ELECTRICAL AND ELECTRONIC ENG. (ELEC)

ELEC 1001 Digital Systems 1 (10 Credit Points)
Subject Details **(**https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec1001/**) Legacy Code:** 300018
This unit provides students with a solid background in digital
logic design which is foundational to the fields of electrical and
computer engineering. Digital logic design involves building electronic
components and hardware, such as circuit boards and microchip
processors. Students are first introduced to the fundamentals of digital
logic, basic logic devices and Boolean algebra. This is followed by
analysis and design of combinational and sequential logic circuits.
Level: Undergraduate Level 1 subject
Equivalent Subjects: ELEC 1002 - Digital Systems 1 (WSTC AssocD)
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 1002 Digital Systems 1 (WSTC AssocD) (10 Credit Points)
Subject Details **(**https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec1002/**) Legacy Code:** 700240
This unit provides students with a solid background in digital
logic design which is foundational to the fields of electrical and
computer engineering. Digital logic design involves building electronic
components and hardware, such as circuit boards and microchip
processors. Students are first introduced to the fundamentals
of digital logic, basic logic devices and Boolean algebra. This is
followed by analysis and design of combinational and sequential
logic circuits.Offerings of alternate units are dependent on there being
sufficient student enrolment numbers. If enrolments are low, the
College may cancel delivery of the alternate unit.
Level: Undergraduate Level 1 subject
Pre-requisite(s): MATH 1010
Equivalent Subjects: ELEC 1001 - Digital Systems 1
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 1003 Electrical Fundamentals (10 Credit Points)
Subject Details **(**https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec1003/**) Legacy Code:** 300021
This unit introduces essential electrical engineering concepts that
provide students with the basic requirements for analysing, designing,
building, and testing simple engineering systems. Students use
techniques for analysing different types of circuits based on their
knowledge of electrical theory and the characteristics of power,
electrical energy, signals, and electrical circuit components. Students
have practical activities including conducting experiments in learning
how electrical systems work. Students are introduced to Electrical
Machines and Renewable Energy systems for a fundamental
understanding.
Level: Undergraduate Level 1 subject
Equivalent Subjects: ELEC 1005 Electrical Fundamentals (WSTC)
ELEC 1004 Electrical Fundamentals (WSTC Assoc Deg)
Restrictions: Please see the Subject Details page for any restrictions
for this subject

