



Information Processing Science

Curriculum description

Every day we rub shoulders more and more with information technology: new products include information technical parts, information services are executed by information technology and production, and many services exploit information technology. The information industry has become the third “pillar” in Finland’s national economy alongside the forestry and metal industries. Fast growing and globalizing areas in information industry are wireless communication and content creation in new media and software. These are, among others, those areas whose know-how can be provided in the information processing science training program. The growth of the information industry is restricted significantly by the deficiency of human resources capable of researching, developing and marketing information technical products and services. Information processing science offers almost unlimited possibilities.

Information processing science research is also something other than software products and services technical execution and production, even if the greater part of the work is done in that area. Equally important is researching how information technology helps to support people’s and organizations’ activity in different kinds of work situations and also how software business is developed in a global, competitive field.

Information processing science students settle themselves into working life excellently. Work opportunities are possible in the private sector, public administration and university research projects. Information processing science graduates with a Master of Science Degree can create their careers very versatilely both in the tasks of an expert and manager. International companies often offer possibilities to work abroad.

The specialization programs and degree

At first students perform a 180 ECTS wide Bachelor of Science degree and after that a 120 ECTS wide Master of Science degree. In the bachelor’s degree almost two-thirds of the studies are general compulsory studies for everyone and voluntary studies that develop a substratum for the coming specializing studies in the Master phase. Students direct their voluntary studies to designating their profession profile according to their interests. The bachelor’s degree already provides the basic abilities to work on the IT terrain’s professional tasks.

In the Master’s degree almost half of the studies are common compulsory studies for everyone and the rest are the specialization program’s compulsory, recommended and voluntary studies. During the Master’s phase, students can direct their designated profession profile through their specialization program, advanced special studies, master’s thesis, practical training and secondary subject studies.

Information Processing Science is divided into five areas of specialization: Information Systems, Software Engineering, Software Business, Digital Media and Mobile Services. Students can choose their specialization freely according their own interests. It is, however, suggested to note that compulsory studies in the specialization programs often require that the basics for efficient studying have already been provided in the bachelor’s phase.

The Information Systems program focuses on various information systems. Familiarization with information systems involves the areas of development, implementation, utilization and exploitation. The program puts emphasis on the meaning of humans and the organizations they have built and considers, among other things, the quality of developing systems (usability, accommodation and impressiveness) from this point of view. The program offers an extensive education which emphasizes both practice and theory. It provides the foundation for specialization in quite different information technology application- and managing tasks and creates the preconditions for continuous study and learning.

Software Engineering focuses on software’s technical solutions and developing the processes that enforces them. The program familiarizes the student with the methods and tools that improve software engineering, execution, quality managing and processes required by modern software engineering.

The Software business program focuses on productization software and the services related to them, developing sharing networks and marketing in an international operational environment, Software Business as a teaching and research target at the convergence of information processing science, science of commerce and some other sciences, such as the science of organization and law. The program discusses the questions related to software companies and the services and products they offer. It also discusses various business strategies and similar models of businesses of the field of business. In the software business program, the teaching aspires to offer a wide view of both software business and the similar areas.

The Digital Media program concentrates on the developing, modeling and valuation of contents, services and systems that have versatile and rich digital significance content. The program also concentrates on presentation of content and its interpretation, information searching and navigating, and the methods that support them. The education discusses using and exploiting digital content and services in various companies, organizations and communities. The content can be informative or entertaining. The program offers an education that emphasizes both practice and theory widely. The program gives a



foundation for specializing in digital media managing and expert tasks.

Mobile Services orientation trains the next generation of professionals for the needs of the mobile information community, focusing on the required knowledge and skills of software developers for mobile information systems. The perspective for mobile telecommunications is global and, in addition to software and service development, covers also standardization, alliances, intellectual property rights, and the relationship between markets and technology. Graduating from this orientation gives the student competence as software professional for the telecommunication industry (manufacturers, vendors, operators, software houses) and as experts in other industries that utilize telecommunications in their business processes.

