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| **Course Name:** Electronics Devices & circuits | 3EC1A | **Course Year:** | 2017-2018 |

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| 3EC1.1 | CO1: Understanding diode and its applications in rectifier, regulator, multipliers etc. |
| 3EC1.2 | CO2: Applying characteristics, biasing and applications of BJT, FET. |
| 3EC1.3 | CO3: Understanding differential and Operational amplifier. |

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| **Course Name:** Data Structures & Algorithms | 3EC2A | **Course Year:** | 2017-2018 |

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| 3EC2.1 | CO1: Understanding data arranging techniques in linear and non linear data structures and analyzing their complexity. |
| 3EC2.2 | CO2: Evaluating searching and sorting algorithms and other operations on data structures. |
| 3EC2.3 | CO3: Applying the data structure that efficiently models the information in a problem |

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| **Course Name:** Digital Electronics | 3EC3A | **Course Year:** | 2017-2018 |

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| 3EC3.1 | CO1: Understanding Boolean algebra, conversions and minimization techniques |
| 3EC3.2 | CO2: Creating various combinational and sequential circuits |
| 3EC3.3 | CO3: Understanding different logic families |
| 3EC3.4 | CO4: Creating of circuits using different minimization techniques. |

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| **Course Name:** Circuit Analysis & Synthesis | 3EC4A | **Course Year:** | 2017-2018 |

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| 3EC4.1 | CO1: Understanding various theorems and its applications in complex networks. |
| 3EC4.2 | CO2: Evaluating the stability of systems by various techniques. |
| 3EC4.3 | CO3: Understanding and creating circuits using network functions. |
| 3EC4.4 | CO4: Understanding resonance conditions in different circuits., |

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| **Course Name:** Electromagnetic Properties of Materials | 3EC5A | **Course Year:** | 2017-2018 |

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| 3EC5.1 | CO1: Understanding the fabrication and applications of various types of materials i.e. magnetic, semiconductor, superconductive and nanomaterials. |
| 3EC5.2 | CO2: Understanding the applications of SCR and LASERS. |

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| **Course Name:** Advanced Engineering Mathematics-1 | 3EC6A | **Course Year:** | 2017-2018 |

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| 3EC6.1 | CO1: Applying Laplace, Fourier, and Z Transform solve differential equations with boundary conditions. |
| 3EC6.2 | CO2: Differentiate and Integrate complex function, Contour Integration and Integrals using residues. |
| 3EC6.3 | CO3: Solving circuit differential equations by the help of Laplace transforms. |

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| **Course Name:** Electronic Instrumentation Workshop | 3EC7A | **Course Year:** | 2017-2018 |

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| 3EC6.1 | CO1: Analysing various electronic components. |
| 3EC6.2 | CO2: Evaluating characteristics of various opto-electronic devices. |
| 3EC6.3 | CO3: Creating circuit on PCB. |

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| **Course Name:** Electronics Design Lab | 3EC9A | **Course Year:** | 2017-2018 |

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| 3EC9.1 | CO1: Understanding devices like multimeter, generator, CRO etc. |
| 3EC9.2 | CO2: Creating the characteristic graph of various diodes, amplifiers, filters and rectifiers. |
| 3EC9.3 | CO3: Analysing the behaviour of op-amp |

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| **Course Name:** Digital Electronics Lab | 3EC10A | **Course Year:** | 2017-2018 |

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| 3EC10.1 | CO1: Evaluating truth table of basic gates. |
| 3EC10.2 | CO2: Analyzing and designing various combinational and sequential circuits. |
| 3EC10.3 | CO3: Creating small projects. |

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| **Course Name:** Business Entrepreneurship | 3EC11A | **Course Year:** | 2017-2018 |

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| 3EC10.1 | CO1: Understanding about entrepreneurship, its need and planning. |
| 3EC10.2 | CO2: Understanding about patents, tax, and government policies. |

