



SYLLABUS 07/08

SYSTEM MODELING USING UML

Class: IMPACTS

TERM: AUTUMN

ISMK7000

Credits: 7.5

AIMS AND OBJECTIVES

- Develop detailed knowledge and critical understanding of the main areas of system modeling using UML 2.0
- Acquire the knowledge about UML and how to model complex technical computer systems.
- Communicate and work effectively with domain experts and other professionals in a project within the field of this master programme.

TOPICS

- Introduction to the Unified Modeling Language UML 2.0
- Use Case analysis and use case diagrams
- Static modeling using Class diagrams
- Dynamic modeling of Objects in action using Sequence diagrams
- Activity diagrams
- Using state machine diagrams
- Communication diagrams
- Packet diagrams
- Components and component diagrams
- Timing diagrams
- Deployment diagrams
- Development processes and the use of models
- Hardware modeling and the use of UML
- UML extension mechanisms
- Interaction overview diagrams

ASSESSMENT STRATEGY

Written examination. To gain access to the exam, the student has to complete compulsory laboratory work during the term.

PREREQUISITES

IMPACTS entrance qualifications.

EDUCATIONAL PROCEDURE

Subject oriented lectures and tutorials, web based studies and laboratory work.

LITERATURE

Required literature

Eriksson, Penker, Lyons, Fado :UML 2 Toolkit
Wiley Publishing ISBN: 0-471-46361-2



SYLLABUS 07/08

Project Management

Class: IMPACTS

TERM: AUTUMN

IPMK7010

Credits: 7.5

AIMS AND OBJECTIVES

- Develop detailed knowledge and critical understanding of the main areas of project management
- Acquire the knowledge about the state of managing projects within the field of complex technical computer systems.
- Plan and execute a significant project within the area of this master programme.
- Communicate and work effectively with domain experts and other professionals in a project within the field of this master programme

TOPICS

- Introduction to project management
- Overview of project planning
- Project evaluation
- Selection of an appropriate project approach
- Software and hardware effort estimation
- Activity planning
- Risk management
- Resource allocation
- Monitoring and control
- Managing contacts
- Managing people and organizing team
- Software quality
- Hardware quality
- Small projects
- Programme management
- Post-mortem analysis

ASSESSMENT STRATEGY

Written examination. To gain access to the exam, the student has to complete compulsory laboratory work during the term.

PREREQUISITES

IMPACTS entrance qualifications.

EDUCATIONAL PROCEDURE

Subject oriented lectures and tutorials, web based studies and laboratory work.

LITERATURE

Required literature

Bob Huges and Mike Cotterell: Software Project Management
McGraw-HillWiley Publishing ISBN: 0-07 709834 X



SYLLABUS 07/08

HARDWARE DEVELOPMENT AND TEST
Class: IMPACTS *TERM: AUTUMN*

IHDP7020
Credits: 7.5

AIMS AND OBJECTIVES

This course aims to provide the student with basic methodology, technologic and architectural aspects of advanced digital system and digital circuit design. After this course, the student shall be familiar with the digital design flow for integrated technologies (ASICs and FPGAs) and with the use of industrial CAE tools for FPGA devices, with the development and experimentation of a practical digital system.

TOPICS

- CMOS process: Lithographic techniques
- Electrical characterization of materials and devices
- Combinational circuits in CMOS – dynamic and static implementations
- Full-custom and semi-custom circuits; cell-based and array-based; FPGAs
- Structured design methodologies for digital systems
- Digital design flow for FPGA technology
- Hardware description languages; modeling, functional validation and test bench development; digital system synthesis. Design of clocked synchronous digital systems.
- CAE tools for XILINX FPGAs (ModelSim, Xilinx ISE)
- Standard test infra-structures: digital circuits (boundary-scan test, IEEE 1149.1) and mixed-signal circuits (IEEE 1149.4)
- Structural and parametric testing of printed circuit boards
- Other IEEE standards for testing electronic circuits

ASSESSMENT STRATEGY

Written examination. To gain access to the exam, the student has to complete compulsory laboratory work during the term.

PREREQUISITES

IMPACTS entrance qualifications.

EDUCATIONAL PROCEDURE

Subject oriented lectures and tutorials, web based studies and laboratory work.

LITERATURE

Required literature



SYLLABUS 07/08

Research Methods and Project Planning

Class: IMPACTS

TERM: AUTUMN

IRME7030

Credits: 7.5

AIMS AND OBJECTIVES

To enable students to develop a range of advanced and specialist skills in the planning and undertaking of research or development work including critical review and analysis, experimental design and communication skills. To set these skills in appropriate context for professional practice in research and in industry, and to help students develop a clear understanding of ethical and legal considerations for professional practice.

TOPICS

- Literature Review
- Technical Writing
- Project planning
- Experimental Design and Data Analysis
- Professional practice, ethics and legal requirements

ASSESSMENT STRATEGY

Written examination. To gain access to the exam, the student has to complete compulsory laboratory work during the term.

PREREQUISITES

IMPACTS entrance qualifications.

EDUCATIONAL PROCEDURE

Subject oriented lectures and tutorials, web based studies and laboratory work.

LITERATURE

Required literature



SYLLABUS 07/08

REAL TIME SYSTEMS

Class: IMPACTS

TERM: AUTUMN

IRPK7040

Credits:6

AIMS AND OBJECTIVES

- Develop detailed knowledge and critical understanding of the main areas of real time systems
- Communicate and work effectively with peers and academic staff within the field of complex real time systems.
- Develop knowledge about the state of real time systems and the ability to select supporting operating systems and languages

TOPICS

- Introduction to Real Time Systems
- Synchronization
- Scheduling Strategies
- Real Time Architectures
 - Cyclic executives
 - Event-driven systems
 - Pipelined Systems
 - Client Server Systems
 - State Machine Systems
- Real Time Operating Systems
 - eCos Operating system
- Real Time Databases
- High Integrity Software Systems

ASSESSMENT STRATEGY

Written examination. To gain access to the exam, the student has to complete compulsory laboratory work during the term.

