

**Department of Electronics
Engineering
K. D. K. College of Engineering,
Nagpur**

**Course Objective
&
Course Outcomes**

B.E. 2nd Year CBS

III Semester Electronics Engineering (CBS)

Sr. No.	Name of Course	University Course Code	University Board	SAR Course Code
1	Applied Mathematics III	BEENE301T	Applied Science & Humanities	301(T)
2	Electronic Devices & Circuits	BEENE302T	Electronics	302(T)
3	Electronics Measurement & Instrumentation	BEENE303T	Electronics	303(T)
4	Object Oriented Programming and Data Structure	BEENE304T	Electronics	304(T)
5	Network Analysis & Synthesis	BEENE305T	Electrical	305(T)
6	Electronic Devices & Circuits	BEENE302P	Electronics	306(P)
7	Electronics Measurement & Instrumentation	BEENE303P	Electronics	307(P)
8	Object Oriented Programming and Data Structure	BEENE304P	Electronics	308(P)

Name of Course	University Course Code	University Board	SAR Course Code
Applied Mathematics III	BEENE301T	Applied Science & Humanities	301(T)

Course Objective :

1. The objective of this course is to introduce the fundamental ideas of the functions of complex variables and developing a clear understanding of the fundamental concepts of Complex Analysis such as analytic functions, complex integrals and a range of skills which will allow students to work effectively with the concepts.
2. To understand the Laplace Transform ,Fourier Transform and its existence and its applications

At the end of the course the students shall be able to:

C301TT.1	Identify Laplace transforms & inverse Laplace transforms of various types of function, its properties and apply it to solve differential equation and are able to use in engineering Problems.
C301T.2	Competent to work out the Fourier series representation of a periodic function in both exponential and sine-cosine forms and to solve partial differential equation and use Fourier transforms and its inverse in practical applications.
C301T.3	Find extreme values of functional using Euler's eq. and also apply knowledge to solve Isoperimetric problems and boundary value problems.
C301T.4	Understand analytic function of a complex variable and are able to apply Cauchy integral theorem and residue theorem to solve contour integrations.
C301T.5	Solve Lagrange's form and linear Homogeneous equation of Higher order with constant coefficient. They can apply method of separation of variable for solving P.D.E. in various engineering problems and also in Laplace transforms
C301T.6	Determine Eigen values and eigenvectors and the solution of linear differential equation using matrix method and student apply concept of matrices and its application for solving engineering problems

Name of Course	University Course Code	University Board	SAR Course Code
Electronic Devices & Circuits	BEENE302T	Electronics	302(T)

Course Objectives :

1. To present a clear consistent picture of the internal physical behavior of Diode and its application.
2. To present a clear consistent picture of the internal physical behavior of Transistor and its Biasing.
3. To Study the AC Analysis of Transistor & its application as a Feedback Amplifier.
4. To Study Transistor Application as a Power Amplifier
5. To Study How to use transistor as a Oscillator to generate ac signal
6. To develop the basic tools with which they can later learn about newly developed devices and applications of FET.

Course Outcome :

At the end of the course the students shall be able to

C302T.1	Explain the details of semi-conductor diode and its application.
C302T.2	Explain the construction and biasing of transistors.
C302T.3	Analyze transistor in AC amplifier.
C302T.4	Apply Transistor as a Oscillator and Multi-vibrator.
C302T.5	Apply Transistor as a Power amplifier.
C302T.6	Analyze and design amplifier circuits employing FET devices.

Name of Course	University Course Code	University Board	SAR Course Code
Electronics Measurement & Instrumentation	BEENE303T	Electronics	303(T)

Course Objective:

1. The primary aim is to acquaint the students with basic principles of measuring instruments generalized block dia. Of instrumentation system, static & dynamic characteristics of instruments, theory of Errors.
2. To study construction of galvanometer, PMMC mechanism, DC voltmeter, AC voltmeter, Ammeter , Multi-meters & various electronics instruments for measurements
3. To study Wheatstone bridge Kelvin's bridge Maxwell's bridge ,hay bridge , Schering bridge , various types of AC & DC Bridges & their applications
4. To study various types of transducers like LVDT, RVDT , piezoelectric & transducers for measurement of pressure temperature ,level ,Displacement & flow
5. To study general purpose CRO Dual trace dual beam CRO storage oscilloscope applications of CRO , Signal generators, AF & RF generators & function generators
6. To study construction & operation of signal analyses, wave analyzer spectrum analyzer , signal conditioning system & its necessity , data acquisition system.