**ELEC 1004 Electrical Fundamentals (WSTC AssocD) (10 Credit
Points)**
Subject Details **(**https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec1004/**) Legacy Code:** 700104
The objective of this unit is to introduce to the student a number of
concepts within electrical engineering. These include basic definitions
of charge, current, potential difference, power; electric circuits and
basic laws such as Ohm's and Kirchoff's Laws; Thevenin, Norton's and
the maximum power theorems; electromagnetism and the associated
fundamental laws; capacitor and resistor circuits and time constants;
an introduction to Electronics; communication waves; Logic gates
and number systems; and an introduction to Electrical Machines
and Renewable Energy systems. Basic principles are explained and
applied to a range of typical electrical circuits and devices. These
foundations provide students with the basic requirements for a career
in engineering where the concepts can be developed or applied to more
complex engineering systems.
Level: Undergraduate Level 1 subject
Equivalent Subjects: ELEC 1003 - Electrical Fundamentals ELEC 1005 -
Electrical Fundamentals (WSTC)
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 1005 Electrical Fundamentals (WSTC) (10 Credit Points)
Subject Details **(**https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec1005/**) Legacy Code:** 700024
The objective of this unit is to introduce to the student a number
of concepts within electrical engineering. These include the basic
definitions of charge, current, potential difference, power; electric
circuits and basic laws such as Ohm's and Kirchoff's Laws; Thevenin,
Norton's and the maximum power theorems; electromagnetism and the
associated fundamental laws; capacitor and resistor circuits and time
constants; an introduction to Electronics; communication waves; Logic
gates and number systems; and an introduction to Electrical Machines
and Renewable Energy systems. Basic principles are explained and
applied to a range of typical electrical circuits and devices. These
foundations provide students with the basic requirements for a career
in engineering where the concepts can be developed or applied to more
complex engineering systems.
Level: Undergraduate Level 1 subject
Pre-requisite(s): Students enrolled in 6033 Diploma in
EngineeringBachelor of Engineering Studies or 7034 Diploma in
Engineering or 7066 Diploma in Engineering Extended must pass
PHYS 0003 Foundation Physics 2 before enrolling in this unit
Equivalent Subjects: ELEC 1003 - Electrical Fundamentals ELEC 1004 -
Electrical Fundamentals (WSTC Assoc Deg)
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 1006 Engineering Computing (10 Credit Points)
Subject Details **(**https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec1006/**) Legacy Code:** 300027
Engineering computing is an introduction to using computation to solve
real problems. The unit also aims to instil sound principles of program
design that can be utilised in many units throughout the students'
course. The basic elements and structures of a high level language are
taught. Students are exposed to numerous engineering problems and
are encouraged to implement solutions using an algorithmic approach.
Level: Undergraduate Level 1 subject
Equivalent Subjects: ELEC 1008 Engineering Computing (WSTC)
ELEC 1007 Engineering Computing (WSTC Assoc Deg)
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 1007 Engineering Computing (WSTC AssocD) (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec1007/) **Legacy Code:** 700106
Engineering computing is an introduction to using computation to solve
real problems. The unit also aims to instil sound principles of program
design that can be utilised in many units throughout the students'
course. The basic elements and structures of a high level language are
taught. Students are exposed to numerous engineering problems and
are encouraged to implement solutions using an algorithmic approach.
Level: Undergraduate Level 1 subject
Equivalent Subjects: ELEC 1006 - Engineering Computing ELEC 1008 -
Engineering Computing (WSTC)
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 1008 Engineering Computing (WSTC) (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec1008/) **Legacy Code:** 700018
Engineering Computing is an introduction to using computation to
solve real problems. The unit also aims to instil sound principles of
program design that can be utilized in many units throughout the
students' course. The basic elements and structures of a high level
language are taught. Students are exposed to numerous engineering
problems and are encouraged to implement solutions using an
algorithmic approach.
Level: Undergraduate Level 1 subject
Pre-requisite(s): Students enrolled in 7066 or 7162 Diploma in
Engineering Extended or 7082 Bachelor of Engineering Extended (WSTC
First Year Program) must pass COMP 0001 Introductory Programming
(WSTC Prep) before enrolling in this unit
Co-requisite(s): Before taking ELEC 1008 students in program 6033
must have passed or be registered in MATH 0008 PHYS 0003 and
GEDU 0008
Equivalent Subjects: ELEC 1006 - Engineering Computing ELEC 1007 -
Engineering Computing (WSTC Assoc Deg)
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 1009 Electrical Circuit Fundamentals (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec1009/) **Legacy Code:** 301336
This subject will be offered at Engineering Innovation Hub - Hassall
St, Parramatta campus. This subject is an introductory unit in
Electrical Engineering, which provides an introduction to electrical
circuits and fundamental electrical elements as well as the technical
skills to analyse such circuits. It is suitable for students pursuing
further studies in Electrical Engineering such as Power and Energy,
Telecommunications, Control, Instrumentation, as well as other related
engineering disciplines including Computer Science and Engineering.
In the practical section, this course provides hands-on experience in
building and testing circuits. This unit is presented in such a way that
students who have taken it are capable of building and analysing some
practical, useful devices afterwards.
Level: Undergraduate Level 1 subject
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 1011 Engineering Computing (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec1011/) **Legacy Code:** 500064
Engineering Computing is an introduction to using computation to
solve real problems. The unit also aims to instil sound principles of
program design that can be utilized in many units throughout the
students' course. The basic elements and structures of a high level
language are taught. Students are exposed to numerous engineering
problems and are encouraged to implement solutions using an
algorithmic approach.
Level: Undergraduate Level 1 subject
Equivalent Subjects: ELEC 1006 Engineering Computing ELEC 1007
Engineering Computing (WSTC AssocD) ELEC 1008 Engineering
Computing (WSTC)
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 1012 Electrical Fundamentals (Block) (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec1012/)
