

Curtin University of Technology

Department of Computing

Bachelor of Science (Software Engineering)

Introduction

The principal objective of the Bachelor of Science (Software Engineering) is to produce graduates well versed in the engineering principles of design, measurement, and analysis, applied in the context of the development of software-based systems. The program includes a strong foundation in the related discipline of computer science, but with emphasis on subjects relating to software requirements gathering, design, implementation and testing. Students also receive a solid foundation in technical communication skills, professional responsibility, social effects, ethical aspects of engineering practice, interpersonal relationships, team work and time management. The final year involves a group project of significant scope that gives graduates the opportunity to learn through practical application.

Course Outline

The aim of this course is to produce graduates who will be equipped to work as practicing software engineers in the computing and information technology business sectors, or who intend to pursue a research career path in software engineering. This three-year degree prepares graduates to work as practicing software engineers in a commercial software development environment. An additional honours year is available to qualified candidates who wish to pursue a research career path. This degree is offered in response to industry and market demands for graduates with the software engineering knowledge and skills required by the IT sector, but without the breadth of non-software subjects found in a traditional four-year engineering degree. The program includes a strong foundation in the related discipline of computer science, but with emphasis on subjects relating to software requirements gathering and analysis, implementation and testing. In particular, students learn to take an engineering approach to software development based on design, measurement and analysis. The final year involves a group project of significant scope that gives graduates the opportunity to learn through practical application.

Course Outcomes

The *ability to apply knowledge of basic science and engineering fundamentals* is generally developed in the BSc (Software Engineering) course by taking a methodical approach to the design, implementation, and testing of software systems. A process-oriented approach that is measurable and repeatable is stressed, as are structured design, analysis and modelling practices common in the software industry.

The *ability to communicate effectively* is an important component of all units. In learning experiences requiring the implementation of computer programs, students are usually required to produce design documentation and test plans, in addition to fully commented source code. Written papers and oral presentations are common in many units.

Students demonstrate *in-depth technical competence in software engineering* in this program, which is structured to impart the Software Engineering Body of Knowledge from the IEEE Computer Society.

Developing *the ability to undertake problem formulation and solution* begins early in the program. This is primarily through the use of lecture note examples, worksheet exercises, and assignments that identify sub-problems that must be solved before formulating a complete solution. By the final year, students are able to integrate prior learning experiences, demonstrate the ability to undertake requirements gathering and analysis, and formulate solutions for large team based projects similar to those they will experience upon graduation.

Identifying the use-cases and the external entities that interact with a system and the manner in which sub-systems collaborate is an integral part of systems analysis and design skills developed by this program. This enables students to *utilise a systems approach to design*. In the third year, particular attention is paid to measuring and tuning the *operational performance* of software-based systems.

Many units have team-based tutorial problems, assignments, and other projects, in which students must work together to complete the given task. Given the international demographics of our student and staff community, these experiences foster the *ability to function effectively as an individual and in multi-disciplinary and multicultural teams, with the capacity to be a leader or manager as well as an effective team member*.

Benefit To Students

Upon graduation, students will have the skills necessary to be employed in the software industry, participating in all aspects of software development, including requirements gathering and analysis, design, implementation, testing, and deployment. During the final year, students will have taken a leadership role in a team-based software engineering project of significant scope. Qualified graduates intending to pursue a research career path will have the opportunity to undertake an honours year to develop research skills in preparation for post-graduate study in a focussed area of software engineering.

Course Structure

Year 1 Semester 1

Index No.	Version	Unit Name	Contact Hours	Credits
12702	v.2	Computer Engineering 103	4.0	25.0
1920	v.7	Software Technology 151	4.0	25.0
392388 -OR- 307590	v.1 v.1	Statistics for Engineers and Scientists 101 -OR- Data Evaluation and Experimental Design 101	3.0 3.0	12.5 12.5
308861	v.1	Science Communication 101	2.0	25.0
308862 -OR- 308863	v.1 v.1	Mathematics 115 -OR- Mathematics 137	5.0 4.0	25.0 25.0

Year 1 Semester 2

Index No.	Version	Unit Name	Contact Hours	Credits
10163	v.9	Introduction to Programming Environments 152	4.0	25.0
1922	v.7	Software Technology 152	4.0	25.0
308625	v.1	Introduction to Operating Systems 101	3.0	25.0
8933	v.10	Software Engineering 251	3.0	25.0

Year 2 Semester 1

Index No.	Version	Unit Name	Contact Hours	Credits
12333	v.5	Design and Analysis of Algorithms 251	3.0	25.0
2519	v.16	Systems Programming and Design 251	4.0	25.0
4521	v.6	Computer Communications 252	3.0	25.0
13019 -OR- 10848	v.2 v.2	Psychology 123 -OR- Management 100 -OR- 25 Credit elective approved by the Course Controller	3.0	25.0

Year 2 Semester 2

Index No.	Version	Unit Name	Contact Hours	Credits
8934	v.8	Software Engineering 252	3.0	25.0
13390	v.3	Requirements Engineering 252	5.0	25.0
4533	v.5	Database Systems 252	4.0	25.0
4524	v.5	Computer Graphics 252	4.0	25.0

Year 3 Semester 1

Index No.	Version	Unit Name	Contact Hours	Credits
308716	v.2	Software Engineering Testing 351	3.0	25.0
305905	v.3	Distributing Computing and Software Components 352	4.0	25.0
4549	v.8	Project Design and Management 351	2.0	25.0
SELECT OPTIONAL UNITS TO THE TOTAL VALUE SHOWN (See note 7):				25.0

Year 3 Semester 2

Index No.	Version	Unit Name	Contact Hours	Credits
303008	v.3	Software Engineering Tools and Metrics 352	3.0	25.0
308717	v.1	Software Engineering for Embedded Systems 352	3.0	25.0
13395	v.1	Project Design and Management 352	1.0	25.0
SELECT OPTIONAL UNITS TO THE TOTAL VALUE SHOWN (See note 7):				25.0