Goals and learning objectives *year 1 courses* (*pre-TOM*)

201100115	We Create Identity	5

Goal: The goal of the course, which will take the structure of a group project, is to set a new group of students to work, to learn about the topics of creative technology, to get to know each other and the staff, and to find ways of expressing their interests and viewpoints in a variety of ways, including blogs, (interactive) videos, and wikis, using commonly available Web 2.0 community services.

Learning Objectives After the course:
- students are aware of personal motivation(s) and the societal context of the curriculum;
- students are familiar with the concepts and topics of creative technology;
- students are fluent with standard social network tools and tools for web development and content-creation.

201200101	Introduction to Computer Science	2

Goal:

Learning Objectives After the course:
- students have an overview over basic phenomena of computer science;
- students have a framework available where they can position phenomena and products of computer science; (in particular the phenomena and products they will find in other courses, and also the (fragmentary) knowledge they have at the beginning of the study);
- students can explain phenomena of computer science and their relationship;
- students can identify basic principles in a new product or service;
- students have experience with the application of principles of rationality for the design and analysis of (computer) systems;
- students have experience in decomposition and elementary use of logic;
- students can identify different stakeholders, and different qualities of requirements to a real system;
- students know the position of rationality with respect to reality and creativity.

201100176	Visual Communication	4

Goal: Primary aim is to generate knowledge and enthusiasm on the topic of visual communication, in such a way that the students will be able to apply their obtained knowledge to the other courses of the bachelor study of Creative Technology. Secondary aim is to involve the group of students in constructive discussions—exchange of knowledge and questions.

Learning Objectives After the course:
- students are knowledgeable and sensitive to how the meaning is constructed in the realm of visual communication;
- students are able to apply their knowledge to construct a meaning and to express a narration in a static visual way;
- students can listen to the comments, remarks and constructive criticisms from the others; and use these comments to improve their work, and conversely students can articulate their views in a constructive way to contribute to the improvement of the work of others;
- students have digital skills to constructy and alter images (although the main focus of the course is on the content of the story told and not on the digital refinements).

201200103	Smart Environments	4

Goal: 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.

Learning Objectives: After the course:
- students can explain basic concepts of smart technology and put smart technology in context with other courses;
- students can "invent" new applications and services based on smart technology, and realize prototypes;
- students can present and defend ideas, and organize and manage a team;
- students are familiar with smart technology, ubiquitous computing and related concepts, and are aware of the state of the art;
- students have practical lab experience.

201100177	Programming and Physical Computing	7

Goal: The course Programming and Physical computing aims to equip the students with tools for programming interactive applications using input from the physical world. Goal is to learn basic programming skills that are needed for Smart Technology and New Media, i.e. both for screen-based applications (processing) and embedded applications (arduino)

Learning Objectives: After the course:
- write programs in the programming environment "Processing", document and debug them;
- explain and use basic language constructs, as types, variables, binding and scope, functions and procedures;
- explain and apply basic principles of object oriented languages, such as objects, classes and subclasses, inheritance;
- use a 'sketching' approach; adapt fragments of more complex programs and use existing libraries to achieve desired behaviour;
- program and construct applications using a microcontroller (Arduino), using a number of different sensors, actuators and communication media (wireless, internet);
- make creative, imaginative physical applications;
- construct simple circuits necessary for connecting sensors and actuators to Arduino;
- document electronic circuits using software tools (Fritzing).

201200099	Sketching for CreaTe	3

Goal: The objective of the course is to provide students with the ability to express themselves (ideas, concepts, designs) visually. In a clear, direct and fast way.

Learning Objectives: After the course the students are familiar with:

- the principles of perspective drawing;
- the basic drawing-constructions of 3d shapes and environments;
- making clear and understandable drawings;
- making concept sketches and explanatory drawings in short time;

Goals and learning objectives *year 1 courses* (*pre-TOM*)

- the use of drawing as a tool for idea-generation and development in the design process;

;

201100155	Living and Working Tomorrow	5

Goal: The goal of this course is to explore new technologies for a future living and working situation. The students will get hands-on experience with state-off-the-art technology, integrating the knowledge gained from previous courses and courses that run during the project. Students will become familiar with the creative design processes, working in a group, organising the work, and writing a structurized report.

Learning Objectives: After the course the student are able to:
- name a number of (new) technologies that will play a role in the near future and explain them in context of relevant topics (privacy, sustainability);
- setup an effective brainstorm, document the results and summarize and present the findings;
- formulate a clear project goal;
- know how to 'pitch' an idea or project proposal;
- write a project proposal;
- make relevant choices which part to demonstrate of a given idea/project proposal;
- explain the responsibilities of various team roles in a project group;
- design user scenario's in a structured manner;
- present a literature survey on state of the art and relevant topics.;
- effectively communicate with external parties;
- organize and document the group work efficiently and structured.;
- explain and use the basic structure for scientific reports (intro, analysis (requirements), design&implementation, results, conclusion);
- write a scientific report.