This subject introduces essential electrical engineering concepts
that provide students with the basic requirements for analysing,
designing, building, and testing simple engineering systems. Students
use techniques for analysing different types of circuits based on
their knowledge of electrical theory and the characteristics of
power, electrical energy, signals, and electrical circuit components.
Students have practical activities including conducting experiments
in learning how electrical systems work. Students are introduced to
Electrical Machines and Renewable Energy systems for a fundamental
understanding.
Level: Undergraduate Level 1 subject
Equivalent Subjects: ELEC 1003 (300021) Electrical Fundamentals
ELEC 1005 (700024) Electrical Fundamentals (WSTC)
ELEC 1004 (700104) Electrical Fundamentals (WSTC AssocD)
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 2001 Circuit Theory (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec2001/) **Legacy Code:** 300005
This unit aims to equip the student with the tools needed for the design
and analysis of electrical and electronic circuits. It also introduces
various techniques of circuit analysis, mutual coupling, frequency
response and two-port networks.
Level: Undergraduate Level 2 subject
Pre-requisite(s): ELEC 1003 AND
MATH 1019 OR
MATH 1035
Equivalent Subjects: ELEC 2002 - Circuit Theory (WSTC AssocD)
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 2002 Circuit Theory (WSTC AssocD) (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec2002/) **Legacy Code:** 700243
This unit aims to equip the student with the tools needed for the design
and analysis of electrical and electronic circuits. It also introduces
various techniques of circuit analysis, convolution, mutual coupling,
frequency response and two-ports loops.Offerings of alternate units
are dependent on there being sufficient student enrolment numbers.
If enrolments are low, the College may cancel delivery of the alternate
unit.
Level: Undergraduate Level 2 subject
Pre-requisite(s): ELEC 1004
Equivalent Subjects: ELEC 2001 - Circuit Theory
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 2004 Electronics (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec2004/) **Legacy Code:** 300025
This unit further develops skills in the analysis, design, practical
implementation and testing of the main analogue electronic circuits.
Topics covered are: semiconductor diodes and their applications,
Bipolar Junction Transistors (BJT), Field Effect Transistors (FET),
analysis of BJT and FET, design of discrete operational amplifiers, and
operational amplifier characteristics and circuit configurations.
Level: Undergraduate Level 2 subject
Pre-requisite(s): ELEC 1003 OR
ELEC 1009
Equivalent Subjects: ELEC 2005 - Electronics (WSTC AssocD)
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 2005 Electronics (WSTC AssocD) (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec2005/) **Legacy Code:** 700242
This unit further develops skills in the analysis, design, practical
implementation and testing of the main analogue electronic circuits.
Topics covered are: semiconductor diodes and their applications,
Bipolar Junction Transistors (BJT), Field Effect Transistors
(FET), analysis of BJT and FET, design of discrete operational
amplifiers and operational amplifier characteristics and circuit
configurations.Offerings of alternate units are dependent on there
being sufficient student enrolment numbers. If enrolments are low, the
College may cancel delivery of the alternate unit.
Level: Undergraduate Level 2 subject
Pre-requisite(s): ELEC 1004
Equivalent Subjects: ELEC 2004 - Electronics
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 2006 Engineering Electromagnetics (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec2006/) **Legacy Code:** 300481
This unit introduces Maxwell's equations in integral and differential
form and their application to basic theory and application of
electromagnetic structures, wave propagation, guides waves, antennas
and Electromagnetic compatibility.
Level: Undergraduate Level 2 subject
Pre-requisite(s): MATH 1019 AND
ENGR 1011 OR
ENGR 1028
Equivalent Subjects: ELEC 2003 - Electromagnetics LGYA 5725 -
Electromagnetic Compatibility
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 2007 Engineering Visualization (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec2007/) **Legacy Code:** 300029
This unit aims to provide a comprehensive introduction to fundamental
concepts and algorithms in engineering visualization. Topics covered
include visualization hardware, scan conversion of geometric
primitives, 2D and 3D transformations, 3D viewing and projection,
hidden surface removal, solid modelling, illumination models and image
manipulation.
Level: Undergraduate Level 2 subject
Pre-requisite(s): Students must have passed ELEC 1006 Engineering
Computing and either ELEC 2009 Microprocessor Systems or
ELEC 2008 Microcontrollers and PLCs
Equivalent Subjects: LGYB 0688 - Computer Graphics
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 2008 Microcontrollers and PLCs (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec2008/) **Legacy Code:** 300044
Through completion of an applied project students will develop
an understanding of the hardware, architecture and the assembly
language of microcontrollers in addition to the control of a mechanical
system with a programmable logic controller (PLC). The unit looks at
the applications of timers, interrupts and serial ports. Furthermore, the
general approach in designing a microcontroller in mechanical systems
will be studied. Students will use an Omron PLC to control a factory
represented by four pneumatic cylinders. After covering the Ladder
Logic programming language, they will move on to cover sequential
programming and numerical manipulation using PLCs.
Level: Undergraduate Level 2 subject
Pre-requisite(s): ELEC 2004 OR
ELEC 1003 OR
ELEC 1009
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 2009 Microprocessor Systems (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec2009/) **Legacy Code:** 300076
This unit introduces students to the internal structure of
microprocessors used in computing systems and their fundamental
operations. Topics include assembly language programming, interrupt
processing, CPU functions, memory organization, and peripheral
programming. The microprocessor and embedded processors are
discussed. Students write assembly language programs, debug and
create executable files to control microprocessor systems.
Level: Undergraduate Level 2 subject
Pre-requisite(s): ELEC 1001
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 2010 Power and Machines (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec2010/) **Legacy Code:** 300052
This unit develops an understanding an understanding of the basic
concepts of power and machines, including modern power systems
and transformers, in addition to the fundamentals of electromechanical
energy conversion. Students will also study magnetic circuits, modern
