Government College of Engineering, Karad

(An Autonomous Institute of Government of Maharashtra)

Programme: Electronics and Telecommunication Engineering

Syllabus for
Second year of B. Tech

Government College of Engineering, Karad
Second Year B. Tech
EX301: Engineering Mathematics - III

Teaching Scheme		**Examination Scheme**	
Lectures	3 Hrs/week	**CT1**	15
Tutorial	1 Hr/week	**CT2**	15
		TA	10
		ESE	60

Total Credits: 4

Course Objectives:

This course aims to:

1. Explain Mathematical methodologies and models, it is basic necessity for the foundation of Engineering and Technology
2. Develop mathematical skills and enhance logical thinking power of students.
3. Provide students with skills to solve differential equations and their applications which would enable students to obtain engineering solutions for given situations they may encounter in their profession.
4. Learn vector calculus, probability which would enable students to find engineering solutions for given situations they may encounter in their profession.

Course Contents

		Hours
Unit I	**Linear Differential Equations (LDE) and Applications:** Linear Differential Equations with constant coefficients, Cauchy's and Legendre's differential equation, Applications of Linear Differential Equations with constant coefficients to Electrical systems.	8
Unit II	**Fourier Series:** Definition, Euler's formulae, Conditions for a Fourier expansion, Functions having points of discontinuity, change of interval, expansions of odd and even periodic functions and half range series.	8
Unit III	**Fourier Transforms:** Fourier transforms, Fourier sine and cosine transforms, Complex form of Fourier Integral, Finite Fourier sine and cosine Transforms.	6
Unit IV	**Laplace Transform and Application:** Definition, properties of Laplace transforms, transforms of derivatives, Transforms of integral. Inverse Laplace transforms, Convolution theorem. Applications to initial value boundary problems, Heaviside Unit step function, Dirac-delta function, and Periodic function.	6

Unit V **Vector Differential Calculus:**

Differentiation of vectors, Gradient of scalar point function, Directional derivative, Divergence of vector point function, Curl of a vector point function. Irrotational and solenoidal vector field. 8

Unit VI **Probability:**

Random Variable, Discrete and continuous random variable, Expected value of random variable, Variance, Moments & moment generating functions. Probability mass function & Probability density function, Probability distribution for random variables, Binomial, Poisson and Normal distributions. 6

Note:

- Tutorials for the subject shall be engaged in minimum of four batches (batch size of 20 students Maximum) per division.
- Teachers Assessment shall consist of minimum 8 tutorials from entire syllabus.

Course Outcome (CO):

Upon successful completion of this course, the student will be able to:

1. Understand the basic necessity of mathematics, for the foundation of Engineering and Technology. Also understand Mathematical methodologies and models.
2. Develop mathematical skills and enhance logical thinking power of students.
3. Solve problems on differential equations and their applications which would enable students to obtain engineering solutions for given situations they may encounter in their profession.
4. Understand vector calculus, probability which would enable students to find engineering solutions for given situations.

Text Books

1. Erwin Kreyszig, “Advanced Engineering Mathematics”, 8th Edition, Wiley Eastern Ltd. Mumbai.
2. J. N. Wartikar & P. N. Wartikar, “A text book of Applied Mathematics: Vol. I, II and III”, Vidyarthi Griha Prakashan, Pune.

Reference Books

1. B. S. Grewal, “Higher Engineering Mathematics”, Khanna Publication, New Delhi.
2. S. D. Sharma, “Operations Research”.
3. Kanti B. Datta, Cengage Learning, “Mathematical Methods of Science and Engineering (Aided with MATLAB)”.

Useful Links

1. http://nptel.ac.in/courses/122103012/
2. www.ocw.mit.edu/courses/most-visited-courses/
3. https://www.khanacademy.org/math/differential-equations
4. https://www.khanacademy.org/math/probability

Mapping of CO and PO

	PO												PSO	
	a	B	C	d	e	F	g	H	i	j	k	l	m	n
CO1	√	√			√				√		√	√	√	
CO2	√	√	√	√					√		√	√	√	
CO3	√	√							√					
CO4	√	√	√						√		√	√		

Assessment Pattern

Knowledge Level	CT1	CT2	TA	ESE
Remember			2.5	15
Understand	5	5	2.5	10
Apply	5	5	2.5	15
Analyse				10
Evaluate	5	5	2.5	10
Create				
Total	15	15	10	60

Government College of Engineering, Karad
Second Year B. Tech
EX302: Electronic Devices and Circuits

Teaching Scheme		**Examination Scheme**	
Lectures	4 Hrs/week	**CT1**	15
		CT2	15
		TA	10
		ESE	60

Total Credits: 4

Course Objectives:

This course aims to:

1. Provide an introduction and basic understanding of Semiconductor Devices viz. diodes and bipolar junction transistors.
2. Understand the different types of transistor with analysis.
3. Analyse effect of frequency on amplifiers.
4. Design electronic circuits to meet the desired specifications.

Course Contents

		Hours
Unit I	**Semiconductors and Diode theory:** Drift and diffusion mechanisms, Recombination process, Mean carrier lifetime, Conductivity, Mobility, Mass action law, Einstein relationship. Semiconductor p-n junction, Depletion region, Barrier potential, V-I characteristic, Equation of diode. Forward and reverse dynamic resistance, Diode Capacitances. Diode Applications – Rectifiers, Clippers & Clampers	7
Unit II	**Bipolar Junction Transistor:** BJT biasing, concept of dc and ac load line, bias stabilization, thermal runaway, thermal stabilization, Early effect, Small signal low frequency h-parameter model. Introduction to amplifier**,** Derivations for CE configuration for AI, Ri, Ro, Avs, AIS in terms of h-parameters, and Detailed study of Single stage RC coupled amplifier & Emitter follower.	7
Unit III	**Field Effect Transistor:** JFET, MOSFET (depletion and enhancement) - construction , V-I characteristics, transfer characteristics, voltage-current relationship, Cut-off & Pinch-off voltages, Transconductance , channel length modulation, Input resistance & Capacitance and various breakdown in FET. FET small signal model, FET biasing – self and voltage divider biasing, CMOS introduction.	7
Unit IV	**Frequency Response analysis:** Concept of frequency response. Effect of coupling, bypass, junction and stray capacitances on frequency response of FET amplifiers.	7

Millers Theorem. High frequency response: Hybrid π model. Gain bandwidth product

Unit V **Power Amplifiers:**
Power transistors; Power amplifiers; Classes of amplifiers: class-A power amplifiers, class-B power amplifiers, Class –AB push-full complementary output stages. 7

Unit VI **Rectifiers and Power Supplies**:
Different types of Rectifiers and related parameters. Inductor filter, Capacitor filter, L filter, π filter. Need of voltage regulator, Stabilization factors, Analysis & Design of Shunt regulator (using Zener diode & BJT), series voltage regulator (using BJT) Series voltage regulator with Pre- regulator & Overload protection circuit. 7

Course Outcome (CO):

Upon successful completion of this course, the student will be able to:

1. Apply knowledge of mathematics, science, and engineering to design, analyse and operation of electronic devices and circuits
2. Explain basic analog electronic circuit design techniques using diodes and bipolar junction transistors.
3. Explain the hybrid model of transistor and analyse the transistor amplifier (CE, CB, CC) using h-parameters.
4. Determine the frequency response of amplifiers
5. Analyse and design electronic circuits such as rectifiers, voltage regulators and transistorized amplifiers

Text Books

1. J. Millman & C.Halkias, “Electronic devices & circuits”, Tata McGraw Hill Publication.
2. Allen Mottershed, “Electronic devices & circuits”, Prentice- Hall India.

Reference Books

1. David A. Bell, “Electronic devices & circuits”, Oxford University.
2. Robert L. Boylestad, Louis Nashelsky, “Electronic Devices and Circuit Theory”, PHI publishers.
3. Sedra/Smith, “Microelectronic Circuits” by, Oxford University Press.

Useful Links

1. http://www.electronics-tutorials.ws/
2. http://ocw.mit.edu/courses/electrical-engineering-and-computer-science
3. http://nptel.ac.in/video.php?subjectId=117103063
4. http://nptel.ac.in/courses/117107094/

Mapping of CO and PO

	PO												PSO	
	a	b	C	d	e	f	g	h	i	j	k	l	m	n
CO1	√		√							√	√	√		√
CO2	√	√	√	√						√	√	√		
CO3	√		√	√							√			
CO4	√			√						√	√			
CO5	√		√							√		√	√	√

Assessment Pattern

Knowledge Level	CT1	CT2	TA	ESE
Remember	5	5	2	10
Understand	5		2	10
Apply	5	5	2	10
Analyse		5	2	10
Evaluate			2	10
Create				10
Total	15	15	10	60

Government College of Engineering, Karad
Second Year B. Tech
EX303: Microcontroller and Interfacing

Teaching Scheme		**Examination Scheme**	
Lectures	4 Hrs/week	**CT1**	15
		CT2	15
		TA	10
		ESE	60

Total Credits 4

Course Objectives:

This course aims to:

1. Provide an overview of difference between microprocessor and micro controller.
2. Give an understanding about the concepts and basic architecture of 8051.
3. Study the architecture and addressing modes of 8051.
4. Impart knowledge about assembly language programs of 8051.
5. Help understand the importance of different peripheral devices & their interfacing to 8051.
6. Impart knowledge of different types of external interfaces including LEDS, LCD, Keypad Matrix, Switches & Seven segment display.

