Høgskolen i Østfold

Studieplan for Master in Applied Computer Science (120 ECTS) (2017–2019)

Fakta om programmet

Studiepoeng: 120
Studiets varighet: 2 år

Kontakt

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Fakultet for informasjonsteknologi, ingeniørfag og økonomi
English

Innholdsfortegnelse

Opptak

A bachelor's degree or an equivalent education of at least 180 ECTS credits,
and in addition or included at least 80 ECTS credits in informatics,
and in addition or included at least 20 ECTS credits in programming

To be admitted, the applicant must have an average grade from the qualifying education of at least C.

Oppbygging og gjennomføring

Studiemodell

Denne studiemodellen har en ny utforming. Fortell oss hva du synes om den

Høst 2017

Obligatoriske emner

ITI46514 Vitenskapelig metode og teori	**15** stp
ITI46317 Interaksjonsdesign	**15** stp

Vår 2018

Velg 2 av 3 emner:

ITI43210 Maskinlæring	**15** stp
ITI43414 Avanserte temaer i informasjonssystemer	**15** stp
ITI43517 Modellering av cyber-fysiske systemer	**15** stp

Trainee-bedriftsoppgave

ITI49017 Bedriftsoppgave	**15** stp

Forskningsoppgave

ITI49114 Forskningsoppgave	**15** stp

Høst 2018

Obligatoriske emner

ITI40314 Spesialpensum	**15** stp
ITI40614 · Del 1 av 2 Masteroppgave	

Vår 2019

Obligatoriske emner

ITI40614 · Del 2 av 2 Masteroppgave	**45** stp

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Østfold University College

ITI46514 Scientific method and theory (Autumn 2017)

Facts about the course

ECTS Credits: 15
Responsible department: Faculty of Computer Science
Course Leader: Cathrine Linnes
Teaching language: English
Duration: ½ year

Table of contents

The course is connected to the following study programs

Mandatory course in the master programme in applied computer science.

Lecture Semester

First semester (autumn) in the full time programme and the part time programme.

The student's learning outcomes after completing the course

Knowledge

The student is knowledgeable about central methods and theories within the field of applied computer science, and different perspectives on the use of informatics in the society. This includes:

- Research design and experiment techniques
- Statistical methods
- Methods for design and evaluation of information systems
- Social science methodologies

- Media science methodologies
- Research and developent activities at the faculty and its partners

The student is familiar with publishing channels relevant to applied computer science, different types of publications, their roles and functions.

Skills

The student is able to:

- assess scientific literature within the field of applied computer science
- use and review scientific references
- use relevant statistical methods for analyzing sets of numerical data
- use methods from social sciences and work with observation and interviews
- use methods for design and evaluation of IT systems
- think critically about the use of information technology deployed in organizations and in the society in general

General competence

After examination, the student has a sufficient understanding of applied computer science and the faculty's research and development activities. The student also has a better understanding of the use of IT in our society.

Content

The course contains a number of seminar-based lectures from the researchers at the faculty and guest lectures from our partners. Some lab activity with relevant tools and application of methods is included.

Forms of teaching and learning

Lectures, presentations of scientific work, and lab excercises.

Workload

Four 2-days sessions during daytime, a total of 8 days. Between the sessions, supervision are given.

Coursework requirements - conditions for taking the exam

The student must present 2-4 scientific papers during the semester.

Examination

Individual oral exam.

Individual oral exam based on the curriculum (scientific publications which have been discussed in the course). Duration 20 - 30 minutes. No aidings tools allowed.

Assessment on the A - F grading scale.

Course evaluation

This course is evaluated by a

- Mid-term evaluation (voluntary)
- End evaluation (compulsory)

The lecturer compiles a report based on the evaluation forms filled in by the students and his/her own experience with the course. The report is discussed by the study quality committee of the faculty of Computer Sciences.

Literature

The curriculum is collected during the semester, based on literature used by lectures throughout the course. The list will be published on the course home page.

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Østfold University College

ITI46317 Interaction Design (Autumn 2017)

Facts about the course

ECTS Credits: 15
Responsible department: Faculty of Computer Science
Course Leader: Joakim Karlsen
Teaching language: English
Duration: ½ year

Table of contents

The course is connected to the following study programs

Mandatory course in the master programme in applied computer science.

Lecture Semester

First semester (autumn) in the full time programme.

Third semester (autumn) in the part time programme.

The student's learning outcomes after completing the course

Knowledge

The student is familiar with
- central theories and models in interaction design
- the development of the field, interaction design and emerging trends

Skills

The student is able to
- design and conduct experiments with new and existing technology for interaction between humans and machines
- relate own work to existing literature, theories and models
- read and reflect on interaction design literature

General competence

Through the course, the student has gained competence in critical reading and reflection. In addition, the student has got experience with project work in groups.

