Course Outline (Higher Education)

School: School of Engineering, Information Technology and Physical Sciences

Course Title: DIGITAL LOGIC AND ELECTRONIC SYSTEMS

Course ID: ENGIN2105

Credit Points: 15.00

Prerequisite(s): (ENGIN1002)

Co-requisite(s): Nil

Exclusion(s): Nil

ASCED: 031301

Description of the Course:
This course facilitates development of knowledge and skills required for designing simple combinational and synchronous digital systems which comprise modules of larger digital systems. The course enables understanding of timing and hazard analysis for reliable digital circuit designs and the use of Electronic Design Automation (EDA) tools for design, analysis and simulation. This course will also enable a student to develop the basic knowledge and gain an understanding of different electronic systems, perform appropriate circuit analysis, and understand operational and performance characteristics of different semiconductor devices, such as diodes, transistors, operational amplifiers, etc.

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

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			✔			
Advanced						

Learning Outcomes:

Knowledge:

K1. Explain the principles used to implement logic functions and its limitations.
K2. Demonstrate the principles of digital circuits and logic design techniques.
K3. Describe and verify the behaviour of logic circuits used to implement various functions.
K4. Identify the structure and operation of different semiconductor devices.
K5. Describe the application of semiconductor devices to power supplies, power converter, and basic amplifier circuits.

Skills:

S1. Design, construct and test digital circuits to implement logic functions.
S2. Solve digital logic design problems.
S3. Employ simple fault finding techniques.
S4. Perform circuit analysis on different electronic systems
S5. Recognise semiconductor device configurations and determine performance expected from them.

Application of knowledge and skills:

A1. Apply Electronic Design Automation (EDA) tools to the digital design process.
A2. Design, construct and test circuits, using appropriate techniques, to meet specifications.
A3. Evaluate circuits to demonstrate and verify the validity of theory.
A4. Design and construct semiconductor based circuits for different applications.
A5. Use appropriate instrumentation and software for testing electronic systems and circuits.

Course Content:

Topics may include:

- Introduction to Digital Electronics and Number Systems and Conversions
- Boolean Algebra
- Boolean Algebra - Applications and Karnaugh maps
- Multi-Level Gate Circuits NAND and NOR Gates
- Sequential Circuit Components
- Introduction to VHDL
- Introduction to circuit theories and semiconductor materials and devices
- Diodes Circuits and Bi-polar Junction Transistor (BJT)
- Bi-polar Junction Transistor (BJT)
- Metal oxide semiconductor FET (MOSFET)
- Operational Amplifier (Op-Amp)
- Active Filters

Values:

V1. Appreciate real-world considerations in the design of digital circuits.
V2. Appreciate timing and hazard considerations in simple digital circuit designs.
V3. Appreciate how digital and electronics systems are used in industrial systems.
V4. 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-K5, S1-S5, A1-A5	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-S5, A1-A5	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.	Not applicable	Not applicable
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.	S1-S5, A1-A5	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.	A1-A5	1,2

Learning Task and Assessment:

Learning Outcomes Assessed	Learning Tasks	Assessment Type	Weighting
S1-S5, A1-A5	Experimental work and / or projects to verify students ability to apply knowledge and skills acquired in the course.	Reports, demonstrations	10% - 30%
K1-K5, S1-S5	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-K5, S1-S5	Questions and problems related to the materials covered in the course.	Mid and / or End of semester test / exam	50% - 70%

Adopted Reference Style:

IEEE

Refer to the library website for more information

Fed Cite - referencing tool