td>
</tr>
<tr>
<td>Intr. to Physical Systems and System Dynamics</td>
<td>Directive, ST</td>
</tr>
<tr>
<td>Interactive Visualization</td>
<td>Directive, NM</td>
</tr>
<tr>
<td>Introduction to Mathematics and Modelling</td>
<td>Directive, MA</td>
</tr>
<tr>
<td>First year portfolio</td>
<td>Portfolio</td>
</tr>
<tr>
<td>Year 1</td>
<td>60</td>
</tr>
</tbody>
</table>

#### 3.2 CREATE Programme, YEAR 2

<table>
<thead>
<tr>
<th>Type of unit and unit area</th>
<th>study load in EC</th>
</tr>
</thead>
<tbody>
<tr>
<td>(5EC) Programming with Structures</td>
<td>(4EC) Ambient Screens</td>
</tr>
<tr>
<td>(5EC) Introduction to Statistics and Probability</td>
<td>(3EC) Web Services and Data-driven Applications</td>
</tr>
<tr>
<td>(3EC) Systems and Signals</td>
<td>(3EC) Strategies and Protocols/ Queues and Logics</td>
</tr>
<tr>
<td>(3,5EC) Smart Technology part 1</td>
<td>(3,5EC) Smart Technology part 2</td>
</tr>
<tr>
<td>(3,5EC) New Media part 1</td>
<td>(3,5EC) New Media part 2</td>
</tr>
<tr>
<td>(2EC) Creative Explorations in Art, Science and Technology</td>
<td>(3,5EC) New Media part 3</td>
</tr>
<tr>
<td>(2EC) Creative Explorations in Art, Science and Technology</td>
<td>(3,5EC) New Media part 4</td>
</tr>
<tr>
<td>(2EC) Second Year Portfolio</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of unit and unit area</th>
<th>study load in EC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hybrid Worlds</td>
<td>Explansive, ST</td>
</tr>
<tr>
<td>CE in Art, Science and Technology</td>
<td>Directive, DE</td>
</tr>
<tr>
<td>Animated Narration</td>
<td>Directive, DE</td>
</tr>
<tr>
<td>Innovation and Entrepreneurship for IBA</td>
<td>Directive, BI</td>
</tr>
<tr>
<td>Startrix for CreaTe</td>
<td>Directive, BI</td>
</tr>
<tr>
<td>Programming with Structures</td>
<td>Directive, CS</td>
</tr>
<tr>
<td>Web Services and Data-driven Applications</td>
<td>Directive, CS</td>
</tr>
<tr>
<td>Introduction to Probability and Statistics</td>
<td>Directive, MA</td>
</tr>
<tr>
<td>Research Methodology</td>
<td>Directive</td>
</tr>
<tr>
<td>Systems and Signals</td>
<td>Directive, MA</td>
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<tr>
<td>either Strategies and Protocols</td>
<td>Directive, MA</td>
</tr>
<tr>
<td>or Queues and logistics</td>
<td>Directive, MA</td>
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<tr>
<td>either Smart Technology</td>
<td>Directive, ST</td>
</tr>
<tr>
<td>or New Media</td>
<td>Directive, NM</td>
</tr>
<tr>
<td>Second Year Portfolio</td>
<td>Portfolio</td>
</tr>
<tr>
<td>Year 2</td>
<td>60</td>
</tr>
</tbody>
</table>
3.3 Admission to (units of) the second year

All students get a progress evaluation regarding the continuation of their studies at the end of their first year. Only students who have completed at least 45 EC of their first year are eligible for a positive advice to continue. A negative advice is compelling and absolute, it amounts to a notice of exclusion (in Dutch: this study advice is a bindend studieadvies). Only with a positive advice to continue, you can be enrolled as a second year student.

To participate in units of study of the second year the following conditions must be met:

a. The student is enrolled, which is only possible if study units of the first year with a total study load of at least 45 credits have been completed.

b. There is a registration as either New Media or Smart Technology student, this registration requires a study plan.

c. (Math) To take either Queues and Logistics or Strategies and Protocols, the student’s registration for the course of his/her choice must have been accepted. There is a registration procedure for students to apply for participation, the number of participants for each course is limited.

d. (ST) To take Smart Technology as a specialization in the second year, the enabling units of the first year must have been completed. The enabling units for ST are: Smart Environments, Introduction to Physical Systems and System Dynamics, Introduction to Mathematics and Modelling.

e. (NM) To take New Media units as a specialization in the second year, the enabling units of the first year must have been completed. The enabling units for NM are: Visual Communication, Interactive Visualization, Programming and Physical Computing.

With the last study advice preceding the final notice of exclusion or admission for the second year, the Examination Board will ask the students to announce their choice of track.

After the registration for a specialization, and a check if all conditions are met, the Examination Board issues a formal permission for the participation in second year units. Note the requirement to have a study plan for the registration as either NM or ST student. (You can find more information about the study plan in section 4.2)

Students without a permission to participate can be excluded from classes and interim examinations. The Examination Board issues a regulation for students who wish to change their registration (from NM to ST or conversely).

3.4 Admission to (units of) the third year

To participate in units of the third year, the following conditions must be met:

a. Study units of the first and second years must have been completed with a total study load of at least 90 credits.

b. (Profileringsruimte) The second year tutor has given permission (on behalf of the Examination Board) for the courses in the profileringsruimte; the tutor has the authority to refuse permission even if a proposed choice of courses meets the requirements b1, b2 and b3. In any case, the tutor will verify whether the student has an up-to-date study plan before giving permission.

1. (Profileringsruimte) The units of study in the profileringsruimte are courses offered by an institution or programme which has an accreditation proving its university level, or comparable.

2. (Profileringsruimte) The units of study of an introductory nature among the courses in the profileringsruimte have a total study load of at most 20 EC; the amount of practical work in the profileringsruimte does not exceed a study load of 15 EC.
3. (profileringsruimte) The units of study devoted to foreign culture and language among the courses in the profileringsruimte have a total study load of at most 10 EC.

c. (electives) The second year tutor has given permission (on behalf of the Examination Board) for the choice of electives; the tutor has the authority to refuse permission even if a proposed choice of courses meets the requirements c1, c2, c3 and c4. In any case, the tutor will verify whether the student has an up-to-date study plan before giving permission.

1. (electives) At least one unit among the electives deals with ethics and professional standards.

2. (electives) Other units among the electives deal with human-product relationships, from the perspective of behavioural and/or management sciences, except for students who opt for an effort as described under c3 or c4.

3. (electives) One unit among the electives, with a study load of 5 EC maximum, can be an assistantship in a final project of a fellow student. It must be clear that the student doing the final project defines the work of the assistant, and acts as his or her manager. An examiner appointed by Examination Board is responsible for the assessment of the assistant’s work. This option cannot be combined with the option under c4.

4. (electives) One unit among the electives, with a study load of 5 EC maximum, can be devoted to academic writing. This option cannot be combined with the option under c3.

The Examination Board sets rules for the assistantships under c3.

Note the requirement to maintain your study plan also in the third year in clauses b and c. You find more information about the study plan in section 4.

3.5 Free space to establish a personal profile “Profileringsruimte”

Students have to choose courses with a study load of 30 EC in semester 5 (of the programme). This is the profileringsruimte, i.e. the free space to establish a personal profile in the curriculum.

In the profileringsruimte

- students can take courses to prepare for further study in a Master’s programme (cf. section 2.4),
- students can take a standard or individual minor programme,
- students can take one semester of courses at another (foreign) university (which is in fact a special kind of an individual minor),
- students can take the opposite course of their second year specialization (15 EC), and combine this with a choice of other courses with a 15 EC study load in total, to make an individual 30 EC minor,
- and possibly more.

In any case, the contents of the profileringsruimte are chosen in consultation with the tutor. The tutor must give permission (on behalf of the Examination Board) for the final choice of content in the profileringsruimte.
3.6 Electives

Students have to choose electives in the third year totalling at least 15 EC. The choice of electives must serve at least two purposes:

1. students are confronted with a view on the human-technology relationship which is largely inspired by behavioural or management sciences, and
2. students work on ethics and professional standards for design.

Among the courses which meet condition 1 are:
- Design against Crime
- Education Entertainment
- Virtual Environments for Collaborative Work
- Health Care and Rehabilitation Technology

Among the courses which meet condition 2 are:
- Computer Ethics
- Philosophy and Ethics of New Media
- Introduction to Philosophy of Technology

A third elective (maximum 5 EC study load) can be used to assist a fellow student in his graduation project. See section 3.4 under c3.

3.7 Bachelor’s graduation project

In their final project students complete graduation work with a study load of 15 EC. The deadline for graduation work is at the end of the semester in which it started. This period of time cannot be extended. If the deadline is not met, the examiners will assess the graduation work anyway. This may result in a fail.

Students can start graduation work only if they have completed 150 EC of their programme.

In the project you have to realize a design to improve the world of a ‘customer’. Business aspects, cost price and life-cycle issues will be important. The BSc project will cover the complete cycle of a design, including initiation, project planning, development, and possibly even deployment and marketing.

In connection with the Bachelor’s projects, you are stimulated to cooperate and assist each other, in order to achieve, within the time constraints imposed by the project, an optimal result, both in terms of external visibility as well as individual development. To support such cooperation, you can ‘hire’ expertise from another student. This expertise may be technological (to make the prototype), human or business-related. Students who are hired may thus earn a maximum of 5 credits out of 15 EC in the third year for their elective courses. It is the responsibility of the student doing the Bachelor’s project to arrange a clear ‘contract’ about the task of the student hired, and set the milestones. Assessment of the hired student is done jointly with the supervisor.
4.1 Teaching approach

4.1.1 The teaching concept
Creative Technology builds upon two principles for your learning: learning by doing, and tutoring.

The programme is organized around the idea of “learning by doing”. Many courses are project based, or centred on practical assignments. Learning by doing contributes to your motivation and ambition.

You will be constantly encouraged to explore design issues (in problem finding, in idea and concept generation, in prototype development, in evaluation of concepts, in presentation and documentation).

You will not only explore, you will also practice your knowledge and skills.

Next to exploration and practice, you will study. You learn about the underlying physics and the theories of dynamical systems. You learn about systems of programmable components. You study graphic design, and the principles of modelling and simulation.

And finally you will learn to integrate your knowledge and skills: you will base your exploration (idea and concept generation, prototype development and presentation and documentation) on practice and study.

To learn effectively, you need more than motivation and ambition. Reflection and feedback are important. Supervisors for courses and projects will give you this feedback. In addition, each Creative Technology student has a tutor. The tutor looks with you at your progress in learning. Tutors help you to reflect on your achievements, and to set goals for yourself.

4.1.2 Learning support
Our teaching supports your learning. Our teaching efforts are organized in units of study. At the end of a unit, we assess if you have reached the intended learning goals.

But learning is not about passing exams. It is about setting and reaching goals for your knowledge, skills and attitude. Such goals may reach beyond the contents of the individual units of study, but they can also be set in preparation of individual units of study. Interim exams are extremely relevant milestones in the development, but the constant movement towards your individual goals is equally important.