permanent magnet materials and their characteristics, and balanced
and unbalanced three-phase power systems.
Level: Undergraduate Level 2 subject
Pre-requisite(s): ELEC 2001 OR
ELEC 2013
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 2011 Signals and Systems (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec2011/) **Legacy Code:** 300057
This unit aims to develop students' understanding of continuous-time
and discrete-time concepts and methods. It covers various signals and
their analysis, as encountered in the fields of electrical, computer and
telecommunication engineering.
Level: Undergraduate Level 2 subject
Pre-requisite(s): MATH 1019 AND
ELEC 1003
Equivalent Subjects: ELEC 2012 - Signals and Systems (WSTC
AssocD)
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 2012 Signals and Systems (WSTC AssocD) (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec2012/) **Legacy Code:** 700241
This unit aims to develop students understanding of continuous-time
and discrete-time concepts and methods. It covers various signals
and their analysis, as encountered in the fields of electrical, computer
and telecommunication engineering.Offerings of alternate units are
dependent on there being sufficient student enrolment numbers. If
enrolments are low, the College may cancel delivery of the alternate
unit.
Level: Undergraduate Level 2 subject
Pre-requisite(s): MATH 1020 AND
ELEC 1004
Equivalent Subjects: ELEC 2011 - Signals and Systems
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 2013 Circuits and Signals (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec2013/) **Legacy Code:** 301352
This unit will be offered at Engineering Innovation Hub - Hassall St,
Parramatta campus. This unit covers the fundamentals of circuit,
system and signal analysis on which most other courses in the
electrical engineering curriculum are built. The unit provides a
foundation in frequency domain analysis and in transform methods,
as well as significantly extending alternate current analysis, transient
analysis and other fundamental circuit analysis tools. Although there is
a practical program in the laboratory, the theory aspects of this course
are the primary focus.
Level: Undergraduate Level 2 subject
Pre-requisite(s): ELEC 1009
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 2014 Mathematics for Electrical Engineers 1 (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec2014/) **Legacy Code:** 301338
This unit will be offered at Engineering Innovation Hub - Hassall St,
Parramatta campus. The unit combines two maths components, Vector
Calculus and Complex Analysis, both of which incorporate calculus
and linear algebra and have many applications to physics, engineering
and mathematics, particularly electrical engineering. Vector Calculus
involves calculus in two and three dimensions, theory of curves,
vector functions and partial derivatives, two- and three-dimensional
integration, line integrals and curl and divergence. Complex Analysis
extends calculus from real numbers to complex numbers, and develops
the theory of analytic functions, complex integration and Cauchy's
theorem, series expansions, the residue theorem and applications to
real improper integrals and trigonometric integrals.
Level: Undergraduate Level 2 subject
Pre-requisite(s): MATH 1035
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 2015 Mathematics for Electrical Engineers 2 (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec2015/) **Legacy Code:** 301339
This unit will be offered at Engineering Innovation Hub - Hassall St,
Parramatta campus. This unit builds on two maths components begun
in first year engineering, that is linear algebra and statistics. For linear
algebra, the aim is to learn and apply the theoretical elements about
linear combinations of vectors and matrices amongst other topics
to problem sets. For statistics, the aim is to learn the various ways
in which random variation arises in engineering contexts and apply
methods and models for understanding data and making decisions. In
both components, students will expand their skills in analytic thinking.
Level: Undergraduate Level 2 subject
Pre-requisite(s): MATH 1035
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 2016 Mathematics for Software Engineers (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec2016/) **Legacy Code:** 301344
This unit will be offered at Engineering Innovation Hub - Hassall St,
Parramatta campus. This unit builds on two maths components begun
in first year engineering, which are Finite Maths and Statistics. For
Finite Maths, the aim is for students to learn about the ideas in Number
Theory, the theory of finite fields, cryptography and Algebraic Coding
Theory as techniques for organising information and analysing it.
For Statistics, the aim is to learn the various ways in which random
variation arises in engineering contexts and apply methods and models
for understanding data and making decisions. In both components,
students will expand their skills in analytic thinking and making sense
of data.
Level: Undergraduate Level 2 subject
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 2017 Requirements and Design Workshop (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec2017/) **Legacy Code:** 301346
This unit will be offered at Engineering Innovation Hub - Hassall St,
Parramatta campus. This unit has a series of software engineering
workshops designed to teach students to work in teams and apply
their knowledge to solve real-life problems. These workshops offer
students opportunities to concentrate on software requirements
analysis and design issues including artefacts produced as well
techniques and tools to support this process (brainstorming, problem
statements, requirements elicitation, producing design documents and
prototyping). In addition, it provides students with some teamwork
skills, requirements engineering and design techniques that an
engineer would use in the early stages of the development process. The
students are also getting experience on different aspects of designing a
Web application with a major focus on the front-end.
Level: Undergraduate Level 2 subject
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 2018 Systems Modelling and Design (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec2018/) **Legacy Code:** 301345
This unit will be offered at Engineering Innovation Hub - Hassall
St, Parramatta campus. This unit reinforces the understanding of
discrete mathematics and the role it plays in computing science
and engineering. Students learn how to systematically derive
implementations from formal specifications using simple mathematics.
Students also learn to develop an understanding of the rules for
deriving implementations from specifications. Why do they work?
What do we have to prove and how? This is crucial for later industrial
software engineering practice.
Level: Undergraduate Level 2 subject
Pre-requisite(s): MATH 1006 AND
ENGR 1045
Restrictions: Please see the Subject Details page for any restrictions
for this subject

