COURSE SYLLABUS
(ELECTRICAL & ELECTRONICS ENGINEERING PROGRAM)

FACULTY OF ENGINEERING DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING UNIVERSITI PERTAHANAN NASIONAL MALAYSIA **NAME DAN COURSE CODE :** INTRODUCTION TO ELECTRICAL ENGINEERING (FOR MECHANICAL STUDENTS), EEE 1012	**M/S :** 1 / 8

Lecture Hours : 3 hrs x 14 weeks **Credit** : 3 **LECTURER:** 1. MUHAZAM BIN MUSTAPHA Bistari 08-R-16 | muhazam@upnm.edu.my 2. MOHD SALMAN MOHD SABRI Bistari | salman@upnm.edu.my	**Revision** : A **Date of Issue** : 6 July 2010 **Last Amendment** : - **Edition** : 1 **Procedure No : PK(0). UPNM. AKAD. 01**

PRE REQUISITE :

SYNOPSIS:

This is an introduction course for students who are not majoring in electrical and electronics engineering. It mostly covers the basics of circuit theories, the application aspects of analog electronics and electric machineries.

In the circuit theory part, various analysis methods like, Ohm's Law, Kirchhoff's Law, Thevenin's Theorem, Norton's Theorem, etc will be taught. Inductive and capacitive elements would also be included.

In the electronics part, the basic theory of semiconductor will start the section and proceed to diodes and bipolar (BJT) and field effect transistors (FET). The models of the devices and basic calculations will be givens. For the transistors, the students will also be taught about the biasing and AC analysis.

For the introductory material on electric machinery, the students will be taught about magnetic circuits, AC and DC motors and generators and various aspects of energy conversion involving the devices.

MAIN REFERENCE :

1. Robert L. Boylestad, "Introductory Circuit Analysis", 8th Edition, Prentice Hall, 2000

OTHER REFERENCE :

1. Thomas L. Floyd, "Electronic Devices", 8th Edition, Pearson Education 2007
2. A. Hughes, "Electric Motors and Drives: Fundamentals, Types and Applications", 3rd Edition, Newnes, 2005

Prepared by : Name: **Muhazam Mustapha** Signature : Date :	Certified by : Name: **Lt. Kol. Ir. Khalid B. Abd Jalil** Head of Department Signature : Date :

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OBJECTIVE :

This course will prepare non-electrical engineering students with the basic foundation of electrical and electronics knowledge. The students should be able to analyze and calculate the values found in basic electrical or electronics circuits. The students should have some intermediate level of circuit analysis knowledge with the ability to perform AC and DC analysis on transistor circuits. The students should also acquire some basic knowledge on electric motors, generators and fundamental theory of energy conversion related to the machines.

COURSE OUTCOME :

CO1	Able to explain and analyze the functionality of electric circuits.
CO2	Basic understanding of physical theory of semiconductor devices.
CO3	Able to do the parametric mathematical analysis on the electronic circuits.
CO4	Basic theoretical and practical understanding of electric machines.

LESSON PLAN :

WEEK	LECTURE	TOPIC / CONTENT	REMARK
1 - 2	1 2 3 4	**Units, Definition, Experimental Laws and Simple Circuits**: System of units, charge, current, voltage and power types of circuits and elements Ohm's law, Kirchhoff's laws Analysis of a single-loop current, single node-pair circuit Resistance and source combination, voltage and current division	12 - 23 Jul
3	5 6	**Circuit Analysis Technique**: Nodal and mesh analysis, linearity and superposition source transformations, Thevenin's and Norton's theorems	26 - 30 Jul
4	7 - 8	**Inductance and Capacitance**: I-V relations for inductor and capacitor, inductor and capacitor combination, duality, linearity and its consequences.	2 - 6 Aug
5	9 - 10	**Transient Response of R-L and R-C circuits**: Simple R-L and R-C circuits, exponential response of source free R-L and R-C circuit.	9 - 13 Aug
6	11 12	**Basic Electronic Devices**: Semiconductor theory, transport mechanism, energy level Diodes and its types, characteristic and application	16 - 20 Aug
7	13 - 14	**Bipolar-Junction Transistor (BJT)**: Structure and operation, NPN and PNP transistors, characteristics, transistor circuit analysis and BJT in digital circuit.	23 - 27 Aug

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8	15 - 16	**BJT Analysis**: Biasing, DC and AC analysis	30 Aug - 3 Sep
		MID SEMESTER BREAK	4 - 19 Sep
9	17 - 18	TEST 1 **Field Effect Transistor (FET)**: Structure and operation, MOS, PMOS, NMOS transistors, characteristics, analysis and FET in integrated circuit	20 - 24 Sep
10	19 - 20	**FET Analysis**: Biasing, DC and AC analysis	27 Sep - 1 Oct
11	21 - 22	**Electrical Machines**: Concept and laws of magnetism, electromechanical energy conversion	4 - 8 Oct
12	23 - 24	**Generators**: AC generator, asynchronous and induction AC, synchronous AC, DC generator, DC power	11 -15 Oct
13	25 - 26	**Motors**: AC motor, asynchronous AC motor, synchronous AC motor, DC motor, compound DC motor, series DC motor, shunt DC motor	18 - 22 Oct
14	27 - 28	**Revision**: Topics revision TEST 2	25 - 29 Oct
17	-	**REVISION WEEK**	1 - 5 Nov
18	-	**FINAL EXAMINATION (50 %)**	8 - 26 Nov
19	-	**FINAL BREAK SEMESTER 1**	27 Nov - 2 Jan 2011