	Course Contents	**Hours**
Unit I	**Introduction to 8085 microprocessor:** Introduction, Block diagram of 8085, machine cycle, Instruction cycle, Timing Diagram Types of Instructions and examples. Difference between microprocessor and microcontroller, memory organization in 8085, Assembly language programming.	4
Unit II	**Basics of 8051 Microcontrollers:** Introduction to various Architectures, Concept of RISC and CISC processors. Microcontrollers and embedded processors, Overview of the 8051 family, Architecture of 8051 , Pin description of the 8051,RAM and Rom Organization in 8051	5
Unit III	**8051 Assembly Language Programming:** 8051 Addressing Modes :Immediate and register addressing modes, Accessing memory using various addressing modes, Bit addresses for I/O and RAM, Extra 128-byte on-chip RAM in 8052.Concept of Instruction cycle, Machine cycle. Types of Instructions ,Introduction to 8051 assembly programming, Assembling and running an 8051 program, The program counter and ROM space in the 8051, 8051 data types and directives, 8051 flag bits and the PSW register, 8051 register banks and stack. Jump, Loop, And Call Instructions. I/O Port Programming. Arithmetic and Logic Instructions and Programs.	7
Unit IV	**8051 Programming in C:** Data types and time delay in 8051 C, I/O programming in 8051 C, Logic	3

operations in8051 C, Data conversion programs in 8051 C, Accessing code ROM space in 8051 C, Data serialization using 8051 C. 8051 Hardware Connection and Intel Hex File

Unit V **8051 Timer Programming in Assembly and C:**
Programming 8051 timers, counter programming, Programming timers 0 and 1 in 8051 C as well as in assembly. 5

Unit VI **8051 Serial Port Programming in Assembly and C:**
Basics of serial communication, 8051 connection to RS232, 8051 serial port programming in Assembly, Programming the second serial port, Serial port programming in C. 5

Unit VII **Interrupts Programming in Assembly and C:**
8051 interrupts programming, Timer interrupts, Programming external hardware interrupts, Programming the serial communication interrupt, Interrupt priority in the 8051/52, Interrupt programming in C. 5

Unit VIII **Interfacings of 8051:**
Details of LCD interfacing, Keyboard interfacing. Parallel and serial ADC, DAC interfacing, Sensor interfacing and signal conditioning. Semiconductor memory, Memory address decoding, 8031/51 interfacing with external ROM, Flash RAM, 8051 data memory space, Accessing external data memory in8051 C.RTC Interfacing and Programming. Motor Control: Relay, PWM, DC and Stepper Motors PWM. 8

Course Outcome (CO):
Upon successful completion of this course, the student will be able to:

1 Explain the difference between microprocessor and microcontroller
2 Explain different addressing modes of 8051
3 Explain the working of various peripherals and their interfacing
4 Write assembly as well as c programs for 8051
5 Design system based on 8051

Text Books

1 Muhammad Ali Mazidi, Janice Gillispie Mazidi and Rolin McKinlay, “The 8051 Microcontroller and Embedded Systems Using Assembly and C”, Second Edition, Pearson Education.
2 K. J. Ayala, D. V. Gadre, “The 8051 Microcontroller & Embedded Systems using Assembly and C”, Cengage Learning, India Edition.

Reference Books

1 Satish Shah, “8051 Microcontrollers: MCS51 family and its variants”, Oxford University Press.
2 Subrata Ghoshal, “8051 Microcontroller: Internals, Instructions, Programming and Interfacing”, Pearson Education.
3 K Uma Rao, Andhe Pallavi, “The 8051 Microcontrollers: Architecture, Programming

and Applications", Pearson Education.

Useful Links

1 http://nptel.ac.in/courses/Webcourse-contents/IIT-KANPUR/microcontrollers/micro/ui/TOC.htm
2 http://freevideolectures.com/Course/3018/Microprocessors-and-Microcontrollers

Mapping of CO and PO

	PO												PSO	
	a	B	c	d	e	f	g	h	i	j	k	l	m	n
CO1														
CO2		√	√	√							√			
CO3		√	√								√			
CO4	√	√	√								√			
CO5			√								√			

Assessment Pattern

Knowledge Level	CT1	CT2	TA	ESE
Remember	5	5	2	10
Understand	5	5	2	20
Apply	5	5	2	10
Analyse			2	10
Evaluate			2	10
Create	-	-	-	-
Total	15	15	10	60

Government College of Engineering, Karad
Second Year B. Tech
EX304: Digital Electronics

Teaching Scheme		**Examination Scheme**	
Lectures	3 Hrs/week	**CT1**	15
Tutorial	1 Hr/week	**CT2**	15
		TA	10
		ESE	60

Total Credits: 4

Course Objectives:

This course aims to:

1. Understand principles, characteristics and operations of combinational & sequential logic circuits.
2. Design combinational circuits by using logic gates
3. Explain Boolean algebra and the various methods of Boolean function reduction, K-map reduction and Quine McCluskey method
4. Design, implement and analyze, asynchronous and synchronous sequential circuits (FSM) using flip flops.
5. Explain the various 74XX series components and their applications in designing combinational & low complexity sequential circuits.

Course Contents

		Hours
Unit I	**Logic Families:** Logic Families – Significance and Types, Characteristic Parameters, Transistor Transistor Logic (TTL), Emitter Coupled Logic (ECL), NMOS and PMOS Logic, CMOS Logic Family, Comparison of Different Logic Families.	6
Unit II	**Minimization Techniques and Logic Gates:** Minimization Techniques: Boolean postulates and laws – De Morgan's Theorem Principle of Duality Boolean expression Minimization of Boolean expressions – Minterm – Maxterm Sum of Products (SOP) – Product of Sums (POS) – Karnaugh map Minimization – Don't care conditions – Quine Mc Cluskey method of minimization. Logic Gates: AND, OR, NOT, NAND, NOR, Exclusive–OR and Exclusive–NOR Implementations of Logic Functions using gates, NAND–NOR implementations – Multilevel gate implementations, TTL and CMOS Logic and their characteristics – Tristate gates	8
Unit III	**Combinational Circuits:** Design procedure – Half adder, Full Adder, Half Subtractor, Full Subtractor, Parallel binary adder, parallel binary Subtractor, Fast Adder Carry Look Ahead adder, Serial Adder/Subtractor BCD adder – Binary Multiplier – Binary Divider Multiplexer/Demultiplexer – decoder encoder – parity	

checker – parity generators – code converters Magnitude Comparators. 6

Unit IV **Sequential Circuits:**

Latches, Flip flops- SR, JK, D, T, and Master Slave – Characteristic table and equation –Application table – Edge triggering – Level Triggering.

Realization of one flip flop using other flip flops – serial adder/Subtractor Asynchronous Ripple or serial counter – Asynchronous Up/Down counter Synchronous counters – Synchronous Up/Down counters – Programmable counters – Design of Synchronous counters: state diagram State table –State minimization –State assignment Excitation table and maps Circuit implementation Modulo– n counter, Registers – shift registers Universal shift registers – Shift register counters – Ring counter – Shift counters Sequence generators. 8

Unit V **Memory Devices:**

Classification of memories – ROM, ROM organization, PROM –EPROM – EEPROM –EAPROM, RAM – RAM organization – Write operation – Read operation.

Programmable Logic Devices – Programmable Logic Array (PLA) Programmable Array Logic (PAL) – Field Programmable Gate Arrays (FPGA), ASIC, Implementation of combinational logic circuits using ROM, PLA, PAL 7

Unit VI **State Machines:**

FSM, Moore/Mealy machines, representation techniques, state diagram, state table, state assignment and state reduction, implementation using D flip flop, Application like sequence detector, binary adder etc., Effect of clock skew and clock jitter on synchronous designs (Meta stability), Introduction to ASM 7

Note:

- Tutorials for the subject shall be engaged in minimum of four batches (batch size of 20 students Maximum) per division.
- Teachers Assessment shall consist of minimum 8 tutorials from entire syllabus.

Course Outcome (CO):

Upon successful completion of this course, the student will be able to:

1 Apply Boolean laws/K-Map/Quine McCluskey method to reduce Boolean functions and design combinational logic circuits using logic gates
2 Demonstrate the operation of flip-flops, counters and shift registers
3 Design Synchronous sequential machine using Moore and Mealy machine
4 Distinguish between various memories and implementation of digital circuits using PLA and PAL
5 Demonstrate logical skills, debugging skills in designing small digital circuits for industrial applications

Text Books

1 R.P. Jain, “Modern Digital Electronics”, 4th edition, Tata McGraw - Hill Education, 2010.

2 Primer , J. Bhasker, “A VHDL”, 3rd edition, PHI Learning, 2009
3 M. Morris Mano, “Digital Design”, Pearson Education (3rd Edition) (Unit 1,2,3,4)

Reference Books

1 William I. Fletcher, “An Engineering Approach to Digital Design”, PHI/ Pearson.
2 Anil K. Maini, “Digital Electronics principles and Integrated Circuits”, Wiley Publications.
3 A. Anand Kumar, “Fundamentals of digital circuits”, 1st edition, PHI publication, 2001.

Useful Links

1 https://en.wikibooks.org/wiki/Digital_Electronics
2 www.asic-world.com
3 *www.electronics-tutorials.com*
4 http://nptel.ac.in/courses/117106086/
5 http://10.0.0.208/NPTEL%20Videos/ELETRONICS%20&%20ELECTRICAL%20ENGG/digitalintegratedcircuits

Mapping of CO and PO

	PO												PSO	
	a	B	c	d	E	f	g	h	i	j	k	l	m	n
CO1	√	√	√					√		√	√	√		√
CO2	√									√	√		√	√
CO3	√	√	√		√			√		√	√	√		
CO4	√	√			√			√		√	√			√
CO5	√	√	√	√	√		√	√	√	√	√	√		

Assessment Pattern

Knowledge Level	CT1	CT2	TA	ESE
Remember	5		2	10
Understand	5	5	2	10
Apply		5	2	10
Analyse	5	5	2	10
Evaluate			2	10
Create				10
Total	15	15	10	60

Government College of Engineering Karad
Second Year B. Tech
EX305 : Transducers and Measurements

Teaching Scheme		**Examination Scheme**	
Lectures	3 Hrs/week	**CT1**	15
		CT2	15
		TA	10
		ESE	60

Total Credits: 3

Course Objectives:

The course aims to:

1. Explain students the fundamental concepts of measurement.
2. Make students aware of various electronic measuring instruments.
3. Provide students an understanding of measurement using Bridge circuits.
4. Explain students the concepts transducers and sensors.
5. Make students able to understand and perform signal conditioning operations.

Course Contents

		Hours
Unit I	**Measurement fundamentals:** Introduction to measurement , Performance Characteristics, Static Characteristics, Error in Measurement, Types of Static Error, Sources of Error, Dynamic Characteristics, Statistical Analysis, Graphical Representation of Measurements as a Distribution	06
Unit II	**Measuring devices:** CRO, Digital storage oscilloscope, Function generators, Digital voltmeters(DVM), digital multimeters, Signal Generators, Spectrum analyzer, logic analyzer, digital frequency meter, Q-meter, LED, LCD, Graphics Display	08
Unit III	**AC and DC Bridges:** Need of Bridges, Measurement of Resistance, inductance, capacitance, frequency and Q of coil with Bridges, : Wheatstone's Bridge, Kelvin Double Bridge, AC Bridges such as Haye's Bridge, Wein Bridge, Maxwell's-Wein Bridge, Maxwell' L/C Bridge, Descourty's Bridge & Schering Bridge	06
Unit IV	**Transducers and Sensors :** Definition of transducers and study of following transducers: (i) Position and motion (ii) Strain, Force, Pressure and Flow (iii) Temperature (iv) Sound Transducer (v) Digital Transducers (vi) Proximity Devices (vii) optical Sensors (viii) Smart Sensors	10
Unit V	**Data acquisition and Signal Conditioning techniques :** Elements of data acquisition system, AC to DC conversion,	06

amplification, OP-AMP and instrumentation amplifier, programmable gain amplifier, theory of active filters, modulators and demodulators, attenuators, comparators, ADC and DAC, introduction to Digital Signal Processing and its applications

Course Outcome (CO):

Upon successful completion of this course, the student will be able to:

1 Understand the basic concepts and need of measurement.
2 Use various transducers and sensors for measurement purpose.
3 Understand the fundamentals and design of signal conditioning circuits.
4 Use and design of Bridge circuits for measurements of various parameters like resistance, inductance, capacitance and frequency and understand its importance in measurement.

