Study guide for Creative Technology 2011/2012

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CREATIVE TECHNOLOGY
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: Creative Technology 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 a 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.

### 1.1 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.

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### 1.2 The final qualifications

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.

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)
CREATE
2.1 Characteristics of the curriculum

2.1.1 We call it CreaTe
Staff and students use the name CreaTe to refer to the Creative Technology curriculum.

2.1.2 Curriculum construction
The curriculum consists of various types of units of study.

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

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

The six ST-units (ST for Smart Technology), two in the first year and four 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 four ST items of the second year can be chosen by students who want to specialize in experience, communication and products by “smart technology”.

The five NM units (NM for New Media), two in the first year and three 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 three NM-items of the second year can be chosen by students who want to specialize in experience, communication and products by “new media”.

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.

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.
2.1.3 Prospective students
The admission requirements for Creative Technology are simple: a VWO certificate of any kind (in Dutch: C&M, E&M, N&G, N&T) is adequate.

This entry level is uncommon for Bachelor’s with objectives in ‘disciplinary’ engineering in the Netherlands.

The choice for admission of students of all profiles reflects our interest in teaching design, and not pure science. We intend to educate designers with a cultural interest, who understand and improve our everyday lives, by working at the boundaries of the human world and the world of digital artefacts. The diverse intake is an asset for teaching and learning design. Different viewpoints and interests stimulate ideas and concept generation.

2.1.4 The language of the Creative Technology curriculum is taught in English.

2.2 The Creative Technology overview

The Creative Technology 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 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 two more explorative units, 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 e.g. for a semester of study abroad. This semester is called “profileringsruimte” 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.

The last quarter of the final year is for the Bachelor’s graduation project.

2.3 After graduation

2.3.1 Access to Master’s programmes
The Creative Technology graduates have the qualifications that allow access to further programmes at academic Master’s level (WO master).

They have access to the Human Media Interaction (HMI) Master’s programme of the University of Twente, without any restriction.

Moreover, in their “profileringsruimte” of the third year, Creative Technology students can take a half-year course programme, which may serve e.g.:
• to prepare for further study in the Master’s programme Communication Studies;
• to prepare for further studies in Industrial Design Engineering;
• to prepare for further studies in Mechatronics or Electrical Engineering.

All students with a Bachelor’s degree in a field of engineering and design have access to the Master’s programme on Philosophy of Science Technology and Society (PSTS) of the University of Twente, and to the Master’s programme Science Education and Communication (SEC, a joint programme of the 3TU federation). This is the university’s admission policy.

Note that the Master’s programmes of the University of Twente are taught in English. But the Science Education specializations in SEC, leading to a Dutch qualification to teach, are in Dutch.
2.3.2 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.

2.3.3 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 wellbeing. 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.

2.3.4 Extra curricular activities

2.3.4.1 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 scientists 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.

2.3.4.2 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.
CURRICULUM
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 types and areas. The areas are:

1. Design (DE)
2. Business (BI)
3. Smart Technology (ST)
4. New Media (NM)
5. Computer Science (CS)
6. Mathematics (MA)

The types are:

1. Explorative
2. Directive
3. Portfolio

Besides the mandatory and optional units of study, the curriculum has in year 3:
• electives;
• free space to establish a profile (“Profileringsruimte”);
• 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.
### 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>Ambient Screens</td>
<td>6.5</td>
</tr>
<tr>
<td>Hybrid Worlds</td>
<td>7.5</td>
</tr>
<tr>
<td>CE in Art, Science and Technology</td>
<td>2</td>
</tr>
<tr>
<td>3-D Modelling</td>
<td>2.5</td>
</tr>
<tr>
<td>Advanced Graphic Design</td>
<td>2.5</td>
</tr>
<tr>
<td>Design Marketing</td>
<td>5</td>
</tr>
<tr>
<td>Business Management</td>
<td>5</td>
</tr>
<tr>
<td>Introduction to Electronics</td>
<td>4</td>
</tr>
<tr>
<td>Introduction to Telecommunication</td>
<td>4</td>
</tr>
<tr>
<td>Control Systems</td>
<td>4</td>
</tr>
<tr>
<td>Sensors</td>
<td>3</td>
</tr>
<tr>
<td>Web 2.0 Mashups</td>
<td>3</td>
</tr>
<tr>
<td>Virtual Environments</td>
<td>6</td>
</tr>
<tr>
<td>Game Development</td>
<td>6</td>
</tr>
<tr>
<td>Programming with Structures</td>
<td>5</td>
</tr>
<tr>
<td>Data-driven Applications</td>
<td>3</td>
</tr>
<tr>
<td>Strategies and Protocols</td>
<td>3</td>
</tr>
<tr>
<td>Queues and Logistics</td>
<td>3</td>
</tr>
</tbody>
</table>

**Note:** Type of unit and unit area study load in EC

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<thead>
<tr>
<th>Year 2</th>
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**Categories:**
- **SEMESTER 1**
  - 30 EC Free space to establish a profile
- **SEMESTER 2**
  - (30 EC, sem 5) Profileringsruimte

- **SEMESTER 3**
  - 15 EC Electives
  - (15 EC, sem 6) Electives
  - 15 EC Graduation Project
  - (15 EC, sem 6) Graduation project

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<table>
<thead>
<tr>
<th>Category</th>
<th>Courses</th>
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<tbody>
<tr>
<td></td>
<td>SEMESTER 1</td>
</tr>
<tr>
<td>0 EC</td>
<td>9</td>
</tr>
</tbody>
</table>

**3.3 CREATE Programme, YEAR 3**

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The table above outlines the courses and study load for each category in Years 2 and 3 of the CREATE Programme. Students who choose the specialization, either NM or ST, will have specific units tailored to their chosen field. For a comprehensive view, please refer to the full curriculum document.
In the third year each student takes elective courses, with a total study load of 15 EC.

