

## Create Curriculum 2012-2013

### Observations regarding the CreaTe programme.

WE DO NOT DELIVER WHAT WE PROMISE.

In our communication about Creative Technology we stress

That we teach applied technology

That Design, Creativity, and Business are important pillars for our teaching

That we seek inspiration in Arts

That we want to educate people to push boundaries in the area where people and technology connect

That we believe in changing people's lives for the better.

Between the lines of our explanations, everyone can read that "understanding technology" is a key issue for us. In fact, we are ambitious regarding the level of "understanding technology" we want our students to reach. We ask them to go fast, and to jump to high levels of abstraction. For some students this is ok. Most students will have to work hard to get where we want them to get, that is ok too. But do we leave enough space for students to be successful in Creativity, Design and Business?

I fear that we educate students in a system of values where Design, Creativity, and Business are not really first class citizens. Moreover, we do not systematically address the human technology connection. The way Arts inspire us, is not so visible

I find these worrisome aspects of our programme. In my view Industrial Design treats Creativity and Design more than we do as first class citizens in their own right. Industrial Design offers more to its students when it comes to the human technology connection. CreaTe teaches applied technology, and emphasizes (probably unintentionally) the technology perspective. We have trouble to keep the other promises we made about our goals. I think we should move in the Industrial Design direction.

WE ARE DYNAMICS.

Design has been moving rapidly (and moves more rapidly every day) from artifacts with a single appearance in a fixed shape and with a single purpose to artifacts with distributed, not always tangible appearances, in (many) states and going through (many) state transitions, adaptive to their user(s) and their context.

System dynamics and system stability are important issues for the new design. So we had Motion and Modelling and Dynamical Systems in our programme, as first year courses. Good for us.

But it is my impression that students perceive these courses as exercise classes. Very difficult for many. Even those who (can) make the exercises find it hard to see the point. They do not make any connection with Design (let alone creativity).

Second year students in the Smart Technology track report that some things fall into place, e.g. when they are working on electronics. However, many first year students also report that they came with Smart Technology in mind, but the first year courses made them doubt.

The subject has to stay. But we need to teach it in a different way. I would advocate a mildly problem based approach. We must certainly be less ambitious in the goals we want to reach. And teach the subject more integrated with exploration of physical phenomena (in various domains), even for new media students.

#### WE TEACH SOFTWARE AND “SCRIPTING”

To build distributed and adaptive systems we use “programmable” components and interfaces. Programmable can be understood in the broadest sense, it refers to any context where a “script” has to be produced, written in a formalized language, in order to achieve any effect at all. Programmable and scripting are suggestive words, to cover anything from programming, physical computing, protocols, web services, databases to the use of Unity.

In our communication to prospective students we tend to avoid any reference to Computer Science. That is not entirely fair. Although on the other hand our approach to the field is certainly different from hard core Computer Science.

In our curriculum the learning experiences we offer regarding this networked world of the “programmable” are not yet optimal:

- The introduction to computer science is potentially useful, but it doesn't really work the way it was intended.
- The initial programming basis upon which Mathematics and Physical Computing try to build in is not strong enough (at least not for students who have no prior programming knowledge and experience).
- There are gaps in learning experiences, second year courses can not rely on first year qualifications.
- The second year Smart Technology courses seem to avoid Computer Science or Computer Science aspects.
- The second year courses Web Mashups/Services and Data-driven Applications are closely related in many respects But the services course is for New Media students only, while the Data-driven Applications course is for all CreaTe students (The Data-driven Applications course moreover is combined with an introduction to programming course for Industrial Engineering and Management.)

#### WE SHOULD OFFER MANY ROADS TO MANY GOALS

I didn't want this, but it seems inevitable. I was in favour of joint classes for a diverse audience. But this regime appears to be too strict. We have to let people travel along separate roads, depending on background and personal goals.

Probably we must start with pre-math workshops in block 1.

Probably we must offer our students the options to develop themselves at their own pace, to their own level (guaranteeing a minimum level, of course).

## **What to do with these observations?**

In view of the New Course Model that the university will adopt starting 2013-2014, it seems unwise to change the CreaTe curriculum for 2012-2013.