201100131	Introduction to Mathematics and Modelling	6

Goal: The purpose of the course eventually is to investigate and understand the mathematical modeling of differential equations / dynamical systems as they occur in smart technologies and new media applications.

Learning Objectives: After the course students can:
- understand mathematical concepts and techniques for modeling dynamical systems, necessary for subsequent courses in the curriculum;
- investigate differential equations using graphical and numerical methods using the programming language Java (Processing);
- invent and implement a creative application based on a mathematical model.

201200100	Designing in Context	3

Goal: In this course the students will learn to use principles and methods for designing products and services within a particular context and for a specific target group.

Learning Objectives: After the course:

Goals and learning objectives *year 1 courses* (*pre-TOM*)

- students can use design terminology to explain their design intentions and the characteristics of their final design. Terms they are able to use are for example style, mood, interaction, user behavior;
- students are able to analyze existing objects for their shape, style and mood and can identify products that fit a similar shape, style or mood;
- students can make 3D models of a design, evaluate their shape and make suggestions for improvement of shape and detailing so that it better fits a desired predefined style;
- students can make use of personas to identify and communicate the target group of their design;
- students are able to use visuals and collages to express desired style, mood or design solution.

201100117   Have Fun and Play!   5

Goal: To design and realize an interactive installation, using and integrating methods and techniques from previous Creative Technology courses. The primary design objective is to have high impact on the spectator / participant of the installation --- irrespective of its practical application, utility or deployment. Moreover, to tell the story, both visually and textually, behind the (creation of) their installation and place it in its context, for a variety of audiences.

Learning Objectives: After passing this course, students are able to:
- [1. System development:] develop an interactive installation,
  - conceptualize the installation using creative thinking techniques,
  - design the installation using,
  - realize the installation using techniques from new media, gaming, sensor systems;
- [2. Presentation techniques:] present the project concept, design, realization,
  - use appropriate visual and textual means,
  - tell the story behind the (creation of) their installation;
- [3. Project management:] apply project management skills,
  - plan, devise roles and subtasks,
  - use appropriate system engineering methods;
- [4. Reflection:] reflect on the artistic value of the installation,
  - what is the impact of the realized installation, why is it important?
  - place their work in a historic and artistic context,
  - motivate their (technical as well as artistic) design choices.

201200102   Interactive Visualization   4

Goal

Learning Objectives:

- to learn about issues in information visualization,
- to learn and practice the development of an dynamic and interactive visualization, using 3D modeling technology and game technology,
- to learn and practice working on a project basis, under contract.

The course will address the development of visualizations of dynamic complex systems, typically in the area of physical or biomedical processes, or engineering. These visualizations involve

"storytelling" and animation, they will (at least partly) be based on game technology. The course is split in two phases. The first phase focusses on basic techniques like some elementary 3D modeling, and scripting for interaction using Unity3D. The second phase is mostly project based. During this phase 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. Some complementary lectures on game design and story telling will be offered during this phase.

201200104   Introduction to Physical Systems and their Dynamic Behaviour   5

Goal: Primarily to get insight in the behaviour of dynamical systems, in the continuous-time as well as in the discrete time domain. Secondly to gather basic knowledge of the physiscal properties of electrical and mechanical systems that are relevant for their behavior.

Learning Objectives: After the course students:
- are able to make a (graphical) description of multidisciplinary systems where elements interact with each other in a feedback structure;
- are able to make simulation models of such systems;
- are able to translate these simulation models into transfer functions or differential equations;
- have sufficient knowledge of the basic forms of the physical relations in the various domains to be able to describe mechanical, electrical and hydraulic systems with ideal physical elements and to see the analogies between these domains on a system level;
- understand the influence of feedback and control on the system behaviour.

196700240   Human Factors   3

Goal: To provide basic insight in how to design products and services that meet users' needs, wishes and expectations.

Learning Objectives: After the course the students:
- are familiar with the Human Engineering Analysis method for obtaining insight in user needs and wishes;
- have experience with the possibilities to design user-centred interfaces.;
- have knowledge of several guidelines for designing usable interfaces;
- have knowledge of the methods, principles and limitations of usability testing and is able to apply this knowledge;
- Be aware of the possibilities of using user-centred research for improving your design.

201100132   First Year Portfolio   4

Goal:

Learning Objectives:

| 201000194 | Programming with Structures | 5 |

Goal:

Learning Objectives: After the course students:
- are fluent in programming in C++;
- are familiar with using libraries;
- are fluent in using abstract data structures, (queues, stacks, arrays, and hash tables), and standard algorithms related to these data structures;
- are aware of complexity of algorithms;
- can decide for suitable data structures and algorithms based on complexity considerations;
- can to find alternative programming solutions making different use of resources

| 191567030 | Introduction to Probability and Statistics | 3 |

Goal: to understand basic concepts from probability and statistics and to be able to apply these in a numbern of situations relevant for creative technology applications. After the course the students will have attained a familiarity with the main concepts and fluency with working with these concepts.