The choice of electives is limited by the constraints that
- At least one of the electives should address professional standards and ethical issues;
- At least one of the electives should address the interaction between humans and technology.

Examples of units of study in these fields offered by the university are:

The third elective (maximum 5 EC study load) can be used to assist a fellow student in his graduation project. See section 3.6 Bachelor graduation project below.

To participate in units of study of the second year students must meet two conditions:
- They are registered as either New Media or Smart Technology students.
- They have completed study units of the first year with a total study load of at least 40 credits.

To take Smart Technology units 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 Dynamical Systems Introduction to Mathematics and Modelling To take New Media units as a specialization in the second year, the enabling units for NM are Interactive Visualization Introduction to Computer Science Programming and Physical Computing.

To participate in units of the third year, students must meet a single condition
- They have completed study units of the first and second years with a total study load of at least 80 credits.

To start their Final Project, students must have completed all other units of the programme.

IThe third year has “profileringsruimte” (free space for students to establish their profile). According to university policy, you can use semester 5 (totalling 30 EC) for various purposes. You select a module of units of study totalling 30 credits. Your choice may serve e.g.
- to prepare for further study in the Master’s programme Communication Studies;
- to prepare for further studies in Industrial Design Engineering;
- to prepare for further studies in Mechatronics or Electrical Engineering;
- for courses (and projects) of the minors Ondernemerschap or Management to prepare for a role on the labour market.

A stay of one semester at another (foreign) university is also an option. And finally, if you want to broaden your knowledge in related topics which are not in the curriculum (e.g. computer music, image or language processing), you can use your “profileringsruimte” to do so.

If you intend to leave the university with a BSc degree only, the project is the proof that you are ready for a career as a creative technologist in industry, practically oriented, and on an academic level. If you continue your education in an MSc programme, the BSc project should also show you the challenges of doing more in depth research and stimulate you to deepen knowledge.

Bachelor projects may be carried out in the university labs and/or with external partners. Students will do their projects under the common supervision of external and university experts.

Typical contexts within the EWI faculty for such projects are in the following groups:
- HMI – Prof. Dr. A. Nijholt – playful interaction, ludic design, multimodal interfaces;
- Telemedicine – Prof. Dr. M.M.R. Vollenbroek-Hutten – telemedicine and e-health, scenarios in virtual worlds;
- Database Group – Prof. Dr. P.M.G. Apers – applications of data collection in sensor networks;
- Semiconductors – Prof. Dr. J. Schmitz – animation of micro-chip production processes.
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.

Apart from the practical work, which preferably results in a prototype or proof-of-concept realization, students are expected to write a report, write the Bachelor’s thesis, and present their work for fellow-students, project stakeholders, and supervising staff.
TEACHING AND LEARNING APPROACH
### 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 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 reach beyond the contents of the individual units of study, they are about your development over a long period of time. Interim exams are extremely relevant milestones in the development, but the quality of the constantly growing portfolio is equally important.

Creative Technology emphasizes that the students take their own responsibility for setting and reaching their goals. Creative Technology students are self-directing learners. They collect their progress in a personal portfolio. The portfolio is not just a showcase. It is a proof of long term development as a “Creative Technologist.”

To assist you in your self-directed learning, the tutor is a key person. Tutors challenge you to pass your exams with the best possible portfolio. Students and tutors use the Creative Technology Tutoring Syllabus ("The road to the final qualifications of a Creative Technology graduate") as a guideline for setting goals and monitoring progress towards reaching those goals.

### 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. Theo de Kuijver (see section 4.2.4). 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 intervision, 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.

After the first examination period, you will receive a ‘pre-advice’ on your study progress. At the end of the first study year you will receive an official assessment of your study progress, and your prospects for a successful study. This study progress assessment isn’t binding.

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 Masterchoice.

4.3 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: 053 489 3697
E-mail: t.h.dekluijver@utwente.nl
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>
<th>These qualifications result from the student’s successful participation in the <a href="#">description</a> of the <a href="#">description</a>.</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>
<td>These qualifications result from the student’s successful participation in the <a href="#">description</a> of the <a href="#">description</a>.</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>
<td>These qualifications result from the student’s successful participation in the <a href="#">description</a> of the <a href="#">description</a>.</td>
</tr>
<tr>
<td>3. (Modelling, planning and simulation) He is fluent in using MATLAB when it comes to functions, vectors, matrices, solving ordinary differential equations and the analysis of time signals. 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. He can analyze and model time signals. He is familiar with basic concepts of probability and statistics.</td>
<td>These qualifications result from the student’s participation in the Mathematics units of study and the Smart Technology units (in particular Dynamical Systems)</td>
<td>These qualifications result from the student’s participation in the <a href="#">description</a> of the <a href="#">description</a>.</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 fluent in writing and debugging simple computer programmes. He is familiar with the use of automatically generated code. He is aware of standard solutions and libraries, and of programme complexity.</td>
<td>These qualifications result from the student’s successful participation in the Computer Science units of study.</td>
<td>These qualifications result from the student’s successful participation in the <a href="#">description</a> of the <a href="#">description</a>.</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 is familiar with XML. 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>
<td>These qualifications result from the student’s participation in the <a href="#">description</a> of the <a href="#">description</a>.</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 “elevator pitch” 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>
<td>These qualifications result from the student’s participation in the <a href="#">description</a> of the <a href="#">description</a>.</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>(5 EC) We Create Identity</td>
<td>(3 EC) Smart environments</td>
<td>(5 EC) Living and working tomorrow</td>
<td>(5 EC) Have fun and play</td>
</tr>
<tr>
<td>(4 EC) Visual Communication</td>
<td>(2 EC) Sketching</td>
<td>(2 EC) Designing in context</td>
<td>(3 EC) Human factors</td>
</tr>
<tr>
<td>(3+2 EC) Computer Science / Programming</td>
<td>(5 EC) Programming and Physical Computing</td>
<td>(3 EC) Interactive Visualization part 1</td>
<td>(2 EC) Interactive Visualization part 2</td>
</tr>
<tr>
<td></td>
<td>(3+1 EC) Intro Math+Modelling / Dynamical Systems</td>
<td>(3+1 EC) Dynamical Systems / Intro Math+Modelling</td>
<td>(2+2 EC) Intro Math+Modeling / Dynamical Systems</td>
</tr>
<tr>
<td>(1 EC) Portfolio 1</td>
<td>(1 EC) Portfolio 2</td>
<td>(1 EC) Portfolio 3</td>
<td>(1 EC) Portfolio 4</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>We Create Identity</td>
<td>Explorative</td>
</tr>
<tr>
<td>Smart Environments</td>
<td>Directive, ST</td>
</tr>
<tr>
<td>Interactive Visualization</td>
<td>Directive, NM</td>
</tr>
<tr>
<td>Living and Working Tomorrow</td>
<td>Explorative</td>
</tr>
<tr>
<td>Have Fun and Play!</td>
<td>Explorative</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>Dynamical systems</td>
<td>Directive, ST</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>
</tbody>
</table>