The long term perspective needs our attention. To be prepared for the transition into a curriculum according to the New Model, we will have to look again, and thoroughly, at learning goals we try to achieve, and learning experiences that we organize.

I suggest that we have one or more curriculum conferences, where people involved evaluate the current state of affairs, measured against the original ideas about Creative Technology, and plan how to refresh both goals and curriculum contents in the new setting. There we can take my observations about the current state of affairs into account.

For the short term I have long been wondering how to act wisely, in line with the opening sentence of this section.

Fact is, that there must be changes in the Create curriculum for 2012-2013 anyway. This has to do with the second year programme. We can not teach the second year courses that we taught this year, because the first year that we are offering in 2011-2012 (to the current generation) is not the same as the first year of 2010-2012 (for students who are now in their second year). The second year of 2012-2013 will have to contain Statistics, and Systems and Signals (which were first year courses for the previous generation, but not for this one).

I think we should keep moving, also in the first year, with my observations above in mind. So I do suggest a number of changes, not only concerning the second year.

## **Changes in the curriculum**

I propose new floorplans for the first and the second year.

The first year floorplan shows a minor shift of attention towards Industrial Design courses. More importantly, I ask everyone involved to join into teams to reconsider the courses, to fit meet the intentions of the new scheme.

## **Portfolio and assessment**

I believe we are moving, also as part of the Twente New Course Model, towards a system of continuous and integral assessment, mostly formative, sometimes summative.

At the end of each block there must be a verdict on each student, regarding every activity of the quarter. If this is not a mark registered in Osiris, then it should be a message of the examiner to the tutor, which can be passed through the student's learning (not showcase) portfolio.

Part of the effort I ask from teams is to look at continuous assessment, not just at the level of individual courses.

The student's learning portfolio must be build and maintained, every course must make an explicit connection to the learning portfolio.

## **Maybe a longer term perspective: The Eindhoven model**

Creative Technology looks a lot like the Eindhoven Industrial Design course.

Eindhoven would most certainly agree with the statement that Design is has been moving rapidly (and moves more rapidly every day) from artifacts with a single appearance in a fixed shape and with a single purpose to artifacts with distributed appearances, in (many) states and going through (many) state transitions, adaptive to their user(s) and their context.

But the similarities are restricted to learning goals. Our learning models are completely different.

In Creative Technology we offer students learning experiences in projects and (mostly assignment based) courses. On top of that we have tutoring, which helps students monitor (and monitors) their progress along development lines.

The Eindhoven Industrial Design course starts from development lines. Each semester projects and assignments are offered. Students must plan the progress they want to make along he development lines, and pick projects (individual) and assignments accordingly. At the end of the semester they are assessed. They get a pass if the portfolio shows that the step forward along the development lines has been made according to plan. A conditional pass is possible, in such a case the student must take an additional assignment in the next semester to earn the pass. And finally a hold is possible: students with a hold must pick new projects and assignments in the next semester to reach the goals they already planned, but failed to attain.

### Proposed CreaTe programme's first year for 2012-2013.

The floorplan of the first year is in table 2, the courses are listed in table 1.

TABLE 1: THE COURSES OF THE FIRST YEAR IN 2012-2013<sup>1</sup>

		study load in EC	teaching activities	assessment
201100115	We Create Identity	5	LPIpG	pPE
201100155	Living and Working Tomorrow	5	LPIpG	pPEO
201100117	Have Fun and Play!	5	LPIpG	pPE
201100176	Visual Communication	4	LPpl	p
EC 2 → 3	Sketching for CreaTe	3	Llp	p
EC 2 → 3	Designing in Context	3	LPpl	p
196700240	Human Factors	3		
EC 3 → 2	Introduction to Computer Science	2	LPIG	pPE
201100177	Programming and Physical Computing	7	Llp	pO
EC 5 → 4	Interactive Visualization	4	LPIp	pE
EC 3 → 4	Smart Environments	4	LPIpG	pPE
<i>new</i>	<i>Introduction to Physical Systems and System Dynamics</i>	5	LI	HO
201100131	Introduction to Mathematics and Modelling	6	Llp	pW
201100132	First year portfolio	4	I	p
	Year 1	60		