Content

The course consists of three parts:
- Theories and models in interaction design
- Current trends in interaction design
- Methods for design, prototyping and evaluation

Forms of teaching and learning

The course is lecture based with projects to be performed throughout the semester. Emphasis will be put on reading and using relevant literature, and presentation of own work.

Workload

Lectures and supervision 4 hours per week.

Coursework requirements - conditions for taking the exam

The student must during the semester:
- present at least one paper (individual or in a group) and lead a plenary discussion based on this.
- write a scientific paper aimed for publication.
- complete at least one project which includes design, prototyping and evaluation of new or existing technology for human-computer interaction.

Coursework requirements must be accepted to qualify for the exam.

Examination

This course has an examination in two parts: written and oral.

Individual written exam (50%)
Individual written exam based on the course curriculum. Duration 4 hours. No aiding tools allowed.

Individual oral exam (50%)
Individual oral exam based on the scientific paper produced by the student and the student project. Duration approx. 30 min. No aiding tools allowed.

Grading scale A - F in both parts.

Both parts of the exam must be passed to pass the exam as a whole.

Course evaluation

This course is evaluated by a

- Mid-term evaluation (voluntary)
- End evaluation (compulsory)

The lecturer compiles a report based on the evaluation forms filled in by the students and his/her own experience with the course. The report is discussed by the study quality committee of the faculty of Computer Sciences.

Literature

Last updated 15.12.2016. The readinglist may be subject to change before the semester starts.

- Rogers, Preece and Sharp (2015): Interaction Design: Beyond Human - Computer Interaction. Wiley, 4th ed. ISBN: 9781119020752
- Lövengren and Stolterman (2007): Thoughtful Interaction design. ISBN: 9780262622097
- The curriculum will be supported by material (scientific papers) during the semester. The material will be posted on the learning platform.

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Østfold University College

ITI43210 Machine Learning (Spring 2018)

Facts about the course

ECTS Credits: 15
Responsible department: Faculty of Computer Science, Engineering and Economics
Course Leader: Roland Olsson
Teaching language: English
Duration: ½ year

Table of contents

The course is connected to the following study programs

Elective course in the master programme in applied computer science.

Lecture Semester

Second semester (spring) in the full time programme and the part time programme.

The student's learning outcomes after completing the course

Knowledge

The student has

- an overview over the most important methods in machine learning, and a deeper knowledge of three of them, viz. Decision Trees, Neural Networks, and Evolutionary Computation
- knowledge about the practical challenges in connection with data mining, e.g. overfitting, missing values, and classifications with different costs.
- gained knowledge in basic topics such as numerical optimisation and statistical methods, for example Bayesian methods used in search engines like Google and in spam filters.

Skills

The student is able to

- arrange or code data to fit data mining and machine learning algorithms
- choose correct tools for a given type of data
- decide on how good the results are based on simpel statistical analysis of, for instance, classification exactness
- use machine learning i practical applications and be able to transfer machine learning models to programming language code

General competence

The student has improved his/her competence in

- research and development, for instance finding relevant literature and understand scientific articles about machine learning
- writing scientific texts in English
- treat and analyse data of arbitrary type, even if this is done without inductive learning

Content

Machine learning is about computers learning through training and experience instead of being explicitely programmed for a given task.The students will get acquainted with several methods and algorithms for machine learning. Based on this, the students should be able to select the methods best suited for the problem in question.

The course should give the students knowledge about the basic properties common to all machine learning methods. Examples include ability to generalise and heuristic search.

The course contains three projects, one about decision trees, rules and regression analysis, one about neural networks, and one about evolutionary computation.

Induction of decision trees and some applications such as medical diagnosis and credit evaluation.

Artificial neural nets and optimization algorithms such as steepest descent and trust region Newton methods. Applications of neural nets to sound and image analysis.

Basic theory for machine learning, for example Bayes' formula, maximum likelihood and the minimum description length principle.

Instance based learning such as nearest neighbour, locally weighted regression, and radial basis functions.

Evolutionary computation, especially genetic algorithms and genetic programming. General principles for evolution. Selection methods and genetic operators such as mutation and crossover. The Baldwin effect.

Some of the topics above require basic knowledge of statistics and information theory which will be taught as needed.

Forms of teaching and learning

Lectures and supervision.

Workload

2 hours lectures per week and projects with mandatory meetings with the supervisor every week.

Examination

Portfolio and individual take home exam.
The exam consists of both a portfolio and a individual take home exam.

The portfolio (determines 65% of the final grade) consists of:

- one project on decision trees
- one project about neural nets
- one project in automatic programming

The projects can be carried out individually or in groups of two students. The students will get an individual grade.

The individual three day home exam determines 35% of the final grade and focus on theory.

The student will get an individual joint grade for the entire course. Grades: A - F.

Upon re-examination, both parts of the examination must be retaken. Upon re-examination, new assignments and the take home exam will be decided by the course instructor.