**ELEC 2019 Workshop on Reasoning about Programs (10 Credit
Points)**
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec2019/) **Legacy Code:** 301347
This unit will be offered at Engineering Innovation Hub - Hassall St,
Parramatta campus. The goal of this unit is to develop skills in writing
precise specifications of software programs and to translate these
specifications into correct implementations. Further methods for
reasoning about programs are introduced, including methods for
reasoning about termination, program refinement and data refinement.
Students learn to apply these ideas to structure their thinking about
programs as well as to build a web application within a project context.
Level: Undergraduate Level 2 subject
Pre-requisite(s): ELEC 2018
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 3001 Communication Systems (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec3001/) **Legacy Code:** 300007
This unit will provide a basic introduction to communication
systems and techniques. Specific topics covered include energy
and power spectral density, amplitude modulation, frequency
modulation, pulse modulation, an overview of digital modulation
techniques, noise in communication systems and an overview of
current telecommunication systems; spread spectrum systems,
optical communication systems, radio broadcasting and mobile
communication systems.
Level: Undergraduate Level 3 subject
Pre-requisite(s): ELEC 2011
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 3002 Data Communications (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec3002/) **Legacy Code:** 300997
This unit is concerned with the principles and topics of fundamental
importance to digital data communication, computer communication
networks and telecommunications. The lower layers of the protocol
structure (physical layer, data link layer and some aspects of the
network layer) and the physical medium (hardware and transmission
lines) are emphasized. An engineering approach will be taken to provide
an insight to transmission and transmission media, communication
techniques and transmission efficiency.
Level: Undergraduate Level 3 subject
Pre-requisite(s): ELEC 2011
Incompatible Subjects: ELEC 4001 - Data Networks
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 3003 Digital Signal Processing (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec3003/) **Legacy Code:** 300069
Students will develop an understanding of the fundamental concepts
and principles in digital signal processing by applying the theory
learned in their classes to practical exercises. The subject matter
includes discrete-time signals and systems, the z-transform, sampling
of continuous-time signals, transform analysis of linear time-invariant
systems, filter design techniques, structures for discrete-time systems,
the discrete Fourier transform and computation of the discrete Fourier
transform.
Level: Undergraduate Level 3 subject
Pre-requisite(s): ELEC 2011 OR
ELEC 2013
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 3004 Digital Systems 2 (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec3004/) **Legacy Code:** 300019
This unit covers modern logic design techniques and the process
of creating logic circuits and systems from design specifications
to implementation. Topics include logic design techniques for
combinational and sequential logic circuits; hardware description
language (HDL); logic circuit implementation using an HDL; state-of-
the-art logic circuit design tools; and programmable logic devices.
Level: Undergraduate Level 3 subject
Pre-requisite(s): ELEC 1001
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 3005 Electrical Drives (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec3005/) **Legacy Code:** 300070
Through practical laboratory exercises students will analyse and
evaluate electrical machines and drives. They will examine various
types of electrical motors and drive systems, their applications and
control. They will also study various types of speed control, starting and
braking systems and dynamics.
Level: Undergraduate Level 3 subject
Pre-requisite(s): ELEC 3006
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 3006 Electrical Machines 1 (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec3006/) **Legacy Code:** 300071
This unit introduces the fundamental principles of electrical machines,
the principles of electromechanical energy conversion and the
operation and analysis of Direct Current (DC) generators and
motors, induction motors and synchronous machines. Students
apply principles and theory to practical exercises to develop their
understanding. The unit also introduces various special purpose
electrical machines, such as permanent magnet machines, step motors
and reluctance machines for an understanding on different types of
machines.
Level: Undergraduate Level 3 subject
Pre-requisite(s): ELEC 2010
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 3008 Instrumentation and Measurement (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec3008/) **Legacy Code:** 300075
Through practical exercises students will engage with engineering
measurement and instrumentation systems. Students determine
the most appropriate measurement method and instrument, such
as multimeters, digital oscilloscopes and interfacing modules, for
particular applications. They will gain experience with the measurement
of physical quantities and the instrumentation required to accurately
present information to a controller. Additionally, transducers used to
measure common physical quantities are presented in detail, while
instrumentation includes a detailed analysis of zero-span circuits,
Wheatstone bridges, instrumentation amplifiers, isolation amplifiers,
voltage-to-current and voltage-to-frequency modules used for faithful
signal transmission, digital-to-analogue and analogue-to-digital circuits
to deepen student learning.
Level: Undergraduate Level 3 subject
Pre-requisite(s): ELEC 2001 OR
ENGR 2001
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 3009 Power Systems (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec3009/) **Legacy Code:** 300771
This unit provides students with a global picture of electrical energy
systems. Through practical exercises students will examine and
analyse the basic processes of generation, transmission and
distribution, power system analysis and planning as well as power
systems operation under steady-state and transient conditions. Various
aspects of power system operation including harmonics, fundamentals
of protection, environmental issues and renewable energy systems are
also covered in this unit.
Level: Undergraduate Level 3 subject
Pre-requisite(s): ELEC 2010
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 3010 Renewable Energy Systems Design (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec3010/) **Legacy Code:** 301425
This unit prepares engineering students to be conversant with
renewable energy systems. Students will learn to appraise
environmental, social, legal, economic and political issues concerning
renewable energy systems. Students will also learn relevant design
skills related to renewable energy systems.
Level: Undergraduate Level 3 subject
Pre-requisite(s): ELEC 1003 AND
ENGR 1011
Equivalent Subjects: ELEC 4006 Sustainable Energy Systems
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 3011 Power and Machines (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec3011/)
This subject develops an understanding of the basic concepts of power
and machines, including modern power systems and transformers, in
addition to the fundamentals of electromechanical energy conversion.
Students engage in practical activities to develop knowledge and
skills in magnetic circuits, balanced and unbalanced three-phase
power systems, and transformers. These concepts comprise essential
knowledge for electrical engineers.
Level: Undergraduate Level 3 subject
Pre-requisite(s): ELEC 2001 OR
ELEC 2013
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 4002 Power Electronics (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec4002/) **Legacy Code:** 300772
The unit covers various types of power electronics systems, their
applications and use in Electrical Drive Systems. It also covers
application considerations and modern developments in electronic
systems. This course provides the fundamentals of Power Electronics
and Industrial Electronics.
Level: Undergraduate Level 4 subject
Pre-requisite(s): ELEC 2010 AND
ELEC 2004
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 4003 Power Quality (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec4003/) **Legacy Code:** 300995
This unit is to introduce students to power quality phenomena such
as voltage sag/swell, distortions, unbalance, and flicker that occur
in power systems. The unit also introduces terms and definitions
associated with power quality, following which each phenomenon, that
is, voltage sag/swell, transient overvoltage, and harmonics. In addition,
flicker is presented and discussed in detail for students to understand
the sources and impact of these occurrences on power system as well
as typical mitigation techniques. Finally, students are introduced to
power quality benchmarking, monitoring and assessment.
Level: Undergraduate Level 4 subject
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 4004 Radio and Satellite Communication (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec4004/) **Legacy Code:** 300489
This unit is offered in alternate years. This unit will develop an
understanding of the theory and practice of radio and satellite
communication techniques and measurements and provide an
introduction to space communication systems. It will complement the
general communication engineering units, addressing advanced topics
important and specific to radio and satellite communications.
Level: Undergraduate Level 4 subject
Pre-requisite(s): ELEC 3001 OR
ELEC 4001
Equivalent Subjects: LGYA 3699 - Satellite Communication
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 4005 Smart Grids and Distributed Generation (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec4005/) **Legacy Code:** 300996
This unit is designed to model, analyse and control of newly developing
areas of distributed generation and smart grids. The unit will cover
modelling, control, simulation and protection of such systems. The unit
will cover the impacts of renewable sources and power electronics on
the operation of smart grids and micro-grids. The unit will also cover
environmental and economic impacts of such systems.
Level: Undergraduate Level 4 subject
Pre-requisite(s): ELEC 3009
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 4006 Sustainable Energy Systems (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/archives/2021-2022/subject-details/elec4006/) **Legacy Code:** 300998
This unit prepares engineering students to work in the area of renewable energy systems and to be knowledgeable and be in a position to appraise environmental, social, legal, economic and political issues concerned with renewable energy systems.
Level: Undergraduate Level 4 subject
Restrictions: Please see the Subject Details page for any restrictions for this subject