Creative Technology emphasizes that the students take their own responsibility for setting and reaching their goals. But, especially when you are just starting, the tutor will assist, and sometimes even direct you. Your tutor will challenge you to participate in individual units of study only with the best possible preparation, to choose roles and tasks in projects which are best for your personal development, to explore where your talents may bring you also beyond the scope of individual units of study, and to make the highlights of your development visible in your (showcase) portfolio.

4.2 Counselling and tutoring

There are departmental study advisers available for students to give advice and support in all matters concerning their personal situation and their personal development. Your adviser will be Mrs. Thea de Kluijver (4.2.3). The adviser helps and supports in personal matters, especially when they interfere with your career as a student. But the adviser can also help and support in matters concerning extracurricular activities, to find stimulus, motivation and reward for your personal development.

For support and feedback on your path towards your final qualifications as a Creative Technology graduate, you will also have a tutor. The tutor is a member of staff with whom you will set your personal learning goals, derived from the general goals of the curriculum and the various courses. Together with the tutor you select essential competencies which deserve your special attention, and together you look for ways to improve these competencies. You report to the tutor on your progress, the tutor gives you feedback on your achievements. The things you do together with the tutor are aligned with the things you do in projects and courses.

The tutor takes care of 10-12 students, in this tutor group you exercise peer reviewing and interviesion, to learn from each other.
You and your group will meet the tutor on a regular basis. In the course timetable an afternoon is scheduled free for tutoring.

Part of the tutoring process is a portfolio, which serves to demonstrate your growth towards the final qualifications, and your achievements in design.

4.2.1 Counselling and tutoring in the first year
There will be regular tutoring meetings, throughout the year.

During the introduction, the first year students will be introduced to the study adviser. In the first quarter you will meet with the study adviser for an introductory interview. The study adviser monitors student’s first year results and their study progress. If necessary, she will make an appointment with you, or you can request an appointment yourself.

4.2.2 Counselling and tutoring in the second and third year
There will be regular tutoring meetings, during the year. The study adviser may invite you for a meeting, if your study results are insufficient. Students can also contact the study adviser to make an appointment. The study adviser can offer assistance and give information on study courses, planning, exams, personal circumstances, etc.

The study adviser also monitors the progress of students. At the end of each semester the student’s progress is evaluated, to determine whether continuation is recommended and whether there are particular areas where improvement is needed. If you receive a negative advice, we strongly recommended you to contact the study adviser.

During your study information meetings will take place. These meetings are about various practical topics: organisation of the second year, organisation of the third year, elective courses information, minor market, preparation of your choice of master.

4.2.3 Counsellors
The study adviser for Creative Technology students is mrs. Thea de Kluijver. If you have any questions about the regulations within the programme, or if you want to talk about study related issues, you can contact her.

Thea de Kluijver
Building Zilverling, room 1003
Telephone: +31 53 489 3697
E-mail: t.h.dekluijver@utwente.nl

4.2.4 Student progress evaluation and minimal performance norm
All first-year students of the Creative Technology programme will receive a binding recommendation on continuation of studies. This entails that students who have achieved unsatisfactory results by the end of the first year will not be permitted to continue on the programme. To continue on the programme, the student must have obtained a minimum of 45 ECTS credits by the end of the academic year. All information on the student progress evaluation can be found at www.utwente.nl/so/studentenbegeleiding/regelingen/bsa.

Students will receive a recommendation within the framework of the student progress evaluation as soon as the grades of the first quarter are published. Students who receive a negative first recommendation will be invited for an interview with the study adviser. A second recommendation is issued around May/June, when the grades of the third quarter are published. Again, students who receive a negative recommendation will be invited for an interview with the study adviser. The final and binding recommendation within the framework of the student progress evaluation will be issued before the new academic year starts.

4.2.5 Study Plan
The study plan is described in detail in the Teaching and Examination Regulations (OER) and the programme-specific section of the OER. All students are asked to complete the study plan at the start of each semester. All first-year students are required to update the study plan every quarter on the basis of their current progress.

The study adviser will use the study plan during interviews with the student. The study adviser may also respond to the study plan in writing. The study adviser is always available to provide feedback on the study plan at the student’s request.

The study plan is completed using a fixed format that the students will be sent via email. Details on study plan update periods and deadlines are recorded in the OER.
4.3 Rules and Regulations

4.3.1 Examinations
At the start of the academic year, for every student a timetable of teaching activities and examinations is available on paper. This timetable shows, among other things, the weeks in which examinations are held. The timetables for teaching are also available on the websites of the programmes. Any changes, such as, for instance, the examination dates, will be announced via the Blackboard sites of the courses concerned and through Education Announcements. So no new timetables will be distributed among the students every time any changes might occur.

For the sake of students’ and teachers’ clarity the starting time of written examinations is identical to the first morning or afternoon lecture respectively. So:
• morning examinations start at 08.45h or 10.45h
• afternoon examinations start at 13.45h or 15.45h
Timetables of examinations are available via: http://my.utwente.nl/.

General rules
1. The student himself is responsible for registering or deregistering for the examinations.
2. Twice a year students are given the opportunity to take written and oral examinations belonging to a particular educational unit. Practical training can be completed at least once a year. The rules that apply for practical training will be communicated at the start of the educational unit.
3. The student who has not gained a mark 6 or higher after two markings by an educational unit and who still wishes to gain such a mark, is to appeal to the examination board for permission to take another examination in the educational unit concerned. This appeal must be accompanied by a working plan drawn up by the student in consultation with the examiner of the educational unit concerned and the study advisor. The examination board will decide on the appeal.
4. On the authority of the examination board at least one month before the start of the semester the timetable of examination of that semester will be announced, in which dates and times of the examinations are fixed.
5. The examination board may give permission to deviate from the number of times an examination will be held and the way in which examinations can be taken.
6. Rescheduling an examination to a time different from the one indicated in the timetable is only permitted after the examination board’s consent.

4.3.2 Registering and deregistering for examinations
Regarding registration in the 2012-2013 academic year, the following rules apply:
• to be able to sit an exam (including interim exams) you must register for the exam beforehand;
• you can register 40 to 14 days prior to the exam;
• you will not receive a general reminder to register for exams per email;
• you can deregister for an exam in Osiris up to 1 day before the exam.

Registering for examinations
As of the new academic year, you can register and deregister for all exams in Osiris. This applies both to exams scheduled in the examination period and interim exams.

The period in which you can register will depend on the examination date. You can register for all exams in Osiris between 40 and 14 days prior to the exam.

Example: the regular examination weeks for the first quarter fall in weeks 44 and 45 this year. The first examinations will be held on Monday 29 October.

This means you can register for exams held on this day from 19 September up until 15 October.

You can register for an exam on the last examination day, Friday 9 November, between 31 September and 26 October.

There are thus no longer fixed registration and deregistration periods per examination period. Take note: you will not receive a general reminder to register for exams.

Due to the overlap in the registration periods, it is still possible to register for all exams at the same time.

Example: you can register for exams in the first quarter during the overlapping registration period from 31 September to 15 October (see example above).
Deregistering for exams
As of the 2012-2013 academic year, if you have registered for an exam and wish to deregister then you can do this yourself in Osiris up to 1 day before the exam.

Registering and deregistering for partial exams
The procedure for registering and deregistering for partial exams will remain unchanged for the time being. You will be informed by email if any changes are to be made.

4.3.3 Third exam attempt regulation
In accordance with the Teaching and Examination Regulations (OER), a student who has not yet passed an exam and wishes to make a third exam attempt must first get the permission of the Examination Board.

Permission can be requested by submitting an application, signed by the study adviser and the tutor of the module and accompanied by a covering letter containing the student’s reflection on the previous two attempts, a plan of action and a study plan. As of the 2011-2012 academic year, the following regulations apply to third exam attempts:

- A completed application for a third exam attempt must be submitted before the start of the quarter in which the module is offered;
- An application for a third attempt in the next quarter must be submitted within two weeks of publication of the results of the last failed attempt;
- An application for a third attempt in a later quarter must be submitted before the start of the applicable quarter.

It is important that the student undertakes action as soon as it becomes clear that a third exam attempt will be necessary. The student should contact the tutor and the study adviser directly and submit an application for a third exam attempt to the Examination Board within the applicable period described above. The student will only be registered for the applicable module by the Exam Office after the Examination Board has given its approval.

<table>
<thead>
<tr>
<th>Timeline</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Essential to take action before the start of the quarter*</td>
<td>Reflect on what went right and what went wrong during the last two attempts. Give a detailed description of the content of the module and analyse which parts are causing you difficulty.</td>
</tr>
<tr>
<td>Before the start of the quarter in which the module is offered/within two weeks after the results of the failed attempt have been published (if the third exam attempt is to take place in the following quarter)</td>
<td>Conceive a plan of action to prepare for the module this time around so as to ensure you receive a pass, taking into account the results of your reflection. Prepare a detailed schedule as part of this plan of action in which you describe which parts of the module you will work on from day to day and how much time you intend to spend on them.</td>
</tr>
<tr>
<td>As soon as possible</td>
<td>The Examination Board will process your application and will inform you and the Office of Educational Affairs of their decision. The Office of Educational Affairs will then inform the study adviser and tutor. If your application is approved the Exam Office will register you for the applicable module.</td>
</tr>
</tbody>
</table>

*If you wish to make a third attempt at a module that was offered during the previous quarter, you must take action as soon as the result of the exam is published. In addition to the aforementioned actions, you will be asked to submit the exam you failed and analyse why you failed it. You will incorporate this in your plan of action.
Important!

- The student is responsible for this process themselves. This remains the case even if the publication of exam results is late, or if dates of examination meetings and other causes make it difficult to meet the deadlines.
- You must be able to demonstrate that you have made every effort to pass the module if you wish to receive supervision for it.
- Changes in module codes, names, etc., are not relevant reasons for a fail. The only thing that counts is the “identity” of the module.
- You are advised to make the best possible use of the first two attempts you are allowed.
- To apply for subsequent exam attempts (4, 5 etc.) you must first contact the study adviser. The same requirements apply as for a third exam attempt. Ensure that you pay extra attention to your reflection on the third exam attempt. Furthermore, when applying for these subsequent attempts you must include a detailed study progress overview so that the Examination Board can assess your application within the context of your performance throughout the programme.
- Fourth and later exam attempts can only be sat in the same quarter that the module is offered. The first rule applies here too: you must submit your application prior to the start of the quarter.
- You may only request one third exam attempt per application (so you cannot apply to re-sit more than one module in an application).
- If you have applied for third exam attempts for more than one module (or have applied for third exam attempts in the past), the Examination Board may take this into consideration.
- This regulation concerns written, and if applicable, oral exams. Other regulations apply for projects and practicals.
- You must register for all exams in Osiris. You can also deregister via Osiris up until the start of the examination period. After the examination period has started, you must deregister no later than 24 hours before the exam via the Student Services central information desk (studentservices@utwente.nl). If you fail to deregister in time, your registration will be counted as an exam attempt. It is not permitted to sit an exam for which you are not registered.