Text Books

1 A.K.Sawhney, "A course in Electrical, Electronics measurement and Instrumentation", Danpat Rai Publication.
2 H. S. Kalsi, "Electronic Instrumentation", MGH, 3rd Edition.
3 S. Tumanski, "Principles of electronic measurement", Taylor and Francis Publication.
4 Rohit Khurana, "Electronic Instrumentation and Measurement", first edition, Vikas Publication.

References

1 Welfrick Cooper, "Electronic Instrumentation and Measurement Techniques", PHI Publication.
2 John Turner, "Instrumentation for Engineers And Scientists" , II Edition , Wiley.
3 David A Bell, "Electronic Instrumentation and Measurements", Third Edition, Oxford.
4 James W Dally, "Instrumentation for Engineering Measurements", II Edition, Wiley.

Useful Links

1 www.analogcircuits.com
2 NPTEL- Mechatronics and Manufacturing automation

Mapping of CO and PO

	PO												PSO	
	a	B	c	d	e	f	g	h	i	j	k	l	m	n
CO1	√	√	√	√	√				√		√	√	√	√
CO2	√	√	√	√	√				√		√	√	√	√
CO3	√	√	√	√	√				√		√	√	√	√
CO4	√	√	√	√	√				√		√	√	√	√

Assessment Pattern

Knowledge Level	CT1	CT2	TA	ESE
Remember	5		2	10
Understand	5	5	2	10
Apply		5	2	10
Analyse	5	5	2	10
Evaluate			2	10
Create				10
Total	15	15	10	60

Government College of Engineering, Karad
Second Year B. Tech
EX306: Electronic Devices and Circuits Lab

Laboratory Scheme		**Examination Scheme**	
Practical	2 Hrs/week	**CA**	25
		ESE	25

Total Credits: 1

Course Objectives:

This course aims to:

1. Understand how to use breadboard and mounting of active / passive components on breadboard.
2. Understand the various diode application circuits with detail analysis.
3. Understand the configurations of transistor with their frequency response.
4. Understand the build and testing of different types of voltage regulator.

Course Contents

Experiment 1 Design and analysis of full wave rectifier using filters.

Experiment 2 Study of different types of clipper circuits.

Experiment 3 Study of different types of clamping circuits.

Experiment 4 Design and study of Low pass filter

Experiment 5 Design and study of High pass filter.

Experiment 6 Design and analysis of common emitter amplifier and FET amplifier.

Experiment 7 Design and analysis of zener shunt regulator

Experiment 8 Design and analysis of series pass voltage regulator.

Experiment 9 Design and analysis of transistorized shunt regulator.

Experiment 10 Determination of H-parameter for CE configuration using input and output characteristics.

List of Submission

1. Total number of Experiments: 10
2. Total number of sheets: NA
3. Project/Dissertation Report: NA
4. Seminar report: NA
5. Field Visit Report: NA

Additional Information

Course Outcome(CO):

Upon successful completion of this course, the student will be able to:

1 Handle various electronic devices, instruments and circuits as well as Bread board and routing on breadboard.
2 Design and test diode related circuits on breadboard and measurement of their parameters.
3 Build and implement various type of regulators
4 Design BJT and FET amplifiers.

Mapping of CO and PO

	PO												PSO	
	a	B	c	d	e	f	g	h	i	j	k	l	m	n
CO1			√							√	√			
CO2	√		√							√	√		√	
CO3	√		√	√	√					√	√			
CO4	√		√	√	√						√	√	√	√

Assessment Pattern

Skill Level	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6	Exp 7	Exp 8	Exp 9	Exp 10	TA	ESE
Assembling												
Testing	√	√	√	√	√	√	√	√			√	√
Observing	√	√	√	√	√	√	√	√	√	√	√	√
Analysing	√		√						√	√	√	√
Interpreting									√	√	√	√
Designing	√	√	√	√	√	√	√	√			√	√
Creating												√
Deducing conclusions	√	√	√	√	√	√	√	√	√	√	√	√
Total	10	10	10	10	10	10	10	10	10	10	25	25

Government College of Engineering, Karad
Second Year B. Tech
EX307: Microcontroller and Interfacing Lab

Laboratory Scheme		**Examination Scheme**	
Practical	2 Hrs/week	**CA**	25
		ESE	25

Total Credits: 1

Course Objectives:

This course aims to:

1. Understand the Assembly language programming for 8051
2. Understand the various peripheral devices and their interfacing
3. Understand the programming and virtual simulation of system designed in PROTEUS
4. Understand the working of various inbuilt modules like Timers, counters, Interrupts, etc.

Course Contents

Experiment 1

a) Write a program to add two 8-bit numbers stored in registers or internal/External memory locations.

b) Write a program to multiply two 8-bit numbers stored in registers or internal/External memory locations.

c) Write a program to multiply two 16-bit numbers.

Experiment 2

a) Write a program to add block of data stored in internal/external memory locations.

b) Write a program to transfer block of data from internal memory locations to external memory locations.

c) Write a program to sort block of data in ascending or descending order.

Experiment 3

a) Write a program to perform the following.

1. Keep monitoring P1.2 until it becomes high.
2. When P1.2 becomes high write value 45H on P0.
3. Sent a high to low pulse to P2.3

b) A switch is connected to P1.7. Write a program to check the status of switch and perform the following.

1. if switch = 0, send letter “N” to P2
2. if switch = 1, send letter “Y” to P2.

Experiment 4

a) Write a program to generate 5 KHz pulse waveform of 50% duty cycle on pin 1.0 using timer 1 in mode 2.

b) Write a program to generate 1 KHz pulse waveform of 70% duty cycle on pin 1.0 using timer.

Experiment 5

a) Write a program for the 8051 to transfer letter “A” serially, continuously.

b) Write a program to transfer the message “YES” serially. Do this continuously.
c) Program the 8051 to receive bytes of data serially, and put them in P1.

Experiment 6 Interfacing ADC and DAC.

Experiment 7 Interfacing Matrix Keyboard.

Experiment 8 Interfacing LED and LCD Displays.

Experiment 9 Interfacing Stepper Motor.

Experiment 10 Controlling DC motor using PWM.

List of Submission

1 Total number of Experiments:10
2 Total number of sheets: NA
3 Project/Dissertation Report: NA
4 Seminar report: NA
5 Field Visit Report: NA

Additional Information

Course Outcome(CO):

Upon successful completion of this course, the student will be able to:

1 Write assembly as well as c programs for microcontroller
2 Design delays using timers in 8051
3 Interface ADC,DAC, LCD, LED, Keyboard, Stepper motor, DC motor etc. with 8051
4 Differentiate between microprocessor and microcontroller

Mapping of CO and PO

	PO												PSO	
	a	B	c	d	e	f	g	h	i	j	k	l	m	n
CO1	√	√	√							√	√			
CO2	√	√	√							√	√			
CO3		√	√	√							√			
CO4											√			

Assessment Pattern

Skill Level	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6	Exp 7	Exp 8	Exp 9	Exp 10	TA	ESE
Assembling												
Testing												
Observing	√	√	√	√	√	√	√	√	√	√	√	√
Analysing	√	√				√	√		√		√	√
Interpreting		√	√						√	√	√	√
Designing	√	√	√	√	√	√	√	√	√		√	√
Creating											√	√
Deducing conclusions	√	√	√	√	√	√	√	√	√		√	√
Total	10	10	10	10	10	10	10	10	10	10	25	25

Government College of Engineering, Karad
Second Year B. Tech
EX308: Digital Electronics Lab

Laboratory Scheme		**Examination Scheme**	
Practical	2 Hrs/week	**CA**	25
		ESE	25

Total Credits: 1

Course Objectives:

This course aims to:

1. Understand principles, characteristics and operations of combinational & sequential logic circuits.
2. Design combinational circuits by using logic gates
3. Explain Boolean algebra and the various methods of Boolean function reduction, K-map reduction and Quine McCluskey method
4. Design, implement and analyse, asynchronous and synchronous sequential circuits (FSM) using flip flops.
5. Explain the various 74XX series components and their applications in designing combinational & low complexity sequential circuits.

Course Contents

Experiment 1 Realization of logic gates OR, AND, NOT, NOR, NAND gates using IC's/ discrete components and verify their truth tables using timing diagram

Experiment 2 Design code convertors (Any two)

Experiment 3 Prototyping of source to destination communication using MUX (IC 74151) and DEMUX(IC 74138)

Experiment 4 Realization of IC7483 as parallel adder and substractor

Experiment 5 Design and build 4-bit, 5-bit & 8-bit comparator using IC 7485

Experiment 6 Realization of all modes of universal shift register using IC IC 7495

Experiment 7 Design and build 4 bit comparator using IC 74181

Experiment 8 Implement and evaluate using oscilloscope Mod-N counter (IC 7490)

Experiment 9 Design, implement and test 4 bit sequence detector using IC 7474

Experiment 10 Design ring and Johnson counter using flip-flops

Experiment 11 Design 4-bit UP/DOWN synchronous counter using IC

Experiment 12 Mini project based on digital circuits on breadboard/ PCB

List of Submission

1 Total number of Experiments :10
2 Total number of sheets:00
3 Project Report of mini project:01

Additional Information

Course Outcome(CO):

Upon successful completion of this course, the student will be able to:

1 Designing combinational logic circuits using logic gates
2 Designing sequential logic circuits using flip-flop ICs
3 Demonstrate logical skills, debugging skills in designing small digital circuits

Mapping of CO and PO

	PO												PSO	
	a	B	c	d	e	f	g	h	i	j	k	l	m	n
CO1	√	√	√					√		√	√			√
CO2	√	√	√					√		√	√			√
CO3	√	√	√	√	√		√	√	√	√	√	√	√	√

Assessment Pattern

Skill Level	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6	Exp 7	Exp 8	Exp 9	Exp 10	Exp 11	Exp 12	TA	ESE
Assembling	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Testing	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Observing	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Analysing	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Interpreting	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Designing		√			√		√		√	√	√	√	√	√
Creating												√	√	√
Deducing conclusion	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Total	10	10	10	10	10	10	10	10	10	10	10	10	25	25

Government College of Engineering Karad
Second Year B. Tech
EX309 : Embedded C

Teaching Scheme		**Examination Scheme**	
Tutorial	1 Hr/week	**CA**	50
Practical	2 Hrs/week	**ESE**	--

Total Credits: 2

Course Objectives:

The course aims to:

1. Learn fundamentals of C, forming the programming platform.
2. Provide an introduction and basic understanding of Types of Memory data Allocations i.e. Data Structures with basic Programming Knowledge.
3. Practice programs on 8051 simulator and hardware kit via Embedded C Programming.

