DEPARTMENT OF ELECTRONICS COURSE OUTCOME		
Course Code	**Course name**	**Course Outcome**
EL/I/EC/01	Electronics Instrument and Circuit Analysis	**At the end of this course, Students will be able to** CO1: Study the passive electrical circuit elements such as resistances, capacitance and inductances. CO2: Use and understand the measuring instruments such as multimeter and electronic voltmeters – Vacuum Tube Voltmeter (VTVM), Transistor Voltmeter, Bridge Rectifier Voltmeter and Cathode Ray oscilloscope (CRO). CO3: Study the alternating current (AC), Series AC Circuit and Filter. CO4: Understand Kirchoff's current law, Kirchoff's voltage laws, Voltage source, Current Source, Conversion of voltage source into current source, Voltage division law, Current division law. CO5: Analyze the electric circuit using network theorems.
EL/I/EC/02	Laboratory-I	**At the end of this course, Students will be able to** CO1: Connect the given capacitors in series and parallel and find out the total capacitance in each case. CO2: Study flow of current/inductance in the coil by connecting them in series and parallel. CO3: Study Active filters: (a) High Pass (b) Low Pass (c) Band pass. CO4: Study timing characteristic of an RC Circuit during charging of a Capacitor. CO5: Study timing characteristic of an RC Circuit during discharge of a Capacitor CO6: Verify the Thevenins theorem. CO7: Verify the Norton theorem. CO8: Verify the Maximum power theorem.
EL/II/EC/03	Semiconductor Physics	**At the end of this course, Students will be able to** CO1: Explains the detail of Atomic structure and the formation of a Junction diode. CO2: Design different types of rectifier with its filter circuits CO3: Elucidating different types of diode such as Tunnel Diode, PIN Diode, Schottky Diode, Light Emitting Diode (LED), Shockley Diode, Varactor Diode, Photo-diode. CO4: Configures transistor in various mode: common base, common collector, and common emitter. CO5: Understand signal amplifier: class-A, class-B, class-C and class-AB.
EL/II/EC/04	Laboratory-II	**At the end of this course, Students will be able to** CO1: Study the characteristic of a Junction Diode. CO2: Study the characteristic of a Zener Diode. CO3: Study the common base characteristics of a P-N-P junction transistor

		CO4: Study the common emitter characteristics of P-N-P junction transistor. CO5: Study the voltage regulation and ripple factor of a half-wave rectifier with L-type filter circuits. CO6: Study the voltage regulation and ripple factor of a Full-wave rectifier with L-type filter circuits. CO7: Determine the energy gap (band gap) of a semiconductor using a P-N Junction Diode. CO8: Study Zener diode voltage regulating characteristics.
EL/III/EC/05	Electronic Devices and Amplifier	**At the end of this course, Students will be able to** CO1: Understand different types of field effect transistor (FETs) CO2: Explain Diode, UJT and SCR CO3: Elucidation of power amplifiers. CO4: Explain Hybrid parameters of a transistor. RC-couple transistor and impedance matching. CO5: Know Basic circuit operation of differential amplifier. Unity follower, virtual ground, CMRR.
EL/III/EC/06	Laboratory-III	**At the end of this course, Students will be able to** CO1: Study the characteristics of a FET and determination of its parameters. CO2: Study the characteristic of a UJT. To study how a UJT works as an oscillator. CO3: Find Common Mode Rejection Ratio (CMMR) of a differential amplifier. CO4: Study the close loop gain of an OP Amplifier and CMRR. CO5: Study OP-Amp (IC 741) as a) Inverting amplifier. b) Non- inverting amplifier. c) Integrator. d) Differentiator. CO6: Study the Hybrid Parameters of a Transistor. CO7: Study the frequency response curve of a R-C coupled Transistor amplifier. CO8: Study negative feedback in a R.C. coupled amplifier. CO9: Study the characteristics of a SCR.
EL/IV/EC/07	Pulse Switching Circuits	**At the end of this course, Students will be able to** CO1: Understand the concept and principle of negative and positive feedback amplifier and its parameter. CO2: Describe the classification of Oscillator, different type of LC Oscillators. CO3: Explain the construction and working of RC Oscillator, Negative resistance oscillators and Crystal oscillators. CO4: Explain the theory and working of different type of Multivibrators and Schmitt trigger. CO5: Know basic knowledge of Number system, Binary