Structure of the Degree

Bachelor Thesis

<u>Compulsory Studies</u>	113
- General Studies	13
- Basic Studies	41
- Subject Studies	59

Voluntary Studies 67

- 25 ECTS from the program and
- 25 ECTS from another program or training program
- Additional voluntary studies are collected from P- and A-studies in Information Processing Science or from other training programs

Total (at least) 180 ECTS

Master of Science

<u>Compulsory Studies (1)</u>	56
- Advanced Studies	56

Studies in Chosen Line of Study 64

- Compulsory Studies (2)
- Minor Subject Studies (3)

Every line of study has defined the compulsory A- and S-studies that have to be included in the thesis. Recommended studies are also defined that help students collect voluntary studies.

- 1 Compulsory studies for everyone are arranged every year
- 2 Compulsory studies in specialization programme are aimed to arrange every year within the limits of department's resources
- 3 Minor subject studies are arranged on the announced years grounding of demand and within the limits of department's resources

Total (at least) 120 ECTS

The recommended times to perform the study units are illustrated in tables. Department's teaching is arranged in three periods during the year:

Period a: September – November

Period b: November – February

Period c: February – May

X = can be any period; please refer to the course description and time table.

Structure of Bachelor Thesis Degree

The compulsory studies including Bachelor Thesis

General Studies	Code	ECTS	Year	Period
Orientation Studies	810029Y	3	1.	a+b
Swedish	901004Y	2	1.	a+b
English 1 (Reading for Academic Purposes)	902002Y	2	1.	b+c
English 2 (Scientific Communication)	902004Y	2	2.	a+b
Written and Oral Communication	900050Y	4	2.	a+b

It is also possible to take the course in written and oral communication in French or German instead of English. This option requires advanced application. Written and oral communication and foreign language courses are described in the Language Centre (Kielikeskus) study guide.



Basic Studies	Code	ECTS	Year	Period
Introduction to the Information Processing Sciences	810136P	4	1.	a+b
Introduction to Programming	811122P	5	1.	a
Introduction to Digital Media	811339A	4	1.	a
Humans as Users and Developers of Information Technology	811171P	3	1.	a
Programming Assignment I	811175P	2	1.	b
Logic	811111P	3	1.	b
Computer Architecture	810124P	5	1.	b+c
Introduction to Information Systems Design	811170P	5	1.	b
Principles of Information Security	811173P	4	1.	b
Introduction to Software Business	811174P	5	1.	c
Sources of Scientific Information	030005P	1	2.	c

Subject Studies

Object-Oriented Software Development	811378A	5	1.	c
Internet and Information Networks	811338A	5	1.	c
Introduction to Data Structures	811376A	3	1.	c
Introduction to Human-Computer Interaction	811379A	5	2.	a
Programming Assignment II	811377A	2	2.	a
Basics of Databases	811380A	5	2.	b
Software Engineering	811335A	6	2.	b
Programming Assignment III	811381A	3	2.	c
Organisations and Information Systems	812304A	6	2.	c
Introduction to Research	811382A	3	2.	c
Project I	811365A	10	3.	x
Bachelor Thesis	815611S	7	3.	x

Bachelor Thesis' voluntary studies

Students have to choose one entity of at least 25 ECTS defined by the specialization program in Information Processing Science and an entity of at least 25 ECTS from either another specialization program of another training program. It is advantageous that these studies already constitute a significant part of the compulsory studies that the student has to choose in the Master of Science phase.

25 ECTS entity defined by specialization programs:**Information Systems**

Object-Oriented Analysis and Design	812346A	4	2.	a
Interaction Design	812335A	6	2.-3.	
Information Systems Design Exercise	812334A	6	3.	a+b
Web Information Systems Design	811345A	5	3.	c
Database Systems	811384A	6	3.	c

Software Engineering

At least 25 ECTS of the following compulsory A-studies in software engineering:

Object-Oriented Analysis and Design	812346A	4	2.	a
Operating Systems	521453A	5	2.	a
Programming in C	812316A	4	2.	b
Basics of C++ Programming Language	812336A	6	2.	b
Object-Oriented Programming	812347A	4	2.	c
Programming Assignment IV	811385A	2	2.	c
Mac OS X Programming	811387A	4	2.	c
Windows Programming	811389A	4	2.	c
Algorithms	811386A	5	3.	a
Symbian Programming	811388A	4	3.	a
Unix Programming	811390A	4	3.	a
Software Testing	813322A	3	3.	b
Software Architectures	815347A	6	3.	b
Software Quality and Quality Techniques	813323A	3	3.	b
Software Product Management	811328A	5	3.	c