Course Contents

		Hours
Module I	**Introduction & Overview:** Introduction to theory of C Programming. Introduction to Turbo C and Code::Blocks software.	1
Module II	**Arrays:** Introduction, linear arrays, representation of linear array in memory, traversing linear arrays, inserting & deleting, Multidimensional arrays.	1
Module III	**Sorting and Searching:** Sorting: bubble sort, selection sort, insertion sort. Searching: linear search, binary search.	1
Module IV	**Pointers:** Pointers: pointer arrays.	1
Module V	**Records:** Records: Record structures, representation of records in memory, parallel arrays, matrices, space matrices.	1
Module VI	**Stacks and Queues:** Introduction to stacks, stack as an Abstract Data type, Operations on Stacks, Applications. Queue as an abstract data type, operations, representation, circular, double ended, priority, applications.	1
Module VII	**Embedded ‘C’ Programming for 8051:** Introduction to Embedded C Programming using Keil µVision IDE. Key words, memory models, memory types, data types, bit types, pointers.	1

Module VIII	**Embedded 'C' Programming for 8051:** Functions interrupt functions, re-entrant functions.	1
Module IX	**Embedded 'C' Programming for 8051:** Time delay, I/O Programming	1
Module X	**Embedded 'C' Programming for 8051:** Logic operations, Data conversions	1
Module XI	**Embedded 'C' Programming for 8051:** accessing code ROM space	1
Module XII	**Embedded 'C' Programming for 8051:** Data serialization	1

Lab Course Contents

(Note: Instructor can conduct any 5 Experiments from 1-7 and any 5 experiments from 8-14.)

Experiment 1	Introduction to C Programming: Any three basic C programs. (Two programmes should be given for practice and last problem of session should be given for students for algorithm development and implementing the same in C. The same problem should be in the lab file of students. The three programmes may be different for every batch.)
Experiment 2	Array Handling - Traversing an Array, Insertion and Deletion of an element in an Array.
Experiment 3	Sorting Techniques for Arrays - Bubble sort, Selection Sort, Insertion Sort.
Experiment 4	Searching Techniques for Arrays - Linear Search, Binary Search.
Experiment 5	Multi-dimensional Array Handling – To Scan and Display a 2D Array.
Experiment 6	Implementation of Stack using Array.
Experiment 7	Implementation of Queue using Array.
Experiment 8	Arithmetic& Logical operations using 8085 using Embedded C
Experiment 9	Data transfer & Exchange using 8085 using Embedded C
Experiment 10	Data conversions using 8085 using Embedded C
Experiment 11	Timer & counter operation in 8051 using Embedded C
Experiment 12	Interface LCD to 8051 using Embedded C

Experiment 13 Serial Communication with 8051 using Embedded C

Experiment 14 Interface Stepper motor using 8051 using Embedded C

List of Submission

1. Total number of Experiments = 10 (Any 5 from 1-7 and any 5 from 8-14.)
2. Total number of sheets = Not Applicable
3. Project/Dissertation Report = Not Applicable
4. Seminar report = Not Applicable
5. Field Visit Report = Not Applicable

Course Outcomes (CO):

Upon successful completion of this course, the student will be able to:

1. Apply knowledge of Programming in the Fields of C Programming as well as in Microcontrollers.
2. Understand the basic programming concepts of C.
3. Develop Logic to Design an algorithm for C as well as Microcontroller Programming.

Text Books

1. V. Kanetkar, “Let us C”, BPB Publication.
2. G. S. Baluja, “Data Structures using C”, Dhanpat Rai Publication.
3. C51 compiler user guide By Keil software.

References

1. Mark Allen Weiss, “Data structure & algorithm analysis in C”, Pearson Education.
2. Muhammad Ali Mazidi & Janice Gillispie Mazidi, “The 8051 Microcontroller & Embedded Systems”, Pearson Edition L. P .E.
3. Kenneth L Short, “Microprocessors and Programmed logic”, Prentice-Hall.
4. Douglas V Hall, “Microprocessors and Digital Systems”, McGraw-Hill, 1980.
5. Kenneth C Ayala, “The 8051 Microcontroller”, 3rd Edition, Pearson Education.

Useful Links

1. http://nptel.ac.in/courses/Webcourse-contents/IIT-KANPUR/microcontrollers/micro/ui/Course_home2_5.htm
2. http://nptel.ac.in/courses/106103069/

Mapping of CO and PO

	PO												PSO	
	a	b	c	d	e	f	g	h	i	j	k	l	m	n
CO1	√	√	√	√							√	√	√	√
CO2	√	√	√	√							√	√	√	√
CO3	√	√	√	√							√	√	√	√
CO4	√	√	√	√							√	√	√	√

Assessment Pattern

Skill Level	Experiments														TA
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Assembling															
Testing	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Observing	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Analysing															
Interpreting	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Designing	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Creating															
Deducing conclusions	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	10	10	10	10	10	10	10	10	10	10	10	10	10	10	50

Government College of Engineering Karad
Second Year B. Tech.
CC 301: Environmental Studies

Teaching Scheme		**Examination Scheme**	
Lectures	3Hrs/week	**CT1**	15
Laboratory	-	**CT2**	15
Total Credits	0 (Audit)	**TA**	10
		ESE	60

Course Objectives:

1. To learn key concepts from Economic and Social analysis as they pertain to design and evaluation of environmental policies and institutions.
2. To learn concepts and methods from ecological and physical sciences and their applications in environmental problem solving.
3. To study the ethical, cross cultural and historical context of environmental issues and the links between human and natural systems.

Course Contents

		Hours
Unit I	**Natural Resources and Associated Problems:** Nature of Environmental Studies**:** Definition, scope and importance. Multidisciplinary nature of environmental studies Need for public awareness. a) Environment resources: Use and over-exploitation, deforestation, dams and their effects on forests and tribal people. b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams benefits and problems. c) Mineral resources: Usage and exploitation. Environmental effects of extracting and using mineral resources. d) Food resources: World food problem, changes caused by agriculture effect of modern agriculture, fertilizer-pesticide problems. e) Energy resources: Growing energy needs, renewable and nonrenewable energy resources, use of alternate energy sources. Solar energy, Biomass energy, Nuclear energy. f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.	**8**
Unit II	**Ecosystems:** Concept of an ecosystem. Structure and function of an ecosystem. Producers, consumers and decomposers. Energy flow in the ecosystem. Ecological succession. Food chains, food webs and ecological pyramids. Introduction, types, characteristics features, structure and function of the following ecosystem :- a) Forest ecosystem, b) Grassland ecosystem, c) Desert ecosystem, d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).	**6**

Unit III	**Biodiversity and its conservation :** Introduction- Definition: genetic, species and ecosystem diversity. Bio-geographical classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. India as a mega- diversity nation. Western Ghat as a biodiversity region. Hot-spot of biodiversity. Threats to biodiversity habitat loss, poaching of wildlife, man- wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.	**6**
Unit IV	**Environmental Pollution:** Definition: Causes, effects and control measures of: Air pollution, Water pollution, soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards. Solid waste Management: Causes, effects and control measures of urban and industrial wastes. Role of a individual in prevention of pollution.	**6**
Unit V	**Social Issue and Environment:** Disaster management: floods, earthquake, cyclone, tsunami and landslides. Urban problems related to energy Water conservation, rain water harvesting, watershed management Resettlement and rehabilitation of people; its problems and concerns. Environmental ethics: Issue and possible solutions. Global warming, acid rain, ozone layer depletion, Social Environment, sustainability nuclear accidents and holocaust. Wasteland exclamation. Consumerism and waste products.	**8**
Unit VI	**Environmental Protection :** From Unsustainable to Sustainable development. Environmental Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act. Population Growth and Human Health, Human Rights, Environment Impact Assessment, Green Tribunals.	**8**

Field Work :

Visit to a local area to document environmental assets-river/Forest/Grassland/Hill/Mountain.
OR
Visit to a local polluted site - Urban / Rural / Industrial /Agricultural.
OR
Study of common plants, insects, birds.
OR
Study of simple ecosystems - ponds, river, hill slopes, *etc*.

Course Outcome:

1 Students will explain key concepts from Economic, and Social analysis as they pertain to design and evaluation of environmental policies and

institutions.

2 Student will appreciate concepts and methods from ecological and physical sciences and their applications in environmental problem solving.

3 Student will appreciate the ethical, cross cultural and historical context of environmental issues and the links between human and natural systems.

4 Student will reflect critically about their roles and identities as citizens, consumers, environmental actors in a complex and interconnected world.

Text Books:

1 Text Book of Environmental Studies by Dr. P.D. Raut from Shivaji University. (Edition 2013)

2 Concise Environmental Studies by Dr. Madhukar Bachulkar, B.V. Kulkarni, Sharvil A. Shah. R.K. Publications. (Edition 2014)

3 Miller T.G. Jr., Environmental Science. Wadsworth Publications Co. (Edition 2007)

4 Townsend C., Harper, J. and Michael Begon, Essentials of Ecology, Blackwell Science. (Edition 2012)

5 Trivedi R.K. and P.K. Goel, Introduction to air pollution, Techno-Science Publications. (Edition 2010)

References:

1 Agarwal, K.C.2001, Environmental Biology, Nidi Pub. Ltd., Bikaner. (Edition 2011)

2 BharuchaErach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad 380013, India, Email:mapin@icenet.net (Edition 2008)

3 Cunningham, W.P. Cooper, T.H.Gorhani, E. & Hepworth, M.T.2001, Environmental Encyclopedia, Jaico Pub. Mumbai, 1196p (Edition 2010)

4 De A.K., Environmental Chemistry, Wiley Wastern Ltd. (Edition 2014)

5 Down to Earth , Centre for Science and Environment , New Delhi. (Edition 2011)

6 Trivedi R.K. Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, vol. I and II, Environmental Media. (Edition 2014)

7 The Water (Prevention and Control of Pollution) Act, 1974

8 The Air (Prevention and Control of Pollution) Act, 1981

9 The Environment (Protection) Act, 1986

10 Hazardous Wastes (Management and Handling) Rules, 1989

11 The Forest (Conservation) Act, 1980

12 The Wildlife Protection Act, 1972

13 The National Environment Tribunal Act, 1995

14 The Noise Pollution Act, 1974

Mapping of CO and PO

	PO 1	PO 2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1		√	√	√	√	√	√		√	√	√	√		
CO2	√		√	√	√	√	√		√		√			
CO3		√		√	√	√	√		√	√	√	√		
CO4	√	√	√	√	√	√	√			√		√		

Assessment Pattern

Knowledge Level	CT1	CT2	TA	ESE
Remember	3	3	2	12
Understand	3	3	2	12
Apply	3	3	2	12
Analyze	3	3	2	12
Evaluate	3	3	2	12
Total	15	15	10	60

Government College of Engineering, Karad
Second Year B. Tech
EX401: Analog Integrated Circuits

Teaching Scheme		**Examination Scheme**	
Lectures	3 Hrs/week	**CT1**	15
		CT2	15
		TA	10
		ESE	60

Total Credits: 3

Course Objectives:

This course aims to:

1. Understand the different type of feedback amplifiers.
2. Understand the multistage amplifier, configurations of differential amplifiers (DC & AC).
3. Understand the electrical parameters of Op-Amp.
4. Understand the design of various applications of Op-Amp.
5. Understand the signal generators and multivibrators.