| Year 1 | 60 |
## 1A  We Create Identity

**Coursecode:** 20110115 | **Study load:** 5.0 EC

<table>
<thead>
<tr>
<th>Lecturer</th>
<th>Activities</th>
<th>Assessment</th>
<th>#sub tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Ir. D. Reidsma</td>
<td>Lectures</td>
<td>Deliverable</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Presentations</td>
<td>Essay(s)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Interaction</td>
<td>Presentations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Deliverable</td>
<td>Group</td>
<td></td>
</tr>
</tbody>
</table>

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

**Coursecode:** 196700610 | **Study load:** 3.0 EC

<table>
<thead>
<tr>
<th>Lecturer</th>
<th>Activities</th>
<th>Assessment</th>
<th>#sub tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ir. J. Scholten</td>
<td>Lectures</td>
<td>Deliverable</td>
<td>none</td>
</tr>
<tr>
<td></td>
<td>Presentations</td>
<td>Essay(s)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Interaction</td>
<td>Presentations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Deliverable</td>
<td>Group</td>
<td></td>
</tr>
</tbody>
</table>

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

**Coursecode:** 201100116 | **Study load:** 5.0 EC

<table>
<thead>
<tr>
<th>Lecturer</th>
<th>Activities</th>
<th>Assessment</th>
<th>#sub tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ir E.C. Dertien</td>
<td>Lectures</td>
<td>Deliverable</td>
<td>none</td>
</tr>
<tr>
<td></td>
<td>Presentations</td>
<td>Essay(s)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Interaction</td>
<td>Presentations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Deliverable</td>
<td>Group</td>
<td></td>
</tr>
</tbody>
</table>

The student explores (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!

**Coursecode:** 201100117 | **Study load:** 5.0 EC

<table>
<thead>
<tr>
<th>Lecturer</th>
<th>Activities</th>
<th>Assessment</th>
<th>#sub tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Ir. D. Reidsma</td>
<td>Lectures</td>
<td>Deliverable</td>
<td>none</td>
</tr>
<tr>
<td></td>
<td>Presentations</td>
<td>Essay(s)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Interaction</td>
<td>Presentations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Deliverable</td>
<td>Group</td>
<td></td>
</tr>
</tbody>
</table>

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

Coursecode: 201100118 | Study load: 4.0 EC

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

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

Coursecode: 196700210 | Study load: 2.0 EC

Lecturer: Vacancy
Activities: Lectures, Assignments
Assessment: Assignment
#sub tests: none

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

Coursecode: 196700230 | Study load: 2.0 EC

Lecturer: Ir. W. Eggink
Activities: Lectures, Assignments
Assessment: Assignments
#sub tests: none

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

Coursecode: 196700240 | Study load: 3.0 EC

Lecturer: Vacancy
Activities: Lectures, Presentations
Assessment: Deliverable
#sub tests: none

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

Lecturer
Dr. A.H. Mader

Activities
Lectures
Interaction
Deliverable
Group

Assessment
Assignment
Written test
Public Defence

#sub tests
2

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.

2(A-B) Interactive Visualization

Coursecode: 196700020 | Study load: 5.0 EC

Lecturer
Vacancy

Activities
Lectures
Presentations
Group

Assessment
Deliverable
Essay

#sub tests
none

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.

1(A-B) Programming and Physical Computing

Coursecode: 201100119 | Study load: 7.0 EC

Lecturer
Dr. A.H. Mader

Activities
Lectures
Assignments

Assessment
Assignments
Oral Examination

#sub tests
2

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.
1B Introduction to Mathematics and 2(A-B) Modelling

Coursecode: 201100131 | Study load: 6.0 EC

Lecturer: Dr. R.M.J. van Damme

Activities: Lectures, Assignments, Group

Assessment: Written test

#sub tests: 3

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.

2A Dynamical Systems

Coursecode: 196700120 | Study load: 6.0 EC

Lecturer: Vacancy

Activities: Lectures, Assignments

Assessment: Oral examination

#sub tests: none

This course will give insight in the behaviour of dynamical systems, in the continuous-time as well as in the discrete time domain. It also teaches basic knowledge of the physical properties of electrical and mechanical systems. Based on simple examples from society, biology and engineering you will learn to make abstractions of dynamical systems, by first detecting the relations between the elements of such systems and next by creating models of such systems that can be simulated in 20-sim. The simulation models will form the basis for a more mathematical description of such systems in the form of differential equations.

