

# Bachelor of Science Course Structure

Course Code – Z046

For students commencing from 2008

The Bachelor of Science is a three year full-time or six year part-time course requiring the successful completion of 24 units of study (300 credit points). To complete the Bachelor of Science you must complete at least 300 credit points (24 units of study) including a major and either a second major, co-major or a minor (see below for details). Included in your 300 credit points must at least 25 credit points of project units. Up to 37.5 credit points can also be taken from any other discipline. An optional and additional year of Industry-Based Learning (IBL) may also be available. For more detailed information visit <http://www.swinburne.edu.au/corporate/industrysolutions/>. A full-time load consists of eight units of study per year (four per semester) and four units of study per year (two per semester) for a part-time load.

**Mandatory unit of study:** HAC0001 Careers in the Curriculum. There are no credit points associated with the unit, but it is a compulsory unit. Normally completed in 2<sup>nd</sup> or 3<sup>rd</sup> year of degree.

## Course Structure

**Major:** A major consists of between 14 and 18 units of study. At least one of these units of study will be a project based unit. The units within a major are fixed although up to 25 credit points may be chosen from relevant electives, depending on the major. Majors are available in the following areas:

- Biomedical Science
- Biotechnology
- Chemistry
- Computer Science
- Electronics
- Environmental Sustainability
- Mechatronics
- Photonics
- Psychology

**Co-Major:** Co-Majors offer in depth study in a given area, but are not as extensive as majors. They generally comprise 7 to 9 units of study. Co-majors are available in the following areas:

- Astrophysics and Supercomputing
- Biochemistry
- Biomedical Science
- Chemistry
- Computer Science
- Electronics
- Environmental Sustainability
- Food Science
- Information Systems
- Mechatronics
- Neuroscience/Psychophysiology
- Philosophy
- Photonics
- Politics
- Sociology
- Technology Management

**Minors:** Minors comprise 3 to 6 units of study and are designed to give an introduction to a given area of study. Minors are available in the following areas:

- Astrophysics
- Biochemistry
- Biophysics
- Chemistry
- Computer Science

- Electronics
- Environmental Sustainability
- Food Science
- Information Systems
- Mathematics
- Mechatronics
- Media and Communications
- Multimedia
- Network Technology
- Neuroscience
- Philosophy
- Photonics
- Physics
- Principles of Game Design
- Psychology
- Research and Development
- Sociology
- Statistics

**Electives Plus:** All students at Swinburne have the opportunity to study a group of three electives which may be outside their discipline. For the purpose of the BSc(Science), an elective plus sequence is the equivalent of a minor and can be used to replace a minor. Electives plus sequences currently available are:

- Effective Communication
- Establishing and Running a Business
- Language Practice and Culture
- Enterprising Marketing
- Multimedia: Web Development
- Information Orientation and Knowledge Management
- Undergraduate Research Skills
- Design: Process and Strategy
- The Networked Economy
- Sustainability

### **It is the student's responsibility to:**

- Design and plan their course using a degree planner
- Ensure that they have completed the requirements of one major
- Ensure that they have completed the requirements a second major, or a co-major, or a minor, or an electives plus sequence
- Completed HAC001
- Completed 25 credit points of project units
- Confirm their completed degree planner with Student Administration Staff
- Ensure they have met prerequisite requirements before enrolling in a unit of study (The Coursefinder located at [www.swin.edu.au/coursefinder](http://www.swin.edu.au/coursefinder), lists specific pre-requisites under unit of study details). Students who find that there is a unit for which they do not have the required pre-requisite which is a standard unit within a major or co-major should consult the course convener as early as possible.

### **Please note:**

- Most units of study are only offered in one of the two semesters each year. (Please also note that not every unit of study listed is offered each year.) Students should take unit of study availability into consideration when completing their degree planners and refer to the current Timetable located at <http://www.swinburne.edu.au/corporate/registrar/timetable/units.htm>. Units of study will normally be offered in the same semester each year.
- Students can automatically transfer from one major, co-major or minor to another, at any time. This may, however, then require extra time to complete the degree and may result in a requirement to complete extra units of study (and therefore an additional cost).