ELEC 4007 Wireless Communications (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/archives/2021-2022/subject-details/elec4007/) **Legacy Code:** 300065
The unit covers the analysis, design and operation of modern wireless communication systems. The primary focus is on the physical layer and hardware, emphasizing the fundamentals of coding and modulation, spread spectrum and multiple access techniques. Current wireless architectures and mobile communication systems are also covered.
Level: Undergraduate Level 4 subject
Pre-requisite(s): ELEC 3001 OR
ELEC 3002
Equivalent Subjects: LGYA 5692 - Digital Communication Engineering
Restrictions: Please see the Subject Details page for any restrictions for this subject

ELEC 4008 Electrical Drives (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/archives/2021-2022/subject-details/elec4008/)
Electrical drives are electromechanical systems which enable electrical machines to function. Through theoretical analyses and practical laboratory exercises, students analyse and evaluate electrical machines and drives as well as examine various types of electrical motors and drive systems, their applications and control. Students conduct experiments on speed control, starting and braking systems, and dynamics of electric motors. These activities comprise essential knowledge and skills for students to be competent in the area of power engineering.
Level: Undergraduate Level 4 subject
Pre-requisite(s): ELEC 3006
Restrictions: Please see the Subject Details page for any restrictions for this subject

ELEC 4009 Instrumentation and Measurement (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/archives/2021-2022/subject-details/elec4009/)
Through practical exercises students will engage with engineering measurement and instrumentation systems. Students determine the most appropriate measurement method and instrument, such as multimeters, digital oscilloscopes and interfacing modules, for particular applications. They will gain experience with the measurement of physical quantities and the instrumentation required to accurately present information to a controller. Additionally, transducers used to measure common physical quantities are presented in detail, while instrumentation includes a detailed analysis of zero-span circuits, Wheatstone bridges, instrumentation amplifiers, isolation amplifiers, voltage-to-current and voltage-to-frequency modules used for faithful signal transmission, digital-to-analogue and analogue-to-digital circuits to deepen student learning.
Level: Undergraduate Level 4 subject
Pre-requisite(s): ELEC 2001 OR
ENGR 2001
Restrictions: Please see the Subject Details page for any restrictions for this subject