Goals are:

- to learn and practice to make a description of complex systems where different functions and or elements interact with each other in a feedback structure,
- to learn and practice to make simulation models of such systems, and to translate these simulation models into transfer functions or differential equations,
- to learn and practice to describe mechanical, electrical and hydraulic systems with ideal physical elements and to see the analogies between these domains,
- to understand the influence of feedback and control on the system behaviour.

1(A-B) Portfolio

Coursecode: 201100132 | Study load: 4.0 EC

Lecturer: Tutors

Activities: Interaction, Deliverable

Assessment: Deliverable

#sub tests: 4

The First Year Portfolio is part of the Creative Technology tutoring. Tutoring, and the focus on self-directed learning, are described in the separate syllabus “The road to the final qualifications”.

The deliverable of First Year Portfolio is the student’s portfolio for learning (not the presentation portfolio). The tutor assesses at the end of each block the contents of this portfolio, with two criteria in mind:

- Quality of the student’s reflection on progress
- The effectiveness of the student’s improvement plans, and (most important) the follow-up these plans have had (both quantitatively and qualitatively).
CREATE Programme
year 2
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.</td>
<td>(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. These qualifications result from the student’s successful participation in the Explorations study units.</td>
</tr>
<tr>
<td>2.</td>
<td>(Graphic design) He is familiar with building geometry and with sound and movement in graphic design. He is familiar with the level of abstraction in information visualization. He can match tools and content creation tasks, and is aware of issues of exchange and interoperability. These qualifications result from the student’s successful participation in the Design units of study.</td>
</tr>
<tr>
<td>3.</td>
<td>(Modelling, planning and simulation) 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. These qualifications result from the student’s successful participation in the Mathematics units of study.</td>
</tr>
<tr>
<td>4.</td>
<td>(Systems of programmable components) He is fluent in OO-programming, and can use standard libraries and standard algorithms. He is aware of the complexity of standard algorithms. He can structure data-driven problems to derive a clear interface to a database, and he is fluent in generating database applications. These qualifications result from the student’s successful participation in the Computer Science units of study.</td>
</tr>
<tr>
<td>5.</td>
<td>(Business and marketing) He is 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. These qualifications result from the student’s successful participation in the Business units of study, and in the Explorations (of the first and the second year).</td>
</tr>
</tbody>
</table>

6. (New Media) 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. He is aware of technologies for networked 3D environments. He can build interactive X3D/VRML applications and he can script interactive behaviour in 3D virtual worlds. 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

<table>
<thead>
<tr>
<th>block 1A</th>
<th>block 1B</th>
<th>block 2A</th>
<th>block 2B</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1 EC) Strategies and Protocols part 1</td>
<td>(2 EC) Strategies and Protocols part 2</td>
<td>(3 EC) Queues and Logistics</td>
<td>(7,5 EC) Hybrid Worlds</td>
</tr>
<tr>
<td>(5 EC) Design Marketing</td>
<td>(2,5 EC) 3D Modelling</td>
<td>(5 EC) Business Management</td>
<td>(2,5 EC) Advanced Graphic Design</td>
</tr>
<tr>
<td>(5 EC) Programming with Structures</td>
<td>(3 EC) Data-driven Applications</td>
<td>(2 EC) Creative Exploration in Art, Science and Technology</td>
<td></td>
</tr>
<tr>
<td>(4 EC) Introduction to Electronics</td>
<td>(4 EC) Introduction to Telecommunication</td>
<td>(4 EC) Control Engineering</td>
<td>(3 EC) Sensors</td>
</tr>
<tr>
<td>(3 EC) Web 2.0 Mash-ups</td>
<td>(4 EC, block 2A) Virtual Environments</td>
<td>(2+2 EC) Virtual Environments and Game Development</td>
<td>(4 EC) Game Development</td>
</tr>
</tbody>
</table>

Units in italics are for students who choose the specialization, either NM or ST.

### 6.3 Study units descriptions

<table>
<thead>
<tr>
<th>Type of unit and unit area</th>
<th>study load in EC</th>
</tr>
</thead>
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<tr>
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<td>Explorative 6,5</td>
</tr>
<tr>
<td>Hybrid Worlds</td>
<td>Explorative 7,5</td>
</tr>
<tr>
<td>CE in Art, Science and Technology</td>
<td>Explorative 2</td>
</tr>
<tr>
<td>3D Modelling</td>
<td>Directive, DE 2,5</td>
</tr>
<tr>
<td>Advanced Graphic Design</td>
<td>Directive, DE 2,5</td>
</tr>
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<td>Design Marketing</td>
<td>Directive, BI 5</td>
</tr>
<tr>
<td>Business Management</td>
<td>Directive, BI 5</td>
</tr>
<tr>
<td>Introduction to Electronics</td>
<td>Directive, ST 4</td>
</tr>
<tr>
<td>Introduction to Telecommunication</td>
<td>Directive, ST 4</td>
</tr>
<tr>
<td>Control Systems</td>
<td>Directive, ST 4</td>
</tr>
<tr>
<td>Sensors</td>
<td>Directive, ST 3</td>
</tr>
<tr>
<td>Web 2.0 Mashups</td>
<td>Directive, NM 3</td>
</tr>
<tr>
<td>Virtual Environments</td>
<td>Directive, NM 6</td>
</tr>
<tr>
<td>Game Development</td>
<td>Directive, NM 6</td>
</tr>
<tr>
<td>Programming with Structures</td>
<td>Directive, CS 5</td>
</tr>
<tr>
<td>Data-driven Applications</td>
<td>Directive, CS 3</td>
</tr>
<tr>
<td>Strategies and Protocols</td>
<td>Directive, MA 3</td>
</tr>
<tr>
<td>Queues and Logistics</td>
<td>Directive, MA 3</td>
</tr>
<tr>
<td>Tutoring</td>
<td>Year 2 60</td>
</tr>
</tbody>
</table>