For a full description of units of study, please refer to the Coursefinder located at [www.swin.edu.au/coursefinder](http://www.swin.edu.au/coursefinder).

## **Recommended Sequences**

The following combinations of major with co-majors are recommended and where practical have been timetabled to enable students to complete in a timely fashion (provided you pass all the units!). Any other combination is possible, however time-table clashes may prevent you from finishing in the minimal period of time and/or you may need to choose an alternative set of electives or minor if you wish to complete in the minimum time.

- Biomedical Science Major / Biochemistry Co-Major
- Biomedical Science Major / Chemistry Co-Major
- Biotechnology Major / Computer Science Co-Major
- Biotechnology Major / Environmental Sustainability Co-Major
- Chemistry Major / Computer Science Co-Major
- Chemistry Major / Photonics Co-Major
- Computer Science Major / Astrophysics and Supercomputing Co-Major
- Computer Science Major / Information Systems Co-Major
- Electronics Major / Neuroscience/Psychophysiology Co-Major
- Electronics Major / Technology Management Co-Major
- Environmental Sustainability Major / Technology Management Co-Major
- Environmental Sustainability Major / Information Systems Co-Major
- Mechatronics Major / Photonics Co-Major
- Mechatronics Major / Technology Management Co-Major
- Photonics Major / Computer Science Co-Major
- Photonics Major / Technology Management Co-Major
- Psychology Major / Biochemistry Co-Major
- Psychology Major / Environmental Sustainability Co-Major

## **Science Majors, Co-majors and Minors**

Your first requirement in this course is to choose a major. Details of majors, co-majors, minors and the units therein can be found on the Swinburne web site under "courses". The following lists the units in each of the majors:

### **MAJORS**

#### **BIOMEDICAL SCIENCE**

HET102 Introductory Physiology  
HET124 Energy and Motion  
HET128 Physics 2  
HET133 Human Physiology  
HET182 Electronic Systems  
HET210 Electronics  
HET230 Cardiovascular Biophysics  
HET240 Cellular Biophysics  
HET260 Renal and Respiratory Biophysics  
HET408 Biomedical Imaging and Emerging Technologies  
HET419 Physiological Modelling  
HMS111 Engineering Mathematics 1  
HMS112 Engineering Mathematics 2  
HMS213 Engineering Mathematics 3B  
HET422 Biomedical Project  
HET426 Instrumentation Project

# **BIOTECHNOLOGY**

HES1510 Chemistry 1  
HMS101 Foundation Mathematics  
HES1610 Concepts of Biology  
HES1626 Professional Skills for Biotechnologists  
HES1616 Concepts of Biotechnology  
HES1525 Chemistry 2  
HMS102 Introduction to Statistics  
HES2621 Introduction to Biochemistry  
HES2631 The Microbial World  
HES2626 Biochemistry of Genes and Proteins  
HES2636 Microbes in the Environment  
HES4621 Advanced Biochemistry  
HES4641 Practical Biochemistry  
HES4626 Biotechnology  
HES4646 Biotechnology Research Project

# **CHEMISTRY**

HES1510 Chemistry 1  
HMS101 Foundation Mathematics  
HES1525 Chemistry 2  
HES1555 Consumer Science  
HMS102 Introduction to Statistics  
HES2510 Investigative Chemistry Prac 1  
HES2540 Forensic and Analytical Science  
HES2515 Investigative Chemistry Prac 2  
HES2520 Chemistry 3  
HES4520 Advanced Chemistry 1  
HES4510 Investigative Chemistry Prac 3  
HES4516 Research Project  
HES4525 Advanced Chemistry 2  
HES4700 Research Skills

# **COMPUTER SCIENCE**

HIT2080 Introduction to Programming  
HIT3181 Technical Software Development  
HIT3172 Object-Oriented Programming in C++  
HIT3303 Data Structures and Patterns  
HMS111 Engineering Mathematics 1  
HMS112 Engineering Mathematics 2  
HIT2313 Computer Systems  
HIT1307 Internet Technologies  
HIT1402 Database Analysis and Design  
HIT2308 Software Development Practices  
HIT2120 Data Communications and Security  
HIT3506 Scientific Computing  
ET318 Applied Science Project A  
HET319 Applied Science Project B  
Two electives chosen from:  
HIT3002 Introduction to Artificial Intelligence  
HIT3150 Multi-Agent Systems  
HIT3083 Digital Graphics