Learning Objectives: After the course
-

| 191567020 | Systems and Signals ST | 3 |

Goal: to introduce the student to some concepts from mathematics that will be needed in courses such as control systems, telecommunication and other courses in the New Media and Smart Technology track.

Learning Objectives: After the course the student is able to:
- determine Fourier- and Laplacetransforms of simple signals;
- work with complex numbers and complex-valued signals;
- analyze linear differential equations and their properties with the help of Fourier and Laplace transforms;
- analyze signals based on the graph of their Fourier transform;
- use simple filters for signal enhancement.

| 201200111 | Systems and Signals NM | 3 |

Goal: to introduce the student with mathematical tools (Fourier theory) for analyzing time signals.

Learning Objectives: After the course the student is able to:
- analyze signals based on the graph of their Fourier transform;
- understand the basics of image processing such as image compression and edge detection;
- understand the key applications of signal analysis for audio signals;
- understand the basics of the role of signal analysis for video signals;
- use simple filters for signal enhancement.

Goals and learning objectives *year 2 courses* (*pre-TOM*)

| 201200105 | Ambient Screens | 5 |

Goal: To explore new interaction concepts which may involve developing new types of screens, new types of interaction methods, or new concepts for the interaction content concept.

Learning Objectives: After the course
- students are aware of he ubiquitousness of screens in our lives;
- students are familiar with issues of privacy, ownership, and bystander involvement related to big and public screens;
- students are aware of technology extending the definition of screens to include smart materials, tangibles, etcetera;
- students are familiar with the virtual humans as an interaction metaphor (giving the screen an identity);
- students are familiar with interaction concepts: implicit interaction, persuasion, invitation, attention;
- students are familiar with user experience and related concepts like flow and types of "fun";
- students are familiar with and have practised evaluation (of user experience);
- students know evaluation techniques, and have employed at least one of these.

| 201200110 | Research Methodology | 2 |

Goal: to grow awareness of the challenges one has to face if one wants to gain insight into a phenomenon from three perspectives: the perspective of the particpant in an experiment, the perspective of the person who seeks the answer to a question, and the perpective of the sceptical academic, reviewing insights gained by others.

Learning Objectives: After the course
- students are aware of the problems that you can and probably will meet if you want to set up an experimental research to disclose some part of reality;
- students know about the various types of sciences and knowledge (mathematics, logics, humanaties, physics) and the related methods of research;
- students have insight into the relation between creative technology and (experimental) research;
- students can critically analyse research and reported research findings (are conclusions valid?);
- students can use SPSS, read the spss output and they know how to report;
- students can write a critical review paper.

| 201000084 | Strategies and Protocols | 3 |

Goal:

Learning Objectives:

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, analyze, 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.

201000085	Queues and logistics	3

Goal:

Learning Objectives:

In this course basic elements of the theory 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.
A rough indication of 8 plenary lectures is as follows:

- Discrete time Markov chains
- Continuous time Markov chains
- Birth and death processes and elementary queues
- tandem queueing networks of basic queues
- general queueing networks
- network optimisation
- decision under uncertainty
- discrete event simulation

Eight exercise classes will be provided to actively work with the theory. In addition, 4 exercise classes will be devoted to building a simulation environment to mimic the behaviour of an elementary logistics system of communicating items (Internet of Things).

201200107	Animated Narration	3

Goal: Pri marily to generate knowledge and enthusiasm on the topic of animated narration, in such that, the students will be able to apply their obtained knowledge to the other courses of the bachelor study of Creative Technology. Secondly to generate constructive discussions—exchange of knowledge and questions—during class time, along with laughter. And finally to improve their digital skills, with focus on the content, the visual means and the story told.

Learning Objectives: After the course
- students are knowledgeable and sensitive to how the meaning is constructed in the realm of animated narration;
- students are able to apply their knowledge to construct meaning and to construct narration expressed through the means of visual motion;
- students can listen to the comments, remarks and constructive criticisms from the others to improve their work;
- students can articulate their views in a constructive way;
- students are aware of ideas and theories on storytelling such as: Gestalt psychology, semiotics, rhetoric and scrip writing at large.

Goals and learning objectives *year 2 courses* (*pre-TOM*)

| 201200109 | Web Services and Data-driven Applications | 4 |

Goal: to provide hands-on knowledge on how to design, access and use local or remote data for Web based applications.