Course evaluation

This course is evaluated by a

- Mid-term evaluation (voluntary)
- End evaluation (compulsory)

The lecturer compiles a report based on the evaluation forms filled in by the students and his/her own experience with the course. The report is discussed by the study quality committee of the faculty of Computer Sciences.

Literature

Last updated 15. October 2015. The readinglist may be subject to change before the semester starts.

Kuhn, Max og Johnson, Kjell, "Applied Predictive Modeling" (2013), 1st Ed., Springer-Verlag New York, ISBN 978-1-4614-6848-6

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Østfold University College

ITI43414 Advanced topics in information systems (Spring 2018)

Facts about the course

ECTS Credits: 15
Responsible department: Faculty of Computer Science, Engineering and Economics
Course Leader: Ricardo Colomo-Palacios
Teaching language: English
Duration: ½ year

Table of contents

The course is connected to the following study programs

Elective course in the master programme in applied computer science.

Lecture Semester

Second semester (spring) in the full time programme.

Second or fourth semester (spring) in the part time programme.

The student's learning outcomes after completing the course

Knowledge
The student
- is familiar with principles for sustainable information systems
- is familiar with the use of IT in businesses
- is familiar with hybrid IT management (including cloud computing)
- has a good overview of health informatics
- is familiar with global trends in information systems management and development.

Skills
The student is able to develop a strategy for the deployment of an information system in a business.

General competence
The student is able to apply scientific theory and methodology in a practical business setting.

Content

- Energy Informatics
- Health IT
- Information Systems in a global world
- IT Governance
- New trends in Business Software (Cloud Computing, Hybrid IT)
- Information Systems Development: Improvement & Capability
- Big Data Acquisition, Storage, Analysis & Visualization. An information systems perspective.

Forms of teaching and learning

Ordinary lectures, video lectures, supervision and project work.

Examination

Individual oral exam

Individual oral exam based on the course curriculum and project work. Duration approx. 20-30 min. No aiding tools allowed. Grades: A - F.

Course evaluation

This course is evaluated by a

- Mid-term evaluation (voluntary)
- End evaluation (compulsory)

The lecturer compiles a report based on the evaluation forms filled in by the students and his/her own experience with the course. The report is the discussed by the study quality committee of the faculty of Computer Sciences.

Literature

Last updated 13.12.2016. The readinglist may be subject to change before the semester starts.

1. IT for Green / Energy Informatics.

Bose, R., & Luo, X. (2011). Integrative framework for assessing firms' potential to undertake Green IT initiatives via virtualization-A theoretical perspective. The Journal of Strategic Information Systems, 20(1), 38-54.
Brooks, S., Wang, X., & Sarker, S. (2012). Unpacking green IS: a review of the existing literature and directions for the future. In Green Business Process Management (pp. 15-37). Springer Berlin Heidelberg.
Colomo-Palacios, R. (2015). IT for Green, a Global Perspective. Journal of Global Information Technology Management, 18(1), 1-5. http://dx.doi.org/10.1080/1097198X.2015.1017399
Faucheux, S., & Nicolaï, I. (2011). IT for green and green IT: A proposed typology of eco-innovation. Ecological Economics, 70(11), 2020-2027.
Gholami, R., Sulaiman, A. B., Ramayah, T., & Molla, A. (2013). Senior managers' perception on green information systems (IS) adoption and environmental performance: Results from a field survey. Information & Management, 50(7), 431-438.
Molla, A., & Abareshi, A. (2012). Organizational green motivations for information technology: empirical study. Journal of Computer Information Systems, 52(3), 92-102.
Murugesan, S. (2008). Harnessing green IT: Principles and practices. IT professional, 10(1), 24-33.
Naumann, S., Dick, M., Kern, E., & Johann, T. (2011). The greensoft model: A reference model for green and sustainable software and its engineering. Sustainable Computing: Informatics and Systems, 1(4), 294-304.
Watson, R. T., Boudreau, M. C., & Chen, A. J. (2010). Information systems and environmentally sustainable development: energy informatics and new directions for the IS community. MIS quarterly, 23-38.

2. Health IT.

Chatterjee, S., LeRouge, C. M., Chiarini Tremblay, M. (2013). Educating Students in Healthcare Information Technology: IS Community Barriers, Challenges, and Paths Forward. Communications of the Association for Information Systems, 33, Article 1.
Chiasson, M. W., & Davidson, E. (2004). Pushing the contextual envelope: developing and diffusing IS theory for health information systems research. Information and Organization, 14(3), 155-188.
Leviss, J., Kremsdorf, R., & Mohaideen, M. F. (2006). The CMIO-A new leader for health systems. Journal of the American Medical Informatics Association,13(5), 573-578.
Wager, K. A., Lee, F. W., & Glaser, J. P. (2013). Health care information systems: a practical approach for health care management. John Wiley & Sons.
Ward, R. (2013). The application of technology acceptance and diffusion of innovation models in healthcare informatics. Health Policy and Technology, 2(4), 222-228.
Wilson, E.V., & Tulu, B. (2010). The Rise of a Health-IT Academic Focus. Communications of the ACM, (53)5, 147-150.