# **ELECTRONICS**

HIT2080 Introduction to Programming  
HMS111 Engineering Mathematics 1  
HET182 Electronic Systems  
HIT3181 Technical Software Development  
HMS112 Engineering Mathematics 2  
HET202 Digital Electronics Design

HMS213 Engineering Mathematics 3B  
HET214 Circuits and Electronics 1  
HET232 Embedded Microcontrollers  
HET308 Circuits and Electronics 2  
HET228 Electrical Actuators and Sensors  
HET378 Integrated Circuit Design  
HET318 Applied Science Project A  
HET319 Applied Science Project B

## **ENVIRONMENTAL SUSTAINABILITY**

HES1510 Chemistry 1  
HES1610 Concepts of Biology  
HES1115 Sustainable Design  
HBSL100 Introductory Law  
HMS102 Introduction to Statistics  
HAM113 Professional Communication Practice  
HES1710 Philosophy and Practice of Public and Environmental Health  
HES2631 The Microbial World  
HES2710 Health and Environmental Law 1  
HES2636 Microbes in the Environment  
HES2705 Water Science  
HES2715 Built and Sustainable Communities  
HES3112 Urban Water Resources  
HES4700 Research Skills  
HES4720 Environmental Management  
HES4705 Research Project

## **MECHATRONICS**

HES1300 Robotics and Mechatronics Project 1  
HET202 Digital Electronics Design  
HIT3181 Technical Software Development  
HMS111 Engineering Mathematics 1  
HES1305 Robotics and Mechatronics Project 2  
HET182 Electronic Systems  
HMS112 Engineering Mathematics 2  
HMS213 Engineering Mathematics 3B  
HET228 Electrical Actuators and Sensors  
HET232 Embedded Microcontrollers  
HET312 Control and Automation  
HIR505 Robotics in Manufacturing  
HET318 Applied Science Project A  
HET319 Applied Science Project B

## **PHOTONICS**

HET124 Energy and Motion  
HMS111 Engineering Mathematics 1  
HMS112 Engineering Mathematics 2  
HET103 Photonics 1  
HMS213 Engineering Mathematics 3B  
HET128 Physics 2  
HMS214 Engineering Mathematics 4B  
HET203 Photonics 2  
HET417 Photonics and Fibre Optics  
HET205 Introduction to Modern Optics  
HET206 Modern Physics  
HET209 Fibre Optics Communication & Optical Instrumentation  
HET318 Applied Science Project A  
HET319 Applied Science Project B

# **PSYCHOLOGY**

HAY100 Psychology 100  
HAY101 Psychology 101  
HMA103 Statistics and Research Methods A  
HAY205 Cognition and Human Performance  
HAY206 Developmental Psychology  
HMA278 Design and Measurement 2  
HMA279 Design and Measurement 3  
HAY307 Social Psychology  
HAY308 The Psychology of Personality  
HAY309 Psychological Measurement  
HAY321 Abnormal Psychology  
HAY303 Psychology Project A  
HAY305 Psychology Project B  
One elective chosen from:  
HAH103 Critical Thinking  
HAS100 Sociology 1A (Introductory Sociology)  
HAH219-HAH319 Philosophical Psychology  
HASP307 Qualitative Research Methods

# **CO-MAJORS**

## **ASTROPHYSICS AND SUPER COMPUTING**

HMS111 Engineering Mathematics 1  
HMS112 Engineering Mathematics 2  
HET124 Energy and Motion  
HIT2080 Introduction to Programming  
HIT2502 From Stars to Black Holes  
HIT3504 Astrophysics and Supercomputing 1  
HIT3505 Astrophysics and Supercomputing 2  
HIT2503 Galaxies and Cosmology