*Units in brackets are for students who choose the specialization, either NM or ST.*
1B Ambient Screens

Coursecode: 201100135 I Study load: 6.5 EC

Lecturer: Dr. Ir. D. Reidsma

<table>
<thead>
<tr>
<th>Activities</th>
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</tr>
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<tbody>
<tr>
<td>Lectures</td>
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</tr>
<tr>
<td>Presentations</td>
<td>Essay(s)</td>
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</tr>
<tr>
<td>Interaction</td>
<td>Presentations</td>
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<tr>
<td>Deliverable</td>
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</tbody>
</table>

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: 201000198 I Study load: 7.5 EC

Lecturer: Ir E.C. Dertien

<table>
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<td>Interaction</td>
<td>Presentations</td>
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<tr>
<td>Deliverable</td>
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</tbody>
</table>

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.).
1(A-B) Creative Explorations in Art,

2(A-B) Science and Technology

Coursecode: 201000196 | Study load: 2.0 EC

Lecturer Activities Assessment #sub tests
vacancy Lectures Deliverable none

Presents Presentations Essay(s)
Interaction Oral examination
Deliverable 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).

2B Advanced Graphic Design

Coursecode: 201000192 | Study load: 2.5 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.

1A Design Marketing

Coursecode: 201000199 | Study load: 5.0 EC

Lecturer Activities Assessment #sub tests
Dr. E. Constantinides Lectures Assignment 2

Assignments Written text

By a transitional arrangement students take this course by completing 201000073 Marketing for IBA

The course discusses how commercial and non-profit organizations can analyse, anticipate and react to their environment and the changing competitive setting by developing and implementing customer oriented strategies. Customer orientation is the key to acquire and retain customers by building trust-based long term relationships.

Goals are:

• to learn to explain the most important elements of the organisations environment;
• to learn to explain the basic concepts of marketing,
• to learn to identify ways the organization should deal with marketing management issues;
• to evaluate facts and developments in marketing and give a critical opinion on these .

2A Business Management

Coursecode: 201000200 | Study load: 5.0 EC

Lecturer Activities Assessment #sub tests
Drs. P. Bliek Assignment Assignment none

Assignments Group

By a transitional arrangement students take this course by completing 193902220 Project StarTrix

The theme of the StarTrix- project is to bring a technology, product or service to market.

It is an introduction to (high-tech) entrepreneurship. Students will develop their affinity for key issues when it comes to business models and business plans for a service or product.

Groups work on an assignment which involves: find and work out existing theory, and write a business plan for a product or service. Groups and individuals will give “pitches.”
### Programming with Structures

**Coursecode:** 201000194 | **Study load:** 5.0 EC

<table>
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<tr>
<td></td>
<td>Assignments</td>
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</tbody>
</table>

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 Realtime 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.

### Data-driven Applications

**Coursecode:** 201000195 | **Study load:** 3.0 EC

<table>
<thead>
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<th>Assessment</th>
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<tbody>
<tr>
<td>Dr. A. Wombacher</td>
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<tr>
<td></td>
<td>Assignments</td>
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</table>

Data driven applications are often based on an underlying database. The aim of this course is to provide hands-on knowledge on how to design, access and use a database for Web based applications. In the course the students will learn about data modelling and the relationship to database schemas. The students will access a database from php and from Java via JDBC. Further, the students will get an overview on options on designing a Web application from a data management point of view. The gained knowledge is applied in two small projects: a friend finder application and a friend notification service.

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 (like MySQL, php, JDBC, and XML);
- to learn to design data models, database schemas, and SQL queries;
- to design an application providing creative usage of context/sensor information.

### Strategies and Protocols

**Coursecode:** 201000084 | **Study load:** 3.0 EC

<table>
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<td>Dr. B. Manthey</td>
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<td>Assignments</td>
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</table>

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.

### Queues and Logistics

**Coursecode:** 201000085 | **Study load:** 3.0 EC

<table>
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</table>

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, queuing 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 Web 2.0 Mashups

**Coursecode:** 201000184 | **Study load:** 3.0 EC

<table>
<thead>
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<th>Lecturer</th>
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<th>Assessment</th>
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<tr>
<td>Dr. L. Ferreira-Pires</td>
<td>Lectures</td>
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</table>

The course presents advanced web service technology, that allows for the development of data-driven dynamic web applications.

**Goals are:**
- To learn to understand the goals and challenges of distributed applications;
- To learn to implement and integrate applications with web service technology.

### 1B-2A Virtual Environments

**Coursecode:** 201000185 | **Study load:** 6.0 EC

**Lecturer:** Vacancy

**Activities**

- Assignments

**Assessment**

- Group

No description was available for the production of this study guide. Please consult OSIRIS and/or Blackboard.

### 2(A-B) Game Development

**Coursecode:** 201000186 | **Study load:** 6.0 EC

<table>
<thead>
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<th>Lecturer</th>
<th>Activities</th>
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<tr>
<td>Dr. Ir. D. Reidsma</td>
<td>Deliverables</td>
<td>Essay</td>
<td></td>
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</tbody>
</table>

The course gives an introduction in the design development of (digital) games. Attention will also be given to the analysis and critical comparison of games, using game interaction patterns, as well as popular technologies for games.

**Goals are:**
- To become aware of the application of games in education and learning;
- To learn the concepts and techniques for the design of (serious) games;
- To learn (and practice) the design of (serious) games;
- To learn and practice the analysis of games using game patterns.
1A Introduction to Electronics

Coursecode: 201000189 | Study load: 4.0 EC

Dr. Ir. C. Salm

Lectures
Assignments

Assignments
Written test

The course aims at a proper image and understanding of electronics, which means in particular familiarity with terminology, and insight into the functionality of electronic systems. Meetings are partly devoted to lectures, and partly to practical exercises to gain experience and confidence.

