Oplæg til manual for vejledning af kandidatstuderende ved Danmarks Tekniske Universitet i faget "Videnbaseret Virksomhedsstart".

We write in English since supervision is done in English

Supervising master students at Technical University of Denmark in knowledge based entrepreneurship COURSE 42435.

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The manual was written in a collaborative effort between Dorte Wiene, who has run the DTU e'ship coaching program related to course 42435 Knowledge based Entrepreneurship since 2005 and John Heebøll, lecturer and course responsible for 42435 since 1992.

Contents

Background

STUDENT RELATED

DTU offers engineering education at bachelor and master level. Course 42435 is a master course.

During their studies, students collect so called ECTS points – European Credit Transfer System points. One point equals 28 working hours at DTU.

Students usually collect 25 ECTS per semester, equaling 5 courses adding 5 ECTS points each. To become a master of science in engineering, 120 ECTS points are required on top of 180 ECTS points from the mandatory bachelor education.

42435 is a 5 ECTS course, and consequently students are expected to invest 140 hours in completing it. This amounts to an average of about 10 – 12 hours per week during the whole semester. (13 weeks + exam).

Out of these hours, 3 – 5 hours are spent in the lecture room per week. The rest is divided between home work, group sessions and exam. Thus students will typically spend in between 5 and 10 hours per week outside the classroom in work related to 42435.

COURSE RELATED

Course 42435 started as an experimental extra-curricular seminar in 1992, offered to students and university employee with a particular interest in business formation.

At this point in time, a business incubator had been in operation at the university for four years, and the need for practical skills and knowledge in business formation amongst university entrepreneurs was evident to those in the arena.

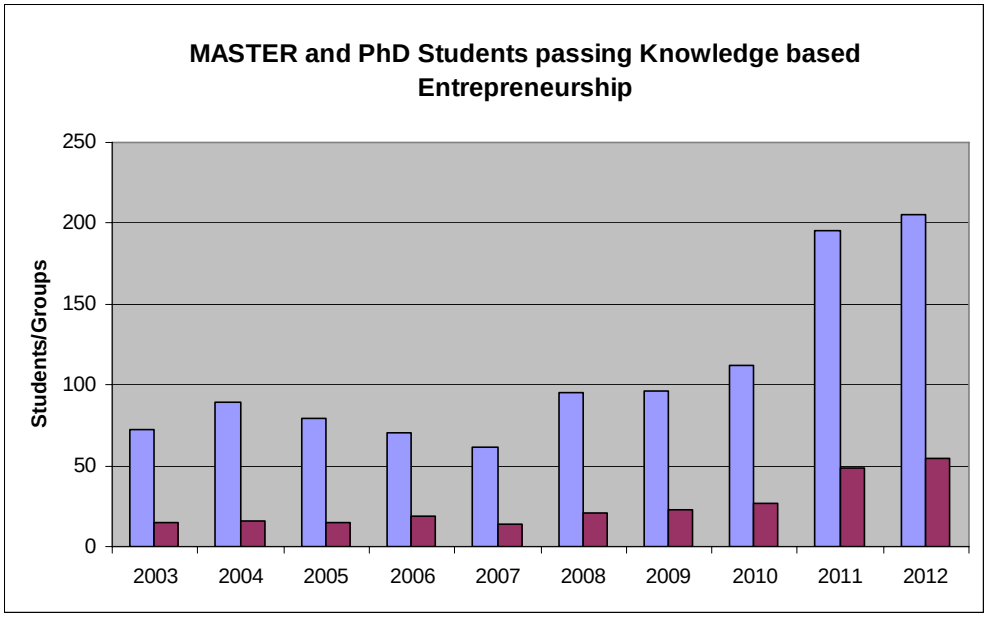
Up through the nineties the course matured in contents and quality, it was accepted as a part of the university course syllabus and the annual number of students that concluded the course grew to an annual average around 40 – 50.

Around the millennium DTU took severe steps to promote practical and commercial innovation out of the research environments. A science park outclassing anything seen before in Denmark was established through a merger with Hoersholm Research Park, facilities for up to 100 start-up companies was provided at the Lyngby campus and risk capital was made available through a publicly funded economical business incubator: DTU Innovation, which later expanded significantly with the emergence of SEED Capital Denmark.

As a consequence of this and also because of consistently good course evaluations that spread through the student communities, course 42435 started to attract more students during the first few years of the new millennium.

The need for a textbook thus increased, and thus, “Knowledge based Entrepreneurship” came into being to cater for the technical skilled but inexperienced technical entrepreneur. Supervision of project groups became a bottleneck and was outsourced. Since app. 2002 the course was no longer a one-man show.

From 2003 up until 2008 the enrollment at 42435 was a stable 60 – 80 students per year but with the ever increasing interest in creating an academic entrepreneurial culture, combined with a good reputation for cost efficient learning and interesting projects coming out of 42435, the course started to attract even more students. By 2011 the demand led to the course being offered twice a year. By 2012 more that 200 students and PhD students passed. When enrollment spring 2013 passed 140 students it was decided to raise the max class size to 200 students per semester and to introduce a two-track parallel exams procedure.