CREATE PROGRAMME
year 1
5.1 First year goals and their curriculum support

<table>
<thead>
<tr>
<th>Goal</th>
<th>Units of study supporting the goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. (Design in general) He is familiar with problem finding, and with idea and concept generation. He is aware of (web 2.0) business models and the societal context of projects, he can identify opportunities for exploitation of a technology, and he is familiar with requirements analysis, concept development, project planning and project management. He can realize basic prototypes. He can present and defend ideas. He is aware of the Human engineering analysis method for obtaining insight in user needs and wishes, and he is aware of the methods principles and limitations of usability testing.</td>
<td>These qualifications result from the student’s successful participation in the Explorative study units, and partly also from the Smart Technology units and the Design units, in particular the Human Factors unit.</td>
</tr>
<tr>
<td>2. (Graphic design) He is familiar with visual communication of concepts and ideas (making concept sketches and explanatory drawing, pictograms, icons, use of colour, fonts, style, readability), he is aware of information visualization issues, he is familiar with the use of visuals and collages to express desired feelings and emotions, and he is familiar with the use of visuals and collages to express a desired design solution.</td>
<td>These qualifications result from the student’s successful participation in the Design units of study, and partly from the New Media units (in particular the Interactive Visualization course).</td>
</tr>
<tr>
<td>3. (Modelling, planning and simulation) He is familiar with functions, vectors, matrices, and their role in systems modeling, he has experience with solving ordinary differential equations. He can use 20-sim software to make (simulation) models of complex systems with a feedback structure, and he can translate the simulation into differential equations.</td>
<td>These qualifications result from the student’s participation in the Mathematics units of study and the Smart Technology units (in particular Introduction to Physical Systems and System Dynamics).</td>
</tr>
<tr>
<td>4. (Systems of programmable components) He is aware of the basic concepts of computer architecture, operating systems, protocols, networks, languages and databases. He is familiar with writing and debugging simple computer programmes. He has experience in programming physical applications (Arduino based).</td>
<td>These qualifications result from the student’s successful participation in the Computer Science units of study.</td>
</tr>
<tr>
<td>5. (New Media) He is familiar with the computational infrastructure provided by the web platform; he is fluent in authoring web pages and the use of tools for that purpose. He can develop simple physics-based animations.</td>
<td>These qualifications result from the student’s participation in the New Media units of study.</td>
</tr>
<tr>
<td>6. (Other qualifications) He is familiar with collaborating in teams, he is aware of team roles, he is familiar with presenting and defending ideas (from &quot;elevator pitch&quot; to elaborate presentation); he is familiar with critical reflection on his own ideas and others, he is familiar with writing essays and is aware of the requirements a good essay must fulfil; he is familiar with the use of other media to communicate.</td>
<td>These qualifications result from the way education and assessment has been organized. The student participates in relevant events and gets feedback on his participation.</td>
</tr>
</tbody>
</table>
5.2 CreaTe Programme, Year 1

<table>
<thead>
<tr>
<th>block 1A</th>
<th>block 1B</th>
<th>block 2A</th>
<th>block 2B</th>
</tr>
</thead>
<tbody>
<tr>
<td>(5EC) We Create Identity</td>
<td>(4EC) Smart Environments</td>
<td>(5EC) Living and Working Tomorrow</td>
<td>(5EC) Have fun and Play</td>
</tr>
<tr>
<td>(4EC) Visual Communication</td>
<td>(3EC) Sketching</td>
<td>(3EC) Designing in context</td>
<td>(3EC) Human Factors</td>
</tr>
<tr>
<td>(5EC) Programming and Physical Computing</td>
<td>(4EC) Programming and Physical Computing</td>
<td>(1EC) Interactive Visualization part 1</td>
<td>(3EC) Interactive Visualization part 2</td>
</tr>
<tr>
<td>(1EC) Portfolio 1</td>
<td>(1EC) Portfolio 2</td>
<td>(1EC) Portfolio 3</td>
<td>(1EC) Portfolio 4</td>
</tr>
</tbody>
</table>

5.3 Study units descriptions

<table>
<thead>
<tr>
<th>Type of unit and unit area</th>
<th>study load in EC</th>
</tr>
</thead>
<tbody>
<tr>
<td>We Create Identity</td>
<td>Explorative 5</td>
</tr>
<tr>
<td>Smart Environments</td>
<td>Explorative,ST 4</td>
</tr>
<tr>
<td>Living and Working Tomorrow</td>
<td>Explorative 5</td>
</tr>
<tr>
<td>Have Fun and Play!</td>
<td>Explorative 5</td>
</tr>
<tr>
<td>Visual Communication</td>
<td>Directive,DE 4</td>
</tr>
<tr>
<td>Sketching for CreaTe</td>
<td>Directive,DE 3</td>
</tr>
<tr>
<td>Designing in Context</td>
<td>Directive,DE 3</td>
</tr>
<tr>
<td>Human Factors</td>
<td>Directive,DE 3</td>
</tr>
<tr>
<td>Introduction to Computer Science</td>
<td>Directive,CS 2</td>
</tr>
<tr>
<td>Programming and Physical Computing</td>
<td>Directive,CS 7</td>
</tr>
<tr>
<td>Intr. to Physical Systems and System Dynamics</td>
<td>Directive,ST 5</td>
</tr>
<tr>
<td>Interactive Visualization</td>
<td>Directive,NM 4</td>
</tr>
<tr>
<td>Introduction to Mathematics and Modelling</td>
<td>Directive,MA 6</td>
</tr>
<tr>
<td>First year portfolio</td>
<td>Portfolio 4</td>
</tr>
<tr>
<td>Year 1</td>
<td>60</td>
</tr>
</tbody>
</table>
1A We Create Identity

Lecturer: Dr. Ir. D. Reidsma
Activities: Lectures, Presentations, Interaction, Deliverable
Assessment: Deliverable, Essay(s), Presentations

The deliverables of the course are an interactive video (group work), a personal webpage as an initial presentation portfolio, a blog, and a worst web page. Lectures, interaction, presentations and essays concentrate on the concept of identity, the group of students as a social network, the relationship between student and course programme, and on storytelling as a key aspect of creating identity and of creative technology.

Goals are:
• to gain further insight in what a “creative technologist” is or could be,
• to explore how each individual in the group relates to the others, and to a future as “creative technologist”,
• to understand and practice the basics of storytelling,
• to understand and practice the basics of web technology.

1B Smart Environments

Lecturer: Ir. J. Scholten
Activities: Lectures, Presentations
Assessment: Deliverable, Essay(s), Presentations

The course shows how developments in computer and sensor technology have led to smart systems, as found in e.g. ambient intelligence, urban sensing, crowd sourcing and wireless sensor networks. These systems are networks of embedded computers, smart mobile phones and smart sensors. In small groups, students deliver (design and build) an application based on ready-to-use smart technology components such as sensors, wireless sensor nodes, RFID tags and smartphones. During the course the students present their ideas, designs and prototypes.

Goals are:
• to get insight in smart technology, ubiquitous computing and related concepts,
• to know the state of the art in smart technology, and
• to gain practical lab experience.

2A Living and working tomorrow

Lecturer: Ir. E.C. Dertien
Activities: Lectures, Presentations, Interaction, Deliverable
Assessment: Deliverable, Essay(s), Presentations

The student explore (in a group), the application of several new technologies in a future living or working situation. After investigating new technologies, application scenarios will be generated. Concepts for these scenarios will be developed, resulting in creating and evaluating a prototype. In project lectures the relevant tools are presented.

Goals are:
• to practice the exploration of technology for the purpose of creating “smart behaviour” of systems for future living and working,
• to practice techniques for idea generation,
• to practice concept evaluation, and justification of choices,
• to organise work, especially working in a group,
• to write an adequate report, and give an adequate presentation.

2B Have Fun and Play!

Lecturer: Dr. M.I.A. Stoelinga
Activities: Lectures, Presentations, Interaction, Deliverable
Assessment: Deliverable, Essay(s), Presentations

The deliverables of the course are installations to be exhibited as works of art. The emphasis is on delivering a message which has impact, within the boundaries of a theme provided by the course supervisors, using the elements introduced during the first year of creative technology.

Goals are:
• the application of creative technology elements,
• the exploration of the combination smart technology & new media,
• the development of interactive game play,
• the reflection on societal context of media & smart system deployment,
• practicing project management, and working under contract (for an exhibition organiser).
1A Visual Communication

Lecturer Activities Assessment #sub tests
C.H. Vermaas Lectures Deliverable(s) none
Presentations
Interaction

The course deals with the arrangement of text, imagery and other visual means to convey messages visually in an appealing and functional manner within the two dimensional field. The meetings consist of short lectures that address the basic knowledge of graphic design with topics such as: typefaces, typographic terms, legibility, signs and symbols, the use of colour, composition, aesthetics, usability, visual narration and other related aspects. The lectures are combined with a succession of shorter and longer assignments designed to activate the students’ passive knowledge, and to make the students familiar and comfortable with the various aspects of conveying a message within the realm of (static) visual communication.

Goals are:
• to acquire knowledge and experience of graphic design in order to convey a message within the realm of (static) visual communication,
• to be able to communicate and collaborate with other visual literate persons, such as graphic designers, website designers, website builders and others visual literate persons.

1B Sketching for CreaTe

Lecturer Activities Assessment #sub tests
P. van Passel Lectures Assignment none
Assignments

Basic skills will be developed for the expression of ideas and concepts through sketching. With practical lab training the basic principles of perspective drawing are taught.

Goals are:
• to develop the ability to express oneself (ideas, concepts, designs) visually (in particular: to learn and practice the principles of perspective drawing and the basic drawing-constructions of 3d shapes and environments),
• to learn and practice to make clear and understandable drawings,
• to learn and practice making concept sketches and explanatory drawings in short time,
• to learn and practice the use of drawing as a tool for idea-generation and development in the design process.

2A Designing in Context

Lecturer Activities Assessment #sub tests
Dr. Ir. G.D.S. Ludden Lectures Assignments none
Assignments
Interaction

The course is about understanding the role of context in design, and of principles and methods for designing products and services within context. New developments will exist in a context characterized by the environment, users, stakeholders, society, fashion, trends et cetera. The participants will understand the relevance of this context, they will practice with the identification and visualisation of this context for design purposes, and they will understand the basic principles of designing attractive solutions with an environment and target group in mind.

Goals are:
• to learn mirroring principle, harmony, colour coding, Gestalt and meaning, semantics and others,
• to practice the use of visuals and collages to indicate and document specific trends, target groups and environments,
• to practice the use of visuals and collages to express desired feelings and emotions,
• to practice the use of visuals and collages to express a desired design solution.

2B Human Factors

Lecturer Activities Assessment #sub tests
Ir. A.P. v.d. Breukel Lectures Assignment none
Dr. Ir. M.C. v.d. Voort Presentations Deliverable Group

In order to be able to design a successful application it is important to know simple methods for fitting the product to the user’s needs, wishes and understanding (of operation, navigation and functioning). Components of the course are to evaluate and redesigning an existing user interface design from user perspective, to make a relevant list of requirements for your own design from user perspective, to design a user interface from Human Factors guidelines, and to evaluate your design with usability testing.