The understanding of functionality concentrates on observing (sensing, measuring) external phenomena leading to electrical signals, and subsequently the processing of these signals into digital codes.

Goals are:

• to learn to understand electrical signals (time and frequency domain, periodic vs non-periodic);
• to learn and practice network analysis (Kirchhoff’s laws, impedancies);
• to learn about digital circuits;
• to learn about energy and power, about feedback, about filtering, about amplifiers, about semi-conductors, about sensors, and actuators;
• to learn about interfacing and data handling (D/A and A/D converters);
• to learn the effects of sampling and quantisation on the quality of a measured signal.

1B Introduction to telecommunication

Coursecode: 201000188 | Study load: 4.0 EC

Dr. Ir. C.G.H. Roeloffzen

Lectures
Assignments

Written test

The course is an introduction to communication technology. Its contents cover four areas.

Firstly network analysis, to determine in a systematic way the transfer functions of electronic circuits of elementary components.

Secondly transmission media, dealing with the way waves propagate, and how they propagate in various media (wired, wireless, optical).

Thirdly representation of signals, where time and frequency aspects of both digital and analogue signals are studied.

And finally modulation, to represent information by signals in such a way that transfer is as correct and efficient as possible, considering both analogue and digital modulation.

2A Control Systems

Coursecode: 201000187 | Study load: 4.0 EC

Vacancy

Lectures

Written test

This course treats the design of control systems in the time domain (state space) and in the Laplace and frequency domain.

Goals are:

• to learn how feed-forward and feedback control can be applied to modify the performance of systems;
• to learn to describe systems with transfer functions, poles and zeros, frequency plots and in state space notation, and to use these descriptions for designing feedback control systems;
• to learn how an accurate control system can be designed that is insensitive for disturbances and parameter variations;
• to learn the consequences of using digital computers in control systems;
• to learn and practice the application of this theory.

2B Sensors

Coursecode: 201000190 | Study load: 3.0 EC

Ir. E.C. Dertien

Lectures
Assignments

Assignments
none

This course treats types of sensors and sensing, and their application, in particular: resistive sensors, capacitive sensors, inductive/magnetic sensors, piezoelectric sensors, optical sensors, and acoustic sensors.

Goals are:

• To learn and practice basic methods for measuring quantities and parameters in the electrical, thermal and mechanical domain;
• To gain familiarity with sensors commonly used for the measurement of these quantities;
• To learn to understand the general performance and basic limitations of these sensors;
• To practice deployment of sensors in an application context.
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+) and the Centre for Telematics and Information Technology (CTIT), IMPACT and MIRA.

7.1 The Faculty of EEMCS

The Faculty of Electrical Engineering, Mathematics and Computer Science (EEMCS) is organised around the following departments:

- Applied Linear and Mathematical Physics (AAWP)
- Biomedical and Environmental Semiconductors (BIOS)
- Biomedical Signals and Systems (BSS)
- Computer Architecture for Embedded Systems (CAES)
- Control Engineering (CE)
- Design and Analysis of Communication Systems (DACS)
- Electronic Circuits (EC)
- Distributed and Embedded Systems (DES)
- Discrete Mathematics and Mathematical Programming (DM&P)
- Formal Methods and Tools (FMT)
- Human-Machine Interaction (HMI)
- Integrated Circuit Design (ICD)
- Integrated Optical Microsystems (IOMS)
- Information Systems (IS)
- Mathematical Systems and Control Theory (MSCIT)
- Numerical Analysis and Computational Mechanics (NACM)
- Nano-Electronics (NE)
- Passive Systems (PS)
- Signals and Systems (SAS)
- Semiconductors Components (SC)
- Software Engineering (SEE)
- BioMedical Operations Research (BOR)
- Statistics and Probability (SP)
- BioMedical Systems and Signals (BSS)
- Telecommunication Engineering (TE)
- Transducers Science and Technology (TST)

7.1.1 Organisation 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/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)
- Computer Science (CSC)
- Applied Mathematics (AM)
- Creative Technology (CreaTe)
Master’s programmes:

- Applied Mathematics (AM)
- Computer Science (CSC)
- Electrical Engineering (EE)
- Embedded Systems (EMSYS) (3-TU)
- Human Media Interaction (HMI)
- Mechatronics (MT)
- 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) and MT this is prof.dr. M.C. Elwenspoek (Miko)
For AM (BSc and MSc) and SC this is dr. J.W. Polderman (Jan Willem)
For CSC (BSc and MSc), TEL and MTE this is dr.ir. R. Langerak (Rom)
For CreaTe en 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, ing. H. van Egmond.

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 (Sjoerd)</td>
<td>+31 53 489 3153</td>
</tr>
<tr>
<td></td>
<td>ir. F. Houweling (Frans)</td>
<td>+31 53 489 3583</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
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<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. Moutahtan (Ton)</td>
<td>+31 53 489 4427</td>
</tr>
<tr>
<td>Director of Operations</td>
<td>ing. H. van Egmond (Harm)</td>
<td>+31 53 489 4403</td>
</tr>
<tr>
<td>Faculty secretariat</td>
<td>E.C. Bosch-van der Heijden (Elis)</td>
<td>+31 53 489 4602</td>
</tr>
<tr>
<td></td>
<td>L. Tunc-Katalanc (Iano)</td>
<td>+31 53 489 4427</td>
</tr>
<tr>
<td></td>
<td>E. ter Brugge (Ellen)</td>
<td>+31 53 489 4603</td>
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</tbody>
</table>