One of the challenges related to running such big classes is to provide quality supervision in the quantities needed. From 2013 onwards, up to 40 groups will need guidance every semester. Since each group in average needs to meet a supervisor twice, this amounts to 80 meetings per semester. Assuming a supervisor accepts to coach 3 groups in average, and we have a supervisor corps responsible who would take in 6 groups, we need to establish a supervisor corps of up to 12 external supervisors every semester.

Our supervisors are people skilled in the art of founding and building tech companies. They usually accept working for a nominal fee – and for one or two semesters at a time. They take great pleasure in connecting to the student ecosystem and most of them consider coaching a pay-back service rendered to their alma mater or to an institution that provides future employees to hire or future start-up companies to invest in.

In this way, course 42435 has maintained a close relationship with the regional high tec community and thus has been able to provide high quality experienced consultancy to students and groups.

The impact of this is unambiguous: the groups that exploit the coaching opportunities consistently earn high marks at exams.

Course design
42435 is designed in accordance with two main ideas:

1. CDIO: Conceive, Design, Implement, Operate: the predominant pedagogic and didactic school within engineering education. Link to Wiki: http://en.wikipedia.org/wiki/CDIO.

   Students at 42435 conceive business ideas, they design business models, they plan the business formation and they prepare for the subsequent business development – in accordance with the CDIO principles and ideas..

2. Prof. Tanaka, Tokyo 1992: “The Near entrepreneurial experience as a release factor for business formation”. Prof. Tanaka concluded upon a study on release factors in entrepreneurship in Japan, that the social heritage was the dominant motivation for starting a new company. He also concluded that number 2 reason was what he named “the near entrepreneurial experience”. Enterprising people who never thought about being entrepreneurs more or less randomly are dragged into an entrepreneurial initiative. During the process and being part of it, they adapt a liking for this type of career option.

   Students at 42435 realize that they are capable of generating viable business ideas and prepare realistic plans for founding and building new companies – and thus develop a taste for trying that in real life.

42435 is also a classic university course: teaching via lectures and learning via group work. Obvious this is a low cost principle and it has been widely criticized – usually by opponents who have no alternative solutions on how to teach big classes at low budgets and only few capable teachers around.

At the end of the day, what matters is that students meet learning objectives rather that they were well taken care of.

Learning objectives and evaluation of student projects
Students at 42435 are evaluated on the basis of - a) a group report – a **business plan** - including a group presentation and –b) an **individual presentation** of a specific theme.

The grade is a weighed average with 2/3 on evaluation of (a) and 1/3 on evaluation of (b).

Evaluation is done by comparing the group and individual performance to a set of learning objectives that are communicated to the students at the beginning of the course to allow them to plan and prioritize their study efforts.

A student who meets the learning objectives of the course will be able to:

- ✓ Identify business opportunities
- ✓ Develop business ideas (Opportunity-driven creativity)
- ✓ Develop business models
- ✓ Analyze markets for technological products and services
- ✓ Interview customers
- ✓ Analyze customer value creation
- ✓ Plan the establishment of a company (Business planning)
- ✓ Determine capital requirements
- ✓ Establish cash flow projection
- ✓ Establish budgets on profit/loss, assets/liabilities
- ✓ Calculate an equity investment
- ✓ Specify management competence profiles

Grade scale is the seven-scale, which can be expressed as follows:

12	(A)	Excellent. Outstanding performance. Only minor errors
10	(B)	Very good. Above average standard with some errors.
7	(C)	Good. Generally sound with a number of notable errors
4	(D)	Satisfactory. Fair, but significant shortcomings
02	(E)	Sufficient. Meets the minimum criteria
00	(Fx)	Failed. Some more work required.
-3	(F)	Failed. Considerably more work required.

Letters in brackets refer to the Anglo-Saxon (American) grading system.

Students have the right to file a complaint to bring the evaluation to the test. In that case the examiner and the censor have to specify the level of fulfillment of learning objectives. This again requires an extensive note apparatus to be maintained during evaluation and exam.

If examiner and censor find nothing that indicates that the assessment of fulfillment of learning objectives is obviously wrong, the complaint is rejected. Students may appeal this verdict, and in that case, a jury looks at the case.

Ambitious students aiming for 10 or more are sometimes tempted to file a complaint to gamble on the likelihood that they may increase grade by one step – which numerically means a lot. This is usually a waist of time if nothing new is brought to the attention of examiner and censor. Recently the outcome of a complaint could also be a decrease of the grade, making the gamble even more exiting.

The bottom line however it, that students should be methodically and fairly evaluated according to the learning objectives and one of the tasks of the group supervisors is to check for significant shortcomings as related to these.