3. Information Systems function in a Global world.

Campagnolo, G. M., Pollock, N., & Williams, R. (2015). Technology as we do not know it: The extended practice of global software development. Information and Organization, 25(3), 150-159.
Djavanshir, G. R. (2005). Surveying the risks and benefits of IT outsourcing. IT professional, 7(6), 32-37.
Elmuti, D. (2003). The perceived impact of outsourcing in organizational performance. Mid-American Journal of Business, 18(2),33-41.
Grover, V., Cheon, M. J., & Teng, J. T. (1996). The effect of service quality and partnership on the outsourcing of information systems functions. Journal of Management Information Systems, 89-116.
Hirschheim, R., & Dibbern, J. (2009). Outsourcing in a Global Economy: Traditional Information Technology Outsourcing, Offshore Outsourcing, and Business Process Outsourcing. In Information Systems Outsourcing (pp. 3-21). Springer Berlin Heidelberg.
Kendrick, R. (2009). Outsourcing IT: A Governance Guide. It Governance Ltd .
Marchewka, J. T., & Oruganti, S. (2014). A Combined Model of IT Outsourcing Partnerships and Success. Communications of the IIMA, 13(2), 6.
Niazi, M., Mahmood, S., Alshayeb, M., Qureshi, A. M., Faisal, K., & Cerpa, N. (2016). Toward successful project management in global software development. International Journal of Project Management, 34(8), 1553-1567.
Rainer, R.K., Prince, B., & Cegielski, C. (2014). Introduction to Information Systems, 5th Edition. John Wiley & Sons.
¿mite, D., Calefato, F., & Wohlin, C. (2015). Cost-Savings in Global Software Engineering: Where's the Evidence. IEEE Software, 32(4), 26-32.
Tungur, S. & Engwall, M. (2014). The business model dilemma of technology shifts. Technovation, 34 (9), 525-535.
Vandermerwe, S., & Rada, J. (1989). Servitization of business: adding value by adding services. European Management Journal, 6(4), 314-324.

4. IT /Business Alignment.

Chan, Y. E., & Reich (2007). IT alignment: What have we learned? Journal of Information Technology, 22(4), 297-315.
Henderson, J. C., & Venkatraman, N. (1993). Strategic Alignment: A Model for Organizational Transformation through Information Technology. IBM Systems Journal, 32 (1), 4-16.
Khaiata, M. & Zualkernan, I.M. (2009) A Simple Instrument to Measure IT-Business Alignment Maturity, Information Systems Management, 26(2), 138-152.
Luftman, J. N. (2004). Managing the Information Technology Resources. New Jersey: Pearson Prentice Hall.

Luftman, J. (2000). Assessing business-IT alignment maturity. Communications of AIS, Volume 4, Article 14.
Luftman, J. and Brier, T., (1999) 'Achieving and Sustaining Business-IT Alignment,' California Management Review, No. 1, Fall 1999, pp 109-122.
Tallon, P., & Kraemer, K. (2007). Fact or fiction? A sense making perspective on the reality behind executives' perceptions of IT business value. Journal of Management Information Systems, 24(1), 13-54
Ullah, A., & Lai, R. (2013). A Systematic Review of Business and Information Technology Alignment. ACM Transactions on Management Information Systems, Vol. 4, No. 1, Article 4.

5. IT Governance.

Calder, A. (2005). 'IT Governance - Guidelines for Directors'. IT Governance Ltd.
Calder, A. (2009). 'IT Governance Implementing Frameworks and Standards for the Corporate Governance of IT'. IT Governance Ltd.
Juiz, C., & Toomey, M. (2015). To govern IT, or not to govern IT?. Communications of the ACM, 58(2), 58-64.
Peterson, R. R. (2003). Information strategies and tactics for Information Technology governance. In W. Van Grembergen (Ed.), Strategies for Information Technology Governance. Hershey, PA: Idea Group Publishing.
Van Grembergen W., (2002). 'Introduction to the minitrack IT Governance and its Mechansims' Proceedings of the 35th Hawaii International Conference on System Sciences (HICSS).
Weill, P. (2004) 'Don't Just Lead Govern: How Top-Performing Firms Govern IT', MIS Quarterly Executive (3)1, pp. 1-17.

6. New Trends in Business Software.

Bosch, J. (2009). From software product lines to software ecosystems. In Proceedings of the 13th International Software Product Line Conference (pp. 111-119). Carnegie Mellon University.
Bosch, J. (2011). Software Ecosystems--Implications for Strategy, Business Model and Architecture. In Software Product Line Conference (SPLC), 2011 15th International (pp. 351-351). IEEE.
Debois, P. (2011). Devops: A software revolution in the making. Journal of Information Technology Management, 24(8), 3-39.
Fitzgerald, B., & Stol, K. J. (2015). Continuous software engineering: A roadmap and agenda. Journal of Systems and Software.
Heredia, A., & Colomo-Palacios, R. (2015). Software Business Models from a distribution perspective: A Systematic Mapping Study. Unpublished.
Hohmann, L. (2003). Beyond Software Architecture: Creating and Sustaining Winning Solutions. Addison-Wesley Longman publishing Co., Inc., Boston, MA, USA, 2003. ISBN 0201775948.
Jadhav, A. S., & Sonar, R. M. (2011). Framework for evaluation and selection of the software packages: A hybrid knowledge based system approach. Journal of Systems and Software, 84(8), 1394-1407.
Jansen, S., Finkelstein, A., & Brinkkemper, S. (2009, May). A sense of community: A research agenda for software ecosystems. In Software Engineering-Companion Volume, 2009. ICSE-Companion 2009. 31st International Conference on (pp. 187-190). IEEE.
Lassenius, C. (2014). Software Business: Towards Continuous Value Delivery; 5th International Conference, ICSOB 2014, Paphos, Cyprus, June 16-18, 2014; Proceedings (Vol. 182). Springer.
Lin, H. Y., Hsu, P. Y., & Sheen, G. J. (2007). A fuzzy-based decision-making procedure for data warehouse system selection. Expert systems with applications, 32(3), 939-953.
Luoma, E., & Rönkkö, M. (2012). Software-as-a-Service business models. Commun Cloud Softw, 1(1).
Manikas, K., & Hansen, K. M. (2013). Software ecosystems-a systematic literature review. Journal of Systems and Software, 86(5), 1294-1306.
Popp, K. M. (2011). Software Industry Business Models. IEEE Software, 28(4), 26-30.
Roche, J. (2013). Adopting DevOps practices in quality assurance. Communications of the ACM, 56(11), 38-43.
Rodríguez, P., Haghighatkhah, A., Lwakatare, L. E., Teppola, S., Suomalainen, T., Eskeli, J., & Oivo, M. (2017). Continuous deployment of software intensive products and services: A systematic mapping study. Journal of Systems and Software, 123, 263-291.
Serebrenik, A., & Mens, T. (2015, September). Challenges in Software Ecosystems Research. In Proceedings of the 2015 European Conference on Software Architecture Workshops (p. 40). ACM.
Thönes, J. (2015). Microservices. IEEE Software, 32(1), 116-116.

7. Software Development Processes: Improvement & Capability

Chrissis, M. B., Konrad, M., & Shrum, S. (2011). CMMI for development: guidelines for process integration and product improvement. Pearson Education.
Calvo-Manzano, J. A., Cuevas Agustín, G., San Feliu Gilabert, T., De Amescua Seco, A. , García Sánchez, L. & Pérez Cota, M. (2002). Experiences in the application of software process improvement in SMES. Software Quality Journal, 10(3), 261-273.
Cugola, G., & Ghezzi, C. (1998). Software Processes: a Retrospective and a Path to the Future. Software Process: Improvement and Practice, 4(3), 101-123.
Dybå, T. (2005). An empirical investigation of the key factors for success in software process improvement. Software Engineering, IEEE Transactions on,31(5), 410-424.
Falessi, D., Shaw, M., & Mullen, K. (2014). Achieving and Maintaining CMMI Maturity Level 5 in a Small Organization. Software, IEEE, 31(5), 80-86.
Habra, N., Alexandre, S., Desharnais, J. M., Laporte, C. Y., & Renault, A. (2008). Initiating software process improvement in very small enterprises: Experience

with a light assessment tool. Information and software technology,50(7), 763-771.
Humphrey, W. S. (1997). Introduction to the personal software process. Addison-Wesley Professional.
Humphrey, W. S. (2000). Introduction to the team software process. Addison-Wesley Professional.
Larrucea, X., O'Connor, R.V., Colomo-Palacios, R., & Laporte, C.Y. (2016). Software Process Improvement in Very Small Organizations. IEEE Software, 33(2), 85-89. http://dx.doi.org/10.1109/MS.2016.42
Oktaba, H., García, F., Piattini, M., Ruiz, F., Pino, F. J., & Alquicira, C. (2007). Software process improvement: The COMPETISOFT project. IEEE Computer, (10), 21-28.
Unterkalmsteiner, M., Gorschek, T., Cheng, C. K., Permadi, R. B., & Feldt, R. (2012). Evaluation and measurement of software process improvement-a systematic literature review. Software Engineering, IEEE Transactions on,38(2), 398-424.

8. Big Data Acquisition, Storage, Analysis & Visualization. An information systems perspective.

Boyd, D., & Crawford, K. (2012). Critical questions for big data: Provocations for a cultural, technological, and scholarly phenomenon. Information, communication & society, 15(5), 662-679.
Chen, M., Mao, S., & Liu, Y. (2014). Big data: a survey. Mobile Networks and Applications, 19(2), 171-209.
Chen, C. P., & Zhang, C. Y. (2014). Data-intensive applications, challenges, techniques and technologies: A survey on Big Data. Information Sciences, 275, 314-347.
Davenport, T. H., Barth, P., & Bean, R. (2012). How big data is different. MIT Sloan Management Review, 54(1), 43.
Erl, T., Khattak, W., & Buhler, P. (2015). Big Data Fundamentals: Concepts, Drivers & Techniques. Prentice Hall.
J. Fürnkranz et al., (2012) Foundations of Rule Learning, Cognitive Technologies, Springer-Verlag Berlin Heidelberg.
Jorgensen, A., Rowland-Jones, J., Welch, J., Clark, D., Price, C., & Mitchell, B. (2014). Microsoft Big Data Solutions. John Wiley & Sons.
Wu, X., Zhu, X., Wu, G. Q., & Ding, W. (2014). Data mining with big data. IEEE transactions on knowledge and data engineering, 26(1), 97-107.

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Østfold University College

ITI43517 Modelling Cyber-Physical Systems (Spring 2018)

Facts about the course

ECTS Credits: 15
Responsible department: Faculty of Computer Science, Engineering and Economics
Course Leader: Øystein Haugen
Teaching language: English
Duration: ½ year

Table of contents

The course is connected to the following study programs

Elective course in the master programme in applied computer science.

Lecture Semester

Second semester (spring) in the full time programme.

Fourth semester (spring) in the part time programme.

The student's learning outcomes after completing the course

Knowledge

The student

- understands the challenges associated with cyber-physical systems
- has experienced the relevance of good software design principles

Skills

The student has the capability to

- model and implement reactive systems with concurrency
- perform analysis of consistency of models of systems with concurrency
- connect sensors, actuators and controlling components in a functioning system
- give and take constructive criticism of the system design and functioning
- receive the experience of building a cyber-physical system and making it execute

General competence

The student

- can build systems in «Internet of Things»
- can assess realistically what errors may occur in cyber-physical systems and how to minimize their vulnerability
- has some insight into formal semantics of sequence diagrams

Content

The course focus on how reactive systems can be built with emphasis on modeling. The models are executable and based on state machines. The requirements of these concurrent systems are modeled as sequence diagrams, and it is emphasized that the requirements and design are consistent.

In particular, we emphasize reactive systems using the Internet of Things, and we use a running example where the functionality is enhanced during the course following an agile method.

Towards the end of the course, we show how systems can be made more resilient to unexpected incidents and errors. Security of cyber-physical systems and how to perform risk-analysis of such systems will be covered.

Forms of teaching and learning

Project work, lectures and guided lab and exercises.

For each instance of the course, we create new project tasks. We teach the project teams how to give and take constructive feedback.

Workload

3 compact sessions of 2 full days each. Between the sessions the students will work on the mandatory project and supervision will be offered.

Coursework requirements - conditions for taking the exam

- Mandatory project: There will be one project, with deliverable at each teaching session (2 deliverables). Project group size should be 2-4 people, but with few students, single person project will be possible. The students should expect to spend 100 hours on the project.
- Plenary presentation and evaluation of the project. The project should normally result in an executable model that should be demonstrated at the plenary presentation.

Coursework requirements must be accepted to qualify for the exam.

Examination

Individual oral exam:

Individual oral exam. Approximately 30 minutes duration. No aiding tools allowed.

Assessment on the A - F grading scale.

Course evaluation

This course is evaluated by a

- Mid-term evaluation (voluntary)
- End evaluation (compulsory)

The lecturer compiles a report based on the evaluation forms filled in by the students and his/her own experience with the course. The report is discussed by the study quality committee of the faculty of Computer Sciences.

Literature

A number of articles and lecture notes constitute the curriculum.

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Østfold University College

ITI49017 Business project (Spring 2018)

Facts about the course

ECTS Credits: 15
Responsible department: Faculty of Computer Science
Course Leader: Per Gunnar Fyhn
Teaching language: English
Duration: ½ year

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The course is connected to the following study programs

Elective course after application in the master programme in applied computer science. The student may apply for this course to replace one of the three elective courses.

An agreement between the student and the company must be made before the student can attend this course. The agreement must be approved by the Head of studies before the project starts.

Lecture Semester

Second semester (spring) in the full time programme.

Second semester (spring) or fourth semester (spring) in the part time programme.

In addition the student is expected to do some work during the summer vacation.

The student's learning outcomes after completing the course

Knowledge

The student has

- acquired good knowledge of ICT, giving a good systems perspective
- knowledge on the use of ICT within the selected theme of work

Skills

The student is able to

- use teoretical methods to solve professional tasks
- work with projects and tasks, both individually and as part of a team

General competence

The student is able to produce new knowledge through literature search, contact with experts, users and in his/her project work.

Content

An agreement between the student and the company must be made before the student starts working in the company.

A description of the business project should be prepared by the student and the company in collaboration. This must be endorsed by the faculty before the work starts. This is done to ensure necessary volume and depth of the project.The trainee normally works approx. 600 hours.

At the end of the project the student must submit a report describing the work done and give an oral presentation of the project.

The company pays the trainee.

Forms of teaching and learning

Project work with guidance from a mentor at the company and a supervisor at Østfold University College.

Workload

Approx. 600 hours.

Coursework requirements - conditions for taking the exam

- Two individual self reflection texts, at 20 % (approximately 120 hours) and 80 % (approximately 500 hours) of total work hours.
- Prepare and conduct meetings with mentor and supervisor every month, including writing abstracts and logging working hours.
- Presentation of the project at half time (approximately 300 hours). This includes a resume of the work done so far and a sketch of the planned/remaining work.

Coursework requirements must be accepted to qualify for the exam.

Examination

Individual oral exam

Individual oral exam based upon four criteria:

1. The process and the progress of the project.
2. The project report.
3. The result of the project.
4. The oral presentation of the project.

Emphasis is put on the project process. Duration approx. 20-30 min. Graded on scale A-F. No aiding tools allowed.

In the case of a new exam, a new project must be carried out on agreement with the instructor responsible for the course and with the company.

Course evaluation

This course is evaluated by a

- Mid-term evaluation (voluntary)
- End evaluation (compulsory)

The lecturer compiles a report based on the evaluation forms filled in by the students and his/her own experience with the course. The report is the discussed by the study quality committee of the faculty of Computer Sciences.

Literature

Depends on the project and is agreed on with the supervisor and the company.

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Østfold University College

ITI49114 Research project (Spring 2018)

Facts about the course

ECTS Credits: 15
Responsible department: Faculty of Computer Science, Engineering and Economics
Course Leader: Jan Høiberg
Teaching language: English
Duration: ½ year

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The course is connected to the following study programs

Elective course after application in the master programme in applied computer science.

Lecture Semester

Second semester (spring) in the full time programme.

Second or fourth semester (spring) in the part time programme.

The student's learning outcomes after completing the course

Knowledge

The student:

- has in depth knowledge of one research project at the faculty or at a partner institution.
- has thorough understanding of the relevant field of research.
- is familiar with relevant publishing channels.

- is familiar with relevant methods and theories.

Skills

The student is able to:

- write a scientific paper aimed at publishing.
- defend the choice of research problem and methods.
- define a research problem.
- design and perform a scientific experiment.

General competence

The student gains experience

- with collaboration with internal or external researchers.
- in research, including planning, performing and reporting in an existing research project.

Content

Student and supervisor agree on a theme related to existing research at the faculty or a partner institution.

Regular supervision and practical project work constitute a major part of the course.

Forms of teaching and learning

Reading, project work, reporting, debate and dicussion.

Workload

No regular lectures. Regular meetings with supervisor.

Coursework requirements - conditions for taking the exam

- Project description essay in the beginning of the semester
- Mid-term report
- Work log

Coursework requirements must be accepted to qualify for the exam.

Examination

Paper and individual oral exam

Paper (approx. 10-20 pages) is assessed to Pass / Fail.

Individual oral exam consisting of a presentation and dicussion of the paper. Duration approx. 20-30 min. Graded on scale A-F. Except the presentation, no aiding tools are allowed.

The paper must be assessed to Pass in order to qualify to the oral exam. The student will get an individual joint grade for the entire course.

In case of a a Fail, the student can request a re-assessment. If the new assesment affects the preliminary grading of the paper, a new oral exam will be arranged.

Upon re-examination, both parts of the examination must be retaken. Upon re-examination, a new topic will be decided in coorporation with the person responsible for the course and the supervisor.

Course evaluation

This course is evaluated by a

- Mid-term evaluation (voluntary)
- End evaluation (compulsory)

The lecturer compiles a report based on the evaluation forms filled in by the students and his/her own experience with the course. The report is discussed by the study quality committee of the faculty of Computer Sciences.

Literature

Literature is selected by the supervisor and the student based on the project theme.

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Østfold University College

ITI40314 Selected Topics (Autumn 2018)

Facts about the course

ECTS Credits: 15
Responsible department: Faculty of Computer Science
Course Leader: Jan Høiberg
Teaching language: English
Duration: ½ year

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The course is connected to the following study programs

Mandatory course in the master programme in applied computer science full time and part time.

Absolute requirements

The student must have passed at least 45 ECTS credits before starting the course selected topics.