Learning Objectives: After the course students can
- explain paradigms of Web applications like rich clients, model view controller, push vs pull;
- understanding the problems of concurrency in Web applications and their effect on data management;
- understand and apply the programming language PHP and the query language SQL;
- understand and apply web related technologies like JSON and RESTful services;
- design data models, database schemas, and SQL queries;
- design and implement an application for managing user and friendship information;
- design and implement a PHP server application for harvesting and processing twitter messages.

| 201300099 | Innovation and Entrepreneurship for CREA | 3 |

Goal: To offer insights in the fields of innovation management and entrepreneurship

Learning Objectives: After the course students
- know the basic models and literature of innovation management, such as the 4P's of innovation space and the innovation life cycle;
- know the basic models and literature of entrepreneurship, such as the Entrepreneurial Process and the Strategic Window Metaphor;
- apply these basic innovation and entrepreneurship models by analyzing empirical phenomena like companies, managers and entrepreneurs and classify them among several typologies, such as the Entrepreneurial Roles typology or the Entrepreneurial Innovation typology;
- create a business idea, critically reflect upon it, and report this business concept in written form and present it as an elevator pitch.

| 201200106 | Hybrid Worlds | 5 |

Goal: Primarily to develop an installation containing phenomena from the physical and the virtual domain, acting either simultaneously or in alternation, where possibilities of interaction or interplay of both domains are explored.But also for students from the New Media track and the Smart Technology track to work together in a larger group, showing that they are able combine their skills in the design and realization of a meaningful installation.

Learning Objectives: After the course
[Realization]
- students can construct a working installation that features interaction between the physical and the virtual domain by an original integration of New Media and Smart Technology content; the installation provides a meaningful experience and a convincing goal w.r.t. its topic;
[Organization]

Goals and learning objectives *year 2 courses* (*pre-TOM*)

- students understand the design process of Creative Technology and use this to plan and organize their project;

[Documentation]
- students can document the project goal, the design process, the planning, the installation and their individual contributions to the project in a complete and structured way.

[Feedback]
- students can improve their installation and documentation by using feedback from supervisors and other students.
- students cangive critical and constructive feedback to other project groups.

201200108   Startrix for CreaTe   5

Goal: to explore the commercialization of a technology that is chosen by the participating teams themselves, preferably of UT origin, i.e. generating content for a business plan (technology, product & service, marketing, organization, finance etc.) going through the processes of info gathering, analysis and reporting, task division, organizing meetings and information exchange.

Learning Objectives: After the course students can
- assess the attractiveness of a certain technology commercialization idea;
- analyze the feasibility of it in order to identify conditions under which it is likely to produce revenues;
- apply business jargon and analytical models that indicate data required to form a realistic image of expectations, needs, markets, and investments and resources;
- design a product/service and business concept that realistically optimizes the chances of winning a course award and possible participation in the national New Venture competition.

201300150   Smart Technology   15

Goal: to supply the right balance between theory and practice on the technological side of smart products and smart environments, and to train students in the engineering skills and attitude necessary for developing, understanding, testing and prototyping Smart Products.

Learning Objectives: After the course, the student
[Introduction to Electronics]
- knows the building blocks of electrical networks (network analysis) and their operating principles;
- can perform analysis of simple (maximum 2 meshes) electrical networks using several network analysis principles;
- can describe electric signals in the time domain and calculate characteristic properties of them;
- can describe electric signals in the frequency domain; can analyze their spectral content and can synthesize periodic signals out of elementary sinusoidal components;
- can perform elementary calculations of transients (only step functions) in first and second order electrical systems;
- can apply the usage of complex numbers in both complex impedances and complex transfer functions; consecutively the student can derive the amplitude ratio and the phase difference from these expressions;

Goals and learning objectives *year 2 courses* (*pre-TOM*)

- knows the basic properties of first and second order filters and also the difference between them; can design passive first and second order filters and interpret and draw their graphical (Bode) representation;
- can identify combinatorial and simple sequential logic and can formulate and interpret truth tables;
- knows the basic properties of diodes and transistors;
- can describe ideal and non-ideal amplifiers and the effect of non-idealities of amplifiers on system performance;
- knows the characteristics of ideal Operational Amplifiers (OpAmps) and the practical limitations of real-life OpAmps; can design and characterize several different Operational Amplifier circuits;
- can build simple electronic circuits, measure and analyse them;
- can explain measurement results from simple electronic circuitry;
- can keep a laboratory journal in a way that enables extracting relevant information for a written report on the lab work;

[Sensors]
- can explain meaning, relevance of - and perform basic calculations with - the concepts range, accuracy, resolution, linearity, bandwidth and sensitivity of sensors;
- can list various sensors for measuring a given physical phenomenon (i.e. displacement) and describe performance, limitations and use conditions of these sensors;
- can explain the physical phenomena used as measurement principle and perform basic calculations;
- can explain and demonstrate how the discussed sensors (magnetic, resistive, optical, capacitive, acoustic) can be interfaced using microcontroller system (i.e. Arduino);
- can change or adapt basic signal conditioning circuits to their needs using for example (negative)offset, amplification, a bridge circuit;
- can explain the characteristics of noise and other negative influences on measurements and name methods to deal with those;
- can explain functioning and aspects of - and perform basic calculations with - resolution, frequency, linearity and range of different AD converter types sensors commonly used for the measurement of these quantities;
- can explain how to implement a given AD converter circuit (capacitive, R2R) using a microcontroller system;
- can point out the bottleneck(s) in a given measurement system;
- can explain advanced processing methods for sensor signals, such as fft, kalman filtering and sensor fusion;