# **BIOCHEMISTRY**

HES1510 Chemistry 1\*  
HES1610 Concepts of Biology  
HES1616 Concepts of Biotechnology  
HES1525 Chemistry 2  
HES2621 Introduction to Biochemistry  
HES2631 The Microbial World  
HES2626 Biochemistry of Genes and Proteins  
HES4621 Advanced Biochemistry  
HES4641 Practical Biochemistry  
HES4626 Biotechnology

\* May be replaced by HES1490 Introduction to Chemistry for students without Year 12 Chemistry

# **BIOMEDICAL SCIENCE**

HET102 Introductory Physiology  
HET133 Human Physiology  
HET226 Sensory Systems  
HMS111 Engineering Mathematics 1  
HMS112 Engineering Mathematics 2  
HET182 Electronic Systems  
HET210 Electronics  
HET240 Cellular Biophysics  
HET219 Neurological Monitoring  
HET227 Neurophysiology

## **CHEMISTRY**

HES1510 Chemistry 1\*  
HES1525 Chemistry 2  
HES1555 Consumer Science  
HES2541 Analytical Chemistry  
HES2526 Organic Chemistry  
HES4520 Advanced Chemistry 1  
HES4510 Investigative Chemistry Prac 3  
HES4516 Research Project

\* may be replaced by HES1490 Introduction to Chemistry for students without Year 12 Chemistry

## **COMPUTER SCIENCE**

HIT2080 Introduction to Programming  
HIT3181 Technical Software Development  
HIT3172 Object-Oriented Programming in C++  
HIT2313 Computer Systems  
HIT1307 Internet Technologies  
HIT1402 Database Analysis and Design  
HIT2308 Software Development Practices  
HIT2120 Data Communications and Security  
NOTE: HIT1312 Computer and Logic Essentials must also be taken unless HMS112 Engineering Mathematics 2 is taken elsewhere.

## **ELECTRONICS**

HMS111 Engineering Mathematics 1  
HET182 Electronic Systems  
HMS112 Engineering Mathematics 2  
HET202 Digital Electronics Design  
HMS213 Engineering Mathematics 3B  
HET214 Circuits and Electronics 1  
HET308 Circuits and Electronics 2  
HET228 Electrical Actuators and Sensors  
HET378 Integrated Circuit Design  
HET312 Control and Automation

## **ENVIRONMENTAL SUSTAINABILITY**

HES1510 Chemistry 1\*  
HES1610 Concepts of Biology  
HES1115 Sustainable Design  
HES2631 The Microbial World  
HES2636 Microbes in the Environment  
HES2705 Water Science  
HES2715 Built and Sustainable Communities  
HES4720 Environmental Management

\* May be replaced by HES1490 Introduction to Chemistry for students without Year 12 Chemistry

## **FOOD SCIENCE**

HES1510 Chemistry 1\*  
HES1610 Concepts of Biology  
HBSL100 Introductory Law  
HES2631 The Microbial World  
HES2636 Microbes in the Environment  
HES2700 Food Science  
HES2725 Food Safety Principle and Practice 1  
HES4730 Food Safety Principle and Practice 2

\* May be replaced by HES1490 Introduction to Chemistry for students without Year 12 Chemistry

# **INFORMATION SYSTEMS**

HIT1401 Introduction to Business Information Systems  
HIT1402 Database Analysis and Design  
HIT2405 Requirements Analysis and Modelling  
HIT3406 Enterprise Systems  
HIT3407 Information Systems Project Management  
HIT3409 Process Modelling  
HIT3410 Systems Acquisition and Implementation Management  
HIT3424 Information Systems Management

# **MECHATRONICS**

HES1300 Robotics and Mechatronics Project 1  
HET202 Digital Electronics Design  
HIT3181 Technical Software Development  
HMS111 Engineering Mathematics 1  
HES1305 Robotics and Mechatronics Project 2  
HET182 Electronic Systems  
HMS112 Engineering Mathematics 2  
HMS213 Engineering Mathematics 3B  
HET228 Electrical Actuators and Sensors  
HET232 Embedded Microcontrollers

# **NEUROSCIENCE/PSYCHOPHYSIOLOGY**

HET102 Introductory Physiology  
HET133 Human Physiology  
HMA103 Statistics and Research Methods A  
HET219 Neurological Monitoring  
HET226 Sensory Systems  
HET227 Neurophysiology  
HET231 Perception and Motor Systems  
HET528 Higher Cortical Functions