ELEC 6001 Applied Project in Neuromorphic Engineering (40 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/archives/2021-2022/subject-details/elec6001/) **Legacy Code:** 800235
This 40 credit point semester-long unit provides a capstone experience to students enrolled in the Master of Applied Neuromorphic Engineering. Students work on an industry-oriented project with practical application and outcome. Having the intention to go into industry, this unit provides opportunities for students to explore a relevant problem that can be completed in one semester. Students will gain valuable experience and industry insights.
Pre-requisite(s): INFO 7001 AND
ELEC 6003 AND
COMP 6001 AND
COMP 6002
Restrictions: Please see the Subject Details page for any restrictions for this subject

ELEC 6002 Master Dissertation in Neuromorphic Engineering (40 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/archives/2021-2022/subject-details/elec6002/) **Legacy Code:** 800234
This is a 80 credit point year-long subject taken over two terms (40 credit points in each term). This subject is offered exclusively on campus for students to benefit from mentorships and regular interactions with leading researchers in the field. Students will have the opportunity to contribute towards impactful research projects, aiming at academic growth and progress. To achieve this goal, the Dissertation subject is designed for students to plan and execute a research-based project in the area of Neuromorphic Engineering. The main task in the year-long 80 credit point dissertation subject is an academic research paper that meets publishing standards and is peer-reviewed by external reviewers (getting the article published on a journal is not a completion requirement to the unit). The students shall be part of regular International Center for Neuromorphic Systems (ICNS) interactions, and benefit from supervisors in a discursive setting as the candidate makes progress.
Restrictions: Please see the Subject Details page for any restrictions for this subject

ELEC 6003 Neuromorphic Accelerators (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/archives/2021-2022/subject-details/elec6003/) **Legacy Code:** 800231
Problem-oriented thinking and distributed system design are essential for neuromorphic engineers. This unit is designed to provide students with sufficient understanding to neuromorphic processor. Students will be able to implement spiking neural networks by programming neuromorphic processors The lab work and programming assignments focus on different key aspects of programming neuromorphic processor. Neural modelling, Python programming, debugging code and hardware/software co-simulation. The workshops focus on the concrete implementation of neural networks.
Restrictions: Please see the Subject Details page for any restrictions for this subject

ELEC 6004 Neuromorphic Electronics Design (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec6004/) **Legacy Code:** 800229
Efficient, parallel, low-power computation is a hallmark of brain
computation and the goal of neuromorphic engineering. The focus
of this unit is to design, implement and test accurate, electronic, very
large scale integrated (VLSI) circuit model of neural systems and
the associated signal processing. Students will have opportunities
to design and build a neural system on hardware and gain resultant
insights into applying neuromorphic engineering to real-world
problems. This subject will be undertaken at Parramatta City - Hassall
St campus.
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 7001 Advanced Control Systems (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec7001/) **Legacy Code:** 300603
This unit covers continuous and discrete control systems. It reviews
and builds on the fundamental concepts of the theory of feedback in
continuous and discrete time to examine the analysis and design of
advanced continuous and discrete time linear control systems. Transfer
function and state variable methods are employed. Instruction makes
use of extensive experimental tasks. There is also considerable use of
Matlab simulations.
Level: Postgraduate Coursework Level 7 subject
Incompatible Subjects: LGYA 5850 - Digital Control LGYA 5813 -
Advanced Control Systems
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 7002 Advanced Data Networks (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec7002/) **Legacy Code:** 300173
This unit covers all major network technologies: asynchronous transfer
mode (ATM), Internet, and telephony. Essential networking topics such
as protocol layering, multiple access, switching, scheduling, routing,
congestion control, error and flow control, and network security are
covered in detail. An engineering approach is taken to provide insight
into network design.
Level: Postgraduate Coursework Level 7 subject
Restrictions: Please see the Subject Details page for any restrictions
for this subject