Goals are:
• to become familiar with the Human Engineering Analysis method for obtaining insight in user needs and wishes,
• to be aware of and practice with guidelines for designing usable interfaces,
• to be aware and practice with the methods, principles and limitations of usability testing.
1A Introduction to Computer Science

Coursecode: 201200101 | Study load: 2.0 EC

Lecturer Activities Assessment #sub tests
Dr. A.H. Mader Lectures Assignment 2
Dr. G. v.d. Hoeven Interaction Written test
Deliverable Public Defence
Group

The course wants to give the students an overview over basic phenomena of computer science, presenting them with a framework where they can position phenomena they will find in other courses. Meetings consist of short lectures, exercises in technodrama, and assignments on aspects of computer science. Process structure and workflow taxonomy are key concepts.

Goals are:
• to have an overview of the basic processes and tools relevant for running applications in a network of devices with processing power,
• to have insight in the workflow of design efforts for a product or service involving processing and communication in a network of devices.

1(A-B) Programming and Physical Computing

Coursecode: 201100119 | Study load: 7.0 EC

Lecturer Activities Assessment #sub tests
Dr. A.H. Mader Lectures Assignments 2
Ir. E. Dertien Assignments Oral Examination

Students acquire elementary programming skills that are needed for Smart Technology and New Media. Meetings consist of short lectures, but mainly making programming exercises, aimed at elementary programming skills, emphasizing the physical computing aspect (communicating with and controlling external devices).

Goals are:
• to learn and practice writing simple programs in the programming environment “Processing” and debug them,
• to learn and practice programming and constructing applications using a microcontroller (Arduino), using a number of sensors and actuators,
• to learn and practice the adaptation of fragments of more complex programs to achieve different behaviour.

2(A-B) Interactive Visualization

Coursecode: 201200102 | Study load: 4.0 EC

Lecturer Activities Assessment #sub tests
Dr. J. Zwiers Lectures Presentations Deliverable none
Group Essay

The course will address the development of (primarily physics based) visualizations of dynamic complex systems. These visualizations involve storytelling and animation, they will (at least partly) be based on game technology. During the course groups of students are under contract of an external party, “owner” of a complex dynamical system, with a desire to make this system better understandable and more easily accessible for a specific audience, through a dynamic and possibly interactive visualization.

Goals are:
• to learn about issues in information visualisation,
• to learn and practice the development of an dynamic and interactive visualization, using game technology,
• to learn and practice working under contract.
This course firstly introduces basic elements of analysis with the aim to discuss ordinary differential equations and their solution. Attention is given to functions, vectors and matrices. The purpose eventually is the mathematical modelling of dynamical systems as occur in smart technologies and new media applications. Programming tools are used to compute and help visualize mathematical structures and solutions to differential equations. The course has a larger assignment to make an application, with an underlying mathematical model of a physical phenomenon (this is group work).

Teaching this course is interwoven with the dynamical systems course.

In the final part of the course attention goes to phenomena in visual representation (and possibly sound) with their underlying mathematical models (self-similar structures and fractals, tiling, golden mean, etc.)

Meetings will often be in smaller groups. Assignments and lectures will be adapted to the different backgrounds in mathematics of the participants.

Goals are:
• To learn and practice the mathematical concepts and techniques for modelling dynamical systems,
• To learn and practice aspects of the (visual) beauty of mathematics.

This course firstly introduces basic elements of analysis with the aim to discuss ordinary differential equations and their solution. Attention is given to functions, vectors and matrices. The purpose eventually is the mathematical modelling of dynamical systems as occur in smart technologies and new media applications. Programming tools are used to compute and help visualize mathematical structures and solutions to differential equations. The course has a larger assignment to make an application, with an underlying mathematical model of a physical phenomenon (this is group work).

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Meetings will often be in smaller groups. Assignments and lectures will be adapted to the different backgrounds in mathematics of the participants.

Goals are:
• To learn and practice the mathematical concepts and techniques for modelling dynamical systems,
• To learn and practice aspects of the (visual) beauty of mathematics.
6.1 Second year goals and their curriculum support

<table>
<thead>
<tr>
<th>Goal</th>
<th>Units of study supporting the goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. (Design in general) He is fluent in problem-finding, and in idea and concept generation. He is aware of security and privacy issues; he is familiar with concept development for interaction with non-computer screens, and concept development relating the real to the virtual world. He is fluent in content production, workflow and project management.</td>
<td>These qualifications result from the student’s successful participation in the Explorations study units.</td>
</tr>
<tr>
<td>2. (Graphic design) He is familiar with the concepts of (visual) story telling, and animation.</td>
<td>These qualifications result from the student’s successful participation in the Design units of study.</td>
</tr>
<tr>
<td>3. (Modelling, planning and simulation) He can analyze and model time signals. He is familiar with basic concepts of probability and statistics. He is familiar with the basic foundations of game theory and can work with concepts of game theory. He is aware of system behaviour under the influence of randomness and of the use of Markov chains, queuing and optimization in this context.</td>
<td>These qualifications result from the student’s successful participation in the Mathematics units of study.</td>
</tr>
<tr>
<td>4. (Systems of programmable components) He is fluent in OO programming. He is familiar with the use of automatically generated code. He is aware of standard solutions and libraries, and of programme complexity. He can structure data-driven problems, and he is fluent in generating database applications and data-driven web services.</td>
<td>These qualifications result from the student’s successful participation in the Computer Science units of study.</td>
</tr>
<tr>
<td>5. (Business and marketing) He familiar with the basics of marketing and business management and can apply simple business principles in developing products. He can develop a business plan including the descriptions of product and product development (with estimation of development costs), a market analysis and analysis of competitors.</td>
<td>These qualifications result from the student’s successful participation in the Explorations (of the first and the second year).</td>
</tr>
</tbody>
</table>

6. (New Media) He is familiar with building geometry and with sound and movement in graphic design. He is aware of the application of games in education and learning. He is familiar with the concepts and techniques for the design of serious games, and he can analyze games using game patterns. These qualifications result from the student’s successful participation in the New Media units of study. |

6. (Smart Technology) He is familiar with basic methods for measuring quantities in various physical domains, and with the sensors commonly used for these measurements. He is aware of the general performance and the basis limitations of these sensors. He understands the most important electronic functions of a data acquisition system, and he understands the effects of sampling and quantisation on the quality of a measured signal. He can model and optimize communication systems, and he can integrate communication systems in new products. He knows how feed-forward and feedback control can be used to modify the performance of a system. He knows how an accurate control system can be build that is insensitive for disturbances and parameter variations. He knows the consequences of using digital computers in control systems. These qualifications result from the student’s successful participation in the Smart Technology units of study. |

7. (Other qualifications) He is fluent in collaborative efforts and can take different team roles; he is fluent in presentation, defence and documentation, both orally and in writing; he is fluent in critical reflection on his own ideas and the ideas of others; he is familiar with the evaluation of concepts and ideas at various levels; he is aware of ethical dilemmas a designer may face. These qualifications result from the way education and assessment has been organized. The student participates in relevant events and gets feedback on his participation.
### 6.2 CreaTe Programme, Year 2

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<th>block 2A</th>
<th>block 2B</th>
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<td>(5EC) Ambient Screens</td>
<td>(4EC) Web Services and Data-driven Applications</td>
<td>(5EC) Hybrid Worlds</td>
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<tr>
<td>(3EC) Introduction to Statistics and Probability</td>
<td>(2EC) Research Methodology</td>
<td>(3EC) Innovation and Entrepreneurship for IBA</td>
<td>(3EC) Startrix for CreaTe</td>
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### 6.3 Study units descriptions

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<th>Study load in EC</th>
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<td>Explorative 5</td>
</tr>
<tr>
<td>Hybrid Worlds</td>
<td>Explorative 5</td>
</tr>
<tr>
<td>CE in Art, Science and Technology</td>
<td>Explorative 2</td>
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<td>Animated Narration</td>
<td>Directive, DE 3</td>
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<td>Innovation and Entrepreneurship for IBA</td>
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<td>Startrix for CreaTe</td>
<td>Directive, BI 5</td>
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<tr>
<td>Programming with Structures</td>
<td>Directive, CS 5</td>
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<td>Web Services and Data-driven Applications</td>
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<tr>
<td>Introduction to Probability and Statistics</td>
<td>Directive, MA 3</td>
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<td>Directive 2</td>
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<tr>
<td>Systems and Signals</td>
<td>Directive, MA 3</td>
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<tr>
<td>either Strategies and Protocols</td>
<td>Directive, MA 3</td>
</tr>
<tr>
<td>or Queues and Logistics</td>
<td>Directive, MA 3</td>
</tr>
<tr>
<td>either Smart Technology</td>
<td>Directive, ST 15</td>
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<tr>
<td>or New Media</td>
<td>Directive, NM 15</td>
</tr>
<tr>
<td>Second Year Portfolio</td>
<td>Portfolio 2</td>
</tr>
<tr>
<td>Year 2</td>
<td>60</td>
</tr>
</tbody>
</table>
1B Ambient Screens

Coursecode: 201200105 | Study load: 5.0 EC

Dr. Ir. D. Reidsma

Activities
- Lectures
- Presentations
- Interaction
- Deliverable

Assessment
- Deliverable
- Essay(s)
- Presentations

Interaction Presentations

Deliverable
Group

Deliverables of the course are creative solutions for interaction with a (multitude of) screen(s). Preferably the solutions will rely on scenario-based serious games. Each deliverable is conceived and realized in a group. The deliverable is supposed to combine smart technology and new media.

Lectures, presentations and interaction concentrate on the (future) consequences of the ubiquitous availability of screens outside the workplace and the personal home computer. Aspects to be considered are technological, human and social. Areas of interest are privacy and security issues, natural interaction between humans and screens, the role of screens in the interaction between humans, the role of screens in influencing the behaviour of humans, etc.

Goals are:
- to practice and further develop skills in system and content development,
- to learn and practice the development of concepts for interaction with non-computer screens,
- to practice and further develop the skills in group work, project structuring and project management,
- to practice reflection upon, and justification of design choices
- to find, summarize, present and discuss existing views (in scientific literature) on issues relating to ambient screens (privacy, security, interaction, persuasiveness, etc.).

2B Hybrid Worlds

Coursecode: 201200106 | Study load: 5.0 EC

Dr. Ir. D. Reidsma

Activities
- Lectures
- Presentations
- Interaction
- Deliverable

Assessment
- Deliverable
- Essay(s)
- Presentations

Group

The course is meant as an integrative project, with a special focus on the relation between the real world and the virtual world, not only in a metaphorical sense, but rather as expressed by the notion of the internet of things.

Topics addressed include RFID identification, geo-tagging, and other sensors in combination with online monitoring, logistics. Groups of students deliver a smart systems where (wireless) sensors and feedback control, realized in microcomputers play a major role. Such systems could be autonomous robots (e.g. robotics vacuum cleaners and so on), traffic control systems, but could also be partly in the real and partly in the virtual world. Dependent on specialisation and interest students are encouraged to explore issues of smart systems, logistics and traffic management, or playful applications in an urban context. In this context the phrase hybrid may also be understood as multicultural.