		operations, Logic gates, adder and subtractor.
EL/IV/EC/08	Laboratory-IV	**At the end of this course, Students will be able to** CO1: Study D.C Power supply and filters. CO2: Study AND, OR and NOT gates. CO3: Study single stage RC-coupled amplifier and frequency response. CO4: Study OP-Amp as Wien bridge oscillator CO5: Determine frequency of Astable multivibrator (using IC741 Op- Amp). CO6: Determine pulse width of Monostable multivibrator (using IC 741Op- Amp). CO7: Study AM modulator and Demodulator. CO8: Determine the time constant (λ) of LC circuit. CO9: Study OP Amplifier parameter.
EL/V/CC/09	Transmission Line and Radar System	**At the end of this course, Students will be able to** CO1: Explain the phenomenon of transmission line, its types and Distributed parameters of transmission lines. CO2: Explain the transmission line termination, transmission line matching, maximum power transfer, line termination by zero load and line termination by infinite impedance. CO3. Understand the basic antenna principles, structure and properties of different antennas. CO4: Know the concept of Radar system. CO5: Describe the working of satellite communication
EL/V/CC/10	Analog Circuits and Modulation	**At the end of this course, Students will be able to** CO1: Explain the power supply module and its implementation. CO2: Understand different techniques of transistor biasing and can also elaborates push-pull amplifier and autotransformer. CO3: Show different function of an operation amplifier and can explains various Op-amp parameters. CO4: Derive several formulas for op-amp application *Viz.* adder, subtractor, integrator, differentiator etc. CO5: Described different types of modulation such as amplitude, frequency and phase modulations.
EL/V/CC/11	Computer Fundamentals	**At the end of this course, Students will be able to** CO1: Study different types of Number System. Also study Arithmetic binary operations and related problems. Explain Analog to Digital and Digital to Analog conversion, Digital Voltmeter, Digital speedometer, Digital Odometer. CO2: Know introduction to Boolean Algebra and can explain different types of Logic gate, adders and subtractor. CO3: Explain Sequential Circuits, different types of Flip-Flops, Registers and Counters CO4: Explain Hard DISK, CD-ROM, Different types of

		Memories and different types of Secondary Storage Devices CO5: Explain I/O Interfacing, Memory Mapped I/O and different Modes of transfer
EL/V/CC/12	Laboratory-V	**At the end of this course, Students will be able to** CO1: Study Op-Amp 741C as an inverting and non-inverting amplifier. CO2: Study Op-Amp 741C as adder and Subtractor. CO3: Study Op-Amp as Voltage Comparator. CO4: Study Op-Amp as Differential and Instrumentation Amplifier. CO5: Study Op-Amp as Integrator and Differentiator. CO6: Study AM Modulation and Detection CO7: Study FM Modulation and Detection CO8: Study Alignment of satellite receiver CO9: Study TV / Radio / Mobile Receiver.
EL/V/CC/13	Laboratory-VI	**At the end of this course, Students will be able to** CO1: Study Basic Logic Gates and Universal Gates. CO2: Verify De Morgan's Theorem. CO3: Study Binary Half and Full Adder Circuit. CO4: Study Binary Half and Full Subtractor Circuits. CO5: Study Multiplexer and Demultiplexer Circuits. CO6: Study Decoder and Encoder Circuits. CO7: Study R-S, D and J-K flip flop. CO8: Study 4 - Bit Ripple Up/Down Counter. CO9: Study Left and Right Shift Registers.
EL/V/CC/14	Laboratory-VII	**At the end of this course, Students will be able to** CO1: Study Amplitude modulator and Amplitude demodulator CO2: Study Sensitivity, Selectivity and Fidelity of an AM radio receiver CO3: Study Two stage RC coupled Amplifier CO4: Study Digital Comparator. CO5: Study D/A Conversion. CO6: Study A/D Conversion. CO7: Study Ring Counter and Decade Counter.
EL/V/CC/15(b)	Solid State Electronics	**At the end of this course, Students will be able to** CO1: Understand the properties of solid-state materials and applications CO2: To learn the basics concept of semiconductor physics CO3: To acquire in dept knowledge of electronics devices CO4: To identify, classify and analyze Integrated circuits and its design process. CO5: Have in-depth knowledge in the making of new technology.
EL/V/CC/16	Project – I	**Project work based on Electronics to be assigned/ supervised by teachers.** Students learn to work on their individual skills regarding