Course Contents

		Hours
Unit I	**Feedback Amplifier :** Classification of amplifiers, Feedback concept, Transfer gain with feedback, General characteristics of negative feedback amplifier, Input and output resistance, Voltage - series, current - series, voltage – shunt, current shunt amplifiers. Darlington Emitter follower.	6
Unit II	**Multistage and Differential Amplifiers:** Cascaded amplifier, cascade amplifier, multistage RC coupled amplifier. Differential Amplifier: configurations, DC analysis, AC analysis using r parameter (Dual Input Balanced output & Dual Input Unbalanced Output), Current mirror circuits.	6
Unit III	**Basics Op-Amp:** Definition, symbol, Block diagram of OP-AMP, Ideal parameters and practical parameters of OP-AMP and their comparison, Virtual ground concept, Open loop configuration, closed loop configuration(Inverting and Non Inverting), unity gain amplifier. Introduction to IC 741.	6
Unit IV	**Applications of Op-amp:** Summing, Scaling & Averaging Amplifiers using Op-amps, Instrumentation amplifier, V to I & I to V Converter, Precision Rectifiers, Log & Anti-log Amplifiers, comparator, Schmitt Trigger, Window Detector, Clippers & Clampers, V to F and F to V convertor, Peak Detectors and Sample & Hold Circuits. Introduction to PLL.	6

Unit V	**Active Filters and Waveform Generator:** High Pass filter, Low Pass filter (First & Second order), Band Pass filter, Band Reject filter, All Pass filter. Square wave generator, Triangular wave generator, Saw tooth wave generator (Design & Analysis using Op-Amp).	6
Unit VI	**Oscillators and Multivibrators:** Use of positive feedback, Barkhausen criterion for oscillations, Different oscillator circuits: Hartley, Colpitts, phase shift and Wien's bridge (Using Op-Amp). Basics of IC 555, Multi-vibrator using IC 555 (Monostable, Bistable and Astable).	6

Course Outcome (CO):

Upon successful completion of this course, the student will be able to:

1. Design and explain feedback amplifiers.
2. Analyse and design electronic circuits such as wave shaping circuits, multistage amplifiers and differential amplifier.
3. Explain basics of op-amp.
4. Explain the working of various circuits for different applications designed using IC 741, IC555.
5. Solve problem related to op-amp.

Text Books

1. Jacob Millman, "Integrated Electronics", Mc Graw Hill second Edition.
2. Ramakant A. Gayakwad, "Op-Amp and Linear Integrated Circuits", Pearson Education.

Reference Books

1. Robert L. Boylsted, Louis Nashelsky, "Electronic devices & circuit theory", Pearson Education
2. Sedra smith, "Microelectronics Circuits", Oxford International student edition.
3. Robert Coughlin, Fredric Driscoll, "Operational Amplifiers and Linear Integrated", Sixth edition, PE.
4. D. Roy Choudhury, "Linear Integrated Circuits", New Age International Ltd.

Useful Links

1. http://nptel.ac.in/courses/117106030/
2. www.allaboutcircuits.com
3. www.electronics-tutorials.ws

Mapping of CO and PO

	PO												PSO	
	a	b	c	d	e	f	g	h	i	j	k	l	m	N
CO1	√		√		√					√	√	√		√
CO2	√		√							√	√	√		√
CO3	√		√		√						√	√	√	
CO4	√		√	√	√						√			√
CO5	√		√							√				√

Assessment Pattern

Knowledge Level	CT1	CT2	TA	ESE
Remember	5	4	2	10
Understand	5	4	2	10
Apply		2	2	10
Analyse		2	2	10
Evaluate	5	3	2	10
Create				10
Total	15	15	10	60

Government College of Engineering, Karad
Second Year B. Tech
EX402: Network Analysis

Teaching Scheme		**Examination Scheme**	
Lectures	3 Hrs/week	**CT1**	15
		CT2	15
		TA	10
		ESE	60

Total Credits: 3

Course Objectives:

This course aims to:

1. Understand use of circuit analysis methods and theorems
2. Understand basic concepts of D.C. and A.C. Circuit behaviour
3. Evaluate two port network parameters
4. Demonstrate series and parallel resonance and its effects
5. Develop and Solve mathematical representations for linear circuits

Course Contents

		Hours
Unit I	**Network Fundamentals**: Basic Definitions: Passive Network, Active Network, Linear Element, nonlinear elements, Unilateral, bilateral, lumped & distributed elements. Representation of voltage & current sources (Ideal & practical), source transformation, series & parallel connection of passive elements(R,L,C), Energy and Power computation, graph of network & its parts, loops & trees, linear graphs & incidence matrix, cutsets, planner & non-planner graph loop matrix. Star- Delta transformation, reduction of networks: Mesh analysis, Node analysis. Supermesh and supernode analysis.	8
Unit II	**Network Theorems**: A. C. Analysis – Average value, R.M.S. value, Power, active power, reactive power, complex power, power factor, D.C. and A.C. network solution using dependent and independent sources: Superposition Theorem, Millman's Theorem, Norton's Theorem, Thevenin's Theorem, Maximum Power Transfer Theorem, Reciprocity Theorem, Duality theorem, Tellegen's Theorem.	8
Unit III	**Two port networks and network functions**: Two port network: Open circuit impedance (Z) parameters, Short circuit admittance (Y) parameters, Hybrid (H) parameter, Transmission parameters(ABCD), Interrelation of different parameters, Interconnections of two port network (Series, Parallel, Cascaded, Series- Parallel) Network Functions: Network functions for one port & two port networks, Driving point impedance and admittance of one port network, Driving point impedance, admittance & different transfer function of	

two port network (Z, Y, H & T parameters). Concept of complex frequency, significance of poles & zeros. Restrictions on poles & zeros for transfer & drawing points function, stability concept in passive circuit using Routh- Hurwitz criterion, pole zero diagram. 8

Unit IV **Resonance:** Types of resonance: Series & Parallel
Series resonance- resonant frequency, variation of impedance, admittance, current & voltage across L & C with respect to frequency, Effect of resistance on frequency response, Selectivity, B.W. & Quality factor.
Parallel resonance – Anti resonant frequency, variation of impedance & admittance with frequency, Selectivity & B.W. 6

Unit V **Transient Response:** Network Solution using Laplace transforms, Initial Conditions of elements. Steady state & transient response (Voltage & Current) DC response of RL circuit, DC response of RC circuit, DC response of RLC circuit, Sinusoidal response of RL, RC & RLC circuit 6

Course Outcome (CO):

Upon successful completion of this course, the student will be able to:

1 Determine voltage, current, power and impedance at various nodes and loops using simplification techniques
2 Understand and analyze the basic A.C., D.C. circuits using network theorems
3 Characterize, model and analyze the network in terms of network functions and parameters
4 Demonstrate knowledge of resonance in series and parallel circuits
5 Explain characteristics of capacitor, inductor and compute initial conditions for current and voltage in 1^{st} order (RC, RL) and 2^{nd} order (RLC) circuits

Text Books

1 A. Sudhakar , Shyammohan S.Palli, “Circuit & Network – Analysis & Synthesis”, III^{rd} Edition – Tata McGraw Hill Publication
2 A.Chakrabarti, “Circuit Theory (Analysis & Synthesis)”, IIIrd Edition Dhanpat Rai & co.
3 Soni Gupta, “Electrical Circuit Analysis”, Dhanpat Rai & Co.

Reference Books

1 Allan Robbins, Wilhelm C. Miller, “Circuit Analysis Theory and Practice”, Cenage Learning.
2 J. David Irwin, R. Mark Nelms, “Basic Engineering Circuit Analysis”, Wiley Publication
3 William H Hayt, Jack E Kimmerly and Steven M.Durbin, “Engineering Circuit Analysis”, Tata McGraw Hill
4 M.E.Van Valkenburg, “Network Analysis”, IIIrd Edition, Pearson Education/PHI

Useful Links

1 http://www.nptel.ac.in/courses/108102042
2 http://www.ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-002-circuits-and-electronics-spring-2007/

Mapping of CO and PO

	PO												PSO	
	a	B	C	d	E	F	g	h	i	j	K	l	M	N
CO1	√	√	√	√								√	√	√
CO2	√	√	√	√								√	√	√
CO3	√	√	√	√							√	√	√	√
CO4	√	√	√	√						√		√		√
CO5	√	√	√	√	√					√		√		√

Assessment Pattern

Knowledge Level	CT1	CT2	TA	ESE
Remember	3	3	2	12
Understand	3	3	2	12
Apply	3	3	2	12
Analyse	3	3	2	12
Evaluate	3	3	2	12
Create				12
Total	15	15	10	60

Government College of Engineering, Karad
Second Year B. Tech
EX403: Analog Communication

Teaching Scheme		**Examination Scheme**	
Lectures	3 Hrs/week	**CT1**	15
		CT2	15
		TA	10
		ESE	60

Total Credits: 3

Course Objectives:

This course aims to:

1 Implement & analyse the basic analog communication techniques/ circuits with the help of theoretical and practical problem solving.

2 Make strong foundation of time domain and frequency domain analysis of modulation techniques.

3 Estimate noise in communication systems

4 Analyse basics and circuits of pulse modulations

Course Contents

		Hours
Unit I	**COMMUNICATION SYSTEM AND NOISE:** Communication system, need of modulation, types of analog modulation, noise-classification of noise, external noise and internal noise, noise due to several sources, noise due to several amplifier in cascade, noise in reactive circuit	5
Unit II	**AMPLITUDE MODULATION:** frequency spectrum, time and frequency domains, Review of Fourier analysis, Amplitude Modulation (AM), DSB-SC, SSB, VSB and ISB transmissions, mathematical Analysis, modulation index, frequency spectrum, power requirement of these systems, frequency division multiplexing	7
Unit III	**ANGLE MODULATION:** Frequency Modulation (FM), mathematical Analysis, modulation index, frequency spectrum, power requirement of FM, narrowband & wideband FM, pre-emphasis and de-emphasis techniques, phase modulation, power contents of the carrier & the sidebands in angle modulation, generation of FM signals, comparison between AM & FM.	6
Unit IV	**RADIO RECEIVERS:** Basic receiver (TRF), Super heterodyne receiver, performance parameters for receiver such as sensitivity, selectivity, fidelity, image frequency rejection etc., AM detectors, FM discriminators, AGC technique, double-spotting effect	4

Unit V **NOISE ANALYSIS:**

SNR for AM & FM for low noise condition, noise figure, calculation of noise figure, noise figure from measurement, noise temperature, noise reduction characteristics of angle modulation 6

Unit VI **PULSE MODULATION AND MULTIPLEXING**

Sampling theorem, Types of sampling-ideal, natural, flat top sampling, quantization, concept, generation and detection - pulse amplitude modulation (PAM), pulse width modulation (PWM), pulse position modulation (PPM), pulse code modulation (PCM), companding, A-law and μ-law companding, delta modulation(DM), adaptive delta modulation(ADM), Linear predictive coding, multiplexing- frequency division multiplexing and time division multiplexing. 8

Course Outcome (CO):

Upon successful completion of this course, the student will be able to:

1 Know the communication system and be able to analyse different types of noise
2 Analyse different analog modulation techniques
3 Know techniques of transmission and reception of analog signal
4 Know pulse modulation techniques.
5 Be able to analyse multiplexing techniques

Text Books

1 D. Kennedy, “Electronic Communication Systems”, 4th edition, Tata McGraw-Hill, 1999.
2 Taub, Schilling and G.Saha, “Principles of Communication Systems”, 3rd edition, McGrawHill, 1995.
3 B.P. Lathi, “Communication Systems”, BS publications.

Reference Books

1 A. Bruce Carlson, “Communication Systems”, 4th edition, McGraw-Hill, 2006.
2 S. Haykin, “Communication Systems”, 4th edition, John wiley & Sons, 2000.
3 Roddy and Coolen, “Electronic Communication”, 4th edition, Prentice Hall of India, 2003.

Useful Links

1. http://nptel.ac.in/courses/117102059/
2. http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-450-principles-of-digital-communications-i-fall-2006/video-lectures/

Mapping of CO and PO

	PO												PSO	
	a	b	C	d	e	f	g	h	i	j	K	l	m	N
CO1	√	√				√				√	√			√
CO2	√	√	√	√				√			√	√		√
CO3	√	√			√	√	√		√	√				
CO4		√	√	√							√	√		

CO5		√		√								√		

Assessment Pattern

Knowledge Level	CT1	CT2	TA	ESE
Remember	5	5	2.5	15
Understand	5	5		15
Apply			2.5	10
Analyse			2.5	10
Evaluate	5	5	2.5	10
Create				
Total	15	15	10	60

Government College of Engineering, Karad
Second Year B. Tech
EX404 : Signals and Systems

Teaching Scheme		**Examination Scheme**	
Lectures	3 Hrs/week	**CT1**	15
		CT2	15
		TA	10
		ESE	60

Total Credits: 3

Course Objectives:

This course aims to:

1. Describe basic signals mathematically and understand how to perform mathematical operations on signals.
2. Understand systems classification, properties & apply skills to solve problems.
3. Know the Fourier series & Transforms for representation of periodic and periodic signals.
4. Analyse the systems in time & frequency domain by applying knowledge of Fourier & Z-Transforms.

Course Contents

Hours

Unit I **Introduction :**

A) **An introduction to signals and systems:** Definitions of Signals and Systems, Signals and systems as seen in everyday life, and in various branches of engineering and science electrical, mechanical, hydraulic, thermal, biomedical signals and systems as examples. Extracting the common essence and requirements of signal and system analysis from these examples. (1 L)

B) **Signals and Classification of Signals:** Analogy between Signals and Vectors, Continuous time signals & discrete time, analog & digital. (1 L) Basic CT & DT signals: unit impulse, unit step, unit ramp, complex exponential & sinusoidal, sinc, rectangular, triangular and signum. (1 L) Operations on signals: Amplitude Scaling, Addition, Multiplication, Differentiation, Integration, (1 L) Time Scaling and Folding, Time Shifting, Precedence rule. (1 L) Classification of Signals: even & odd signals, periodic & non-periodic, deterministic & non-deterministic, energy & power. Operations on Signals (1 L).

C) **System and Classification of Systems:** System Representation, continuous time Systems & discrete Systems, system with and without memory (static and dynamic), causal and non-causal system, linear and non-linear system, Time invariant and time variant system, Stable and Unstable system, Invertible Systems, properties of systems. (2 L) 8

Unit II **LTI Systems and Convolution:**

Linear time-invariant systems: The representation of signals in term of impulses, discrete time LTI systems, continuous time-LTI systems, properties of CT- LTI and DT-LTI systems. (2 L)

Convolution: Convolution integral & its properties, convolution sum & its properties, Systems described by differential, difference equations, block diagram representation of LTI systems described by differential difference equations, Singularity functions. (4 L) 6

Unit III **Fourier Series for Continuous Time & Discrete Time Signals:**

Continuous time Fourier series: Trigonometric and exponential Fourier series, Relation between trigonometric and exponential Fourier series. Discrete time Fourier Series, properties of Fourier series. 4

Unit IV **Fourier Transform:**

From Fourier series to Fourier Transform, Fourier Transform pair, Fourier Spectra, Convergence of FT.

Properties of Fourier transform: linearity, time shifting, frequency scaling, time scaling, time reversal, duality, differentiation in time domain and frequency domain, Integral in time domain, multiplication, and convolution and Parseval's relation. 6

Unit V **Laplace Transform:**

Definition and its properties, ROC and pole zero concept. Application of Laplace transforms to the LTI system analysis. Inversion using duality, numerical based on properties. Signal analysis using LT. 6

Unit VI **Z transform:**

Introduction of Z-transform, Relation between DTFT and Z-transform, ROC, properties of ROC, Unilateral Z-transform, properties of Z transform: linearity, time shifting, time reversal, time scaling, convolution, differentiation, multiplication, Parseval's theorem, initial value & final value theorem. Inverse Z-transform: long division method, PFE method, residue method. Transfer function (Poles & Zeros), stability and causality. Representation of system via difference equation and solutions. 6

Course Outcome (CO):

Upon successful completion of this course, the student will be able to:

1 Define CT and DT signals mathematically & solve problems related to operations on signals.
2 Classify different systems & understand their properties.
3 Understand the concept of convolution and its applications.
4 Apply different tools like Fourier Series, Fourier Transform, Laplace Transform and

Z-transform to analyse the systems in time and frequency domains.

Text Books

1. Hsu, “Signals & system” (Schaum’s outlines), Tata McGraw Hill
2. Ramesh Babu, “Signals & system”, SciTech Publication.
3. Simon Haykin, Barry Van Veen, “Signals & system”, Wiley publication

Reference Books

1. Michael J. Roberts, “Fundamentals of signals & systems”, Tata McGraw Hill.
2. Mandal and Asif, “Continuous and Discrete Time Signals and Systems”, Cambridge University Press.
3. Dr. D. D. Shaha and Dr. A. C. Bhagali, “Signals and Systems”, MPH.
4. B. P. Lathi, “Signals Systems and Communication”, BS Publications.

Useful Links

1. http://nptel.ac.in/courses/117104074/
2. http://nptel.ac.in/downloads/117101055/
3. http://textofvideo.nptel.iitm.ac.in/video.php?courseId=117104074

Mapping of CO and PO

	PO												PSO	
	a	b	c	d	e	f	g	h	i	j	k	l	m	n
CO1	√	√	√	√							√	√	√	√
CO2	√	√	√	√							√	√	√	√
CO3	√	√	√	√							√	√	√	√
CO4	√	√	√	√							√	√	√	√

Assessment Pattern

Knowledge Level	CT1	CT2	TA	ESE
Remember	5	3	2	12
Understand		3	2	12
Apply	5	3	2	12
Analyze		3	1	12
Evaluate	5	3	3	12
Create			1	
Total	15	15	10	60

***Note for paper setter:** 30% theory and 70% numerical and Design from entire syllabus.

Government College of Engineering, Karad
Second Year B. Tech
EX405: Electromagnetic Engineering

Teaching Scheme		**Examination Scheme**	
Lectures	3 Hrs/week	**CT1**	15
Tutorial	1 Hr/week	**CT2**	15
		TA	10
		ESE	60

Total Credits: 4

Course Objectives:

This course aims to:

1. Provide fundamentals of Static Fields.
2. Explain basics of the vector Differential, Integral operators to Electrostatic & magneto static.
3. Define and derive different laws in Electrostatic & Electromagnetic fields.
4. Explain Maxwell's equations and concepts of EM waves.
5. Study various parameters in transmission line.

Course Contents

		Hours
Unit I	**Basics of electromagnetics**: Review of scalars and vectors, The coordinate system: rectangular, cylindrical and spherical. gradient, divergence and curl. dielectric: permittivity and permeability, differential elements of length, surface and volume.	7
Unit II	**Electrostatic**s : Introduction to Coulomb's law, electric field intensity, field of line charges, field of surface charges, flux density, Gauss's law, divergence theorem, electric potential and potential gradient.dipole and dipole moment, polarisation ,method of images, Boundary conditions for Electrostatic	7
Unit III	**Magnetostatics:** Current and current density, continuity equation, Biot-Savart law, Ampere's circuital law and applications, Stokes theorem, magnetic flux and flux density, vector magnetic potentials. boundary conditions for Magnetostatic	7
Unit IV	**Maxwell's equations** : steady field, time varying fields, Maxwell's equations in point form and integral form	4
Unit V	**Electromagnetic waves** : Electromagnetic wave equation, wave propagation in free space, in a perfect dielectric, and perfect conductor, wave polarization, skin effect, Poynting theorem, reflection and refraction of uniform plane wave at normal incidence plane, reflection at oblique incident angle. Wave propagation through	9

guided media (Rectangular waveguide) and various modes of propagation.

Unit VI **Transmission lines :** Introduction, concept of distributed elements, equations of voltage and current , standing waves and impedance transformation, lossless and low-loss transmission lines, smith chart and impedance matching using transmission lines 8

Note:

- Tutorials for the subject shall be engaged in minimum of four batches (batch size of 20 students Maximum) per division.
- Teachers Assessment shall consist of minimum 8 tutorials from entire syllabus.

Course Outcome (CO):

Upon successful completion of this course, the student will be able to:

1 Comprehend the fundamentals of Electrostatic and Electromagnetic fields.
2 Demonstrate mathematical skills related with differential, integral and vector calculus
3 Apply Gauss' law, Ampere's Law, Biot-Savart law, Faraday's law and laws related with steady magnetic field while solving problems in Electrostatic and Electromagnetic fields.
4 Develop field equations from understanding of Maxwell's Equations.
5 Extend the knowledge of basic properties of transmission lines to analyse electromagnetic wave propagation in generic transmission line geometries.

Text Books

1 W.H Hayt. and J.A. Buck, "Engineering Electromagnetics", 7th edition, Tata McGraw Hill, 2006.
2 G. S. N. Raju, "Electromagnetic Field Theory and Transmission Lines", Pearson Education.
3 E.C. Jordan and K.C. Balamin, "Electromagnetic Waves and Radiating System", 2nd edition, Prentice Hall of India Private Limited, 1985.