Software Business

Dimensions of Software Entrepreneurship	813318A	5	2.	a
Business Opportunity Creation in Software Industry	813319A	5	2.	b
Software Business Planning	813315A	5	2.	c
Productization of Software Business	813324A	5	3.	a



Sales Strategies in Software Business 813325A 5 3. b

In addition above one of the next study entities (25 ECTS) is recommended:

Faculty of Economics and Business Administration:

- Marketing, basic studies
- Information and Communication Business, basic studies
- Management and Organization, basic studies
- Logistics, basic studies
- Finance, basic studies
- Business Law, basic studies
- Economics, basic studies

or

Department of Industrial Engineering and Management:

- Study entity is arranged separately with the student

Digital Media

At least 25 ECTS of the following compulsory A-studies in digital media:

Multimedia Techniques	811362A	4	2.	c
New Media Communication	811356A	5	2.	a
Audio Design and Processing	812338A	4	2.-5.	b
Content Creation in New Media	811349A	4	2.	b
Graphic Design	811342A	6	2.-3.	a
Digital Image Processing	811343A	4	3.	b
Interaction Design	812335A	6	2.-3.	c
Net Culture	812337A	4	2.	b
Legislation on Digital Information	812317A	4	3.	c

Mobile Services

Introduction to Embedded Systems *	812339A	3	2.	a
Mobile Internet Service Architecture	815349A	8	2.-3.	a+b
Software Architectures	815347a	6	2.-3.	b
Real-Time Software Design	812340A	6	2.-3.	b+c
ICT standardization	815348A	6	3.-4.	a

Structure of Master Thesis grade

Compulsory studies for everyone

Advanced Studies

Project II	812631S	14	4.-5.	a+b+c
Research Methods	813621S	5	4.	a+b
Master's Thesis	813606S	35	4.-5.	x
Thesis Seminar	813602S	2	5.	x

Recommended studies in specialization programs can be studied freely; e.g. even if a student has chosen information systems as their specialization program, they can in any case study its recommended studies, also e.g. software engineering program compulsory and recommended studies.

NOTE! The list of compulsory studies and different specialization programs does not cover all the courses offered by the department. An extensive course list can be found in the course descriptions. In addition, special courses can be arranged during the academic year.

Specialization programs studies

Information systems program studies

Compulsory Studies

Object-Oriented Analysis and Design	812346A	4	2.	a
Interaction Design	812335A	6	2.-3.	
Information Systems Design Exercise	812625A	6	3.	a+b
Electronic Issues	813353A	4	2.	b
Web Information Systems Design	811345A	5	3.	c
Database Systems	811384A	4	3.	c
Information Systems Design Methods	812324A	4	3.	c
Information Systems Theory	813601S	10	4.	a+b+c
Total		41		



Recommended Studies

Secure System Design	815352A	4	2.-5.	b
Requirements Construction	811391A	4	3.-4.	
Project Management	811330A	5	4.	x
Net Culture	812337A	4	2.	b
Information Technology Ethics	811355A	3	x	a
Multimedia Techniques	811362A	4	2.	c
Object-Oriented Programming	812347A	4	2.	c
Information Security Management	811327A	5	2.-4.	x
Content Creation in New Media	811349A	4	2.-5.	b
New Media Communication	811356A	5	2.-5.	a
Secure System Design	813322A	3	3.	b
Software Quality and Quality Techniques	813323A	3	3.-5.	b
Software Architectures	815347A	6	3.-5.	b
Software Product Management	811328A	5	3.	c
Usability Testing	813352A	4	3.-5.	c
Information System Applications	812644S	5	4.	b
Persuasive Web Information Systems	815654S	5	4.	b
Methods of Secure Information System Design	815639S	6	4.-5.	c
Management of Structured Information	812632S	4	4.-5.	b
Strategies of User-Centred Design	815627S	6	4.-5.	
Computer-Supported Cooperative Work	815616S	3	4.-5.	
Software Process Improvement	813612S	5	4.-5.	c
Progressive Sandwich Training	814311A	8		x

Suggested minor subjects are sciences that represent an application area in information system design and/or information system science supporting context sciences like economics, psychology, sociology, pedagogics, cultural anthropology, philosophy, human-factors engineering and statistics.