[Introduction to Telecommunication]
- can define and describe the building blocks of a communication system;
- can describe signals and waves in time and frequency domain (electromagnetic frequency spectrum);
- can define the general categories of transmission media and can mention the differences between the various transmission media;
- can define and describe the optical properties of radio waves: refraction, reflection, and diffraction;
- can define the modes of terrestrial propagation: ground waves, space waves, and sky waves;
- can define free-space path loss;
- can describe the basic antenna operation;
- can describe the functioning of transmitters and receivers (analog and digital);
- can explain the terms modulation and demodulation of signals (show signals before and after modulation in time and frequency domain);

- knows the functioning of AM, FM and PM, and explain the differences, advantages and disadvantages;
- can explain the prominent noise sources, and knows the relevance of signal-to-noise ratio;
- can analyze the criteria for a certain communication system and select the appropriate components to create the system;
- can explain the differences between analog and digital communication;
- understands A/D and D/A conversion;
- can explain how to connect transceivers in a network
- can explain various medium acces control mechanisms (like polling, Bleutooth, Ethernet);
- can explain the basics on internet networking (architecture, layering, protocols). including adressing (DNS), naming, IP, NAT;
- can explain the principles of routing and switching, as well as of unicast, broadcast and multicast;
- can explain the principles of end-to-end protocols like UDP and TCP;
- can explain the principles of networked applications, like client-server applications (including HTML and HTTP), peer2-peer networking, cloud applications and real-time applications (like YouTube and NetFlix);

[Control Engineering]
- can explain how control can be applied to modify the performance of system using terms of control loop, feedback, overshoot, steady state, error, instability, bandwidth;
- can generate,interpret and perform basic calculations with transfer functions, poles and zero's and frequency (Bode) plots to describe system behaviour;
- can generate, interpret and perform basic calculations with models (IPM, block diagram, bondgraph and transfer functions (both in the Laplacian (s) domain and the frequency (ω) domain) of first and second order systems;
- can generate , interpret and perform basic calculations with feedback control systems applied to first and second order systems;
- Is familiar with using and rewriting given transfer functions to the standard form, explaining and interpreting time constant, resonance frequency, relative damping, DC gain;
- can explain where and how in the context of modeling and control linearization is used;
- can generate a linearization of a system around a certain operating point;
- can realize a PID controller for a given system in the analog domain using opamp circuitry, and explain how to realize a summing point, integrator and differentiator using an opamp;
- can realize a PID controller for a given system in the digital domain using code. Explain how to take a derivative or integral in software and program P, PD and PID controllers in a given embedded system environment (i.e. Arduino);
- can explain the consequences of using a discrete (digital) implementation of a control system with respect to a continuous time (analog) version using terms of sample time, discretization, aliasing, bandwidth, nyquist frequency;
- can describe and deploy methods for increasing stability and decreasing sensitivity for disturbances and parameter variations in a given system;
- can point out bottlenecks in a given digital control setup regarding performance and stability;
- can explain various types of (nonlinear) control such as Feedforward, Learning Feedforward, MRAS, PID, Fuzzy, Neural networks, Beng-Beng etc;
- can explain behaviour of DC motors' internal relations of current, voltage, velocity, torque and internal resistance, using simplified (bondgraph) models;
- can explain H-bridge amplifiers and pwm control signals in relation with the behaviour of DC motors;

- can explain and realize different ways of interfacing and interpreting the feedback sensor signals in a given control setup. Explain where aditional differentiation of integration of signals might be neccessary and their side effects in terms of noise, drift, windup;
- can explain force feedback systems, in relation to their implementation, performance, delay, stability.

201200113   New Media   15

This module covers theory, materials, and applications for New Media. In particular, the materials of sound and graphics are combined with concepts of games, experiences and users, to tackle the big theme of Serious Games: Developing game play for persuasion, behavior change, and societal change.

- Materials: Sound Engineering by Jan Koornstra (Audio and signals: spectrum analysis, fft, oscillator synthesis. Sound production: foley, voiceover, music & speech, recording techniques)
- Materials: Graphics and animation by Job Zwiers
- Theory: Game Development by Dennis Reidsma
- Application in practice: Serious Games by Ant

NM part 1 Sound Engineering	4
NM part 2 Graphics	4
NM part 3 Game Development	4
NM part 4 Data Visualization	3

201000196   Creative exploration in AS & T   2

Goal: Firstly to explore a subject in art, science or technology (and preferably a subject which combines two or more of these angles)of the student's choice, in such a way that the exploration contributes to the intended learning outcomes, preferably (but not exclusively) to learning outcomes in the area "self-management of the process of creation". Secondly to challenge the student to set learning objectives for him/herself, and to show that he/she can reach those objectives.