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| **Course Name:** Analog Electronics | 4EC1A | **Course Year:** | 2017-2018 |

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| 3EC4.1 | CO1: Understanding concept of feedback and its application in oscillators and amplifiers. |
| 3EC4.2 | CO2: Analyzing circuits using equivalent models. |
| 3EC4.3 | CO3: Understanding the concepts of Schmitt trigger and 555 timer. |

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| **Course Name:** Random Variables and Stochastic Processes | 4EC2A | **Course Year:** | 2017-2018 |

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| 3EC9.1 | CO1: Understanding Probability, its Distributions and concept of multiple random variables with central limit theorem. |
| 3EC9.2 | CO2: Understanding the concept of Stochastic Process and linear transmission system. |
| 3EC9.3 | CO3: Analyzing its applications in Electronics communication system. |

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| **Course Name:** Electronic Measurement and Instrumentation | 4EC3A | **Course Year:** | 2017-2018 |

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| 4EC3.1 | CO1: Understanding the construction and working of electronic instruments i.e. CRO, generators, transducers etc. |
| 4EC3.2 | CO2: Analyzing and generating signals. |
| 4EC3.3 | CO3: Understanding temperature measuring devices i.e. Pyrometer. |

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| **Course Name:** Electromagnetic Field Theory | 4EC4A | **Course Year:** | 2017-2018 |

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| 4EC4.1 | CO1: Remembering about coordinate systems and its conversion. |
| 4EC4.2 | CO2: Evaluating electric and magnetic field of different charge and current configurations. |
| 4EC4.3 | CO3- Analyzing about nature of waves. |
| 4EC4.4 | CO4- Understanding the basic concepts of antennas and its types |

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| **Course Name:** Optimization Techniques | 4EC5A | **Course Year:** | 2017-2018 |

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| 4EC4.1 | CO1: Understanding the problems of optimization, its formulation and LPP with certain techniques. |
| 4EC4.2 | CO2: Analyzing the concept of optimal solutions of Nonlinear programming problems. |
| 4EC4.3 | CO3: Analyzing certain techniques that will help students to solve problems of electronics engineering with reference to optimization. |

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| **Course Name:** Advanced Engineering Mathematics-II | 4EC6A | **Course Year:** | 2017-2018 |

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| 4EC6.1 | CO1. Evaluating numerical methods for interpolation, numerical differentiation and integration for differential equations |
| 4EC6.2 | CO2. Understanding recurrence relation, generating function, simple properties of Bessel’s and Legendre’s functions and students can solve simple variational problems using Euler’s equation. |
| 4EC6.3 | CO3. Understanding the concept of probability distribution for discrete and continuous random variables. |
| 4EC6.4 | CO4. Analyzing the problems of electronics engineering with the help of such functions. |

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| **Course Name:** Analog Electronics Lab | 4EC8A | **Course Year:** | 2017-2018 |

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| 4EC8.1 | CO1: Creating the characteristic graph of various amplifiers, oscillators and filters. |
| 4EC8.2 | CO2: Analysing the behaviour and applications of op-amp |

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| **Course Name:** Measurement and Instrumentation Lab | 4EC9A | **Course Year:** | 2017-2018 |

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| 4EC9.1 | CO1: Analyzing the characteristics of various transducers and measuring instruments. |
| 4EC9.2 | CO3: Understanding the concept of earthing and grounding with applications. |

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| **Course Name:** Humanities and Social Sciences | 4EC10A | **Course Year:** | 2017-2018 |

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| 4EC10.1 | CO1: Understanding history of Indian constitution and society problems. |
| 4EC10.2 | CO2: Analyzing Indian economy. |
| 4EC10.3 | CO3: Analyzing the architecture of Indian history. |

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| **Course Name:** Signals & Systems | 5EC1A | **Course Year:** | 2017-2018 |