Software Engineering program studies

There are 76-77 ECTS compulsory studies in the software engineering program. It is advantageous that of these studies, A-studies should be passed largely (about 30 ECTS) already in the bachelor's thesis phase. It is also recommended that students perform in addition to the specialization program's recommended courses, also at least a 25 ECTS entity from other specialization program's compulsory/recommended studies. From other training studies especially mathematics' 25 ECTS and Electrical and Information Engineering studies are suitable for progression software engineering professionals' and scientific abilities.

Compulsory Studies

Programming in C	812316A	4	2.	b
Object-Oriented Analysis and Design	812346A	4	2.	a
Basics of C++ Programming Language	812336A	6	2.	b
Object-Based Programming	812347A	4	2.	c
Programming Assignment IV	811385A	2	2.	c
Algorithms	811386A	5	3.	a
Software Testing	813322A	3	3.	b
Software Architectures	815347A	6	3.	b
Software Quality and Quality Techniques	813323A	3	3.	b
Software Product Management or	811328A	5	3.	c
Component Based Software Production	815618S	6	3.-5.	c
Database Systems	811384A	6	3.	c
Operating Systems	521453A	5	2	a
Programming Environment (2 of the following)		8		
- Mac OS X Programming	811387A	4	2.	c
- Windows Programming	811389A	4	2.	c
- Symbian Programming	811388A	4	3.	a
- UNIX Programming	811390A	4	3.	a
Software Process Improvement	813612S	5	4.-5.	c
Software Engineering Reserach	815608S	10	4.	a+b+c
Total		76		

Recommended studies

Principles of Programming Languages	815338A	5	1.-	c
Introduction to UNIX	810135P	3	1.-2.	b
Interaction Design	812335A	6	2.-3.	
Real-Time Software Design	812340A	6	2.-3.	b+c
Network Security	811354A	5	2.-5.	a



Secure System Design	815352A	4	2.-5.	b
Parallel Programming	815301A	5	3.	b
Web Information Systems Design	811345A	5	3.	c
Mobile Systems Programming	811359A	5	3.	b+c
Requirements Construction	811391A	4	3.-4.	
3D Graphics	811361A	5	3.-5.	a
Games and Virtual Environments	811664S	5	3.-5.	a
Usability Testing	813352A	4	3.-5.	c
Advanced C++ Programming	812643S	4	4.	c
Management of Structured Information	812632S	4	4.-5.	b
Personal Software Process	813611S	6	4.	a
Project Management	811330A	5	4.	x
Open Source Seminar	815653S	4	4.-5.	b
Progressive Sandwich Training	814311A	8		x
Introduction to Compilers	811337A	6		
Computer-Supported Cooperative work	815616S	3	4.-5.	

Software Business program studies

In the software business program in the Master of Science phase there are three separate lines of study. Students choose options that correspond to their Bachelor of Science phase study attainments.

Option I is comprehensive line that examines software business. This choice is recommended especially to students who will conduct research in the future or to students who want to gain extensive knowledge of some special area in software business.

Option II offers students the possibility to familiarize themselves with wide problems in various software business sectors. The choice is especially recommended to student who desire to practice company business.

Option III is mainly meant for students who want to change their specialization program in the Master of Science phase. This suits well also students who are from other faculties or universities.

Compulsory studies

Managing Software Business in Software Industry	813626S	6	4.	a
International Software Business	813616S	6	4.	b
Case Studies in Software Business	813608S	6	4.	c

In addition to the above one of the following study entities:

Compulsory studies

Option I (35 ECTS):

Economics and Business Administration or Industrial Engineering and Management executed study modules that have to be arranged separately, require that in the Bachelor of Science phase students have to pass their basic study entities that correspond to the Software Business entity and study modules.

or

Option II (25 ECTS):

Economics and Business Administration, Industrial Engineering and Management, and Teacher Education in Kajaani executed basic study modules that have to be arranged separately, require that in the Bachelor of Science phase students have to pass the Software Business entity.

or

Option III (25 ECTS):

Student executes the Software Business entity.

Voluntary studies

Choice I (11 ECTS):

- freely selectable

Choice II (21 ECTS):

- freely selectable

Choice III (21 ECTS):

- freely selectable

Recommended studies

Progressive Sandwich Training	814311A	8		x
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Voluntary studies; refer to the recommended courses and study modules in the Software Business program's web-site. More specific information about minor subjects of Economics and Business Administration, Industrial Engineering and Management,



and Teacher Education in Kajaani can be found from the corresponding faculty's study guide.