# **PHILOSOPHY**

HAH100 Introduction to Philosophy  
HAH101 History of Ideas  
HAH210-HAH310 Philosophy, Media, Culture  
HAH219-HAH319 Philosophical Psychology  
HAH222-HAH322 Practical Ethics  
HAH223-HAH323 Environmental Philosophy  
HAH224-HAH324 Natural Philosophy and the Sciences  
HAH226-HAH326 Knowledge, Reason, and Society: Contemporary Issues and Perspectives

# **PHOTONICS**

HET124 Energy and Motion  
HMS111 Engineering Mathematics 1  
HMS112 Engineering Mathematics 2  
HET103 Photonics 1  
HMS213 Engineering Mathematics 3B  
HET128 Physics 2  
HMS214 Engineering Mathematics 4B  
HET203 Photonics 2  
HET417 Photonics and Fibre Optics  
HET205 Introduction to Modern Optics

# **POLITICS**

HAP100 Australian Politics  
HAP117 International Politics

HAP221/HAP321 Modern Australia  
HAP234/HAP334 War and Peace in a Globalized World  
HAP233/HAP333 Comparative Asian Politics  
HAP231/HAP331 Dictators, Democrats and Dynasties: Comparative Politics  
HASP200-HASP300 Public Policy in Australia  
HASP201-HASP301 Work in Australia

## **SOCIOLOGY**

HAS100 Sociology 1A (Introductory Sociology)  
HAS101 Sociology 1B (Social Institutions And Social Change)  
HAS296 The Family, Sex and Society.  
HASM201 eSociety: Sociology of the Electronic Age  
HASP202 Social Theory  
HAS303 Genetics and Society  
HAS316 Migration and Ethnicity  
HASP309 Social Research Design: Principles and Methods

## **TECHNOLOGY MANAGEMENT**

HBSG200 New Venture Development and Management  
HBC110 Accounting for Success  
HBSG300 Managing and Developing A Small Business  
HBM110 The Marketing Concept  
HIT1401 Introduction to Business Information Systems  
HBH110 Organisation and Management  
HBH222 Organisation Design & Technology  
HBP228 Manufacturing Management  
HBP336 Quality Management in Manufacturing  
HBP337 Managing Technology and Innovation

## **MINORS**

### **ASTROPHYSICS**

HMS111 Engineering Mathematics 1  
HMS112 Engineering Mathematics 2  
HET124 Energy and Motion  
HIT1501 Discovering the Universe  
HIT2502 From Stars to Black Holes  
HIT2503 Galaxies and Cosmology

### **BIOCHEMISTRY**

HES1510 Chemistry 1\*  
HES1610 Concepts of Biology  
HES1616 Concepts of Biotechnology  
HES1525 Chemistry 2  
HES2621 Introduction to Biochemistry  
HES2626 Biochemistry of Genes and Proteins

\* May be replaced by HES1490 Introduction to Chemistry for Students without Year 12 Chemistry

### **BIOPHYSICS**

HET102 Introductory Physiology  
HET133 Human Physiology  
HET124 Energy and Motion  
HET240 Cellular Biophysics  
HET230 Cardiovascular Biophysics  
HET260 Renal and Respiratory Biophysics

## **CHEMISTRY**

HES1510 Chemistry 1  
HES1525 Chemistry 2  
HES1555 Consumer Science  
HES2541 Analytical Chemistry  
HES2526 Organic Chemistry

\* May be replaced by HES1490 Introduction to Chemistry for Students without Year 12 Chemistry

## **COMPUTER SCIENCE**

HIT2080 Introduction to Programming  
HIT1307 Internet Technologies  
HIT1402 Database Analysis and Design  
HIT3181 Technical Software Development

## **ELECTRONICS**

HMS111 Engineering Mathematics 1  
HET182 Electronic Systems  
HMS112 Engineering Mathematics 2  
HET202 Digital Electronics Design  
HET214 Circuits and Electronics 1  
HET308 Circuits and Electronics 2