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| 5EC1.1 | CO1: Understanding basic signals and their properties |
| 5EC1.2 | CO2: Representing periodic and non periodic signals in Fourier, Laplace and Z-transform. |
| 5EC1.4 | CO3: Understanding the concept of sampling and its applications. |

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| **Course Name:** Linear Integrated Circuits | 5EC2B | **Course Year:** | 2017-2018 |

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| 5EC2.1 | CO1: Understanding Operational amplifier and its applications like oscillators, convertors, filters etc. |
| 5EC2.2 | CO2: Analyzing 555 timer and PLL. |
| 5EC2.3 | CO3: Applying its application in convertors i.e. D/A to A/D. |

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| **Course Name:** Telecommunication Engg. | 5EC3A | **Course Year:** | 2017-2018 |

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| 5EC3.1 | CO1: Understanding transmission line and its applications. |
| 5EC3.2 | CO2: Analyzing different medium for transmission of signals. |

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| **Course Name:** Analog Communication | 5EC4A | **Course Year:** | 2017-2018 |

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| 5EC4.1 | CO1: Understanding and analyzing the noise performance |
| 5EC4.2 | CO2: Analyze how information is put on electronic systems for storage and delivery through detailed understanding of AM, FM and PM. |
| 5EC4.3 | CO3: Analyzing the application of modulation in mobile communication. |

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| **Course Name:** Microwave Engg. –I | 5EC5A | **Course Year:** | 2017-2018 |

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| 5EC5.1 | CO1: Analyzing the concept of transmission lines used at GHz frequency range |
| 5EC5.2 | CO2: Evaluating various parameters for microwave based devices. |
| 5EC5.3 | CO3: Understanding Radar based devices |

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| **Course Name:** Microwave Engineering Lab | 5EC8A | **Course Year:** | 2017-2018 |

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| 5EC8.1 | CO1: Analyzing the characteristics of microwave devices i.e. gunn diode, magic tee etc. |
| 5EC8.2 | CO2: Analyzing printed antenna input characteristics. |

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| **Course Name:** Signal Processing Lab | 5EC10A | **Course Year:** | 2017-2018 |

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| 5EC10.1 | CO1: Creating and analyzing elementary signals i.e. unit step, ramp etc. |
| 5EC10.2 | CO2: Analyze the concepts to simulate the Fourier series, Fourier transform and Laplace transform. |
| 5EC10.3 | CO3: Generating random sequences with arbitrary distributions. |

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| **Course Name:** Professional Ethics and Disaster Management | 5EC11A | **Course Year:** | 2017-2018 |

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| 5EC11.1 | CO1:Understanding the concepts of social and professional values |
| 5EC11.2 | CO2: Analyzing the importance of engineering. |
| 5EC11.3 | CO3: Evaluating the effect of disasters. |

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| **Course Name:** Microwave Engg.-II | 6EC1A | **Course Year:** | 2017-2018 |

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| 6EC1.1 | CO1: Analyzing the operation and characteristics of microwave diodes. |
| 6EC1.2 | CO2: Analyzing klystrons, magnetrons etc. for microwave generation and amplification |
| 6EC1.3 | CO3: Understanding applications of smart antenna. |

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| **Course Name:** Microprocessors | 6EC2A | **Course Year:** | 2017-2018 |

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| 6EC2.1 | CO1: Implementing real time problems using assembly language. |
| 6EC2.2 | CO2: Analyzing applications of embedded systems. |

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| **Course Name:** Industrial Electronics | 6EC3A | **Course Year:** | 2017-2018 |

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| 6EC3.1 | CO1: Understanding different semiconductor power devices and its applications |
| 6EC3.2 | CO2: Analyzing different techniques to control the speed of motors. |
| 6EC3.3 | CO3: Understanding resistance and inductive heating control. |

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| **Course Name:** Digital Communication | 6EC4A | **Course Year:** | 2017-2018 |