Digital Media program studies

In the Digital Media program there are about 70 ECTS of compulsory studies. Of these, the A-studies (about 30 ECTS) should largely be passed already in the Bachelor of Science phase. Also, it is recommended that students will execute additional program's other recommended courses of at least 25 ECTS entities from other program's compulsory/recommended studies. From other training programs especially film and television studies, information research and media producing education are suitable for developing digital media professional and scientific completion.

Compulsory studies

New Media Communication	811356A	5	2.	a
Multimedia Techniques	811362A	4	2.	c
Content Creation in New Media	811349A	4	2.	b
Net Culture	812337A	4	2.	b
Graphic Design	811342A	6	2.-3.	a
Digital Image Processing	811343A	4	3.	b
Legislation on Digital Information	812317A	4	3.	c
Electric Issues	813353A	4	2.	b
Web Information Systems Design	811345A	5	3.	c
Research on Digital Media	814644S	10	4.	a+b+c
Total		48		

Recommended studies

Interaction Design	812335A	6	2.-3.	c
Usability Testing	813352A	4	3.-5.	c
Information Systems Design Exercises	812334A	6	3.	a+b
Requirements Construction	811391A	4	3.-4.	c
Time-Based Multimedia	812320A	5	3.-5.	c
3D Graphic	811361A	6	3.-5.	a
Narrative Analysis and Design	811363A	5	3.-5.	c
Project Management	811330A	5	4.	x
Information Technology Ethics	811355A	3	x	a
Games and Virtual Environments	811664S	5	3.-5.	a
Virtual Reality Technologies	815624S	4	3.-5.	c
Persuasive Web Information Systems	815654S	5	4.	b
Personalisation, profiling and segmentation for mobile	812642S	5	4.	a+b
Computer-Supported Cooperative Work	815616S	5	4.-5.	
Strategies of User-Centred Design	815627S	6	4.-5.	
Management of Structured Information	812632S	4	4.-5.	b
Progressive Sandwich Training	814311A	8		x

Minor subjects for Digital Media are the following recommended entities: software business, pedagogics, information studies, and film and television studies.

Mobile Services program studies

Compulsory studies

Embedded Systems *	521268A	4,5	2.	b
Basics of C++ programming language	812336A	6	2.	b
Mobile Internet Service Architecture	815349A	8	2.-3.	a+b
Software Architectures	815347A	6	2.-3.	b
Real-Time Software Design	812340A	6	2.-3.	b+c
Mobile Systems Programming	811359A	5	3.	c
ICT Standardization	815348A	6	3.-4.	a
Location and context based services	812641S	5	3.-4.	b
Personalisation, profiling and segmentation for mobile	812642S	5	4.	a+b
Business applications in Mobile Networks	815651S	7	4.	b+c
Mobile Research	815645S	10	4.-5.	a+b+c
Total		68		

Recommended Studies

General studies

Progressive Sandwich Training	814311A	8		x
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**Service development platforms**

Symbian Programming	811388A	4	3.-4.	a
Unix Programming	811390A	4	2.-3.	a
Windows Programming	811389A	4		c
Operating Systems *	521453A	5		c
Telecommunications Software II *	521314S	5		b+c

Mobile Media

Legislation on Digital Information	812317A	4	3.-5.	c
Virtual Reality	815624S	4	3.-5.	c
Mobile Augmented Reality	815650S	5		c
Games and Virtual Environments	811664S	5	3.-5.	a

Security in Networks

Information Security Management	811327A	5	2.-4.	x
Secure System Design	815352A	4		b
Information Security and Law	811360A	3		a
Network Security	811354A	5	2.-5.	a
Data Security in Wireless communication	815340A	5		c

Information industrial business

Electronic Commerce **	721426P	5		
Information Goods **	721650 P	5		
EC Systems, implementation and strategy **	721653P	5		
Strategic Networking in Electronic Commerce **	721671A	5		
m-commerce **	721673A	5		

Mobile Work

Basic Course in Occupational Psychology ***	032031A	3		
Administration, Organization and Education in Working Life ***	032033A	5		
Creativity at Work and in Product Development ***	032050S	5		
Seminar in Industrial Engineering and Management ***	555111S			

Traveling

Introduction to Tourism Geography ****	790160P	5		
Northern Environment and Sustainable Tourism ****	790161A	3		
Northern areas, integration and identity ****	791622S	3		
Tourism Planning and Development ****	790320A	5		

* Courses from Department of Electrical and Information Engineering

** Courses from Faculty of Economics and Business Administration

*** Courses from Department of Industrial Engineering and Management

**** Courses from Department of Geography

Examinations and Assessment

Information Processing Science examinations are held on Mondays 17.00-20.00. Accurate examination lists are announced on the notice board of the department and on-line at <http://www.tol.oulu.fi/opiskelijoille/tentit.html>. Students must sign up for the examinations in WebOodi.