TABLE 2, PROPOSED FLOORPLAN OF THE FIRST YEAR

block 1A	block1B	block2A	block2B
(5 EC) We Create Identity	(4 EC) Smart Environments	(5 EC) Living and Working Tomorrow	(5 EC) Have Fun and Play
(4 EC) Visual Communication	(3 EC) Sketching	(3 EC) Designing in Context	(3 EC) Human Factors
(2 EC) Introduction to Computer Science	(4 EC) Programming and Physical Computing	(1 EC) Interactive Visualization part 1	(3 EC) Interactive Visualization part 2
(3 EC) Programming and Physical Computing	(3 EC) Introduction to Mathematics and Modelling	(5 EC) Introduction to Physical Systems and System Dynamics	(3 EC) Introduction to Mathematics and Modelling
(1 EC) Portfolio 1	(1 EC) Portfolio 2	(1 EC) Portfolio 3	(1 EC) Portfolio 3

<sup>1</sup> The abbreviations in the columns Teaching activities and assessment are explained at the end of this note.

## The changes in courses and study loads

In quarter 1 I lifted some weight from Introduction to Computer Science. Programming increases in study load. I think there is quite a large group of students who need more programming experience before they start Mathematics and Physical Computing.

In quarter 2 I added weight to Smart Environments (more on a par with other project based courses).

Sketching gets 0,5 EC extra. Programming and Physical Computing loses some weight in this quarter, but that weight has been moved to quarter 1.

In quarter 3 we find the Introduction to Physical Systems and System Dynamics course, with a 5EC weight.

The original Dynamical Systems contents get embedded here (not all of it, obviously) in a new course, which gives a practical orientation on (physical) systems as well. The Designing in Context course gains 0,5 EC. Interactive Visualization loses 1 EC in this quarter, it gets the same study load as Smart Environments.

In quarter 4 the situation remains unchanged.

In summary:

1 EC shifts from Interactive Visualization to Smart Environments (to make them equal in study load)

2 EC shift from Introduction to Computer Science and Dynamical Systems on the one hand to Sketching and Designing in Context on the other.

The Dynamical Systems course changes into a more introductory course, with more hands-on exploration of physical phenomena.

## The expectations

The first quarter seems to be the least tool- and problem-solving-oriented of the four. I expect the teachers of Web Technology (part of We Create Identity), Programming, and Introduction to Computer Science to team up to construct an interwoven programme of activities, which gives the technology part of the first block a coherent outlook (even if results are obtained by students count in different courses).

Moreover, I believe it is essential that all teachers of the first quarter sit together with the math teacher to look at possibilities to start a pre-math group here. Some of the identity to be created in We Create Identity may be identity in the basics of calculus. The students for whom calculus basics are already part of their identity, may have to concentrate on shooting a movie in this quarter, because the expert movie-maker in their team is working on the math part of his identity.

Sketching as a form of natural communication between people discussing ideas and thoughts must get more attention in the Sketching course. (In its current form it seems to concentrate on prototyping aspects: the visually correct 2D representation in lines and shades of a 3D object.)

The new Introduction to Physical Systems and System Dynamics should be a marriage between IEEE and the current course Dynamical Systems.

The second part of Mathematics and Modelling is largely a programming project. This should help to bridge the gap between first and second year programming. Teachers of Math and Programming should team up here, to improve the programming line.

## Portfolio and assessment

At the end of each block there must be a verdict on each student, regarding every activity of the quarter. If this is not a mark registered in Osiris, then it should be a message of the examiner to the tutor, which can be passed through the student's learning (not showcase) portfolio.

The student's learning portfolio must be built and maintained, **every course must make an explicit connection to the learning portfolio**. The tutors must be aware of these connections.

## Changes which are too difficult

In an earlier proposal I suggested to move the Have Fun and Play! exploration to the second year. The transitional regulations and the practical consequences of such a move are too complicated to further pursue this move.

It has been suggested to make room for an Academic Writing course. I don't know where to fit such a course.