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LEARNING LOAD

NO	TEACHING AND LEARNING ACTIVITIES	HOURS
1	Lectures and Tutorials	42
2	Individual Assignment: • Assignment assessment and answering problems	10
3	Individual/Group Learning: • Preparation before lectures including reading modules and notes • Preparation after lectures includes updating notes, reading additional references, discussion with peers and lecturers • Revision for test and final exam	30
6	Test 1 & Test 2	4
7	Final Exam	3
	TOTAL HOURS	**89**

Course Credit 'Intro to Electrical Engineering' 89 hours / 40 hours = 2.2 (2 credit)

METHODOLOGY :

Lectures and tutorials

COURSE EVALUATION :

1.	Quiz	10 %	CO: 1, 2, 3
2.	Assignment	10 %	CO: 1, 2, 3
3.	Test 1 & Test 2	30 %	CO: 1, 2, 3, 4
4.	Final Exam	50%	CO: 1, 2, 3, 4
	Total	**100%**	

Rules & Regulation :

Refer to *Peraturan Akademik UPNM*

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RELATIONSHIP BETWEEN PROGRAMME OUTCOME (PO)
With COURSE LEARNING OUTCOME (CO)

No	COURSE OUTCOME (CO)	Relationship Between C.O and P.O. (Includes 8 domains in MQF)										Delivery	Assessment
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	
CO1	Able to explain and analyze the functionality of electric circuits.	3		2									Lecture, Tutorial	Test / Quiz / assignment / exam
CO2	Basic understanding of physical theory of semiconductor devices.	3											Lecture, Tutorial	Test / Quiz / assignment / exam
CO3	Able to do the parametric mathematical analysis on the electronic circuits.	3		2									Lecture, Tutorial	Test / Quiz / assignment / exam
CO4	Basic theoretical and practical understanding of electric machines.	3		2									Lecture, Tutorial	Test / exam

1 = low emphasis, 2 = medium emphasis, 3 = strong emphasis

RELATIONSHIP BETWEEN (CO) AND GENERIC / SOFT SKILLS

Generic / Soft Skill	CO 1	CO 2	CO 3	CO 4	Evaluation
Communication					Assignment
Critical Thinking & Problem Solving	3	3	3	3	Test / Quiz / assignment / exam
Team Work					Assignment
Life-long Learning & Information Management	1	1	1	1	Test / Quiz / assignment / exam
Entrepreneurship					Assignment
Ethics & Professional Morale					Test / Quiz / assignment / exam
Leadership					Assignment
Environmental Awareness					Assignment

Legend:

1: Knowledge
2: Moderate
3: Important/Relevant

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EXAMPLES OF EVALUATION (RUBRIK) :

COURSE OUTCOME (CO)	A (5)	B (4)	C (3)	D (2)	E (1)
Understand the engineering profession as well as the interaction between various engineering disciplines.	Solve problems with less than 20% error	Solve problems with less than 35% error	Solve problems with less than 50% error	Solve problems with more than 60% error	Solve problems with more than 70% error
Understand the engineering fundamentals & elements.	Solve problems with less than 20% error	Solve problems with less than 35% error	Solve problems with less than 50% error	Solve problems with more than 60% error	Solve problems with more than 70% error
Understand the procedure for approaching an engineering problem, determining the necessary data and method of solution and presenting results.	Solve problems with less than 20% error	Solve problems with less than 35% error	Solve problems with less than 50% error	Solve problems with more than 60% error	Solve problems with more than 70% error
Enhance the ability to use software application for the analysis and presentation of engineering data.	Solve problems with less than 20% error	Solve problems with less than 35% error	Solve problems with less than 50% error	Solve problems with more than 60% error	Solve problems with more than 70% error

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NOTE: PROGRAMME OUTCOME (PO) FOR DEFENCE HUMAN RESOURCE MANAGEMENT

MQF has established that Outcome Based Learning emphasizes the development on student's competency in multiple learning environments using the following 8 domains:

i. Knowledge
ii. Practical
iii. Leadership
iv. Ethics and Professionalism
v. Environment Awareness
vi. Entrepreneurship
vii. Communication
viii. Life-long Learning

PO1	Ability to acquire and apply knowledge of sciences, mechanical and military engineering principles.
PO2	Ability to competently apply the techniques, skills and use modern engineering tools.
PO3	Ability to utilize systems approach to design and evaluation of operational performance.
PO4	Ability to identify, formulate and solve mechanical engineering related problems.
PO5	Ability to communicate effectively and with confidence not only with engineers but also with the community at large.
PO6	Ability to respond and adapt to changing situations with special attention toward sustainable development, peace keeping and humanitarian needs.
PO7	Ability to function effectively as and individual and/or in a group with the capacity to be a leader/manager to achieve the goals.
PO8	Ability to understand of professional ethical responsibilities and commitment to them.
PO9	Ability to understand the social, cultural, global and environmental responsibilities of a professional engineer in civilian and military context.
PO10	Ability to seek and acquire contemporary knowledge including defense matters.
PO11	Possess entrepreneurship qualities.

END