Reference Books

1 Rao, Edward C. Jordan, "Elements of Engineering Electromagnetics", 6th edition, Pearson Education, 2006.
2 J. D. Krauss, "Electromagnetics", 3rd edition, Mc-Graw Hill, 1984.
3 S. Ramo and R.Whinnery, "Fields and Waves in Communication Electronics", 3rd edition, John Wiley and Sons, 2009.
4 K. E.Lonngren and S. V. Savov, "Fundamental of Electromagnetic with MATLAB", 1st Prentice Hall of India, 2008.

Mapping of CO and PO

	PO												PSO	
	a	b	c	d	e	f	g	h	i	j	K	l	m	n
CO1	√	√	√							√	√	√		
CO2	√	√	√	√				√		√		√		√
CO3	√	√		√						√	√	√		
CO4	√	√		√	√	√					√	√		
CO5	√				√		√		√			√		√

Assessment Pattern

Knowledge Level	CT1	CT2	TA	ESE
Remember	3	3	5	10
Understand	4	4		10
Apply	4	4		15
Analyze	4	4	5	15
Evaluate				10
Create				
Total	15	15	10	60

Government College of Engineering, Karad
Second Year B. Tech
EX406: Analog Integrated Circuits Lab

Laboratory Scheme		**Examination Scheme**	
Practical	2 Hrs/week	**CA**	25
		ESE	50

Total Credits: 1

Course Objectives:

This course aims to:

1. Understand the characteristics of IC and Op-Amp and identify the internal structure.
2. Understand measurement of frequency response for various amplifiers.
3. Understand and verify results (levels of V & I) with hardware implementation.
4. Analyse and identify linear and nonlinear applications of Op-Amp.

Course Contents

Experiment 1 Design and frequency response of two stage RC coupled amplifier

Experiment 2 Design and frequency response of voltage series feedback amplifier.

Experiment 3 Measurement Op-Amp Parameters. 1) Input Bias current 2) Input Offset current 3) Input Offset voltage 4) CMRR.

Experiment 4 Design of Inverting and Non inverting amplifier using Op-Amp.

Experiment 5 Design, build and test Integrator and Differentiator.

Experiment 6 Design, build and test precision rectifier.

Experiment 7 Design, build and test comparator and Schmitt trigger.

Experiment 8 Design and implementation of Square wave and Triangular wave generator using Op-Amp.

Experiment 9 Design of Active filters (LPF & HPF) using Op-Amp.

Experiment 10 Design and implementation Wien bridge oscillator using Op-Amp.

Experiment 11 Design and simulate monostable and astable multivibrator using multisim.

Experiment 12 Design and simulate clipper and clamper using multisim.

Note: Any 10 practical’s to be conducted from the above list.

List of Submission

1. Total number of Experiments:10
2. Total number of sheet: NA
3. Project/Dissertation Report: NA
4. Seminar report: NA
5. Field Visit Report: NA

Additional Information

Course Outcome(CO):

Upon successful completion of this course, the student will be able to:

1. Handle various electronic devices, instruments and circuits as well as Bread board and routing on breadboard.
2. Design and test BJT amplifiers on breadboard and measurement of their parameters.
3. Build and implement various applications of op-amp and draw output voltage waveforms.
4. Simulate linear & non-linear circuits on software.

Mapping of CO and PO

	PO												PSO	
	a	b	c	d	E	f	g	h	i	j	K	l	m	n
CO1			√							√	√	√		
CO2	√		√							√	√			√
CO3	√		√	√	√					√	√			√
CO4	√		√	√	√						√	√	√	√

Assessment Pattern

Skill Level	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6	Exp 7	Exp 8	Exp 9	Exp 10	Exp 11	Exp 12	TA	ESE
Assembling	√	√	√	√	√	√	√	√	√	√			√	√
Testing	√	√	√	√	√	√	√	√	√	√			√	√
Observing	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Analyzing	√	√					√	√	√		√	√	√	√
Interpreting		√							√		√	√	√	√
Designing	√	√	√	√	√	√	√	√	√	√			√	√
Creating									√	√			√	√
Deducing conclusions	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Total	10	10	10	10	10	10	10	10	10	10	10	10	25	50

Government College of Engineering, Karad
Second Year B. Tech
EX407 : HDL LAB

Teaching Scheme		**Examination Scheme**	
Tutorial	1 Hr/week	**CA**	25
Practical	2 Hrs/week	**ESE**	50

Total Credits: 2

Course Objectives:

This course aims to:

1. Explain students the fundamental concepts of Hardware Description Language and design flow of digital system design.
2. Make students able to design combinational and sequential logic circuits using Data flow and Behavioural modelling styles.
3. Provide students an understanding of structural description for designing of digital circuits.
4. Explain students the concepts of Packages, Functions and Procedures and its usage for designing digital systems.

Course Contents

		Hours
Unit I	**Introduction to HDL**: **Need of HDL**, A brief history of VHDL, design flow, EDA tools, structure of VHDL module, operators, data types, attributes, types of descriptions, simulation and synthesis.	3
Unit II	**Data Flow and behavioural descriptions:** Highlights of data flow descriptions, structure of data flow descriptions, highlights of behavioural descriptions, structure of behavioural descriptions, combinational logic design and sequential logic design (including FSM) using data flow and behavioural modelling styles.	4
Unit III	**Structural Descriptions** : Highlights of structural descriptions, organization of structural descriptions, Binding, Generate, Generic and parameter statements, design of combinational and sequential logic circuits using structural modelling style.	3
Unit IV	**Packages, Functions and Procedures:** Highlights of Packages, functions and Procedures, Function versus Procedures, additional examples on system design.	2

Lab Course Contents

Experiment 1	1) To design and simulate all the logic gates in VHDL and its implementation on CPLD/ FPGA kit. 2) To design and simulate Binary to Gray and Gray To Binary Code Converter

in VHDL and its implementation on CPLD/ FPGA kit.

Experiment 2 1) To design half adder and full adder using Dataflow and behavioural modelling and its implementation on CPLD/FPGA kit.
2) To design half Subtractor and full Subtractor using Dataflow and behavioural modelling and its implementation on CPLD/FPGA kit.

Experiment 3 1) To design and simulate 2X1 MUX, 4X1 MUX, 8X1 MUX using Dataflow and behavioural modelling.
2) To design and simulate 1X2 DEMUX, 1X4 DEMUX, 1X8 DEMUX using Dataflow and behavioural modelling

Experiment 4 1) To design and simulate 4X2 encoder, 8X3 encoder in VHDL using dataflow and behavioural modelling.
2) To design and simulate 2X4 decoder and 3X8 decoder in VHDL using dataflow and behavioural modelling.

Experiment 5 To design and simulate VHDL code for half adder and full adder using structural description and its implementation on CPLD/ FPGA kit.

Experiment 6 To design and simulate VHDL code for 4X1 MUX, 1X4 DEMUX, 4X2 encoder and 2X4 decoder with the help of structural description.

Experiment 7 To design and simulate all the type of flip-flops using sequential constructs.

Experiment 8 1) To design and simulate VHDL code for eight bit shift register.
2) To design and simulate VHDL code for eight bit Johnsons counter.

Experiment 9 To design and simulate VHDL code for sequence detector and its implementation on CPLD/ FPGA kit.

Experiment 10 To design and simulate VHDL code for a full adder using two half adders with the use of PROCEDURE.

List of Submission

1 Total number of Experiments:10
2 Total number of sheets: NA
3 Project/Dissertation Report: NA
4 Seminar report: NA
5 Field Visit Report: NA

Course Outcome (CO):

Upon successful completion of this course, the student will be able to:

1 Implement and demonstrate the design flow of digital circuit design using VHDL.
2 Design combinational circuits like adder, subtractor, multiplexer, Encoder, Decoder, comparator etc. using various description techniques in VHDL.
3 Design the sequential logic circuits like flip-flops, registers, counters, sequence

detectors etc. using various description techniques in VHDL.

4 Design digital systems using VHDL elements like Packages, Functions, Procedures.

Text Books

1 Nazeih M. Botros, “HDL Programming” (VHDL and Verilog), John Weily India Pvt. Ltd. 2008.

2 Stephen Brown and Zvonko Vranesic, “Fundamentals of Digital Logic with VHDL design”, Tata–Mcgraw Hill.

3 Velnoi A. Pedroni, “Circuit Design with VHDL”, MIT Press, Cambridge, Massachusetts

Reference Books

1 Douglas L. Perry, “VHDL Programming by Examples”, fourth Edition, Tata McGraw-Hill.

2 Charles S. Roth, “Principals of Digital System Design using VHDL”, Cengage Learning, Jr. PWS publications.

3 Jayram Bhaskar, “A VHDL Primer”, AWL publication.

4 Enoch O. Hwang, “Digital logic and microprocessor design”, Nelson Engineering; Har/Cdr edition.

Useful Links

1 www.xilinx.com

2 Xilinx synthesis tool details- xst.pdf

3 www.cs.lasierra.edu/~ehwang

Mapping of CO and PO

	PO												PSO	
	a	b	c	d	e	f	g	h	i	j	k	l	m	n
CO1	√	√	√	√	√				√		√	√	√	√
CO2	√	√	√	√	√				√		√	√	√	√
CO3	√	√	√	√	√				√		√	√	√	√
CO4	√	√	√	√	√				√		√	√	√	√

Assessment Pattern

Skill Level	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6	Exp 7	Exp 8	Exp 9	Exp 10	TA	ESE
Assembling												
Testing	√	√	√	√	√	√	√	√	√	√	√	√
Observing	√	√	√	√	√	√	√	√	√	√	√	√
Analysing	√	√	√	√	√	√	√	√	√	√	√	√
Interpreting	√	√	√	√	√	√	√	√	√	√	√	√
Designing	√	√	√	√	√	√	√	√	√	√	√	√
Creating		.										
Deducing conclusions	√	√	√	√	√	√	√	√	√	√	√	√
Total	10	10	10	10	10	10	10	10	10	10	25	50

Government College of Engineering, Karad
Second Year B. Tech
EX408: Analog Communication Lab

Laboratory Scheme		**Examination Scheme**	
Practical	2 Hrs/week	**CA**	25
		ESE	50

Total Credits:1

Course Objectives:

This course aims to:

1 Familiarize several modulation & demodulation techniques in communication
2 Implement communication systems of given specification
3 Enhance mathematical skill as well problem solving power

Course Contents

Experiment 1 Practical implementation of Amplitude modulation and demodulation.

Experiment 2 Calculation of modulation index by graphical method of DSBFC signal & measurement of power of AM wave for different modulating signal.

Experiment 3 SSB modulation using any method (filter method, Phase shift method) and its detection.

Experiment 4 Envelope detector- Practical diode detector.

Experiment 5 Performance and analysis of AM system using trapezoidal method

Experiment 6 Performance and analysis of frequency modulator system and also find the modulation index.

Experiment 7 Experiment on Sampling and reconstruction and also observe aliasing effect by varying sampling frequency.

Experiment 8 Practical implementation of PAM system

Experiment 9 Practical implementation of PPM system

Experiment 10 Practical implementation of PWM system

Experiment 11 Practical implementation of PAM-TDM systems.

Experiment 12 Experiment on Pre-emphasis and De-emphasis.

Experiment 13 Visit to AIR (Compulsory)

NOTE: At least 10 experiments are compulsory out of which minimum 2 should be

performed on simulation software

List of Submission

1 Total number of Experiments: 10
2 Total number of sheets: NA
3 Project Report of Industrial visits: NA

Additional Information

Course Outcome(CO):

Upon successful completion of this course, the student will be able to:

1 Design to modulating & demodulating circuits
2 Perform sampling of signals
3 Analyse various pulse modulation techniques

Mapping of CO and PO

	PO												PSO	
	a	b	c	d	e	f	g	h	i	j	K	l	m	n
CO1	√	√		√	√			√				√		√
CO2		√	√			√		√	√	√	√	√		
CO3	√			√	√		√		√	√				√

Assessment Pattern

Skill Level	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6	Exp 7	Exp 8	Exp 9	Exp 10	Exp 11	Exp 12	TA	ESE
Assembling							√	√	√	√			√	√
Testing		√		√	√						√		√	√
Observing	√		√			√	√	√	√	√		√	√	√
Analysing		√		√		√	√						√	√
Interpreting	√	√	√		√		√					√	√	√
Designing													√	√
Creating						√		√	√	√	√		√	√
Deducing conclusions	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Total	10	10	10	10	10	10	10	10	10	10	10	10	25	50

Government College of Engineering, Karad
Second Year B. Tech
EX409 : Signals and Systems Lab

Laboratory Scheme		**Examination Scheme**	
Practical	2 Hrs/week	**CA**	25
		ESE	--

Total Credits: 1

Course Objectives:

This course aims to:

1. Implement different concepts and methods of handling signals and systems in MATLAB environment.
2. Understand the different MATLAB functions and tools.
3. Effective MATLAB programming using different functions and commands

Course Contents

Experiment 1 Introduction to MATLAB with matrix manipulation techniques.

Experiment 2 Introduction to Graph Plotting: To plot graphs of signals like Basic Signals (both in CT and DT), Addition, Subtraction and Multiplication of given CT and DT signals in MATLAB environment.

Experiment 3 Program for signal operations on Trigonometric Signals: Time Shifting, Time Scaling, Amplitude Shifting, Combined Operations.

Experiment 4 Program using branching and looping statements.

Experiment 5 Program for Classification of Signals and Systems.

Experiment 6 Program for DT Convolution (without and with use of in-built MATLAB function).

Experiment 7 Program for handling complex data.

Experiment 8 Program for obtaining Forward and Inverse Transforms of a given DT Signal. (Forward and Inverse Fourier Transform, Laplace Transform and Z-transform)

Experiment 9 Program using user defined function using MATLAB.

Experiment 10 Program for creating & Displaying GUI using MATLAB.

List of Submission

1. Total number of Experiments: 10
2. Total number of sheets: NA
3. Project/Dissertation Report: NA
4. Seminar report: NA

5 Field Visit Report: NA

Additional Information

Course Outcome(CO):

Upon successful completion of this course, the student will be able to:

1 Implement, test and develop various signal/system handling algorithms in MATLAB.

2 Analyse and simulate the various signals and systems in MATLAB.

3 Use the different commands, functions required for programming in MATLAB

4 Calculate and perform various operations using MATLAB.

Mapping of CO and PO

	PO												PSO	
	a	b	c	d	e	f	g	h	i	j	k	l	m	N
CO1	√	√	√	√	√				√		√	√	√	√
CO2	√	√	√	√	√				√		√	√	√	√
CO3	√	√	√	√	√				√		√	√	√	√
CO4	√	√	√	√	√				√		√	√	√	√

Assessment Pattern

Skill Level	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6	Exp 7	Exp 8	Exp 9	Exp 10	TA	ESE
Assembling												NA
Testing												
Observing	√	√	√	√	√	√	√	√	√	√	√	
Analysing	√	√	√	√	√	√	√	√	√	√	√	
Interpreting	√	√	√	√	√	√	√	√	√	√	√	
Designing	√	√	√	√	√	√	√	√	√	√	√	
Creating												
Deducing conclusions	√	√	√	√	√	√	√	√	√	√	√	
Total	10	10	10	10	10	10	10	10	10	10	25	

Government College of Engineering Karad.
Second Year B. Tech
HS002: General Proficiency-II

Teaching Scheme		**Examination Scheme**	
Lectures	2 Hrs/week	**CA**	50
Practical	2 Hrs/week		
Total Credits	3		

Course Objectives:

1. To introspect, develop a thorough understanding of oneself by identifying one's strengths & weakness
2. To map one's competence /employability skills & improve upon as per the same
3. To improve one's intrapersonal & interpersonal communication by mastering the art of listening & assert oneself while communicating for developing harmonious relationships
4. To identify latent talents and sharpen them into effective tools for success in career
5. To apply practical knowledge for self development focusing upon various skill sets as per industry requirement
6. To live up to the popular saying "the first impression is the last impression", the focus is on building a pleasing personality leading to positive branding of oneself
7. To keep oneself abreast with the social & professional etiquette by working on power dressing, elegant presentation & one's brand management
8. To map one's competence /employability skills & improve upon as per the same

Course Contents
Section I - Language Skills
Duration – 15 hrs

Unit I **Domain: Letter Writing**

The domain letter writing is transacted based on the theme material possession. There are five modules under this domain. Each module has a specific outcome. Each module is dealt with the help of a linguistic tool that is interaction

Module 1 **Duration: 3 hrs**

Objective: Produce & role play a conversation

A trigger (picture/Image/video/ Audio/ Script) is used to initiate interaction through this the class arrives at a common theme. Understands the features of conversation & role play it.

- To read the text critically
- To track one’s own reading process.
- To come out with graphical organisers.

- Constructing multiple texts from the given.

Module 2 **Duration: 3 hrs**

Objective: Reading an article

Based on the trigger (picture/Image/video/ Audio/ Script) related to the theme to process reading. Through this learners understand how to read a text effectively & understand the sensory perceptions and emotions involved. At the end of this process the learners come out with graphical organizers and there by construct multiple texts out of it.

Module 3 **Duration: 3 hrs**

Objective: Write a letter

To read the different forms of letter and identify the various features of a letter. Make the learners understand the correct way of writing letters through group editing.

Module 4 **Duration: 3 hrs**

Objective: Reading a news report

Based on the trigger (picture/Image/video/ Audio/ Script) related to the theme a text is given to process reading. The text given here is a news report. Through this learners understand the features of news report, learn to read a text critically & track their own reading process. At the end of this process the learners come out with graphical organizers and there by construct multiple texts out of it.

Module 5 **Duration: 3 hrs**

Objective: Writing a news report

Based on the trigger (picture/Image/video/ Audio/ Script) write a news report keeping all the features of a news report in mind. To present a news report orally and edit a news report.

Section II - Soft Skills

Duration – 24hrs

Unit II **Self-Awareness** **Duration – 6 hrs**

The module self awareness has three different topics that are**:**

- Personality Assessment
- Competency Mapping
- Self-Concept

This capsule focuses on the following:

- To introspect & develop a thorough understanding of one's personality.
- To Identifying the key traits in oneself comprising of attitude skill & knowledge
- To correlate the trait in oneself with the employability skill required for success
- To identify ones strength& weakness

To move from an imaginary self-concept to real self-concept

Unit III Communication Skill Duration – 6 hrs

The module communication skills has two different topics that are**:**

- Interpersonal Behavioral Styles
- Assertive Communication

This capsule focuses on the following:

- Being able to listen and use other appropriate communication techniques including an appreciation of non-verbal communication.
- To identify different behavioral styles & assert ones communication according to style.

Unit IV Self Management Duration – 6 hrs

The module self management has two different topics that are**:**

- Response Able Behaviour
- Beginning with End in Mind

This capsule focuses on the following:

- To develop skills and techniques to cope with daily challenges
- To gain practical solutions for day-to-day issues
- To set career goals to improve one's wellbeing and quality of life
- To understand how to calculate percentage of any numbers
- To understand how to calculate percentage of any numbers
- To develop and implement an action plan

Unit V Image Management Duration – 6 hrs

The module Image Management has two different topics that are**:**

- Presentation Skills
- Grooming and Etiquette

This capsule focuses on the following:

- To make the first impression always the best impression.
- To understand & follow the social norms in public.
- To know the importance of personal hygiene & grooming

Section III - Aptitude Skills

Duration-21 hrs

Unit VI **Basic concept 1** **Duration – 3 hrs**

The module basic concepts 1 has two different topics that are**:**

- Percentages
- Profit and loss

This module focuses on the following:

- To understand how to calculate percentage of any numbers
- To understand how to calculate percentage of any numbers
- To improve upon calculations
- To understand when & how to calculate profit% & loss%

Unit VII **Basic concept 2** **Duration – 3 hrs**

The module basic concept 2 has two different topics that are**:**

- Time and work

This module focuses on the following:

- To understand how to calculate efficiencies of the person's
- To understand when to take positive or negative work

Unit VIII **Basic concept 3** **Duration – 3 hrs**

The module basic concepts 2 has two different topics that are**:**

- Time and distance
- Problems on trains

This module focuses on the following:

- To understand how to calculate Speed or Distance or Time when two unknown's are given
- To understand how to calculate Relative speed
- To understand how to calculate length of the train or bridge or platform

Unit IX **Reasoning 1** **Duration – 3 hrs**

The module reasoning 1 has the following topic:

- Puzzle test

This module focuses on the following:

- To understand & analyze the given information

Unit X **Reasoning 2** **Duration – 3 hrs**

The module reasoning 2 has two different topics that are**:**

- Directions sense
- Blood relations

This capsule focuses on the following:

- To understand how to calculate the direction and distance
- To understand how to say proper relations

Unit XI Reasoning 3 Duration – 3 hrs

The module reasoning 3 has the following topic**:**

- Coding & decoding

This capsule focuses on the following:

- To understand how to start depending on the different types of coding

Unit XII Reasoning 4 Duration – 3 hrs

The module reasoning 4 has the following topic**:**

- Number series
- Oddman out

This capsule focuses on the following:

- To understand how to calculate the series depending on the information
- To understand how to pick right answer from the given information

Course Outcome (CO):

1 To understanding of one's personality.
2 To Identifying the key traits in oneself comprising of attitude skill & knowledge
3 To correlate the trait in oneself with the employability skill required for success
4 To move from an imaginary self-concept to real self-concept
5 To identify different behavioral styles & assert ones communication according to style.
6 To set career goals to improve one's wellbeing and quality of life
7 To be responsible for ones actions
8 To make the first impression always the best impression.