EDUCATION SUPPORT OFFICE EEMCS (BOB-EEMCS)

<table>
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<tr>
<th>Position</th>
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</tr>
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<tbody>
<tr>
<td>Manager of Education</td>
<td>H.J. van Loar (Jolanda)</td>
<td>+31 53 489 4466</td>
</tr>
<tr>
<td>Internationalization</td>
<td>drs. J. Schut (Jan)</td>
<td>+31 53 489 4350</td>
</tr>
<tr>
<td>Traineeship</td>
<td>dr. M.J. Korsten (Maarten)</td>
<td>+31 53 489 3887</td>
</tr>
<tr>
<td>Traineeship mediator</td>
<td>B. Joosma-Knol (Belinda)</td>
<td>+31 53 489 3887</td>
</tr>
<tr>
<td>Quality assurance</td>
<td>drs. J.H. Romkema (Hans)</td>
<td>+31 53 489 2774</td>
</tr>
<tr>
<td>Student advisers</td>
<td>S.B.A.M. Yonk MSc (Sharon)</td>
<td>+31 53 489 5645</td>
</tr>
<tr>
<td>Mathematics</td>
<td>L. Spijker (Lillian)</td>
<td>+31 53 489 5645</td>
</tr>
<tr>
<td>Creative Technology and Electrical Engineering</td>
<td>T.H. de Kuijver MA (Thea)</td>
<td>+31 53 489 3697</td>
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Secretariat

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<tr>
<th>Position</th>
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<tr>
<td>Student advisers,</td>
<td>R. Assink (Remke)</td>
<td>+31 53 489 3426</td>
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<tr>
<td>Internationalization</td>
<td></td>
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</tr>
<tr>
<td>Quality assurance</td>
<td>A. de Bruin-van Willigen (Annemiek)</td>
<td>+31 53 489 3275</td>
</tr>
<tr>
<td>Programme directors</td>
<td>K. Veldhuis (Karim)</td>
<td>+31 53 489 5450</td>
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COMMUNICATIONS
Communications is a shared service centre within the UT. The following contacts apply for the faculty of EEMCS:

<table>
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<tr>
<th>Position</th>
<th>Name</th>
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<tbody>
<tr>
<td>Account manager/communications adviser</td>
<td>t.b.a.</td>
<td></td>
</tr>
<tr>
<td>Communications staff member</td>
<td>D. Dalenoord (Diana)</td>
<td>+31 53 489 3450</td>
</tr>
</tbody>
</table>

PREMISES MANAGEMENT
Premises Manager

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
<th>Phone number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Premises Manager</td>
<td>ir. M.J.B. ten Bulte (Michel)</td>
<td>+31 54 489 2800</td>
</tr>
<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>
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</tbody>
</table>

LIBRARY & ARCHIVE
Library & Archive is a service centre of the University Library of the University of Twente.

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
<th>Phone number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information Specialist</td>
<td>Computer Science, Applied</td>
<td>+31 53 489 2085</td>
</tr>
<tr>
<td></td>
<td>Mathematics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Educational Engineering</td>
<td>+31 53 489 2079</td>
</tr>
</tbody>
</table>

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>
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</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</td>
</tr>
<tr>
<td>2299Contact</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hogekamp, Zilverling, Carré</td>
<td>N.C.M. Heijnkamp (Nancy)</td>
<td>+31 53 489 5768</td>
</tr>
<tr>
<td></td>
<td>Citadel</td>
<td>+31 53 489 6838</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 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, Educational Affairs Office).

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
<th>Phone number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Team leader S&amp;EA EEMCS</td>
<td>M.H. Huiskes-Borghuis [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 Office for Educational Affairs (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 flexoffice of Smart XP. The Creative Technology practicals take place in the Zilverling building on floor 2 (room 2042). Furthermore, in the Zilverling building rooms are situated on floor 3 (3042) and floor 4 (4054) containing 24 and 36 PCs respectively. During lecture hours a room assistant is present in room 3042. At night this room is open until 20.30h. After 18.00h, you can obtain entrance via the night porter at the main entrance of the Zilverling building.

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

Year room

For first-year Bachelor students of Applied Mathematics a year room is available in the Citadel building (T100); most of their training will take place there.

In the Citadel building, there is also a year room available for the Creative Technology programme (T300). Outside lecture hours this room can be used for self-study or as a project space by CreaTe students.

Smart XP Lab

This new multifunctional area in the Zilverling building is structurally used for teaching in 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 set-up is imaginable.

Educafe

Next to the (main) entrance of the Zilverling building, you will find the Educafe: a space where you can study, work in groups and relax with your fellow students. There are computer workspaces and you can grab a drink or snack from the vending machines. In short: this is an ideal environment to work together on projects. In the Educafe there are two rooms for get-togethers where students frequently sit around. On the first floor, three EEMCS student associations are situated: Scintilla (Electrical Engineering), Abacus (Applied Mathematics) and Inter-Actief (Computer Science). The brand-new student association for the Bachelor’s programme CreaTe, Proto, has its own association’s room in Zilverling/Hal A.

The Educafe also hosts two shops: IAPC and Stores. IAPC is a non-profit shop where you can turn to when you have questions about or want information on computers. Besides, you can buy laptops and all sorts of computer parts there for reasonable prices. ‘Stores’ sells components (such as resistors and capacitors) and office supplies. Furthermore, IAPC as well as Stores sells study books. Both shops are run entirely by volunteers and they are open during weekday lunch breaks for most of the year.

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 Studentenstatuut). 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 setup, 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.

If you wish to be sure of your enrolment as from 1 September, you must complete all enrolment formalities in time – preferably 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.

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/studentservices/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:
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

7.2.3 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 http://my.utwente.nl/.

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 for teaching activities
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 the new self-service student information system which has recently been put into use by 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. 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.