Goals are:
- to practice and further develop skills in system and content development,
- to learn and practice the development of concepts concerning the integration of the real and the virtual world,
- to practice and further develop the skills in group work, project structuring and project management,
- to practice reflection upon, and justification of design choices
- to find, summarize, present and discuss existing views (in scientific literature) on issues relating to the real and virtual world, specific for the deliverable that has been chosen (all aspects of the internet of things, privacy, security, issues of culture and cultural differences, etc.).

1A Systems and Signals

Coursecode: 201200111 | Study load: 3.0 EC

Prof. dr. A.A. Stoorvogel

Activities
- Lectures
- Tutorials

Assessment
- Deliverable
- Written examination

No description was available for the production of this study guide. Please consult OSIRIS and/or Blackboard, www.utwente.nl/coursecatalogue.
1(A-B) Creative Explorations in Art, Science and Technology

Coursecode: 201000196 | Study load: 2.0 EC

Lecturer Activities Assessment #sub tests
vacancy Lectures Deliverable none
Presentations Essay(s)
Interaction Presentations
Deliverable Oral examination
Group

This course is not taught. It provides space for the student’s own explorations on (the intersection of) art, science and technology. Students may:
• give a mini-seminar on a technological tool or application they have seen or learnt to master,
• reflect on an exhibition or festival they had been to,
• participate in or initiate some artistic activity (e.g. creating a sculpture or a laser show, may be with an artist in resident),
• provide entry to some reputed festival,
• compile and present an illustrated survey on history of e.g. computer animation, organize debate on some ethical issues, 3D modelling or a creative idea.

In general, students may use these credits to explore topics beyond the curriculum, and share the result of their exploration with the rest of the students (and staff).

2A Animated Narration

Coursecode: 201200107 | Study load: 3.0 EC

Lecturer Activities Assessment #sub tests
C. H. Vermaas Lectures Deliverable none
Presentations
Interaction

The course deals with storytelling by visual (and a little auditive) means. Students create animations and story boards, and they evaluate their own, and others’ products. Moreover, the course deals with various aspects of meaning, communication and signs.

Goals are:
• to learn to evaluate a visualization by rhetoric standards of persuasion (logos, pathos and ethos)
• to learn to distinguish various aspects of the use and meaning of signs, like syntax, semantics and pragmatics,
• to learn to distinguish various types of signs, like iconic, indexical and symbolic
• to learn to understand the various aspects of meaning and communication, like denotation, connotation, representation, interpretation.

2A Innovation and Entrepreneurship for International Business Administration

Coursecode: 201000051 | Study load: 3.0 EC

Lecturer Activities Assessment #sub tests
A. J. Frederiks Group Group assignment none
Deliverable Written examination
Presentations

This course introduces students into the academic field of innovation management and entrepreneurship. Always wanted to know how big firms introduce radical, ground breaking innovations to the market? Or how entrepreneurs start their business after they got a great business idea? In this course the student will, based on basic models of innovation and entrepreneurship processes, be taught on the development of new businesses based on new technologies or broader innovative knowledge such as service innovation. Students are expected to deal with the prescribed materials on a theoretical and practical level.

Upon completing this course, students are expected to:
• Know the basic models and literature of innovation management, such as the 4P’s of innovation space and the innovation life cycle;
• Know the basic models and literature of entrepreneurship, such as the Entrepreneurial Process and the Strategic Window Metaphor;
• Apply these basic innovation and entrepreneurship models by analyzing empirical phenomena like companies, managers and entrepreneurs and classify them among several typologies, such as the Entrepreneurial Roles typology or the Entrepreneurial Innovation typology;
• Create a business idea, critically reflect upon it, and report this business concept in written form and present it as an elevator pitch.

2B Startrix for CreaTe

Coursecode: 201200108 | Study load: 5.0 EC

Lecturer Activities Assessment #sub tests
Dr. A.H. van Reekum Lectures Deliverables none
Presentations

The central theme in the Startrix project is the ‘Commercialization of a Technology’ (or a product/service based on it). The goal of the project is to give students an introduction into the field of high-tech entrepreneurship and all the different elements that play a part in it.

Students will work in groups on a self-chosen technology, preferable of UT-origin, and develop - as a management team - a strategy for the commercialization of the technology and write it down into a sound business plan.

Next to the content of the plan (technology, product & service, marketing, organization, finance etc.), processes such as info gathering, analysis & reporting, task division, organizing meetings and information exchange play an important role. Also, a short presentation (pitch) is included.
1A Programming with Structures

Coursecode: 201000194 | Study load: 5.0 EC

Lecturer: Dr. A.H. Mader

Activities:
- Lectures
- Assignments

Assessment:
- #sub tests: none

The meetings consist of short lectures and a lot of exercises and assignments. Gaining experience with a new programming language (C++), with the concept of a pointer, with the programme life cycle, and with a number of data structures and (standard) algorithms requires practice. Topics that are treated are Data structures, Recursion, Fractals, Trees, Graphs, Complexity, Formal models (Turing Machine), Distributed algorithms and Real-time aspects.

Goals are:
- to gain experience with C++ and Open Frameworks;
- to lose a pointer at least once;
- to gain insight in basic questions of complexity and algorithms;
- to learn to achieve real-time behaviour;
- to learn a number of nice standard algorithms;
- to understand basics of address spaces, compiling and linking.

1B Strategies and Protocols

Coursecode: 201000084 | Study load: 3.0 EC

Lecturer: Dr. B. Manthey

Activities:
- Lectures
- Assignments

Assessment:
- #sub tests: none

In our technologically advanced society, decentralization is not only omnipresent, but inevitable: Think of the functioning of sensor or computer networks, the organization of traffic, both on the streets or through the internet, or of auctions as an economic platform to make business. This course provides the basic foundation to understand, analyse, and design such decentralized systems. This includes basic foundations of game theory and provides an introduction to mechanisms design. Practical applications such as traffic routing, scheduling and internet protocols will be discussed.

2A Web Services and Data-driven Applications

Coursecode: 201200109 | Study load: 4.0 EC

Lecturer: Dr. A. Wombacher

Activities:
- Lectures
- Tutorials
- Group

Assessment:
- Deliverable
- Software
- Written test

The deliverables of the course are the realization of two small projects: a friend management application and a twitter notification service. The projects are performed in groups and contain implementation, documentation and short presentation of the solutions. The project progress is checked at several milestones. The students acquire the required knowledge in lectures, tutorials, group work and self study.

Goals are:
- to learn about paradigms of Web applications like rich clients, model view controller, push vs pull;
- to learn about the problems of concurrency in Web applications and their effect on data management;
- to learn to apply data management and web related technologies (MySQL, php, JSON, RESTful services);
- to learn to design data models, database schemas, and SQL queries;
- to design an application providing creative usage of online information.

1B Queues and Logistics

Coursecode: 201000085 | Study load: 3.0 EC

Lecturer: Prof. Dr. R.J. Boucherie

Activities:
- Lectures
- Assignments

Assessment:
- #sub tests: none

In this course basic elements of stochastic systems are introduced with the aim to give insight into the influence of randomness on system behaviour. Emphasis will be on insight into mathematical modelling and rules of thumb. Attention will be given to Markov chains, queueing problems and optimization, including decision processes under uncertainty.

Goals are:
- To learn to understand the influence of randomness on system performance,
- To experience how communication will help to optimise the behaviour of logistics systems.
1A Introduction to Statistics and Probability

Coursecode: 191567030 | Study load: 3.0 EC

Lecturer: Ir. T.M.J. Meijer

Activities: Lectures, Tutorials
Assessment: Deliverables, Written examination
#sub tests: none

Concepts from probability theory will be familiarized, such as ‘probability’, ‘stochastic variable’, ‘probability distribution’, ‘expectations’ and ‘variance’. Statistics come into play as soon as we deal with unknowns. In a number of simple situations the estimation of unknowns is required. We will also consider ‘confidence intervals’ to characterize the accuracy of estimation. Finally, we consider the theory of statistical testing, which allows statements to be made on the basis of research results. Applications will involve noisy signals. Students will be able to design, implement and interpret the outcome of statistical tests.

The goal in this course is to understand basic concepts from probability and statistics and to be able to apply these in a number of situations relevant for creative technology applications.

1B Research Methodology

Coursecode: 201200110 | Study load: 2.0 EC

Lecturer: Dr. ir. M. C. v.d. Voort

Activities: Lecturers, Tutorials
Assessment: Deliverables, Group deliverables
#sub tests: none

Part of a design process forms the literature concerning your design or competitive designs. Before proceeding with such information in your process it is important to evaluate and estimate the value of it. Main activity of this course is to learn to view on a scientific basis towards research of yourself and others. Literature surveying and evaluating is the main topic of the first part. In the second part you will learn how to judge the quality of a scientific research and what characterizes good research. In a group you will discuss several papers on their quality. In the third part of the course you will learn to set-up and carry out a research according to scientific standards.

Goals are:
• To select relevant literature and to evaluate it,
• To judge research of others on their scientific quality,
• To discuss with fellow students on quality of a research,
• To setup and carry out a research according to scientific standards and to report this properly,
• To critically evaluate your own research.

1(A-B) Second Year Portfolio

Coursecode: 201200114 Study load: 2.0 EC

2(A-B)

Lecturer: Tutors

Activities: Interaction
Assessment: Deliverable
#sub tests: 4

The main activities are devoted to building the personal portfolio. Students are supposed to have both a learning and a presentation portfolio. Through the learning portfolio and guided by the tutoring syllabus ("The road to the final qualifications"), students are encouraged, and learn, to reflect upon their personal development, and their itinerary towards the Bachelor’s degree in Creative Technology. The tutor assesses at the end of each block:
• The contents of the portfolio,
• The quality of the tutor’s reflection upon his/her own progress, and upon the choices to be made (in the third year), and goals to be set.

Important assessment criteria are:
• Completeness, being up-to-date, of the portfolio.
• The effectiveness of reflection.
Since the start of the information technology about 50 years ago the cultivated world we live in shows a higher complexity and functionality. At first all artificial intelligence was isolated to our personal computers or other complex (and often expensive) devices. Nowadays also simple and cheap devices and our daily environments evolve rapidly in the sense that they become more versatile and more intelligent or “smarter”. A product or functional space is not anymore invented for a sole purpose but shows multifaceted interaction with users and other (sub)systems. These “smarter” environments and products all have in common that in order to operate properly at such high complexity they:

1. Contain electronic circuitry for signal processing such as: filtering, conversion from analogue to digital world, modulation, amplification, etc. (Electronics).
2. Communicate within subsystems of the device or between devices (Telecommunication).
3. Contain intelligent software or hardware [in so called embedded systems] in which the sensory information is used for steering towards optimal and desired behavior [Control systems].
4. Sense or measure physical quantities in their environment (sensors) and have an effect on the environment or user (actuators).

The Smart Technology course aims at supplying the right balance between theory and practice on the technological side of smart products and smart environments. It trains students in the engineering skills and attitude necessary for developing, understanding, testing and prototyping Smart Products. This course consists of four subcourses in which the topics coincide with the points mentioned above.