Recommended requirements

None.

Lecture Semester

First half of third semester (autumn - to the middle of October) in the full time programme.

First half of fifth semester (autumn - to the middle of October) in the part time programme.

The student's learning outcomes after completing the course

Knowledge

The student has attained acquaintance and knowledge about the content of literature relevant for the themes of the master thesis.

Skills

The student is able to account for, both orally and in writing, the content of literature relevant for the themes of the master thesis.

General competence

The student is able to write academic texts.

Content

The course aims at preparing the student for his/her master thesis. The content is chosen individually and is related to the master project.

The student shall, together with his/her supervisor, find literature (books, articles, webpages) that is relevant for the master project. The student shall produce a report summing up this literature and give an oral presentation of the report.

Forms of teaching and learning

Guided self-study.

Workload

Approx. 450 hours.

Practical training/internship

None.

Coursework requirements - conditions for taking the exam

The student must write an individual report summing up the literature.

There will be held a mandatory seminar in academic writing.

Coursework requirements must be accepted to qualify for the exam.

Examination

Individual oral exam

Individual oral exam, where the student presents and discusses his/her special topic. Duration approx. 20-30 min. Except the presentation, no supporting materials are allowed.

The grading is individual with a "pass / no pass" mark.

Examiners

The exam is assessed by an internal or external examiner in consultation with the supervisor.

Conditions for resit/rescheduled exams

Upon re-examination, new literature must be decided in cooperation with supervisor.

Course evaluation

None.

Literature

Individually chosen.

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Østfold University College

ITI40614 Master's Thesis (Autumn 2018–Spring 2019)

Facts about the course

ECTS Credits: 45
Responsible department: Faculty of Computer Science, Engineering and Economics
Course Leader: Jan Høiberg
Teaching language: English
Duration: 1 year

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The course is connected to the following study programs

Mandatory course in the master programme in applied computer science full time and part time.

Absolute requirements

The student must have passed the course Selected Topics.

Recommended requirements

None.

Lecture Semester

Third and fourth semester (autumn and spring) in the full time programme.

Sixth, seventh and eight semster (autumn and spring) in the part time programme.

The student's learning outcomes after completing the course

Knowledge

The student has

- attained the requisite knowledge and expertise for challenging jobs in research and development in the field.
- gained knowledge from literature and methods related to the subjects that are part of the master thesis.

Skills

The student is able to

- work independently with a complex problem over a longer period of time.
- analyze a situation, describe a problem and plan its solution.
- master feasible planning that consider alternatives, limitations and time constraints.
- collect and analyze relevant information with an ethically healthy and critical approach.
- present reasearch and results in a clear and comprehensive written thesis.
- communicate knowledge clearly and precisely, orally and in writing.
- express own and others reflections and solutions in the chosen area of research.
- construct models and implement them in digital environments.
- apply methods and design principles to make prototypes for different information systems.

General competence

The student has

- obtained a relation to scientific literature and methods.
- developed academic curiosity
- gained consciousness towards values such as openness, precision and ability to discriminate between knowledge and opinions.
- the ability to think critically about central ethical, philosophical and scientific problems in his/her field.

Content

The content may vary significantly and may include research, development, testing or analysis that will be documented in the master thesis.

Forms of teaching and learning

Guided self-study, writing a master thesis.

Workload

Approx. 1350 hours. Supervision constitutes 40 hours.

Practical training/internship

None.

Coursework requirements - conditions for taking the exam

None.

Examination

Master thesis and oral exam

The assessment is based on the master thesis (individually or in groups of two people) and an individual oral exam. At the oral examination the candidate first holds a presentation of the master thesis (approx. 30 min). Then the candidate defends his/her thesis (approx 30 min). The oral examination is public.

The thesis is graded on the A - F grading scale. It is given a tentative grade of the thesis. This grade can be adjusted up to 2 stages at the oral exam.

If the student decides to challenge the assessment, the thesis must be re-assessed. If the new assessment affects the tentative grading of the thesis, a new oral exam will be arranged.

Plagiarism control/ cheating
Master's theses is subject to electronic plagiarism control. Exam papers that are partly or entirely identical will not be approved and will be regarded as cheating. For further information please see Exam regulations for Østfold University College.

Examiners

The master thesis is assessed by an external examiner in consultation with the supervisor.

Conditions for resit/rescheduled exams

Upon re-examination, both parts of the examination must be retaken.

If the student wishes to improve a passed result of his/her master thesis, the thesis must be rewritten with a new problem statement. In this case, the student is not entitled to receive new academic supervision.

Course evaluation

This course is evaluated by a

- Mid-term evaluation (compulsory)

The responsible for the course compiles a report based on the feedback from the students and his/her own experience with the course. The report is discussed by the study quality committee of the faculty of Computer Sciences.

Literature

Individually chosen, depending on the thesis.

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