If you have any questions on Blackboard or OSIRIS, within the faculty you can turn to S&O, Diane Muller, the Zilverling building, room A104, phone +31 53 489 2681.

For a Blackboard manual, go to blackboard.utwente.nl/. The Support tab holds a quick reference and a manual.

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.onderwijs.el.utwente.nl/
- Computer Science: www.utwente.nl/inf.onderwijs.cs.utwente.nl/
- Applied Mathematics: www.utwente.nl/tw.onderwijs.math.utwente.nl/

For the Master’s programmes:

- Applied Mathematics: www.utwente.nl/am.onderwijs.math.utwente.nl/
- Computer Science: www.utwente.nl/csc.onderwijs.cs.utwente.nl/
- Electrical Engineering: www.utwente.nl/electric.onderwijs.el.utwente.nl/
- Embedded Systems: www.utwente.nl/epsys.onderwijs.el.utwente.nl/
- Human Media Interaction: www.utwente.nl/hmi.onderwijs.cs.utwente.nl/
- Mechatronics: onderwijs.el.utwente.nl/
- Systems and Control: www.utwente.nl/syscon [in time www.utwente.nl/sc]
- Telematics: www.utwente.nl/tele.onderwijs.cs.utwente.nl/

You can also find an overview of all programme guides, OERs etc. on www.utwente.nl/ewi/en/education.
7.2.4 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 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 2011-2012.
- 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.

Theft/loss

In case of theft or loss of the card, you can apply for a new student card on payment of EUR 5.- 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. On workdays between 09.00 and 17.00h you can have your picture taken at the Student Services desk in the Vrijhof building (room 239B), across the library.

7.2.5 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 (5 September 2011) until week 45 (11 November 2011)
- Quarter 2 from week 46 (14 November 2011) until week 05 (3 February 2012)
- Quarter 3 from week 06 (6 February 2012) until week 16 (20 April 2012)
- Quarter 4 from week 17 (23 April 2012) until week 27 (6 July 2012)

For the exact schedule of courses see the timetables on the website http://my.utwente.nl/ut/.

For a brief summary in English: www.utwente.nl/so/roosterwerkgroep/jaarcirkels/jaarcirkels.doc/summary_in_english.html

7.2.6 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.

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<th>Duration</th>
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</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</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>
7.2.7 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.

7.2.8 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.

CR  Carré
CU  Cubicus
HB  Hal B (main entrance Zilverling, Carré and Waaier; location servicedesk Carré)
HO  Hogekamp
HR  Horstring
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 http://www.utwente.nl/media/28498/plan-campusmap-en.pdf

7.2.9 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/.

7.2.10 PC-privé scheme for UT students and PC, laptop and printer purchase
As a student you are entitled to take part in a special subsidized PC purchase scheme (referred to as the PC-privé scheme) offered by the UT. You can take part in this scheme cheaply with an interest-free loan. Every regular full-time student enrolled at the UT can take part in the PC-privé scheme as follows.

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 PC and communication equipment in the IT shop at a highly competitive price. The University of Twente will lend you a maximum of EUR 1,362.- interest-free, which is to be repaid in a number of monthly instalments.

Whether the student is required to repay the loan in 12 or up to 24 months depends on the remaining duration of the course. If the remaining study duration is 12 months, the loan has to be repaid in 12 months. A graduated calculation related to the remaining duration of the course may mean that the repayment term is longer.
PLAN OF THE UNIVERSITY OF TWENTE

This plan is available online: www.utwente.nl/campusmap

Visiting address:
Drienerlolaan 5
7522 NB Enschede

Postal address:
Universiteit Twente
Postbus 217
7500 AE Enschede

tel: +31 53 4899111
fax: +31 53 4892000
e-mail: info@utwente.nl
Via the Notebook Service Centre general UT software (such as Maple, Virus scanner, SPSS) can be downloaded. 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/

7.2.11 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 examination are held (see also section 2.5). 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.

‘Third Chance’ rules
• You are responsible yourself for this process. Even if late results, schedules, dates of examination meetings and the like cause a difficult time schedule
• You will have to be able to make a reasonable case yourself for having exerted yourself for the subject if you want to be considered for tutoring.
• Change of subject code, change of name etc. are irrelevant. It is the identity of the subject that counts.
• It is advisable to be meticulous about the two attempts you have.
• For a next examination attempt (4, 5 etc.) you always contact the study adviser.
• You have to submit a request for a third attempt per subject, so do not include more than one subject in a request.
• The examination board may include in its consideration the fact that you are submitting/have submitted requests for more than one subject.
• This regulation concerns written examinations, and possibly oral examinations as well. For projects, practicals, other rules apply.
• It is compulsory to register for examinations via OSIRIS. You may deregister until 24 hours before the examination. If you have not deregistered, the registration will count as an attempt. It is prohibited to make the examination without registering.

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 IBG (Informatie Beheer Groep, 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 Transitional arrangements

If courses are radically changed or if they are cancelled, at the beginning of the academic year you will be informed in writing about the consequences which this entails.

#### 7.3.3 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

#### 7.3.4 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/topsports/

#### 7.3.5 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/ravis

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

#### 7.3.6 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 Educational Affairs Office EEMCS

The Educational Affairs Office (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 ground floor of the Zilverling building, room A104-A116. 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 UnionShop

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/

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 if 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 11.30 until 16.30h on Saturdays (for study purposes only, during examination periods). The information desk is open from Monday to Friday from 08.30 until 17.00h. You will find more information on www.utwente.nl/db/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 Waaier 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

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 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.

Student associations

Every educational programme has its student 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-togethers and parties. In addition, the student association for instance takes care of the book sale.

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

Student participation and other committees

Within the faculty of EEMCS you may become a member of various committees, such as: