Course Outline (Higher Education)

School:	School of Engineering, Information Technology and Physical Sciences
Course Title:	ANALOG AND DIGITAL ELECTRONICS
Course ID:	ENGIN2401
Credit Points:	15.00
Prerequisite(s):	(ENCOR1000 or ENCOR1021 or ENGIN1002)
Co-requisite(s):	Nil
Exclusion(s):	(ENMTX2010)
ASCED:	030101

Description of the Course:

This course will enable a student to develop the basic knowledge and gain an understanding of the analog electronic devices such as operation of diodes, transistors and operational amplifiers and their applications, analysis and design in practical circuits. Also, through this course a student will be able develop an awareness of the advantages and limitations of solving combinational logic problems, confidence in the analysis of practical logic circuits and the use of software to demonstrate the validity of the theory.

Grade Scheme: Graded (HD, D, C, P, MF, F, XF)

Work Experience:

No work experience: Student is not undertaking work experience in industry.

Placement Component: No

Supplementary Assessment: Yes

Where supplementary assessment is available a student must have failed overall in the course but gained a final mark of 45 per cent or above and submitted all major assessment tasks.

Program Level:

Level of course in Program	AQF Level of Program					
	5	6	7	8	9	10
Introductory						
Intermediate			✔			

Level of course in Program	AQF Level of Program					
	5	**6**	**7**	**8**	**9**	**10**
Advanced	☐	☐	☐	☐	☐	☐

Learning Outcomes:

On successful completion of the course the students are expected to be able to:

Knowledge:

K1. Identify the structure and operation of operational amplifiers, diodes and transistors.

K2. Describe the application of semiconductor devices to power supplies and basic amplifier circuits.

K3. Design systems that incorporate analog and digital components.

K4. Describe the principles used to implement combinational logic functions and its limitations.

K5. Demonstrate the principles of digital circuits and logic design techniques.

K6. Interpret and verify the behaviour of logic circuits used to implement various functions.

Skills:

S1. Perform analysis of amplifier circuits.

S2. Recognise amplifiers configuration and determine performance expected from them.

S3. Analyse operational amplifier circuits.

S4. Design, construct and test circuits to implement logic functions.

S5. Solve combinational design problems.

S6. Apply simple fault finding techniques.

Application of knowledge and skills:

A1. Design and construct operational amplifiers for the amplification of nonlinear applications.

A2. Use of appropriate instrumentation and software for testing electronic circuits.

A3. Analyse analog and digital circuits to demonstrate and verify the validity of theory.

A4. Design, construct and test logic circuits to meet specifications.

Course Content:

Topics may include:

- Analog Electronics: Circuit theory, semiconductor materials diodes, bi-polar junction transistor (BJT) and field-effect transistors (FET), basic BJT and FET amplifiers, frequency response and operational amplifiers.

- Digital Electronics: Number systems, Boolean algebra, Karnaugh maps, logic gates and circuits, combinational circuit design including multiplexers, decoders and programmable logic devices.

Values:

V1. Appreciate how analog and digital electronic devises are used in industrial systems.

V2. Understand how analog and digital electronics are used for controlling a system or a product.

V3.   Appreciate learning as a lifelong process.

Graduate Attributes

The Federation University FedUni graduate attributes (GA) are entrenched in the Higher Education Graduate Attributes Policy (LT1228). FedUni graduates develop these graduate attributes through their engagement in explicit learning and teaching and assessment tasks that are embedded in all FedUni programs. Graduate attribute attainment typically follows an incremental development process mapped through program progression. **One or more graduate attributes must be evident in the specified learning outcomes and assessment for each FedUni course, and all attributes must be directly assessed in each program**

Graduate attribute and descriptor		Development and acquisition of GAs in the course	
		Learning Outcomes (KSA)	Assessment task (AT#)
GA 1 Thinkers	Our graduates are curious, reflective and critical. Able to analyse the world in a way that generates valued insights, they are change makers seeking and creating new solutions.	K1-K6 S1-S6 A1-A4	1-3
GA 2 Innovators	Our graduates have ideas and are able to realise their dreams. They think and act creatively to achieve and inspire positive change.	S1-S6 A1-A6	1-3
GA 3 Citizens	Our graduates engage in socially and culturally appropriate ways to advance individual, community and global well-being. They are socially and environmentally aware, acting ethically, equitably and compassionately.	A1-A4	1-3
GA 4 Communicators	Our graduates create, exchange, impart and convey information, ideas, and concepts effectively. They are respectful, inclusive and empathetic towards their audience, and express thoughts, feelings and information in ways that help others to understand.	K1-K6 S1-S6 A1-A4	1-3
GA 5 Leaders	Our graduates display and promote positive behaviours, and aspire to make a difference. They act with integrity, are receptive to alternatives and foster sustainable and resilient practices.	K1-K6 S1-S6 A1-A4	1-3

Learning Task and Assessment:

Learning Outcomes Assessed	Learning Tasks	Assessment Type	Weighting
S1-S6, A1-A4	Experimental work and / or projects to verify students ability to apply knowledge and skills acquired in the course	Reports, demonstrations	10 - 30%
K1-K6, S1-S6	Relevant tasks and problems to enforce understanding of the students and help in gradual development of knowledge and skills throughout the course	Assignments, quizzes	10 - 30%
K1-K6	Questions and problems related to the course contents	Exams / Tests	40 - 60%

Adopted Reference Style:

Other (IEEE: Refer to the library website for more information)

Refer to the library website for more information

Fed Cite - referencing tool