

Walchand College of Engineering, Sangli					
(Government Aided Autonomous Institute)					
AY 2022-23					
Course Information					
Programme		B.Tech. (Electronics Engineering)			
Class, Semester		Third Year B. Tech Sem V			
Course Code		5OE356			
Course Name		Open Elective 1– Signals and Systems			
Desired Requisites:					
Teaching Scheme		Examination Scheme (Marks)			
Lecture	2 Hrs/week	T1	T2	ESE	Total
Tutorial	-	20	20	60	100
Practical	-				
Interaction	-	Credits: 2			
Course Objectives					
1	Develop the mathematical skills to solve problems involving signals and systems in various areas of appllcations				
2	To Understand signals and systems in terms of both the time and transform domains with , complementary insights into tools for analysis				
3					
4					
Course Outcomes (CO) with Bloom’s Taxonomy Level					
At the end of the course, the students will be able to,					
CO1	Classify the different signals and systems				Understand
CO2	Capable of characterizing LTI systems in the time domain and frequency domain				Apply
CO3	Use MATLAB software to implement the signal processing and system analysis for different applications				Analyze
CO4					
Module	Module Contents				Hours
I	Classification of Signals and Systems: Standard signals- Step, Ramp, Pulse, Impulse, Real and complex exponentials and Sinusoids, Classification of signals – Continuous time (CT) and Discrete Time (DT) signals, Periodic & Aperiodic signals, Deterministic & Random signals, Energy & Power signals, Classification of systems- CT systems and DT systems, Linear & Nonlinear, Time-variant & Time-invariant, Causal & Noncausal, Stable & Unstable.				5
II	Analysis of CT and DT signals Fourier series for periodic signals - Fourier Transform – properties- Laplace Transforms and properties.				5
III	Analysis of DT signals Baseband signal Sampling – Fourier Transform of discrete time signals (DTFT) – Properties of DTFT - Z Transform & Properties				4
IV	Linear Time Invariant DT Systems Impulse response – Difference equations-Convolution sum- Discrete Fourier Transform and Z Transform Analysis of Recursive & Non-Recursive systems-DT systems connected in series and parallel.				4
V	Application areas of Signals and Systems Overview of applications of Signals and Systems in the fields of Speech and audio processing.Multimedia processing (image and video),Underwater acoustic, Biological signal analysis, Biometrics, control applications				4

VI	Analysis of Signals and Systems using Simulation Tools Introduction to MATLAB, Use MATLAB software to implement the signal processing and system analysis.	4
Text Books		
1	B.P. Lathi, “Signals, Systems & Communications”- BS Publications, 2003.	
2	A.V. Oppenheim, A.S. Willsky and S.H. Nawab,”Signals and Systems”- PHI, 2nd Edn.	
3		
4		
References		
1	Simon Haykin and Van Veen,”Signals & Systems” -,Wiley, 2nd Edition.	
2		
3		
4		
Useful Links		
1	NPTEL lectures	
2	https://www.mathworks.com	
3		
4		

CO-PO Mapping														
	Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3													
CO2		2												
CO3					3								2	
CO4														
The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High Each CO of the course must map to at least one PO.														

Assessment (for Theory Course)
The assessment is based on 2 in-semester examinations in the form of T1 (Test-1) and T2 (Test-2) of 20 marks each. Also there shall be 1 End-Sem examination (ESE) of 60 marks. T1 shall be typically on modules 1 and 2, T2 based typically on modules 3, 4 and ESE shall be on all modules with nearly 50% weightage on modules 1 to 4 and 50% weightage on modules 5, 6.

Assessment Plan based on Bloom’s Taxonomy Level (Marks) For Theory Course				
Bloom’s Taxonomy Level	T1	T2	ESE	Total
1 Remember				
2 Understand	10	10	30	50
3 Apply	10	5	15	30
4 Analyze		5	15	20
5 Evaluate				
6 Create				
Total	20	20	60	100