Courses are graded on the following scale 0 (fail), 1 (passable), 2 (satisfactory), 3 (good), 4 (very good) and 5 (excellent). Some courses are graded pass/fail. Major and minor subjects' study modules' grades are determined numerically based on the graded study modules' ECTS accentuated average x as follows:

Sufficient knowledge $1 \leq x < 1,5$

Satisfaction knowledge $1,5 \leq x < 2,5$

Good knowledge $2,5 \leq x < 3,5$

Very good knowledge $3,5 \leq x < 4,5$

Excellent knowledge $4,5 \leq x \leq 5$

Information Processing Science as a minor subject

In information processing science it is possible to execute study modules that are at least 25 ECTS or at least 60 ECTS within the limits of the department's resources.

If information processing science minor subject studies are compulsory in a student's own degree and their own faculty or



department has agreed with the information processing science department that it be compulsory, the student has the right to participate in these studies within the limits of department's selection (check Selection). Also, students who perform voluntary information processing sciences as a minor subject are taken into the courses as resources allow. If participants in the course have to be limited, participants performing their voluntary minor subject can be limited. Students who have a right to study in the University of Oulu do not have to ask separately for the right to study. Also, at least 25 ECTS and at least 60 ECTS study modules in Information processing science studies can be performed in Open University.

Teaching in the department is arranged during three periods:

Period a: September – November

Period b: November – February

Period c: February – May

Studies corresponding to study module at least 25 ECTS

Introduction to Programming	811122P	5	a
Programming Assignment I	811175P	2	b
Introduction to the Information Processing Science	810136P	4	a+b

From the following study modules at least two have to be chosen:

Introduction to Digital Media	811172P	4	a
Humans as Users and Developers of Information Technology	811171P	3	a
Introduction to Software Business	811174P	5	c
Introduction to Information Systems Design	811170P	5	b
Principles of Information Security	811173P	4	b

If needed, other separately arranged courses which information processing science has approved can be performed so the total is at least 25 ECTS.

Studies corresponding to study module at least 60 ECTS

Added to the study module introduced above at least 15 ECTS of the following courses have to be chosen, taking preceding studies into consideration.

Introduction to Information Systems Design	811170P	5	b
Introduction to Data Structures	811376A	3	c
Introduction to Digital Media	811172P	4	a
Humans as Users and Developers of Information Technology	811171P	3	a
Internet and the Information Networks	811338A	5	c
Introduction to Software Business	811174P	5	c
Introduction to Human-Computer Interaction	811379A	5	a
Organisations and Information Systems	812304A	6	c
Basics of Databases	811380A	5	b
Principles of Information Security	811173P	4	b
Object-Oriented Software Development	811378A	5	c
Programming Assignment II	811377A	2	a
Software Engineering	811335A	6	b

If needed, other separately arranged courses which information processing science has approved can be performed so the total is at least 60 ECTS.

Selection

Teaching is provided in the information processing science department within the limits of resources. To participate in the courses, students have to have passed the compulsory studies that are mentioned in the curriculum. If the amount of participants has to be limited, it happens according the following selection rule.

1. Students, for whom the course is compulsory, are chosen first.
2. Then students for whom the course is compulsory course in their compulsory TOL minor study module are taken into consideration.
3. Lastly, are students from other institutions.

Inside the above steps the following criterions are used if needed in the following order.

- a) Firstly, information processing science major subject studies are approved.
- b) Students who have passed the preceding courses mentioned in curriculum.



Department of Information Processing Science

- c) A final determinant is the amount of passed information processing science courses' ECTS.

Course Descriptions

Course descriptions are in the alphabetical order. The literatures related to courses can be found in the university main library of science Tellus.