### Proposed CreaTe programme's second year for 2012-2013.

The floorplan of the second year is in table 4, the courses are listed in table 3.

TABLE 3, THE COURSES OF THE SECOND YEAR IN 2012-2013<sup>2</sup>

		study load in EC	track	teaching activities	assess
<i>EC 6,5 → 5</i>	Ambient Screens	5	All	LPIDG	DEP
<i>EC 7,5 → 6</i>	Hybrid Worlds	6	All	LPIDG	DEP
201000196	CE in Art, Science and Technology	2	All	A	A
<i>EC 2,5 → 3</i>	Kinetic Visual Communication	3	All	LPID	D
<i>new</i>	Marketing and Business Development	7	All	LPI	W
201000194	Programming with Structures	5	All	LID	AO
<i>new</i>	Web services and data driven applications	4	All	LA	A
191567030	Intoduction to Statistics and Probability	3	All	LI	W
<i>new</i>	Research methodology	2			
<i>new</i>	Systems and Signals	3	All	LI	W
201000085	Queues and Logistics	3	ST		
201000084	Strategies and Protocols	3	NM		
<i>new</i>	Smart Technology	15	ST	LA	AO
<i>new</i>	New Media	15	NM	LPID	DEP
<i>new</i>	Second year portfolio	2	All		
	Year 2	60			

TABLE 4, PROPOSED FLOORPLAN OF THE SECOND YEAR

<b>block 1A</b>	<b>block1B</b>	<b>block2A</b>	<b>block2B</b>
(5 EC) Programming with Structures	(5 EC) Ambient Screens	(4 EC) Web Services and Data- driven Applications	(6 EC) Hybrid Worlds
(3 EC) Introduction to Statistics and Probability	(2 EC) Research Methodology	(3 EC) Marketing and Business Development part 1	(4 EC) Marketing and Business Development part 1
(3 EC) Systems and Signals	(3 EC) Strategies and Protocols/ Queues and Logistics	(3 EC) Kinetic Visual Communication	
(3,5 EC) Smart Technology part 1	(4,5 EC) Smart Technology part 2	(3,5 EC) Smart Technology part 3	(3,5 EC) Smart Technology part 4
(3,5 EC) New Media part 1	(4,5 EC) New Media part 2	(3,5 EC) New Media part 3	(3,5 EC) New Media part 4
(2EC) Creative Explorations in Art, Science and Technology			
(2 EC) Second Year Portfolio			

<sup>2</sup> The abbreviations in the columns Teaching activities and assessment are explained at the end of this note.

## The changes and expectations

An overall change is to merge the key courses of the tracks (Smart Technology and New Media) into one single unit. I think this will be the future for these specializations in the modular Twente New Course Model. More importantly, it gives a lot of freedom for the actual organization of teaching in these tracks. Of course I assume that assessment will be by separate sub tests.

Moreover

- The Creative Explorations project remains; this is a fortunate change of plan (upon stakeholder request);
- a Research Methodology course is added (2 EC), according to plan;
- the marketing and business courses are merged into one unit of 7 EC (last year they were offered as two units of 5 EC), according to plan;
- the Web Mashups and the Data-driven Applications courses are merged into a single 4 EC course, php based (last year offered as two separate courses of 3 EC each, the one JAVA based, the other php); a change of plan based on this year's experiences;
- the 3D modelling course disappears as a course for everyone (but is supposed to re-enter as a New Media course only); a change of plan, based on this year's experiences;
- the students get to choose between two math courses, Queues and logistics, versus Strategies and Protocols; a new plan, but one that was more or less to be expected

There are a few second year courses which are taught jointly in 2011-2012 with other programmes (IBA, AT, TBK). Next year (2012-2013) all courses will be CreaTe only, according to plan

In quarter 1 Introduction to Statistics and Probability returns (this course was offered as a first year course to previous CreaTe generations). In parallel we find the new Systems and Signals course, which will have two tracks. One track will be media oriented, the other one is introductory to control and stability, especially for smart technology.

The CreaTe character of this quarter depends heavily on the Design and Creativity aspects in the track courses for ST en NM, and on Programming with Structures.

I expect the 3D modelling course, which was a course for all, to re-appear here within the New Media mega-course.