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| 6EC4.1 | CO1: Evaluating optimum detection techniques i.e. matched filter, optimum filter etc. |
| 6EC4.2 | CO2: Analyzing different digital modulation techniques like ASK, BPSK, QPSK etc. |
| 6EC4.3 | CO3: Understanding mobile communication applications |

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| **Course Name:** Control Systems | 6EC5A | **Course Year:** | 2017-2018 |

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| 6EC5.1 | CO1: Understanding the analogy between electromechanical systems. |
| 6EC5.2 | CO2: Evaluating system stability by following methods i.e. Routh Hurwitz, Root Locus, Nyquist, Bode etc. |

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| **Course Name:** Communication Lab-II | 6EC7A | **Course Year:** | 2017-2018 |

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| 6EC7.1 | CO1: Creating transmitted and received waveforms of TDM, PAM, TDM-PCM. |
| 6EC7.2 | CO2: Creating digitally modulated and demodulated waveforms of ASK, PSK |
| 6EC7.3 | CO3: Analyzing optical fibre communication |

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| **Course Name:** Microprocessor Lab | 6EC8A | **Course Year:** | 2017-2018 |

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| 6EC8.1 | CO1: Creating assembly language programs for real time problems. |
| 6EC8.2 | CO2: Understanding embedded |

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| **Course Name:** RF Simulation Lab | 6EC9A | **Course Year:** | 2017-2018 |

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| 6EC5.1 | CO1: Evaluating the parameters of microwave based devices using HFSS |
| 6EC5.3 | CO3: Creating simple microstrip patch antenna design. |

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| **Course Name:** Antenna and Wave Propagation | 7EC1A | **Course Year:** | 2017-2018 |

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| 7EC1.1 | CO1: Understanding the basic skills required for designing a wide variety of practical antennas and antenna arrays. |
| 7EC1.2 | CO2: Analyzing the propagation of the wave in different atmospheric medium, ionosphere, troposphere propagation |
| 7EC1.3 | CO3: Creating and analyzing the defects introduced in the structures. |

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| **Course Name:** VLSI Design | 7EC5A | **Course Year:** | 2017-2018 |

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| 7EC5.1 | CO1: Understanding modes, types, characteristics and fabrication of MOS |
| 7EC5.2 | CO2: Creating combinational and sequential digital circuits and layouts using CMOS technology. |

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| **Course Name:** VHDL | 7EC4.3A | **Course Year:** | 2017-2018 |

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| 7EC | CO1: Understanding the design flow of different integrated circuits. |
| 7EC | CO2: Understanding the fundamentals, advantages of VHDL and writing code for combinational and sequential circuits. |

**3.1.2. CO-PO matrices of courses selected in 3.1.1 (six matrices to be mentioned; one per semester from 3rd to 8th semester) (05)**

Note : Enter correlation level s1, 2 or 3 as defined below : 1 : Slight(Low) 2 : Moderate(Medium) 3 : Substantial(High) If there is no correlation, put 1

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| **Electronic Devices & Circuits** | | | | | | | | | | | | |
| **POs** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Cos** |
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| **2** | **M** | **M** | **-** | **-** | **L** | **-** | **-** | **-** | **-** | **-** | **-** | **-** |
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| **Data Structures & Algorithms** | | | | | | | | | | | | |
| **POs** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
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| **Digital Electronics** | | | | | | | | | | | | |
| **Pos** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Cos** |
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| **3** | **L** | **L** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** |
| **4** | **H** | **H** | **H** | **-** | **M** | **L** | **L** | **-** | **L** | **-** | **L** | **L** |
| **Circuit Analysis & Synthesis** | | | | | | | | | | | | |
| **Pos** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Cos** |
| **1** | **H** | **H** | **-** | **-** | **L** | **-** | **-** | **-** | **-** | **-** | **-** | **-** |
| **2** | **M** | **L** | **L** | **L** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** |
| **3** | **M** | **M** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** |
| **4** | **M** | **L** | **L** | **L** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** |