Learning Objectives: After the course
- the student can write down learning goals;
- the student can make a planning to reach learning goals;
- the student can execute the planning, and adapt goals and planning according to circumstances;
- the student can analyze the results achieved, and judge the success of the learning effort;
- the student can present discoveries and products to an audience of fellow students;
- the student has gained knowledge and skills contributing to the inended learning outcomes of the Creative Technology programme.

201200114   Second Year Portfolio   2

Goals and learning objectives *year 3 courses* (*pre-TOM*)

201100221   Cyber Crime Science   6

Goal: The aim of the course is to place Information Security in the broader context of:
- Criminology, because the failure to use Information Security properly may lead to cyber crime.
- Economy, because the costs and benefits of Information Security are economic values.
- Law, because the transnational character of the Internet poses serious challenges for the law.
- Psychology, because life online is sufficiently different from real life.

Learning objectives: After the course the students have
- a good understanding of the theoretical principles of Crime Science;
- a basic understanding of the Economics of Information Security;
- an appreciation of the Legal and Psychological issues;
- an appreciation of the whole spectrum of different cyber crimes;
- skills necessary to research cyber crime prevention measures.

201300223   Academic Writing for CreaTe   5

Goal:

Learning Objectives: After the course students
[Linguistic competencies]
- show knowledge of common sentence errors;
- demonstrate ability to use words purposefully and effectively;
- show an understanding of advanced grammatical concepts;
- show knowledge of punctuation and mechanics of writing;
[Textual competencies]
- demonstrate ability to write appropriate titles and headings;
- demonstrate ability to write effective paragraphs (e.g. topic sentences, appropriate signalling expressions and connectives, bulleted lists, etc);
- demonstrate ability to efficiently draft and revise own writing;
- understand the purposes and typical content and structure of common academic genres, such as research proposal, research report, thesis, personal reflection;
[Typical competencies of academic writing]
- demonstrate ability to write academic texts typical of one's field of research;
- demonstrate ability to use an academic style (formal vocabulary, multi-word verbs, passive voice, cautious language, objective language, generalised statements, contracted forms;
- demonstrate ability to (formally) define concepts, using different definition techniques;
- demonstrate ability to describe processes and theories;
- demonstrate ability to classify/categorize concepts, phenomena, qualities;
- demonstrate ability to include citations and references properly;
- demonstrate ability to express, evaluate and support a point of view;
- demonstrate ability to use tables and illustrations properly;
- understand the importance of following scientific styles (such as APA, IEEE, Chicago);
[Writing process competencies]
- understand the writing process;
- demonstrate ability to determine purpose and audience;

Goals and learning objectives *year 3 courses* (*pre-TOM*)

- demonstrate ability to formulate research questions accurately and with appropriate scope

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201200206	Remote Care Nearby for CreaTe	5

Goal: to introduce students to Telemedicine services that have a serious chance to be successfully implemented in our current care system for reconditioning of chronically ill patients and which aim on:
- improving the quality of care;
- lowering the pressure on our labour capacity in health care;
- a higher quality of life for the patients;
- application in extramural care settings, so at home, at work or when on the move.

Learning Objectives*:* After the course
- students know the possible role of telemedicine in care and rehabilitation processes;
- students are familiar with the theoretical backgrounds with respect to design of technological innovations for a care process of a chronic disease;
- students are able to come to (in a group assignment with other students) a design for an technological innovation that contains:
  a) a description of the chronic disease and the problems experienced with the current way of care provision for these patients
  b) the methodology choosen to motivate the design of the technological innovation
  c) a description (a scenario) of the technological innovation as well as a list of (functional and technical) requirements;
- students are able to present the technological innovation by means of a poster and mock up.

201200217	Ethics for CreaTe	5

Goal: to introduce students to issues related to the professional ethics of creative technology graduates, especially with regard to developing and deploying new and emergent technology to improve quality of life, with special attention to how creative technology may change user behaviour, for good and bad, and how such changes may be anticipated.

Learning Objectives: After the course, the student is able to:
- understand basic ethical theory, critical reasoning and professional responsibility, and on this basis be able to clarify how technologies may positively or negatively affect user behavior and quality of life;
- draw inspiration from theoretical resources, and use for the design/prototype of a technological product;
- engage in unbiased and critical discussion of the ethical implications of technological innovation.