Note: the former 4 courses within the Smart Technology track (introduction to electronics, introduction to telecommunication, control systems, sensors) can still be found on Osiris and are accessible for students from previous years.
7.1 The Faculty of EEMCS

The Faculty of Electrical Engineering, Mathematics and Computer Science (EEMCS) comprises three disciplines, each of which again has connections with other disciplines. Besides teaching, research is carried out in the faculties by our research groups/chairs. This research is entirely clustered in the university research institutes Institute for Nanotechnology (MESA+), the Centre for Telematics and Information Technology (CTIT) and MIRA.

### 7.1.1 Organization chart EEMCS

Dean
Dean of the faculty of EEMCS is prof.dr.ir. Ton Mouthaan. With him rests ultimate responsibility for all of the faculty’s educational programmes.

Faculty Council EEMCS
The Faculty Council EEMCS is a representative advisory body of the faculty. The Council consists of eight students and eight staff members. The students are elected annually, the staff members serve on the Faculty Council for a period of two years. Nominations for the Council take place in April, the elections are held in June. The Council’s term of office runs parallel to the academic year.

Depending on the subject at hand, the Faculty Council has advisory powers or the right of consent about the proposed decisions of the faculty dean. If he wants to take decisions about the outlines of personnel policy, regulations in the field of terms of employment and the occupational health and safety policy, the dean requires the consent of the Faculty Council beforehand. The dean also requires the Faculty Council’s consent beforehand if he wants to take decisions on setting or modifying the Faculty Education and Examination Regulation (OER), rules in the field of safety, health and well-being or policy on students’ facilities.

For more information concerning the Faculty Council, please refer to: www.utwente.nl/ewi/organisatie/beastuur/faculteitsraad (Dutch)

The Board of Professors
The Board of Professors consists of all professors and programme directors of the faculty.

#### 7.1.2 Educational programmes

The faculty offers the following educational programmes:

- Bachelor’s programmes:
  - Electrical Engineering (EE)
  - Technische Informatica (INF)
  - Technische Wiskunde (TW)
  - Creatieve Technologie (Create)

- Master’s programmes:
  - Computer Science
  - Electrical Engineering
  - Embedded Systems
  - Human Media Interfaces
  - Systems and Control
  - Telematics
Master’s programmes:
- Applied Mathematics (AM)
- Computer Science (CSC)
- Electrical Engineering (EE)
- Embedded Systems (EMSYS) (3-TU)
- Human Media Interaction (HMI)
- Systems and Control (SC) (3-TU)
- Telematics (MTE)

Programme director
At the head of every educational programme is a programme director. He marks the outlines of the educational programme and is responsible for the content of the educational programme and its courses.

For EE (BSc and MSc) this is prof.dr. M.C. Elwenspoek (Miko)
For TW, AM and SC this is dr. J.W. Polderman (Jan Willem)
For INF, CSC and MTE this is dr.ir. R. Langerak (Rom)
For CreaTe and HMI this is dr. G.F. van der Hoeven (Gerrit)
For EMSYS this is prof.dr.ir. G.J.M. Smit (Gerard)

7.1.3 Services and units
The faculty has a number of EEMCS-wide service groups which are under the direction of the director of operations, dr.ir. J.F.C Verberne.

SAFETY AND HEALTH CARE EEMCS

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
<th>Phone number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coordinator</td>
<td>ing. S. Visser</td>
<td>+31 53 489 3153</td>
</tr>
<tr>
<td></td>
<td>(Sjoerd)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ir. F. Houweling</td>
<td>+31 53 489 3583</td>
</tr>
<tr>
<td></td>
<td>(Frans)</td>
<td></td>
</tr>
</tbody>
</table>

OFFICE OF THE DEAN OF THE FACULTY OF EEMCS (BFD-EEMCS)

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
<th>Phone number</th>
</tr>
</thead>
<tbody>
<tr>
<td>General e-mail address</td>
<td><a href="mailto:BFD_ewi@ewi.utwente.nl">BFD_ewi@ewi.utwente.nl</a></td>
<td></td>
</tr>
<tr>
<td>Dean</td>
<td>prof.dr.ir. A.J. Moutaana (Tan)</td>
<td>+31 53 489 4602</td>
</tr>
<tr>
<td>Director of Operations</td>
<td>dr.ir. J.F.C Verberne</td>
<td>+31 53 489 4427</td>
</tr>
<tr>
<td>Faculty secretariat</td>
<td>E.C. Bosch-van der Heijden (Elis)</td>
<td></td>
</tr>
<tr>
<td>director of operations and MT</td>
<td>L. Tunc-Katalanc (Eno)</td>
<td>+31 53 489 4602</td>
</tr>
<tr>
<td>dean</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

EDUCATION SUPPORT OFFICE EEMCS (BOB-EEMCS)

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
<th>Phone number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manager of Education</td>
<td>H.J. van Loar</td>
<td>+31 53 489 4466</td>
</tr>
<tr>
<td>(Jolanda)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internationalization</td>
<td>drs. J. Schut</td>
<td>+31 53 489 4350</td>
</tr>
<tr>
<td>(Jan)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality assurance</td>
<td>drs. J.H. Romkema</td>
<td>+31 53 489 2774</td>
</tr>
<tr>
<td>(Hans)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Educational support</td>
<td>drs. K.M.J. Slotman (Karina)</td>
<td>+31 53 489 5809</td>
</tr>
<tr>
<td>Traineeship</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traineeship coordinator</td>
<td>dr. M.J. Korsten</td>
<td>+31 53 489 2763</td>
</tr>
<tr>
<td>(Maarten)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traineeship mediator</td>
<td>B. JoaarmsKnol</td>
<td>+31 53 489 3887</td>
</tr>
<tr>
<td>(Belinda)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coordinator New Educational Model</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BSc Electrical Engineering</td>
<td>dr.ir. E.J. Faber</td>
<td>+31 53 489 2041</td>
</tr>
<tr>
<td>(Erik)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BSc Computer Science</td>
<td>drs. J.A. Kamphuis</td>
<td>+31 53 489 2771</td>
</tr>
<tr>
<td>(Jan)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student advisers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BSc INF and TEL</td>
<td>S.B.A.M. Yorck MSc</td>
<td>+31 53 489 5645</td>
</tr>
<tr>
<td>(Sharon)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BSc TW and MSc CSC, MTE, AM</td>
<td>L. Spijker</td>
<td>+31 53 489 3493</td>
</tr>
<tr>
<td>(Iljan)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BSc CreaTe and EE, and MSc HMI, SC, EMSYS and EE</td>
<td>T.H. de Kuijver MA (Thea)</td>
<td>+31 53 489 3697</td>
</tr>
<tr>
<td>Secretariat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student advisers, Internationalization</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality assurance</td>
<td>A. de Bruin-van Willigen (Annemieke)</td>
<td>+31 53 489 3725</td>
</tr>
<tr>
<td>Programme directors</td>
<td>K. Veldhuis</td>
<td>+31 53 489 5450</td>
</tr>
<tr>
<td>(Karin)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S. Biharie-Soebdhan (Satie)</td>
<td></td>
<td>+31 53 489 2751</td>
</tr>
</tbody>
</table>
COMMUNICATIONS
Communications is a shared service directorate within the UT. The following contacts apply for the faculty of EEMCS:

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
<th>Phone number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communications staff member</td>
<td>D. Dalenoord (Diana)</td>
<td>+31 53 489 3450</td>
</tr>
</tbody>
</table>

PREMISES MANAGEMENT
Position Name Phone number
Premises Manager ir. M.J.B. ten Bulte (Michel) +31 54 489 2800
Service desk Servicedesk.carre@fb.utwente.nl +31 54 489 2299

LIBRARY & ARCHIVE
Library & Archive is a service of the University Library of the University of Twente.
Position Name Phone number
Information Specialist
Computer Science, Applied Mrs drs. P. de Willigen (Petri) +31 53 489 2085
Mathematics ir. W.C. Oosterling (Wim) +31 53 489 2079

FACILITY SERVICE CENTRE
The Facility Service Centre is a shared service centre that offers its services within and for the various faculties, including EEMCS.

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
<th>Phone number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service desk</td>
<td><a href="mailto:Servicedesk.carre@fb.utwente.nl">Servicedesk.carre@fb.utwente.nl</a></td>
<td>+31 54 489 2299</td>
</tr>
<tr>
<td>Building contact</td>
<td>Citadel</td>
<td>+31 53 489 5768</td>
</tr>
<tr>
<td></td>
<td>Zilverling, Carré</td>
<td>+31 53 489 6284</td>
</tr>
<tr>
<td></td>
<td>Account EWI</td>
<td>+31 53 489 6251</td>
</tr>
</tbody>
</table>

ICT SERVICE CENTRE (ICTS)
ICTS is a shared service centre within the University of Twente. The following contacts apply for the faculty of EEMCS.

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
<th>Phone number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Account Manager EEMCS</td>
<td>ing. A.B. Tibben (Tonnie)</td>
<td>+31 53 489 3724</td>
</tr>
<tr>
<td>ICTS Service desk</td>
<td><a href="mailto:icts.servicedesk@utwente.nl">icts.servicedesk@utwente.nl</a></td>
<td>+31 53 489 5577</td>
</tr>
</tbody>
</table>

STUDENT & EDUCATION SERVICE CENTRE
The Student & Education Service Centre (S&O) performs tasks on a central level as well as within the various faculties. The Student & Education Administration (S&OA) EEMCS deals with all sorts of educational affairs and is part of this service centre. The Student & Education Administration is also known as the Bureau Onderwijszaken (BOZ, Office for Educational Affairs).

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
<th>Phone number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Team leader BOZ EEMCS</td>
<td>M.H. HuiskesBorghuis (Miranda)</td>
<td>+31 53 489 4605</td>
</tr>
<tr>
<td>OSIRIS/Blackboard key user</td>
<td>D. Muller (Diane)</td>
<td>+31 53 489 2681</td>
</tr>
</tbody>
</table>

Education support
Educational support is provided by the university Student & Education Service Centre (S&O) and the Education Support Office (BOB) of the faculty. The education administration is part of the Bureau Onderwijszaken (BOZ/S&O). See also section 4.1. EEMCS-wide coordination in the fields of Internationalization, Quality assurance, Traineeship and Study advice takes place from the BOB.
7.1.4 Facilities

PC-rooms

For practical courses the faculty of EEMCS has a number of PC-rooms available. The W-zaal (West-room) situated in Zilverling/Hal A is mainly scheduled for Electrical Engineering practicals. Situated in Zilverling/Hal A as well is a general practical space, the flex office of Smart XP. Furthermore, there is a general computer room on the fourth floor of the Zilverling building (Z1 4054) 36 PCs.

Please note that there are staff rooms situated near the course rooms in the Zilverling. So please keep quiet in the building corridors, limit talking and do not use your phone, but go to the stairwell or the Educafe instead. Eating is prohibited in the PC-rooms; drinking is only allowed when using lockable bottles.

Year room

For first-year Bachelor students of the Mathematics, Electrical Engineering and Creative Technology programmes, year rooms are used for most classes will take place there. Instead of moving groups of students between lecture rooms, teachers will come to the one room dedicated to one of the programmes. Outside lecture hours this room can be used for self-study or as a project space.