Walchand College of Engineering, Sangli					
(Government Aided Autonomous Institute)					
AY 2022-23					
Course Information					
Programme		B.Tech. (Electronics Engineering)			
Class, Semester		Third Year B. Tech Sem V			
Course Code		5OE357			
Course Name		Open Elective 2 – Introduction to Electronics Systems			
Desired Requisites:		-			
Teaching Scheme		Examination Scheme (Marks)			
Lecture	3Hrs/week	T1	T2	ESE	Total
Tutorial		20	20	60	100
Practical	-				
Interaction	-	Credits: 3			
Course Objectives					
1	To explain the working of various components used in electronics systems.				
2	To explain the working of analog and digital electronic circuits.				
3	To illustrate the concept behind electronics systems and its application.				
4	To explain the working of power semiconductor devices and its applications in power electronics.				
5	To illustrate the implementation of Arduino based embedded systems.				
Course Outcomes (CO) with Bloom’s Taxonomy Level					
At the end of the course, the students will be able to,					
CO1	Explain the working of components used in the electronic systems.				Understand
CO2	Develop a digital circuit for a given logic and build circuit for given specifications.				Apply
CO3	Analyze the performance of Data Acquisition System and Power Electronics Circuits.				Analyze
CO4	Build and Test an embedded system using Arduino board.				Create
Module	Module Contents				Hours
I	Electronic System Components Transducers-Types, Classification, Characteristics: Signal Conditioning of inputs, Instrumentation Amplifiers, Capacitive type, Inductive type sensors, Limit switches, Temperature sensors: RTD, thermistor, Thermocouple, semiconductor diode sensor, piezoelectric transducer photovoltaic cell, LDR, Speed measurement using magnetic photoelectric pickup. Distance measurement: LVDT, capacitive transducers, Resistive, Glass scales, Magnetic scales. Concept of Quadrature output and index pulse.PH Sensors, Proximity Sensors, Motion Sensors.				6
II	Operational Amplifier Differential amplifier, Basic op-Amp configuration, Ideal op-amp analysis, Op-amp characteristics, Inverting and Non inverting amplifiers, Adder, Subtractor, voltage to current converters, current to voltage converters, instrumentation amplifiers, Active filters. Voltage comparator, Comparator application, waveform generators: multivibrators, oscillators.				6
III	Digital Systems Flip-flops, Counters, Up-counters, Down Counters, Mod-N counters, State diagram.				6
IV	Data Acquisitions System Digital to Analog Converter (DAC), Analog to Digital converter (ADC), Data Acquisition System (DAS): introduction, objectives of DAS, single and multichannel, data conversion, sample and hold circuit, elements of DAS, interfacing of transducers-multiplexing.				6

V	Power Semiconductor Devices and its Applications SCR, TRIAC, DIAC, UJT, AC voltage regulator, Controlled rectifiers, Inverters, Speed control of AC and DC motors, SMPS, UPS, Electronics lamp ballast.	6
VI	Embedded Systems Introduction to microcontroller based system: Arduino board, Arduino based systems, Simple Arduino program, interfacing display board to Arduino, Speed control of DC motor, motor driver IC: L293D.	6
Text Books		
1	R. Boylestad and L. Nashelsky, "Electronics Devices and Circuits", 8th Edition, Prentice Hall International, 2005.	
2	Anand Kumar, " <i>Fundamentals of Digital circuits</i> ", 2 nd Edition, PHI, 2009.	
3	A. K. Sawhney, " <i>Measurements and Instrumentation</i> ", Dhanpat Rai and Sons, 2013.	
4		
References		
1	R. P. Jain, " <i>Modern Digital Design</i> ", Mc-Graw-Hill, 2008	
2	Ramakant Gaikwad, " <i>Op-amps and Linear Integrated Circuits</i> ", Pearson Education, 2011.	
3	M.D. Singh and KB Khanchandani, " <i>Power Electronics</i> ", 2 nd Edition, McGraw-Hill, 2007.	
Useful Links		
1	www.spoken-tutorial.org ---IIT Bombay.	
2		
3		
4		

CO PO Mapping														
	Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3													2
CO2	3		2		3	2								2
CO3		3												3
CO4	3		2						3					3

Assessment
The assessment is based on 2 in-semester examinations in the form of T1 (Test-1) and T2 (Test-2) of 20 marks each. Also there shall be 1 End-Sem examination (ESE) of 60 marks. T1 shall be typically on modules 1 and 2, T2 based typically on modules 3,4 and ESE shall be on all modules with nearly 50% weightage on modules 1 to 4 and 50% weightage on modules 5, 6.

Assessment Plan based on Bloom's Taxonomy Level				
Bloom's Taxonomy Level	T1	T2	ESE	Total
Remember				
Understand	10		10	20
Apply	10	10	10	30
Analyze		10	20	30
Evaluate				
Create			20	20
Total	20	20	60	100