PREREQUISITES

Completed IMPACTS first semester courses and Real Time Systems IRSK7040

EDUCATIONAL PROCEDURE

Subject oriented lectures and tutorials, web based studies and laboratory work.

LITERATURE

Required literature

Web based material
eCos manuals



SYLLABUS 07/08

REAL TIME PROGRAMMING

Class: IMPACTS

TERM: AUTUMN

IRPK7050

Credits:9

AIMS AND OBJECTIVES

- Develop detailed knowledge and critical understanding of the main areas of real time programming
- Communicate and work effectively with peers and academic staff within the field of complex real time systems.
- Develop knowledge about the state of real time programming and the ability to communicate with domain experts and professionals within this field of study
- Plan and execute a significant project of research, investigation or development in the area of real time programming.

TOPICS

- Introduction to Real Time Programming
- Development tools
- Embedded UML tools
- Real Time Profiles in UML
- Real Time Patterns
- Development Processes for Real Time Applications
 - ROPES development process
 - COMET development process

ASSESSMENT STRATEGY

Written examination. To gain access to the exam, the student has to complete compulsory laboratory work during the term.

PREREQUISITES

Completed IMPACTS first semester courses and Real Time Systems IRSK7040

EDUCATIONAL PROCEDURE

Subject oriented lectures and tutorials, web based studies and laboratory work.

LITERATURE

Required literature

Web based material

Bruce Powel Douglass, Real Time UML Third Edition, Advances in the UML for Real-Time Systems, ISBN: 0-321-16076-2

Brian Goetz et al., Java Concurrency in Practice ISBN 0-321-34960-1



SYLLABUS 07/08

SOFTWARE/HARDWARE CO-DEVELOPMENT

Class: IMPACTS

TERM: AUTUMN

ICDK7060

Credits:9

AIMS AND OBJECTIVES

- Develop the proper attitude, knowledge and skills required in a holistic approach to embedded systems design wherein
 - an executable system description is partitioned into software, hardware, storage and communication facilities treated in an integrated manner, according to O-O project development methodology
 - software, hardware and communication facilities are verified concurrently
 - from requirements gathering
 - through analysis and design
 - to implementation, testing and deployment.
- Communicate and work effectively with peers and academic staff within the field of modern embedded systems design.

TOPICS

- Challenges and state of affairs – tools and methodologies
- Integrated system descriptions – combined UML/SystemC modelling
- Co-verification and validation
- Code generation and HW synthesis
- System integration
 - Linking HW and SW
 - Communication
- System test
 - SW ISS combined with post layout HW simulation

ASSESSMENT STRATEGY

Written examination. To gain access to the exam, the student has to complete compulsory laboratory work during the term.

PREREQUISITES

Completed IMPACTS first semester courses and Real Time Systems IRSK7040.

EDUCATIONAL PROCEDURE

Subject oriented lectures and tutorials, web based studies and laboratory work.

LITERATURE

Required literature

Web based material

Tool manual and SystemC language specification

Recommended literature

System Design with SystemC; Grotker, Liao, Martin, Swan; Kluwer 2002, ISBN 1-4020-7072-1



SYLLABUS 07/08

IMPLEMENTATION TECHNOLOGY

Class: IMPACTS

IITK7070

TERM: AUTUMN

Credits:6

AIMS AND OBJECTIVES

- Give the students a deeper knowledge of modern processors, architectures and trends within technology and applications, especially focused on use in embedded systems and based on highly integrated circuit technology ('systems-on-a-chip').
- The students should assimilate the rapid growing importance of FPGA technology.
- Introduce the students to the basic techniques of needed to design electronic systems for electromagnetic compatibility (EMC).

TOPICS

- Introduction to implementation technology
- Processor architecture: Driving forces for architecture - technology and applications, modern architectures, core processors
- Implementation requirements for embedded systems
- Application specific architectures
- FPGA's: Recent advances in programmable circuit technology
- Time to market advantages
- Hard processor cores
- Dedicated on-board memory capabilities
- ASIC prototyping
- HW synthesis targeting FPGA's
- EMC fundamentals: Generation, transmission and reception
- Emission, susceptibility and interference
- Radiated and conducted emission
- Radiated and conducted susceptibility
- Inter system and intra system interferences
- Design techniques and tools to prevent interference and achieve EMC

ASSESSMENT STRATEGY

Written examination. To gain access to the exam, the student has to complete compulsory work during the term.

PREREQUISITES

Completed IMPACTS first semester courses.

EDUCATIONAL PROCEDURE

Subject oriented lectures and tutorials, web based studies and laboratory work.



LITERATURE

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SYLLABUS 07/08

MSc Dissertation Project

IMPW7080

Class: IMPACTS

TERM: SPRING

Credits:30

AIMS AND OBJECTIVES

The purpose of the MSc dissertation project is to bring together in one activity the understandings gathered over the range of classes taken in the earlier part of the course. It provides a framework within which a student can demonstrate that they have acquired the knowledge, theories, skills, and attitudes to tackle in a disciplined way, a significant piece of work which is typical of the field.

ASSESSMENT STRATEGY

The student's project will be assessed on the basis of the project dissertation

PREREQUISITES

All IMPACTS subjects must have been completed at the appropriate standard.

EDUCATIONAL PROCEDURE

The following procedure applies:
selecting a project and submitting a project proposal
planning and executing the project work
project dissertation
project assessment