BSc Mathematics (TW)  | Citadel T100
BSc Electrical Engineering (EE) | Oosthorst 210
BSc Creative Technology 1st year | Smart XP
BSc Creative Technology 2nd year | Zilverling 3042
BSc Creative Technology 3rd year | Zilverling 2042

Smart XP Lab

This new multifunctional area in the Zilverling building is structurally used for teaching purposes towards the CreaTe programme. The lab is a true research playground and offers ample opportunity for testing and experimenting. This lab is, as it were, a meeting point where every possible research setup is imaginable.

7.2 The organization of education

7.2.1 Students’ Charter

As every institute for higher education in the Netherlands, the University of Twente also holds a Students’ Charter. The Students’ Charter is legally based in art. 7.59 of the Dutch Higher Education and Research Act (WHW). The Dutch text of the Students’ Charter is law-making. This means that in case of problems or conflicts you can appeal to the content of the Dutch text of the Students’ Charter (or Studentenstatus). The Students’ Charter contains a programme-specific section (the OSS) and an institute-specific section. The institute-specific section of the Charter is at all times available in its most up-to-date form on the website www.utwente.nl/so/studentenbegeleiding/en/regulations/charter.

If you would like to have a printed version of the Charter, it is available on request from the Red Desk: the information desk of the Student Counselling Service.
A copy of the programme-specific section of the Charter (OSS), which contains the Education and Examination Regulation (OER), can be collected from Bureau Onderwijszaken (BOZ). The programme-specific section contains at least:

- a description of the structure of the programme and the supporting facilities the institute offers to the students, including in any case (for definitions, please refer to the programme-specific section in question of the Charter):
  - information about the set-up, organization and realization of education,
  - the student facilities, and
  - the facilities concerning tutoring,
- the Education and Examination Regulation (OER)
- a description of procedures aimed at protecting the rights of students, which apply to the programme, in addition to the procedures that are established by the institutional administration.

www.utwente.nl/ewi/en/education/oer

7.2.2 Student Enrolment/Re-enrolment

Each academic year you are required to re-enrol at the University of Twente using Studielink. This re-enrolment is grafted on to the regulations in the Dutch Higher Education and Research Act (WHW) and it must be completed before 1 September. As soon as your request for re-enrolment via Studielink is received by the Central Student Administration (CSA), it will be verified whether you satisfy the conditions for enrolment. If you qualify for enrolment, your enrolment will be completed as soon as all enrolment documents have been submitted and the payment of your tuition fees is processed.

To enrol or re-enrol before 1 September, you must complete all enrolment formalities before 1 August.

When your enrolment is complete, as proof of enrolment you will receive your student card and two declarations of enrolment. The declaration contains, among other things, the programme(s) and the period for which you are enrolled.

On the university level there are various student service centres, which are united in the Student & Education Service Centre (S&O). The student desk accommodates the service centres. The main services are mentioned below.

7.2.3 Student and Education Services (S&O)

Student Services

Student Services offers various support services: you can go there to have your digital picture taken for your student card, to register, enrol or de-enrol. Student Services is situated in the Vrijhof building. See also: www.utwente.nl/so/studentenbegeleiding/en.

Student Counselling Service

The desk of the Student Counselling Service (the “Rode Balie”) is responsible for individual care and support of UT students at a coordinating level (besides the care educational programmes take for their “own” students). This includes for example a student psychologist, various courses (“self management”, graduating, job application) and the student counsellor.

Student psychologist

You can get help from the student psychologist when you need to talk to someone, for instance when you experience personal problems such as problems in your relation with your parents, friends or fellow students. You do not need a referral: you can make an appointment yourself. The student psychology service aims at having the first session within a week after the student contacted them.

Student counsellor

The student counsellor offers help when you have questions about, for instance, student grants, UT financial support, switching disciplines, problems involved with switching from a school for Higher Vocational Education to University, personal problems, appeal procedures, studying abroad, studying with a disability, and entrance examination (colloquium doctum). In order to make an appointment you need to telephone the secretariat. You have to take the initiative yourself to make an appointment with the student counsellor. At certain times the student counsellor does consultations without appointment, for which you do not have to make an appointment in advance.

The “Rode Balie” is situated in the Bastille building. For more information, go to: www.utwente.nl/so/studentenbegeleiding/en.
Complaints Desk
As from 1 April 2011 the UT arranged for a so-called Complaints Desk. Any student or external student, including prospective and former students, can turn to the Complaints Desk with a formal complaint, a formal appeal, or a formal objection. The Complaints Desk is situated with Student Services on the second floor of the Vrijhof building.

You will find more information about the Counter and the complaints procedures on:
www.utwente.nl/so/studentservices/en/complaints_desk

7.2.4 Communication and Information
When you want to take up a study at the University of Twente, from the very start you will be faced with various means of communication the university, the faculty and your programme use to communicate with you. As soon as your preliminary enrolment at the University of Twente is received, you will be provided with an e-mail account, user name and password. You will also be provided with some writing space of your own, where you can save your documents and where you might put your own home page. The Internet is by far the most important means of communication of the programme and the university.

E-mail
Whenever the programme or a particular lecturer wants to communicate quickly with a particular student or a small group of students, this will be done by e-mail. The Student & Education Service Centre (S&O) also uses e-mail to communicate with large groups of students. This occurs, for instance, when a lecture is suddenly cancelled or when an examination has to be rescheduled. In those situations, S&O is unable to contact the students in time through the usual channel of communication of the educational programmes, which is the Education Announcement. S&O also uses e-mail to announce, for example, information sessions about study-related matters.

UT students in general have e-mail addresses such as: <student name>@student.utwente.nl. In this address <student name> is replaced with a person’s initials and surname. Exceptions do occur, especially when a number of UT students have identical initials and surnames.

You can find e-mail addresses of UT students and staff on the UT website. Go to www.utwente.nl/telefoongids.

MyUniversity
MyUniversity, the UT student portal, gives access to all UT data systems (OSIRIS, Blackboard). You can log on at http://my.utwente.nl/.

Besides, the portal gives access to the timetables for teaching and to some other services.

Education Announcements
Every Education Announcement (Onderwijsmededeling) is spread through the Internet. The same applies for announcements concerning graduation colloquia and presentations of Bachelor’s and Master’s assignments. You can read them via the MyUniversity portal.

The Education Announcement is the programme’s main means of communication to communicate with all of its students. It is important to check if there are any changes in the timetable every day, in order to be informed as much as possible and to prevent sitting in the wrong lecture-room at the wrong time.

Timetable Course Programme
The portal MyUniversity gives access to the timetables for teaching activities. Changes will be immediately incorporated in the timetables. On the first page of your timetable you will find an overview of the latest changes.

OSIRIS (Student information system)
OSIRIS is a self-service student information system at the UT. Via MyUniversity you can log in on OSIRIS using an ‘s’ plus your student number and the corresponding password. You can find a user manual and further information on www.utwente.nl/onderwijssystemen/en.

If you have any questions, you can turn to Student Services (Vrijhof building), studentservices@utwente.nl, phone number +31 53 489 2124.

Blackboard
Blackboard is the digital learning environment of the UT. It offers all the information you need to follow a course, such as the timetable, the contents of the lectures and additional information on the course material and the examination or assignment. Within a Blackboard site you can also communicate with fellow students and lecturers or work together on assignments.
Blackboard is a lecturer’s main means of communication to communicate with his or her students about a course. On this site you may also find important announcements and news items on the course. You need to sign up for each course via Blackboard and OSIRIS.

If you have any questions on Blackboard or OSIRIS, within the faculty you can turn to S&O, Diane Muller, Citadel H208, phone +31 53 489 2681. For a Blackboard manual, go to blackboard.utwente.nl. The Support tab holds a quick reference and a manual.

ICT Account
To get access to the courses, you will need an account. After your registration at the CSA, the ICTS will usually provide you with a user name and password, the so-called ICT account, by letter within 10 workdays.

If you were not provided with an ICT account or if you lost your password, please report this at the ICTS servicedesk, located at Horstring W122 (icts.servicedesk@utwente.nl, phone number +31 53 489 5577) and keep your student card at hand.

Educational websites
For the EEMCS Bachelor’s programmes, educational information is available on the following websites:
- Creative Technology www.utwente.nl/create
- Electrical Engineering www.utwente.nl/el
- Technische Informatica www.utwente.nl/inf
- Technische Wiskunde www.utwente.nl/tw

For the Master’s programmes:
- Applied Mathematics www.utwente.nl/am
- Computer Science www.utwente.nl/csc
- Electrical Engineering www.utwente.nl/ee
- Embedded Systems www.utwente.nl/emsys
- Human Media Interaction www.utwente.nl/hmi
- Systems and Control www.utwente.nl/sc
- Telematics www.utwente.nl/mte

You can also find an overview of all programme guides, OERs (teaching regulations) etc. on www.utwente.nl/ewi/en/education.
7.2.5 Student card

The student card issued by the University of Twente is valid proof of identity within the UT and it is also a proof of enrolment. You are required to show the student card at request when making use of university facilities such as attending lectures, taking examinations, or visiting libraries. You will receive your student card and two declarations of enrolment through the post as soon as you are registered. So please see to it that the Central Student Administration (CSA) has your correct address.

Uses of the student card:
- **Student card**
  - The card is a valid proof of enrolment for the academic year 2012-2013.
- **Library pass**
  - The student card barcode enables the card to serve as a library pass.
- **Xtra card**
  - If you want to make use of the sports and cultural facilities in Enschede, the card serves as Xtra card as well. See www.xtra-card.nl/en.

Declaration of enrolment

With a declaration of enrolment you can prove your enrolment (for instance to get a student grant or at your insurance company). The declaration contains, among other things, the programme(s) and the period for which you are enrolled.

Thief/loss

In case of theft or loss of the card, you can apply for a new student card on payment of EUR 10.- at the Student Services desk in the Vrijhof building.

No student card yet?

If your enrolment has not yet been fully completed, no student card will be produced. In addition to your enrolment the CSA requires a digital photograph. You can upload a recent passport photograph in Osiris Student.

7.2.6 Year’s schedules

The year is divided into two semesters, each of which is divided into two quarters. Most courses will take one quarter and will be completed in the same quarter, mostly through a written examination. In every quarter 15 ECTS-credits are scheduled. The quarters run as follows:

- Quarter 1 from week 36 (3 September 2012) until week 45 (9 November 2012)
- Quarter 2 from week 46 (12 November 2012) until week 05 (1 February 2013)
- Quarter 3 from week 06 (4 February 2013) until week 16 (19 April 2013)
- Quarter 4 from week 17 (22 April 2013) until week 26 (28 June 2013)

Resits will take place in weeks 27 (1-5 July) and 30 (22-26 July)

For the exact schedule of courses see the timetables on the website http://my.utwente.nl. For a brief summary in English: www.utwente.nl/so/roosterwerkgroep/en.

7.2.7 Lectures

The lecture hours on a 3TU level are identical at all three of the institutes. This facilitates the exchange of education between the 3TU institutes by means of real time video conferencing.

The lecture hours fit in very well with a very simple and straightforward model: all lecture hours start at a quarter to the hour and end at the half hour.