**ELEC 7003 Advanced Electrical Machines and Drives (10 Credit
Points)**
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec7003/) **Legacy Code:** 300601
The subject covers various types of electrical motors and drive
systems, their applications and control. The unit aims to introduce
an advanced study of electrical machines and drives. It also covers
application considerations and modern developments in high
performance drive systems. This course covers various types of the
speed control, the starting, the braking and the dynamics of different
electrical machines and drives.
Level: Postgraduate Coursework Level 7 subject
Incompatible Subjects: LGYA 5847 - Variable Speed Electric Drives
LGYA 5844 - Special Electrical Machines
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 7004 Advanced Power Quality (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec7004/) **Legacy Code:** 301025
This unit is to introduce students to power quality phenomena such
as voltage sag/swell, distortions, unbalance, and flicker that occur
in power systems. The unit also introduces terms and definitions
associated with power quality, following which each phenomenon, that
is, voltage sag/swell, transient overvoltage, and harmonics. In addition,
flicker is presented and discussed in detail for students to understand
the sources and impact of these occurrences on power system as
well as typical mitigation techniques. Finally, students are introduced
to power quality benchmarking, monitoring, assessment. In addition
Advanced knowledge on network frequency responses is presented.
Level: Postgraduate Coursework Level 7 subject
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 7005 Advanced Signal Processing (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec7005/) **Legacy Code:** 300596
This unit covers the principles and techniques in signal processing.
The subject matter includes advanced topics in discrete-time signals
and systems, the z-transform and its applications in signal processing,
advanced topics in the sampling of continuous-time signals, FIR and IIR
filter design, filter structures, and the discrete Fourier transform and its
computation. Students develop skills of analysing and designing digital
signal processing systems.
Level: Postgraduate Coursework Level 7 subject
Equivalent Subjects: LGYA 5840 - Signal Processing 1
Restrictions: Please see the Subject Details page for any restrictions
for this subject

**ELEC 7006 Advanced Smart Grids and Distributed Generation (10
Credit Points)**
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec7006/) **Legacy Code:** 301026
This unit is designed to model, analyse and control of newly developing
areas of distributed generation and smart grids. The unit will cover
modelling, control, simulation and protection of such systems. The unit
will also cover the impacts of renewable sources and power electronics
on the operation of smart grids and micro-grids. The unit will also cover
environmental and economic impacts of such systems.
Level: Postgraduate Coursework Level 7 subject
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 7008 Instrumentation and Measurement (PG) (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec7008/) **Legacy Code:** 300515
This unit covers topics associated with the measurement and
presentation of physical parameters. A wide range of transducers are
presented in detail, while instrumentation includes a detailed analysis
of a multitude of analogue and digital circuits used to amplify, transmit,
and display electrical signals. The application of these modules in
modern measurement equipment is presented in details.
Level: Postgraduate Coursework Level 7 subject
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 7009 Personal Communication Systems (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec7009/) **Legacy Code:** 300196
This unit covers the design fundamentals of cellular systems, including
frequency reuse, channel assignments, radio wave propagation in
mobile environments, modulation techniques, coding techniques,
spread spectrum and multiple access. It includes topics from emerging
wireless technologies, and third-generation mobile communication
systems and standards.
Level: Postgraduate Coursework Level 7 subject
Restrictions: Please see the Subject Details page for any restrictions
for this subject

ELEC 7010 Power System Planning and Economics (10 Credit Points)
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec7010/) **Legacy Code:** 300197
This unit covers planning techniques for energy and electrical power
systems. It also covers the economics of various options and reliability
of electrical power systems.
Level: Postgraduate Coursework Level 7 subject
Restrictions: Please see the Subject Details page for any restrictions
for this subject

**ELEC 9001 Higher Degree Research Thesis - Engineering
(Computer) (20 Credit Points)**
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec9001/) **Legacy Code:** 800053
Level: PhD and Research Masters Level 9 subject
Restrictions: Please see the Subject Details page for any restrictions
for this subject

**ELEC 9002 Higher Degree Research Thesis - Engineering
(Electrical) (20 Credit Points)**
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec9002/) **Legacy Code:** 800051
Level: PhD and Research Masters Level 9 subject
Restrictions: Please see the Subject Details page for any restrictions
for this subject

**ELEC 9003 Higher Degree Research Thesis - Engineering
(Mechatronic) (20 Credit Points)**
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec9003/) **Legacy Code:** 800057
Level: PhD and Research Masters Level 9 subject
Restrictions: Please see the Subject Details page for any restrictions
for this subject

**ELEC 9004 Higher Degree Research Thesis - Engineering
(Telecommunications) (20 Credit Points)**
Subject Details (https://hbook.westernsydney.edu.au/
archives/2021-2022/subject-details/elec9004/) **Legacy Code:** 800055
Level: PhD and Research Masters Level 9 subject
Restrictions: Please see the Subject Details page for any restrictions
for this subject