		critical thinking and problem solving, creativity and innovation, collaboration/teamwork and communications, learning self-reliance and project management.
EL/VI/CC/17	Analog and Digital Electronics	**At the end of this course, Students will be able to** CO1: Describe RC Circuit. CO2: Explain switching and pulse formation circuit. CO3: Derive De – Morgan's Theorem, Boolean algebra and Karnaugh Maps to reduce/simplify Boolean expressions. CO4: Study the characteristics of Logic families, RTL, DTL, TTL Circuits, ECL, I2L Circuits, MOS Family, PMOS Circuit, NMOS Circuit and CMOS Circuit. CO5: Understand TTL circuits and its applications.
EL/VI/CC/18	Computer Organization and Microprocessor	**At the end of this course, Students will be able to** CO1: Understand computer architecture and functions of Operating System CO2: Know developments in the area of computer architecture CO3: Understanding of processor microarchitecture and its evolution. CO4: Know the difference between low level and High-level programming Languages. CO5: Write programs in assembly language
EL/VI/CC/19	Opto-electronic Devices	**At the end of this course, Students will be able to** CO1: Know the Optical properties of semiconductors CO2: Study advanced Optical properties like Semiconductor quantum wells, Optical inter band transitions in a quantum well. CO3: Explain the construction and working of Photodetectors, Light-Emitting Diodes, Photoresistors, Photodiodes, Solar Cells, Phototransistor. CO4: Explain introduction of Laser: Einstein's A and B coefficients, Ruby Laser, Raman laser etc. CO5: Explain Semiconductor Lasers: Population Inversion at a Junction, Emission Spectra for p-n Junction Lasers, The Basic Semiconductor Laser, Heterojunction Lasers, Materials for Semiconductor
EL/VI/CC/20	Laboratory-VIII	**At the end of this course, Students will be able to** CO1: Draw V-I characteristics for forward bias and calculation of impedance. CO2: Study load and line regulation of a Full Wave power supply. CO3: Study ripple factor of Half-Wave and Full-Wave rectifier CO4: Study forward bias and reverse bias characteristics of a Zener diode. CO5: Study Zener diode as voltage regulator. CO6: Study load regulation of power supply with Zener or IC as voltage

		regulator. CO7: Study Largest & smallest from a set of numbers CO8: Study Sorting (Ascending & descending)
EL/VI/CC/21	Laboratory-IX	**At the end of this course, Students will be able to** CO1: Study commercially available power amplifier(IC). CO2: Study the effect of negative feedback on frequency response and gain of amplifier. CO3: Design and test FET amplifier. CO4: Design and testing of Wien bridge oscillator. CO5: Study percentage regulation and ripple factor of stabilized variable power supply. CO6:To study Astable Multivibrator CO7: To study Monostable Multivibrator CO8:To study Bistable Multivibrator
EL/VI/CC/22	Laboratory-X	**At the end of this course, Students will be able to** CO1: Study BCD addition & subtraction CO2: Study Up / down counter CO3: Observe the output wave shape of differentiating and integrating circuit on CRO. CO4: Measure phase and frequency with CRO. CO5: Design and testing of Colpitt's oscillator. CO6: Design and testing of Phase shift oscillator.
EL/VI/CC/23(a)	Power Electronic Devices	**At the end of this course, Students will be able to** CO1: Understand Introduction to power electronic system. CO2: Explain of Thyristor families and its workings CO3: Described AC Voltage Regulators: Principle of Phase Controlled Switching. CO4: Describe Phase Controlled Converter, Three phase and Multiple converters. CO5: Understand Classification of Thyristor based Inverters, also design and implementation of UPS and SMPS
EL/VI/CC/24	Project – II	**Project work based on Electronics to be assigned/ supervised by teachers.** Students learn to work on their individual skills regarding critical thinking and problem solving, creativity and innovation, collaboration/teamwork and communications, learning self-reliance and project management.
Programme Outcome		**The following program outcomes have been identified for B.Sc Electronic.** **PO1:**To impart knowledge in fundamental aspects of all branches of Electronics **PO2:**To teach students the principles of Electronics **PO3:**To create inquisitiveness and problem solving skills **PO4:**To prepare students for higher education and career in Electronics **PO5:**To develop skills in the proper handling of apparatus and components **PO6:**To make students apply Electronics in their day to

	day life **PO7:**To create the students a responsible citizen.