## **ENVIRONMENTAL SUSTAINABILITY**

HES1115 Sustainable Design  
HES2715 Built and Sustainable Communities  
HES4720 Environmental Management

## **FOOD SCIENCE**

HES1490 Introduction to Chemistry  
HES1616 Concepts of Biotechnology  
HBSL100 Introductory Law  
HES2636 Microbes in the Environment  
HES2700 Food Science  
HES2725 Food Safety Principle and Practice 1

## **INFORMATION SYSTEMS**

HIT1401 Introduction to Business Information Systems  
HIT1402 Database Analysis and Design  
HIT2405 Requirements Analysis and Modelling  
HIT3406 Enterprise Systems

## **MATHEMATICS**

HMS111 Engineering Mathematics 1  
HMS112 Engineering Mathematics 2  
HMS213 Engineering Mathematics 3B  
HMS214 Engineering Mathematics 4B  
HMB111 Quantitative Analysis B  
HMS411 Engineering Mathematics 5A

## **MECHATRONICS**

HES1300 Robotics and Mechatronics Project 1  
HIR505 Robotics in Manufacturing  
HMS111 Engineering Mathematics 1  
HES1305 Robotics and Mechatronics Project 2  
HET182 Electronic Systems  
HMS112 Engineering Mathematics 2

## **MEDIA AND COMMUNICATIONS**

HALM104 Media Literature Film: Texts and Contexts  
HAM105 The Media in Australia  
HALM202 Journalism: Processes and Practices  
HALM207 Network Cultures  
HALM315 Network Literacies  
HAM313 Radio Production and Criticism A

## **MULTIMEDIA**

HET215 Multimedia Applications  
HET208 3D Animation and Special Effects  
HET222 Digital Video and Audio  
HET324 Media Theory, DVD and Compositing

## **NETWORK TECHNOLOGY**

HET104 Lan Principles  
HET410 Network Administration  
HET424 IP Technologies  
HIT3712 Enterprise Networking

## **NEUROSCIENCE**

HET102 Introductory Physiology  
HET219 Neurological Monitoring  
HET226 Sensory Systems  
HET227 Neurophysiology  
HET231 Perception and Motor Systems  
HET528 Higher Cortical Functions

## **PHILOSOPHY**

HAH100 Introduction to Philosophy  
HAH103 Critical Thinking  
HAH222-HAH322 Practical Ethics  
HAH223-HAH323 Environmental Philosophy  
HAH224-HAH324 Natural Philosophy and the Sciences

## **PHOTONICS**

HET124 Energy and Motion  
HMS111 Engineering Mathematics 1  
HMS112 Engineering Mathematics 2  
HET103 Photonics 1  
HET203 Photonics 2  
HET417 Photonics and Fibre Optics

## **PHYSICS**

HMS111 Engineering Mathematics 1  
HET182 Electronic Systems  
HMS112 Engineering Mathematics 2  
HET124 Energy and Motion  
HET128 Physics 2  
HET206 Modern Physics

## **PRINCIPLES OF GAME DESIGN**

HET120 Interactive Games Structures  
HET217 Business of Games  
HET208 3D Animation and Special Effects  
HET325 Principles of Game Design

## **PSYCHOLOGY**

HAY100 Psychology 100  
HAY101 Psychology 101  
HMA103 Statistics and Research Methods A  
HMA278 Design and Measurement 2  
HAY206 Developmental Psychology  
HAY321 Abnormal Psychology

## **RESEARCH AND DESIGN**

HET101 Research and Development Project 1  
HET201 Research and Development Project 2  
HET305 Research and Development Project 3  
HET405 Research & Development Placement (Project 4)

## **SOCIOLOGY**

HAS100 Sociology 1A (Introductory Sociology)  
HAS296 The Family, Sex and Society  
HASM201 eSociety: Sociology of the Electronic Age  
HAS316 Migration and Ethnicity  
HASP307 Qualitative Research Methods  
HAS303 Genetics and Society

## **STATISTICS**

HMA103 Statistics and Research Methods A  
HMA278 Design and Measurement 2  
HMA279 Design and Measurement 3  
HASP309 Social Research Design: Principles and Methods