201300289	Academic Skills - elective: English CREA	5

The Academic Skills elective consists of 3 courses:
1. English for Academic Purposes 2 (EAP2) + extra reading and writing assignment (2 ects) (has its own Bb organisation)
2. Presentation Skills for Students (1 ects) (has its own Bb organisation)
3. Business English (2 ects)

Goals and learning objectives *year 3 courses* (*pre-TOM*)

Students need to pass all three courses in order to pass the Academic Skills course and receive the 5 credits.
Criteria for passing the course:

- Attending the lessons
- Handing in the assignments, giving presentations
- Showing progress

1. ENGLISH FOR ACADEMIC PURPOSES II

AIM
Speaking

- take part in discussions displaying confidence and credibility.
- make use of various rhetorical functions in academic speaking such as reporting and narrating, comparing and contrasting and describing processes, developments and operations.
- give clear, detailed descriptions on a wide range of subjects related to their field of interest, expanding and supporting ideas with subsidiary points and relevant examples.
- initiate discourse, take their turn when appropriate and end conversation when they need to.
- ask follow-up questions to check that they have understood what a speaker intended to say, and get clarification of ambiguous points.
- reach a consensus in group work.

Writing

- write a critical and purposeful academic report or essay
- describe things, processes, charts and diagrams
- classify and categorize scientific facts, theories and ideas
- provide reasons and explanations
- argue and evaluate a point of view
- compare and contrast theories and ideas
- provide examples and evidence to support their claims
- draw conclusions and offer recommendations

CONTENT

- Revision of basic academic writing skills
- Writing research reports as the default mode of academic writing
- The language of narrative and reporting, of describing processes and interpreting data, of exemplification and of diagrams and charts.
- Participation in discussions
- Peer review
- Successful vocabulary and language learning strategies

Extra opdracht
Extra leesmateriaal en een extra schrijfopdracht. Er zal een aparte, extra schrijfopdracht (casus) worden geïntegreerde om het bestudeerde in de praktijk te brengen. De opleiding of de studenten leveren zelf de relevante opdracht aan. De ontwikkelaar heeft geen volledig zicht op 'typische' tekstsoorten en criteria van betreffende opleiding.

2. PRESENTATION SKILLS

AIM
Acquiring basic techniques to improve presentation skills. Participants learn general rules for structuring a presentation, what they should do and should not do in a presentation and how to deal with nerves. The course is very hands-on and offers ample opportunity for practice.

CONTENT

- Structure of a presentation
- Speaking schedule and voice usage
- Style and contents
- Use of Powerpoint
- Non-verbal communication and nerves

3. BUSINESS ENGLISH

AIM
The students are organizing a study trip to Silicon Valley and aim to improve skills they will use in advance of and during their trip. Acquiring writing skills for business purposes; writing emails, business letters and proposals. Acquiring speaking skills for business purposes; formal conversations, introductions and meetings, business vocabulary etc. The course is very hands-on and offers opportunity for practice. Students are expected to spend a large amount of time on self-study.

CONTENT

- writing business letters and proposals, emails.
- taking part in formal conversations, introductions and meetings, presentations
- business vocabulary
- Business trip: first time questions, talking to people, and eating during business trips

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201300292   Study Trip Theme Course   5

Goal: to explore with particpants of a Study Trip the issues pertaining to successful exchange of information with visited parties during the trip, and to preparatory research into the Study Trip theme. (I.e. issues like introduction to the culture of the visited countries, writing a research proposal, writing a report.)

Learning Objectives: After the course, the student is able to:

Goals and learning objectives *year 3 courses* (*pre-TOM*)

- View and research into the relation of human-technology inspired by behavioural and management sciences.
- Discuss in the possible research tracks with the gathered information.
- Write an academic report of the research
- Present an academic report as a start for discussion.
- Gather information from different academic sources.
- Present their research.

Students are participants of the study trip and will do research in the possible tracks which are made for this study trip. The tracks are relating to the theme of the study trip.
Every participant will do academic research which connects to one of the tracks. On basis of the chosen track, a supervisor will be coupled to the student. This supervisor will help and coordinate the student in his or her research.
The aim of the research is to write an academic paper (like a mini-bachelorreferaat). The students start to write a research proposal, which is supported by related work and / or state of the art documentation. When the supervisor approves the research proposal, the student can start to work on the academic paper and if necessary build a prototype.
Before the departure and as part of the course, some lectures about the culture of the destination countries have to be followed.
The students will visit organizations at the destination after the approval of the research and before finishing the paper/prototype. These visits are for the students to get insight and inspiration for the subject of their research from practical experience of the companies. There will be question and answer moments at the companies.
After the examination of the paper and eventually a prototype, the student will give a presentation to all the other participants, about his or her paper and results.

