

BGE004-ELECTRONICS FOR MECHANICAL SYSTEM

Academic Course Description

BHARATH UNIVERSITY
Faculty of Engineering and Technology
Department of Mechanical Engineering
BGE004-ELECTRONICS FOR MECHANICAL SYSTEM
Seventh Semester, 2015-16 (odd Semester)

Course (catalog) description

To understand the various components, operations and applications of different types of power plants .

Compulsory/Elective course : **Non-Major elective**

Credit & contact hours : 3 & 45

Course Coordinator : **A.BUCKSHUMIYAN**

Instructors :

Name of the instructor	Class handling	Office location	Office phone	Email (domain:@bharathuniv.ac.in)	Consultation
Vijaya	4A,4B	JR201, JR202		Vijaya.mct@bharathuniv.ac.in	9.00am-9.50 am

Relationship to other courses:

Pre –requisites : Mechatronics

Co –requisites :

Assumed knowledge : Study about robots

Following courses : **Nil**

Syllabus Contents

UNIT I DIGITAL ELECTRONICS 9

Basic logic Gates - Application of logic gates – De-Morgan’s theorem-Boolean Expression-Minimization of Boolean expression- Minterm - Maxterm-Sum of Products(SOP)-Product ofSum(POS)–K-MAP- Digital Comparators – Code Converter – Adders – Sequential logic – Flip flops – SR/JK/D – Counters – Synchronous and Asynchronous – Shift registers – Memory I.C’s – RAM, ROM, EPROM – Multiplexers – Demultiplexers - Decoders – Encoders.

UNIT II SIGNAL GENERATORS 9

Operational Amplifier / Inverting / Noninverting / Summing / Integrating / Differential / Logarithmic –Bridge Measurements- Maxwell, Hay, Schering, Andeson, Weinbridge, Wheat Stone Bridge - Comparison of Analog & Digital Techniques, Electronic multimeter, Function generator- Pulse and Square wave Generator- Harmonic Distortion

UNIT III 8085 ARCHITECTURE**9**

Block diagram with CPU – Input/output – Components and features of CPU – Program Instructions -Control Unit - Arithmetic logic unit – Registers – Significance of data, address and control bus – Architecture of Intel 8085A and Pin Configuration.

UNIT IV MICROPROCESSOR PROGRAMMING**9**

Programming concepts – Machine code – Hex code – Basic concepts of assembly language – Instruction sets – Addressing modes – Assembly language programming examples – Addition of 8 bit numbers in two memory addresses – Subtraction, Multiplication – Division -Determination of the biggest number in the list of numbers - Counting – sorting – Delay subroutine – Delay with stepper motors.

UNIT V APPLICATIONS IN MECHANICAL SYSTEMS**9**

Introduction-Generation of I/O ports-Programmable peripheral Interface(PPI)- Intel 8255 -Keyboard and Display Controller(8279) ,Traffic light control-washing Machine control –DC Motor-Stepper Motor- D/A Converters- A/D converters–Automotive applications – Antilock braking – Steering – transmission and suspension systems- Illustrative Examples.

TEXTBOOKS:

- 1.Goankar R.S., Microprocessor Architecture programming and Applications, New Age International.2006.
- 2.W.Bolton, Mechatronics, Addison Wesley Longman, 2006.

REFERENCES:

1. M.Morris Mono, Digital Design, 3rd Edition, Prentice Hall of India Pvt Ltd.,2003/Pearson Education(Singapore) Pvt Ltd.,New Delhi.,2003.
2. Malvino A.P., Digital Electronics, Principle and Applns.-TMH 1989V.K. Mehta, Principle of Electronics, S.Chand& Company, 2007.
3. Kenneth J.Ayala."The 8086 Microprocessor: Programming & Interfacing the PC"Delmar Publishers, 2007.
4. Douglas V., Hall, Microprocessors Interfacing,Programming And Hardware, TMH 2007.
5. <https://www.amazon.com/Mechatronics-Electronic-mechanical...ebook>

Total : 45**Computer usage:****Professional component**

General	-	0%
Basic Sciences	-	10%
Engineering sciences & Technical arts	-	100%
Professional subject	-	100%

Broad area : Non-conventional sources of energy**Test Schedule**

S. No.	Test	Tentative Date	Portions	Duration
1	Cycle Test-1	February 2 nd week	Session 1 to 14	2 Periods
2	Cycle Test-2	March 2 nd week	Session 15 to 28	2 Periods
3	Model Test	April 3 rd week	Session 1 to 45	3 Hrs
4 1	University Examination	TBA	All sessions / Units	3 Hrs.

Mapping of Instructional Objectives with Program Outcome

To enable the students to understand the fundamental concepts of Semi Conductors, Transistors, Rectifiers, Digital Electronics and 8085 Microprocessors	Correlates to program outcome		
	H	M	L
Upon completion of this course, the students can able to understand digital electronics	a		
Learn concepts of 8085 architecture	c,i		e,k
Learn the concepts of signal generators	a	f	
Learn the concepts of programming	c	g	e
Learn the concepts of applications in mechanical system	i		
Learn the concepts of braking and steering system	a		e,l

H: high correlation, M: medium correlation, L: low correlation

Draft Lecture Schedule

Session No	Topics to be covered	Problem solving Yes/no	Text/chapter
UNIT-I			
1	Basic logic Gates	NO	[T1]/CHAPTER-4,5,6
2	Application of logic gates	NO	
3	De-Morgan's theorem	NO	
4	Product of Sum(POS)–K-MAP	NO	
5	Boolean Expression-Minimization of Boolean expression-Minterm	NO	
5	Maxterm-Sum of Products(SOP)	NO	
6	Digital Comparators – Code Converter – Adders – Sequential logic – Flip flops – SR/JK/D – Counters	NO	
7	Synchronous and Asynchronous – Shift registers – Memory I.C's – RAM, ROM, EPROM	NO	
8	Multiplexers – Demultiplexers	YES	