In quarter 2 both math courses Strategies and Protocols and Queues and Logistics are offered simultaneously. I expect the New Media students to choose the Strategies and Protocols course, and the Smart Technology students the Queues and Logistics course.

The new course Research Methodology appears here, following Statistics.

The 3D modelling course disappears as a course for all. See previous remarks.

In quarter 3 the original Data Driven Applications course reappears in a merger with Web Services. I think this is content which is relevant for all CreaTe students. However, the study load of the joint course is reduced, from 6 to 4 EC.

Also in quarter 3 I put the start of the 7 EC Marketing and Business Development course. The first half, in this quarter, is supposed to provide basic concepts for the project of quarter 4. (See below)

Finally the old Advanced Graphis Design course reappears in quarter 3 (was in quarter 4) under a new name: Kinetic Visual Communication.

In quarter 4 the second part of the Marketing and Business course appears. This is supposed to be the "CreaTe-only" version of Startrix.

## Portfolio and assessment

At the end of each block there must be a verdict on each student, regarding every activity of the quarter. If this is not a mark registered in Osiris, then it should be a message of the examiner to the tutor, which can be passed through the student's learning (not showcase) portfolio.

The student's learning portfolio must be build and maintained, **every course must make an explicit connection to the learning portfolio**. The tutors must be aware of these connections.

TABLE 5, FLOORPLAN OF THE CUURENT FIRST YEAR

block 1A	block1B	block2A	block2B
(5 EC) We Create Identity	(3 EC) Smart environments	(5 EC) Living and working tomorrow	(5 EC) Have fun and play (project)
(4 EC) Visual Communication	(2 EC) Sketching	(2 EC) Designing in context	(3 EC) Human factors
(3+2 EC) Computer Science and Programming	(5 EC) Programming and Physical Computing	(3 EC) Interactive Visualization part 1	(2 EC) Interactive Visualization part 2
	(3+1 EC) Mathematical Modelling & Dynamical Systems	(4 EC) Dynamical Systems	(1+3 EC) Dynamical Systems & Mathematical Modelling
(1 EC) Portfolio 1	(1 EC) Portfolio 2	(1 EC) Portfolio 3	(1 EC) Portfolio 3

TABLE 6, FLOORPLAN OF THE SECOND YEAR, AS IT WAS PRESENTED LAST YEAR

block 1A	block1B	block2A	block2B
(5 EC) Statistics and Research Methodology	(5 EC) Ambient Screens	(3 EC) <i>Mathematics</i>	(6 EC) Hybrid Worlds
	(3 EC, B) Systems and Signals	(4 EC) Design Marketing and Business management	(3 EC) Design Marketing and Business management
(5 EC) Programming with Structures	(3 EC) 3-D Modelling	(3 EC) Data driven Applications	(3 EC) Advanced Graphic Design
(4 EC) Introduction to Electronics	(4 EC) Introduction to Communication Systems	(4 EC) Control Engineering	(3 EC) Sensors
(4 EC) Game Development	(4 EC) Web Services	(3+1 EC) New Media Course & Virtual Collaboration	(3 EC) Virtual Collaboration
(1EC) Portfolio 5		(1 EC) Portfolio 6	

## **Abbreviations for teaching activities and assessment**

The abbreviations in the various tables must be read as follows.

For teaching activities

- L (Lectures) an expert speaker addresses the students.
- P (Presentations) the students address their fellow students.
- I (Interaction) questions are raised, discussed and answered, in collaboration between students and teacher.
- A (Assignments) Students work on assignments, under supervision of a teacher and/or assistant.
- D (Deliverable) a result is being produced, which can be demonstrated and observed; the product is more than mere text for reading.
- G (Group) students collaborate in a group.

For assessment

- W (Written) students participate in a session for a written examination.
- O (Oral) oral examination
- E (Essay) students hand in one or more essays.
- A (Assignments ) students hand in (homework) assignments.
- P (Public defence) student give a presentation and (publicly) defend the results of an assignment
- D (Deliverable) students demonstrate the results of an assignment (a working prototype, a result to be analyzed and observed, not mere text)