201100229   Education Entertainment for CreaTe   5

Aan het eind van de cursus is de student in staat om:

- een aantal bestaande toepassingen van EE te omschrijven.
- de belangrijkste theorieën en theoretische concepten op het gebied van EE benoemen, omschrijven en herkennen in praktische toepassingen
- een aantal voor- en nadelen te benoemen van de EE-strategie, en een beschrijving te geven van de ethische en praktische uitdagingen die gemoeid zijn met de strategie
- een (prototype voor een) EE interventie te ontwikkelen voor een specifiek gezondheidsprobleem bij een specifieke doelgroep, en deze interventie te onderbouwen met theorie en epidemiologische gegevens.
- het prototype van de EE interventie te onderwerpen aan een kleinschalig formatief onderzoek; hierbij is de student in staat een passende onderzoeksmethode te kiezen, het onderzoek zelf vorm te geven, uit te voeren, te analyseren en te rapporteren.
- te reflecteren op het interdisciplinair samenwerken, enkele kansen en problemen in de samenwerking te identificeren, en te leren op basis van de ervaringen

De Entertainment Education (EE) strategie is een manier om planmatig boodschappen met een `pro-sociale' inhoud (leefstijl, milieu, gezondheid, enz.) te verwerken in een amusementsformat. Vooral in ontwikkelingslanden wordt deze strategie al geruime tijd ingezet om mensen te bewegen zich gezonder te gedragen. In de Westerse wereld wordt de EE strategie in toenemende mate gezien als een manier om de traditioneel moeilijk bereikbare doelgroepen, met een lage betrokkenheid bij gezonde leefstijlthema's, te kunnen bereiken. Een voorbeeld van Nederlands origine is de soap Costa! over jongeren op vakantie aan de Spaanse kust. Hierin werd een verhaallijn over

condoomgebruik verwerkt. Maar ook in amusementprogramma's en soaps zoals 'Onderweg naar morgen' komt bij gelegenheid een EE-verhaallijn voor. Behalve deze massamediale toepassingen vinden ook steeds meer lokale toepassingen plaats, bijvoorbeeld het geven van voorlichting in theatervorm.

Nieuwe (Informatie- en communicatie-) technologieen bieden nog meer kansen voor innovatieve toepassingen zoals computergames, social-media (bv 'virals') en mobiele applicaties.

De EE strategie vereist een goede interdisciplinaire samenwerking tussen de zogenaamde 'Educators' (zij die het publiek willen voorlichten) en de 'Entertainers' (zij die het publiek willen vermaken). In dit vak zullen de studenten deze interdisciplinaire zelf ervaren, omdat zij zullen werken in 'interdisciplinaire teams van Psychologie- en Creative Technology (CreaTe) -studenten. Nadat de studenten zich via zelfstudie en enkele colleges hebben verdiept in de (psychologische processen achter) de theorie, wordt in interdisciplinaire duo's gewerkt aan het ontwerp voor een EE-interventie. Voor beide groepen studenten gelden (deels) andere leerdoelen en beoordelingscriterea.

201300129   Communication Technology for Global Work   5

Goal: to explore issues, challenges, and opportunities facing workers, teams, and organizations working together across national boundaries and using innovative technology to do so.

Learning Objectives: After the course, students
- understand the challenges faced by global teams;
- are able to think strategically about issues such as virtual teams and creativity;
- have gained insights for successfully creating technology for participation in and management of geographically distributed teams and organizations.

201100243   Final Project Bachelor   15
In their Final project students complete graduation work with a study load of 15 EC.

Graduation work consists of:

1. A design project, where context and goals are set preferably by an external party.
2. A graduation report, with appendices when necessary, in which the student renders account of the graduation project and the design approach, and describes and documents literature search, surveys and experiments conducted during the project, as well as the prototypes and other deliverables which result from the project.
3. A summary of the graduation report.
4. A public presentation and defence of the graduation work.

The student can start graduation work at the beginning of a semester.

The deadline for graduation work is at the end of the semester in which it started. This period of time cannot be extended. If the deadline is not met, the examiners will assess the graduation work anyway. This may result in a fail.

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

Goals and learning objectives *individual pursuit courses* (*pre-TOM*)

Course number	Course name	Study load
201200224	Supplementary Topics Create 1	1
201200225	Supplementary Topics Create 2	2
201200226	Supplementary Topics Create 3	3
201200227	Supplementary Topics Create 4	4
201200228	Supplementary Topics Create 5	5

Supplementary Topics (1-5) are not taught courses, but units of study which a student, or a group of students, can use to pursue their individual learning goals. Participants in a Supplementary Topics unit need approval of their tutor (on behalf of the Examination Board). Before the student starts to work on Supplementary Topics, he/she should find, in cooperation with his/her tutor, an examiner for the interim examination of the topics. The student, the tutor and the examiner should agree beforehand upon the learning goals set for the supplementary topics, and the way in which (project/assignment based, and/or through self study) the student will work towards these goals. Grading by the examiner will be based on an assessment to what extent these learning goals have been reached.