One shortcoming that will consistently cause a drop of at least one step is the lack of feed back from customers and important stakeholders in the market. The viewpoint is this: any start-up builds on the hypothesis that someone out in the market will pay for the values that the start-up offers. If this hypothesis is not checked, the founding team is exposed to an unnecessarily high risk. Start-up teams should always check the assumption that they actually create values that someone is ready to pay for. So supervisors should make sure that groups have good evidence based reasons to believe that they can make money in the market.

Supervising groups in 42435
Since 2008 a supervisor corps of 4 – 8 persons have volunteered to assist 42435 groups each autumn. Since 2011 this was augmented to twice a year.

Supervisors are introduced to the students via a small bio included in a hand out that is presented at first or second lecture.

Groups are expected to identify the supervisor who fits the best and to open the relationship on their own initiative.

Groups expect to have to meetings with their supervisor. Quite often they would like to have more meetings and it is up to the individual supervisor to set the limit.

The right time to meet the supervisor is usually

a. When one or a few business opportunities have been singled out for further examination and a choice has to be met. In spring this happens sometime late February into mid March. In autumn, this happens sometime late September into mid October.

b. When most of the work is done, the group needs a second opinion on the business model, the market research and crucial parts of the business plan. This usually happens early May for the spring class and early November for the autumn class.

The location of meetings is decided by the supervisor, and students often travel to places outside DTU to meet. This is part of the set-up and fully accepted by all parties.

Things to look for at first meeting:

a. Have the students identified real pain? Are they addressing a real need?
b. Do they build on their expertise, experience and knowledge? Often they set up their business in the consumer market since this is the only market they know – instead of moving backwards in the value chains to set up their business where they have real competitive advantages via their skills and education.
c. Is the business idea “analyzable” at all? In B2B markets this is usually the case. In B2C markets this can be very difficult, and this is another good reason for DTU student entrepreneurs to stay away from end

user. If stakeholders like decision makers, buyers, opinion leaders, competitors etc. are not easy to identify, the market analysis and the very crucial customer feed back becomes difficult to obtain and to interpret. So from the course perspective, it is important that the business model works in a segment that can be analyzed via statistics, Google searches and interviews.

Things to look for at the second meeting:

a. Quality and interpretation of market data and feed back from customers and stakeholders. Have interviews been done? Have competitors been identified and analyzed?
b. Estimated future turn over and market shares: a sanity check on forecasts may often disclose students' lack of experience leading to sometimes wildly overestimated turnover.
c. Economy: has a cash flow budget been done? Does it look realistic?
d. Organization: often students underestimate the amount of people it takes to get a job done. If turn-over per employee is available in the budget (se "Profit & Loss yearly", this will often indicate whether the company is over- or understaffed.
e. Financing: often students build on venture capital investments, but is the business a venture case at all? Alternatively, financing can be partly avoided by early customer relations and risk-oriented loans.

Things you should know as a supervisor:

Ideally students should distribute their workload evenly over the semester, but due to variable and occasionally intense workload competition from other courses, this ideal rarely materializes. The supervisor should encourage groups to get as much work done during the first two months of the semester as possible to avoid them being cached in a time trap by the end of the semester.

To help planning the work, a tentative project plan is suggested at semester start. It looks like this:

QUOTE
Your project typically includes two milestones and three work periods:
Kick-off: the team is formed.

1. *First Work period*: The quest for the business opportunity and the idea in ping-pong with teacher(s), coach(es) and potential customers. Transformation of a business idea into a business model including a start-up strategy via rough estimates, quick calculations and discussions with teacher(s), coach(es) and mentors/advisors in your own network.

First milestone: Product/service identified and + Business model designed.

2. *Second Work Period*: Research and analysis. The assumptions on pain and value creation in the market are verified by empiric information. The marketplace materializes.

Second milestone: The data incl. customer feed-back needed to finalize your business model and develop your business plan has been collected and is ready for analysis.

3. *Third Work Period*. Business planning: rationale, action plan, resource plan, time schedule and budgets are procured.

Termination: the completed business plan + Go-No go decision + pitching the project at exam.

Each task takes its time. In particular: do not rush for the business idea. The first work period is usually quite frustrating. Desperate groups tend to jump to the first viable idea that comes into view. Reduce the risk of missing a clearly better candidate by being persistent! So: ***allow three weeks from kick-off to finalise your portfolio of ideas in order to select the most perspective and to develop a business model. Spend another two – three weeks doing customer interviews and market research, and finally spend three – four weeks in finalizing your business plan. After that set aside one-two working days to prepare your presentation at exam***

UNQOUTE

This and other recommendations are communicated to the students via a course manual that is highly recommendable reading to new supervisors. It can be downloaded form the course website at www.entrepreneur.dk.

Other stuff to be mentioned
The technical skills of students enrolled at course 42435 fan out over all possible engineering specializations whereas they usually have no business economic background.

NEXT SECTION
Feedback from previous coaches
To be written spring 2013

Lyngby 8 February 2013
John Heebøll