

NATIONALLY HARMONISED B.Sc. CHEMICAL ENGINEERING PROGRAM				
Course <i>Code</i>	EEng 4181			
Course Name	Electrical machine and Electronics			
Degree Program	B.Sc. in Chemical Engineering			
Module Name	Process Control and Instrumentation			
Module Coordinator	N.N.			
Lecturer	N.N.			
Instructor's contact information	Office Phone E-mail Office hour			
ECTS Credits	5			
Students work load (per week)	Lecture	tutorial	Laboratory or Practice	Home study
	3	0	3	2
Students work load (per semester)	48hrs	0	48hrs	32hrs
Mode of delivery	Parallel(per semester)			
Course Objectives & Competences to be Acquired	After completion of this course, students will be expected to; - understand the basics in electrical engineering - understand the basic principle of electrical machine - understand the application of different electronic components and its characteristics; theory of semi conductor devices, transistor configurations, operational amplifier and timers			
Course Description/Course Contents	1Basic Principles of Electrical Machines Analysis 1.1The Magnetic aspects of machines			

	1.1.1 Introduction
	1.1.2 Magnetic Circuit
	1.1.3 Properties of Magnetic Materials
	1.1.4 AC excitation of Magnetic Cores
	1.1.5 Magnetic Core Losses
	1.1.6 Permanent Magnets
	1.2 Process of Energy Conversion
	1.2.1 Self and Mutual Inductance
	1.2.2 Production of an EMF
	1.2.3 Motional EMF
	1.2.4 Production of Electromagnetic Force-Torque
	1.2.5 Singly Excited-Systems
	1.2.6 Doubly-Excited Systems
	1.2.7 Circuit Conventions
	1.2.8 Per-Unit Values
	The Transformer
	2.1 Principle of Action
	2.2 Open-Circuited Transformer
	2.3 Transformer on Load
	2.4 The Equivalent Circuit of Transformer
	2.5 Transformer Regulation
	2.6 Transformer Test
	2.7 Transformer Efficiency
	2.8 Transformer Construction and Design Considerations
	2.9 Three-phase Transformer
	2.10 Polarity Test and Group Connections
	2.11 Transformer Operating in Parallel

	2.12 Excitation System and Harmonics 2.13 Inrush Currents 2.14 The Auto-Transformer 2.15 Instrument Transformers 3 Induction Machines 3.1 Constructional Features 3.2 Production of Rotating Magnetic Fields 3.3 Principle of Operation 3.4 AC Windings 3.5 Generated EMF in AC Machines 3.6 Torque and Rotor Power Factor 3.7 Starting Torque and Running Torque 3.8 Relation between Torque and Slip 3.9 Vector Diagram of an Induction Machine 3.10 Equivalent Circuit of an Induction Machine 3.11 Induction Machine tests 3.12 Power Distribution of an Induction Motor 3.13 Construction of the Circle Diagram 3.14 Determination of the No-load Parameters of the Equivalent Circuit 3.15 Starting of an Induction Motor 3.16 Speed Control of an Induction Motor 4 semiconductor theory, P-N junction diode, transistor configuration, performance and characteristics of SCR, UJT, TRIAC, DIAC etc, operational amplifier and timers
Pre-requisites	None
Semester	Year IV, semester II
Status of Course	Compulsory
Teaching & Learning Methods	Classroom contact/Lecture, laboratory work and individual work (independent learning).

Assessment/Evaluation	➤ Quizzes 10% ➤ Assignment 10% ➤ presentation 10% ➤ tests 20% ➤ Final Examination 50%
Course Policy	Attendance: As per harmonized academic policy Assessments: students are supposed to handle all assessments on time. Cheating/plagiarism: it is strictly forbidden and any misconduct is accountable per the students' code of conduct. Also, please do not chew gum, eat, listen to recorders or CD players, wear sunglasses, or talk about personal problems. Please be sure to turn off pagers and cell phones before class and exam sessions
Literature	References: 1. Charles A. Schuler, Electronics, principle and applications, Jan 18, 2007 2. P.S. Bimbhra, <i>Generalized Theory of Electrical Machines</i>, 2002. 3. Muhammad H. Rashid, <i>Power Electronics: Circuits, Devices and Applications (3rd Edition)</i>, Aug 4, 2003. 4. Bimal K. Bose, <i>Power Electronics And Motor Drives: Advances and Trends</i>, Jul 28, 2006. 5. Electrical Engineering - Edward Hughes V.K. Mehta, "Principles of Electronics", S. Chand and company Ltd., 1994 6. Jimmie J. Cathey and S.A. Nasar, 'Basic Electrical Engineering', Schaum outline series in Engineering, McGraw-Hill Book Co. 1987
Approval section	Module team