9	Decoders – Encoders.	NO	[T1]/CHAPTE R-6
UNIT-II			
10	Operational Amplifier	NO	[T1]/CHAPTE R-2
11	Inverting / Noninverting	NO	
12	Summing / Integrating / Differential	NO	
13	Logarithmic –Bridge Measurements-	YES	
14	Maxwell,Hay,Schering,Andeson,Weinbridge,Wheat Stone Bridge	YES	
15	Maxwell,Hay,Schering,Andeson,Weinbridge,Wheat Stone Bridge	NO	
16	Comparison of Analog& Digital Techniques, Electronic multimeter,Function generator	NO	
17	Pulse and Square wave Generator	YES	
18	Harmonic Distortion	YES	
UNIT-III			
19	Block diagram with CPU	NO	[T1]/CHAPTER -9 [R1]/CHAPTER- 11,12,13
20	Input/output	NO	
21	Components and features of CPU	NO	
22	Program Instructions	YES	
23	Control Unit	YES	
24	Arithmetic logic unit – Registers	YES	
25	Significance of data, address and control bus	NO	
26	Architecture of Intel 8085A and Pin Configuration	YES	

27	Architecture of Intel 8085A and Pin Configuration	YES	
UNIT-IV			
28	Programming concepts – Machine code	NO	[R1]/CHAPTER-15
29	Hex code	NO	
30	Basic concepts of assembly language	NO	
31	Instruction sets – Addressing modes	NO	
32	Subtraction, Multiplication – Division	NO	
33	Assembly language programming examples	NO	
34	Addition of 8 bit numbers in two memory addresses	NO	
35	Determination of the biggest number in the list of numbers - Counting – sorting – Delay subroutine	NO	
36	Delay with stepper motors.	NO	

UNIT-5			
37	Introduction	NO	[T1]/CHAPT ER-14 [R1]/CHAPT ER-16,18
38	Generation of I/O ports	NO	
39	Programmable peripheral Interface(PPI)- Intel 8255	NO	
40	Keyboard and Display Controller(8279	NO	
41	Traffic light control-washing Machine control	YES	
42	DC Motor-Stepper Motor- D/A Converters- A/D converters	YES	
43	Automotive applications	YES	
44	Antilock braking – Steering	YES	

45	transmission and suspension systems- Illustrative Examples.	YES	
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Teaching Strategies

The teaching in this course aims at establishing a good fundamental understanding of the areas covered using:

- Formal face-to-face lectures
- Tutorials, which allow for exercises in problem solving and allow time for students to resolve problems in understanding of lecture material.
- Laboratory sessions, which support the formal lecture material and also provide the student with practical construction, measurement and debugging skills.
- Small periodic quizzes, to enable you to assess your understanding of the concepts.

Evaluation Strategies

Cycle Test – I	-	5%
Cycle Test – II	-	5%
Model Test	-	10%
Assignment / Seminar / Online Test / Quiz	-	5%
Attendance	-	5%
Final exam	-	70%

Prepared by : S.THIRUMAVALAVAN

Addendum

ABET Outcomes expected of graduates of B.Tech / MECH / program by the time that they graduate:

- The ability to apply knowledge of mathematics, science, and engineering fundamentals.
- The ability to identify, formulate and solve engineering problems.
- The ability to design a system, component, or process to meet the desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
- The ability to design and conduct experiments, as well as to analyze and interpret data
- The ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- The ability to apply reasoning informed by the knowledge of contemporary issues.
- The ability to broaden the education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
- The ability to understand professional and ethical responsibility and apply them in engineering practices.

- i) The ability to function on multidisciplinary teams.
- j) The ability to communicate effectively with the engineering community and with society at large.
- k) The ability in understanding of the engineering and management principles and apply them in project and finance management as a leader and a member in a team.
- l) The ability to recognize the need for, and an ability to engage in life-long learning.

Program Educational Objectives

PEO1: PREPARATION:

Mechanical Engineering graduates are enthusiastic to provide strong foundation in mathematical, scientific and engineering fundamentals necessary to analyze, formulate and solve engineering problems in the field of Mechanical Engineering.

PEO2: CORE COMPETENCE:

Mechanical Engineering graduates have competence to enhance the skills and experience in defining problems in the field of Mechanical Engineering and Technology design and implement, analyzing the experimental evaluations, and finally making appropriate decisions.

PEO3: PROFESSIONALISM:

Mechanical Engineering graduates made competence to enhance their skills and embrace new thrust areas through self-directed professional development and post-graduate training or education.

PEO4: PROFICIENCY:

Mechanical Engineering graduates became skilled to afford training for developing soft skills such as proficiency in many languages, technical communication, verbal, logical, analytical, comprehension, team building, inter personal relationship, group discussion and leadership skill to become a better professional.

PEO5: ETHICS:

Mechanical Engineering graduates are morally merged to apply the ethical and social aspects of modern Engineering and Technology innovations to the design, development, and usage of new products, machines, gadgets, devices, etc.

BGE004-ELECTRONICS FOR MECHANICAL SYSTEM

Course Teacher	Signature
A.BUCKSHUMIYAN	
S.THIRUMAVALAVAN	
G.ANBALAGAN	

Course Coordinator
A.BUCKSHUMIYAN

HOD/MECH