There are fifteen-minute breaks between lecture hours, lunch and dinner breaks last 75 minutes. Starting times of written examinations fit in with this schedule. The longer breaks between the morning and afternoon lectures and the afternoon and evening lectures respectively, are included in a consecutive numeration.

<table>
<thead>
<tr>
<th>Period</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st period</td>
<td>08:45 - 09:30</td>
</tr>
<tr>
<td>2nd period</td>
<td>09:45 - 10:30</td>
</tr>
<tr>
<td>3rd period</td>
<td>10:45 - 11:30</td>
</tr>
<tr>
<td>4th period</td>
<td>11:45 - 12:30</td>
</tr>
<tr>
<td>5th period + lunch break</td>
<td>12:45 - 13:30</td>
</tr>
<tr>
<td>6th period</td>
<td>13:45 - 14:30</td>
</tr>
<tr>
<td>7th period</td>
<td>14:45 - 15:30</td>
</tr>
<tr>
<td>8th period</td>
<td>15:45 - 16:30</td>
</tr>
<tr>
<td>9th period</td>
<td>16:45 - 17:30</td>
</tr>
</tbody>
</table>
7.2.8 Taking courses
You need to sign up for each course via Blackboard and OSIRIS. To get access to the courses you require an account. The ICTS will provide you with a user name and password.

7.2.9 Knowing your way on campus
All of the faculty of EEMCS teaching takes place in rooms situated in buildings which are spread all over campus. In the time tables the lecture rooms are indicated using a code in which the first two letters indicate the building where the room is situated. The list below contains the most frequently occurring abbreviations of buildings. The computer practicals generally take place in one of the Zilverling rooms.

- CI  Citadel
- CR  Carré
- CU  Cubicus
- HB  Hal B (main entrance Zilverling, Carré and Waaier; location servicedesk Carré)
- HO  Hogekamp
- HR  Horasting
- HT  Horsttoren
- LA  Langezijds
- RA  Ravelijn
- SC  Sportcentrum
- SP  Spiegel
- VR  Vrijhof
- WA  Waaier
- ZI  Zilverling

For a map of the University of Twente see the next page or www.utwente.nl/plattegrond

7.2.10 Study material
Textbooks, lecture notes, readers or syllabuses are required for virtually every course. For those you can turn to the student association and the UnionShop.

The lecture notes, readers and syllabuses will be sold from the beginning of every semester at the UnionShop. You can check the website to see if they are in stock: www.studentunion.utwente.nl/en

7.2.11 PC-privé scheme for UT students and PC, laptop and printer purchase
The UT offers the possibility of an interest-free loan for the acquisition of the notebook provided by the NSC. The exact arrangements and conditions for the loan can be found in the students statutes. With the interest-free loan, the University of Twente will advance the funds necessary for your Notebook, which you will have to pay back to the University within 24 months. The maximum amount that you can borrow from the UT is 1,000 euros.

Principal requirement:
Once in the Bachelor’s phase and once in the Master’s phase, provided the student in question is 60 ECTS-credits or more away from the degree in the respective phase.

Exceptions:
1. When attending a one-year Master’s course, the student may sign up for the scheme no later than one month after the beginning of the programme;
2. Students enrolled in a Bachelor’s programme who take courses in the Bachelor’s phase as well as in the Master’s phase and who still have to attain at least 60 ECTS-credits for both phases taken together are also entitled to take part in the scheme. Taking part in the scheme is then regarded as taking part during the Master’s phase.

Note: this also includes students entering a programme via an alternative route who are attending a so-called ‘bridging programme’.

As a UT student you can purchase a high-quality notebook at the Notebook Service Centre at a highly competitive price along the the service guarantee that after handing the notebook in at the service desk you will obtain a working model within one hour. Obviously the notebook will also fulfil the requirements set by the universities bachelor’s programmes. The Notebook Service Centre also provides general UT software (such as Maple, Virusscanner, SPSS) through downloads. Special software may be available via your faculty.

For more information on the PC-privé scheme, refer to: www.utwente.nl/so/studentenbegeleiding/en/regulations/notebook/
This plan is available online: www.utwente.nl/campusmap

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APPENDICES
7.3 UT regulations

7.3.1 Studiefinanciering (Dutch student grant)
The contribution of the Dutch government towards the cost of education is called studiefinanciering. It consists of either a conditional grant plus an additional loan (the so-called blended studiefinanciering), or just a loan. The grant of DUO (Dienst Uitvoering Onderwijs, the government institution responsible for the Dutch student grants) allows students to receive part or all of their training outside the Netherlands. The entitlement to studiefinanciering depends on your first year of enrolment. In any case, you have to be enrolled as a student and you should not be over 30.

If you have any questions about the UT regulations below, you can also consult your study adviser.

7.3.2 Regulation graduation support
Students at the UT with certain special circumstances can make use of the Regulation graduation support. Students can appeal to this regulation when they have run into a delay due to recognized special circumstances during a period of blended studiefinanciering. The blended studiefinanciering concerns the period for which the studiefinanciering can partially be converted to a gift; in other words: the period in which the student is entitled to the basisbeurs (basic grant). To apply for graduation support you can contact the student counsellor in the Bastille building.

www.utwente.nl/so/studentenbegeleiding/en/regulations/graduationsupport

7.3.3 Top-level sport
Combining university-level studies and top-level sport can be problematic for many students. It generally proves impossible to postpone either academic studies or a career in sport until later; both activities require the practitioner to achieve results within a relatively short period of time. The UT is aware of the problems involved and has developed a policy covering the practice of top-level sport.

See also: www.utwente.nl/so/studentenbegeleiding/en/regulations/ttopsports/

7.3.4 Regulation encouragement student activism
Within the framework of encouragement of student activism there is a special regulation for active students. This involves the individual readjustment of educational obligations for active students, in order for them to have more flexibility in their studies and so that they will run into less delay because of their activism. If you want to know if you qualify for this regulation or if you want more information, go to: www.utwente.nl/so/studentenbegeleiding/en/regulations/graduationsupport or www.utwente.nl/so/studentenbegeleiding/en/regulations/ranis

7.3.5 Studying with a disability
Being disabled, following an educational programme is not always easy. However, the UT makes a serious effort to enable the disabled to study. Physically or sensory disabled students or dyslexic students are given the opportunity to take examinations in a way that is tailored to the requirements of their personal disabilities as much as possible. Students who fall under this regulation have been brought to the attention of S&O/BOZ and the EEMCS lecturers concerned through a letter of the study advisor.

www.utwente.nl/so/studentenbegeleiding/en/counselling/firstyear/introductionprogramme/
www.utwente.nl/so/studentenbegeleiding/en/counselling/firstyear/register

In general, being disabled, it may be wise to talk to the student counsellors and the study advisor of the faculty before the start of your studies. This may prevent any disappointments.
7.4 UT facilities

7.4.1 Office for Educational Affairs EEMCS
The Office for Educational Affairs (BOZ, Bureau Onderwijszaken) of the faculty of EEMCS is part of the Student & Education Service Centre (S&O) and assists the faculty in registering study results, supervising the (individual) students’ study programmes, organizing everything surrounding final assessment, making timetables, organizing examinations and organizing administrative systems.

BOZ is situated on the second floor of the Citadel, rooms H205-209. You can turn to them with most of your practical questions. They are reachable by telephone number +31 53 489 3794 or by e-mail boz@ewi.utwente.nl.

In addition to this, you can turn to Student Services on the first floor in the Vrijhof building with any questions concerning education.

7.4.2 Union Shop
The UnionShop is situated on the ground floor in the Bastille building. The UnionShop sells lecture notes, readers and syllabuses. It also runs a copy service. In the self-service section not only copies can be made, but also reports can be bound, flyers cut, etc.

7.4.3 Notebook Service Centre
Nowadays, a notebook is virtually indispensable to any student at the University of Twente. You require your notebook to communicate with others, to collect information, to make calculations and drawings, to perform simulations and even to take examinations.

Are you planning to buy a notebook in July or August? Every year in the summer, the ICTS Notebook Service Centre of the UT selects notebooks which most assuredly will meet the requirements of your educational programme!

On the Notebook Service Centre website various software packages are available for download, including Maple, Matlab, Solidworks, SPSS, VanDale etc.

For more information, go to: www.utwente.nl/icts/en/nsc

Service desk
All students and university staff members can turn to the ICTS Service desk if they have problems or questions in the field of ICT. The ICTS Service desk is open from 08.30 until 17.00h and is reachable by telephone number +31 53 489 5577.

The service desk is situated in Horstring W122 (next to the Notebook Service Centre). With ‘general’ questions on ICTS you can turn to icts.servicedesk@utwente.nl. For more information, go to: www.utwente.nl/icts/en/servicedesk.

7.4.4 Library/information specialist EEMCS
The central library of the University of Twente, situated in the Vrijhof building, contains books and journals on a number of disciplines. In addition, it contains study facilities such as study places in the reading rooms, quiet study places, working areas and PC work areas. The University Library catalogue, which includes the faculty libraries and the central library, is available online (www.utwente.nl/ub/en). Here you can also consult the catalogues of all Dutch University Libraries.

You need a student card if you want to lend publications or you want to make use of the study facilities, for the student card serves as a library pass. Further information on lending or ordering publications is available at the desk of the library. The University of Twente is working on the accessibility of scientific journals. More and more journals can be consulted through the Internet.

The opening hours of the central library are from 08.30 until 22.00h on workdays, and from 9 until 16.30h on weekends (for study purposes only). The information desk is open from Monday to Friday from 08.30 until 17.00h. You will find more information on www.utwente.nl/ub/en.

The University of Twente has a team of information specialists who offer support in the purchase of books, provide information on how to use the (digital) library and how to find scientific information on research and education for both staff and students.

For EEMCS, the information specialists are:
- Mrs drs. P. (Petri) de Willigen, Citadel building H203, phone +31 53 489 2085
7.4.5 Student restaurant

In the Woaiier building, the student restaurant of the UT is situated. The restaurant is based on the so-called free-flow system, which means that at various free-standing points of distribution a broad assortment is offered. Here you can get a hot day’s menu, the Dagmenu. You can also choose to have the more luxurious menu, or select from a broad assortment of sandwiches, rolls, snacks, desserts and hot and cold drinks.

7.5 Student activism and study associations

Organizing various activities requires qualities and skills which you may benefit from for the rest of your life. So being active in an association (being on a committee or a board) will always be beneficial to your CV. In the professional field, surely students will be watched for who did more than just study.

Being active also helps you getting introduced to people you might never meet otherwise. Moreover, board members often have a specific position, such as chairman, secretary or treasurer. Positions like this will teach you how to draw up an agenda, to chair meetings, to take minutes or, for instance, to draw up an estimate.

Every educational programme has its study association. They all organize all sorts of study-related activities, such as lectures, excursions and conferences. But also recreational activities are laid on, such as get-toghethers and parties. In addition, the student association for instance takes care of the book sale.

The study association for Electrical Engineering is Scintilla, for Creative Technology this is Proto, Abacus is the study association for Applied Mathematics and Inter-Actief for Computer Science.

Student participation and other committees

Within the faculty of EEMCS of your study programme you may become a member of various committees, such as the Faculty Council, Programme Committee or the Programme Quality Committee.