Subject code	Subject Name	Teaching Scheme			Credits Assigned			
		Theory	Practical	Tut.	Theory	TW/Pract	Tut	Total
SEITC304	Analog and Digital Circuits	04	02	-	04	01	-	05

Subject code	Subject Name	Examination Scheme							
		Theory Marks				TW	Pract	Oral	Total
		Internal Assessment			End Semester Exam				
SEITC304	Analog and Digital Circuits	Test1	Test2	Average of Test1 and Test2					
		20	20	20	80	25	--	25	150

Course Objective:

1) To provide concepts that underpins the disciplines of Analog circuits, digital electronics and Microprocessor systems.
2) To provide the concept of various components
3) To provide basic knowledge of designing Analog and digital circuits

Course outcomes:

1) Knowledge and Awareness of various components.
2) Design of stable analog circuits.
3) Circuit simulation.
4) Binary and hexadecimal calculations and conversions.
5) Design of combinational and sequential circuits.
6) Translate real world problems into digital logic formulations.
7) Awareness in Design of digital systems and concepts of Microprocessor and Microcontroller systems.

Detailed Syllabus:

Module	Detailed Contents	Hours
1	Voltage Regulator and components: Zener diode. Series and Shunt Regulator. Regulator ICs 78XX, IC 79XX.Light Emitting diode(LED), Schottky diode, Varactor diode, power diode, Photodiodes, Liquid-crystal Displays, Solar cells, Thermistor.	06
2	Biasing of BJT: DC operating point, BJT characteristics & parameters,	08

	all biasing circuits, analysis of above circuits and their design, variation of operation point and its stability. Differential Amplifier, constant current source, current mirror. Introduction to FET and comparison with BJT.	
3	Operational Amplifiers and linear applications: Block diagram representation, Ideal Op-amp, Equivalent circuit, Open-loop configuration, Transfer characteristics. Op-amp with negative feedback, Frequency response. Op-amp IC 741 specifications. Basic op-amp applications: Adder, Scalar, Subtractor, Difference amplifier, I-V converter, V-I converters, Integrator, Differentiator, Instrumentation amplifier using 2 and 3 op-amp stages. IC 555 Timer, Astable, and Monostable Multivibrator.	10
4	Number Systems and Codes: Binary, Octal, Decimal and Hexadecimal number Systems and their conversion, Binary Addition and Subtraction , Gray Code, BCD Code, Excess-3 code, ASCII Code.	04
5	Boolean Algebra and Logic Gates: Theorems and Properties of Boolean Algebra, Standard SOP and POS form, Reduction of Boolean functions using Algebric method, K -map method (2,3,4 Variable). Basic Digital Circuits: NOT,AND,OR,NAND,NOR,EX-OR,EX-NOR Gates.	04
6	Combinational Logic Design: Introduction, Half and Full Adder, Half and Full Subtractor, Four Bit Binary Adder, One digit BCD Adder, code conversion, Multiplexers and Demultiplexers, Decoders, 4-bit Magnitude Comparator IC 7485 and ALU IC74181.	06
7	Sequential Logic Design: Flip Flops: SR, D, JK, JK Master Slave and T Flip Flop, Truth Tables and Excitation Tables, Flip-flop conversion. Counters: Design of Asynchronous and Synchronous Counters, Modulo Counters, UP- DOWN counter .IC 74193 Shift Registers: Shift Register IC 7496 , SISO, SIPO,PIPO,PISO, Bidirectional Shift Register , Universal Shift Register, Ring and Johnson Counter.	06
8	Introduction to VHDL: Introduction , Library, Entity, Architecture, Modeling Styles, Concurrent and sequential statements, Data objects and Data types, attributes. Design Examples for combinational circuits.	04

TERMWORK MARKS: 1. Attendance (Theory and Practical) - 05
2. Laboratory work (Experiments and Journal) -15
3. Assignments -05

The final certification and acceptance of TW ensures the satisfactory performance of Laboratory Work and Minimum Passing in the term work.

LABORTARY WORK:

1. Laboratory work should consist of at least 10 Experiments.

The Experiments should be based on following topics (Any Ten):

1) Zener diode as Regulator.
2) BJT Biasing Method.
3) OP-amp as Inverting and Non-inverting amplifier.
4) Applications of Op-amp.
5) IC 555 as astable Multivibrator.
6) Simulation of any circuit using Pspice.
7) Logic Gates.
8) Code Conversion.
9) Multiplexer, Demultiplexer.
10) Flip-flops using gates and ICs.
11) Design of Sequential circuits.
12) VHDL for Combinational logic.

Text Books:

1. Robert L. Boylestad, Louis Nashelsky, "Electronic devices and circuit Theory", PHI
2. Ramakant A. Gaikwad, "Op-amp and linear Integrated circuits", PHI
3. R. P. Jain, "Modern Digital Electronics", Tata McGraw Hill.
4. M. Morris Mano, "Digital Logic and computer Design", PHI.
5. J. Bhasker." VHDL Primer", Pearson Education

Reference Books:

1. Martin s. Roden, Gordon L. Carpenter, William R. Wieserman "Electronic Design-From Concept to Reality", Shroff Publishers and Distributors.
2. D.roy Choudhury,shail B.jain, "Linear integrated Circuits", New age International Publisher.
3. Subrata Ghosal, "Digital Electronics", Cengage Learning.
4. Anil K. Maini, "Digital Electronics Principles and Integrated Circuits", Wiley India
5. Donald p Leach, Albert Paul Malvino, "Digital principles and Applications", Tata McGraw Hill.

Theory Examination :

- Question paper will comprise of 6 questions, each carrying 20 marks.
- Total 4 questions need to be solved.
- Q.1 will be compulsory, based on entire syllabus wherein sub questions of 2 to 3 marks will be asked.
- Remaining question will be randomly selected from all the modules.

Weightage of marks should be proportional to number of hours assigned to each module.