Course Outcome:

At the end of the course the students shall be able to:

C303T.1	Elucidate basic concepts & basic principles of measuring instruments definitions of static & dynamic characteristics of instruments in measurement
C303T.2	Explain the operation & design of various electronic instruments like PMMC galvanometer ammeter , AC&DC voltmeter for measurement
C303T.3	Analyze, demonstrate working of various AC & DC bridges & their applications in the measurement & instrumentation system
C303T.4	Describe the operation of various types transducers and use them for measurement of pressure, temperature, level, displacement & flow
C303T.5	Explain the operation & working of oscilloscopes & the basic circuit blocks in the design of oscilloscope , dual beam , dual trace oscilloscope & application of CRO in the measurement circuitry & design of various function generators, signal generators, AF&RF generators
C303T.6	Explain the construction & operation of signal analyzer, wave analyzer, spectrum analyzer, signal conditioning system & its necessity, data acquisition system.

Name of Course	University Course Code	University Board	SAR Course Code
Object Oriented Programming and Data Structure	BEENE304T	Electronics	304(T)

Course Objectives:

1. To understand the concept of object oriented programming and develop skills in C++ Language.
2. Access how the choice of data structures and algorithm design methods impacts the performance of programs.
3. To Choose the appropriate data structure and algorithm design method for a specified application.
4. Write programs using „C++ Language“.

Course Outcomes:

At the end of the course the students shall be able to

C304T.1	Describe the concept of procedural languages and implement the concept of object oriented programming using C++ programs.
C304T.2	Implement the feature of OOPs using generic programming method.
C304T.3	Describe the concept of inheritance and implement its various methods using C++ Programs.
C304T.4	Describe the use pointer in data structure using array and implement it using sorting and searching methods.
C304T.5	Analyse the concept of Stack, Linked List and Queue and implement its algorithm using C++ Program.
C304T.6	Analyze the concept of TREE and its traversals using C++ Program.

Name of Course	University Course Code	University Board	SAR Course Code
Network Analysis & Synthesis	BEENE305T	Electrical	305(T)

Course Objectives:

1. To introduce the concept of circuit elements lumped circuits, circuit laws and reduction.
2. To make the students capable of analyzing any given electrical network using network theorems.
3. To study the concept of Resonance(series, parallel).
4. To make students aware of RL, RC circuits with transient and steady state in those circuits.
5. To introduce the concept of attenuators, filters and transmission lines.
6. To make the students learn how to synthesize an electrical network from a given impedance/ admittance function.
7. To introduce different two port network parameters for electrical circuits.

Course Outcomes:

At the end of the course the students shall be able to

C305T.1	Analyze circuit systems using direct application of Kirchoff's Current and Voltage Laws along with Ohm's Law.
C305T.2	apply network theorems to simplify circuits
C305T.3	Analyze the series resonant and parallel resonant circuit.
C305T.4	Design attenuators, filters and understand the basics of transmission lines.
C305T.5	Analyze the steady state and transient response of simple electric circuits.
C305T.6	Evaluate two-port network parameters of any network

Name of Course	University Course Code	University Board	SAR Course Code
Electronic Devices & Circuits	BEENE302P	Electronics	306(P)

Objectives :

To study basic concepts, DC circuits, AC circuits, semiconductors, Semiconductor devices, Power supply, Bipolar and Field effect transistor amplifiers, Frequency response of amplifier.

Outcome :

After completion of the practical's the students will be able :

C302P.1	Analyze various semiconductor devices
C302P.2	Analyze, design and apply amplifier circuit employing BJT and FET
C302P.3	Demonstrate various applications of BJT and FET.

Name of Course	University Course Code	University Board	SAR Course Code
Electronics Measurement & Instrumentation	BEENE303P	Electronics	307(P)

Course Objectives

1. Introduce students to the use of various electrical/electronic instruments, their construction, applications, principles of operation, standards and units of measurements.
2. provide students with opportunities to develop basic skills in the design of electronic equipments.

Course Outcomes

At the end of the practical's, the students shall be able to:

C303P.1	Measure the resistance ,inductance and capacitance by AC/DC Bridges
C303P.2	Use the various measuring instruments such as CRO, Function generator & Spectrum analyser
C303P.3	Measure various physical parameters by using various types of transducers

Name of Course	University Course Code	University Board	SAR Course Code
Object Oriented Programming and Data Structure	BEENE304P	Electronics	308(P)

Course Objectives:

1. To understand the concept of object oriented programming and develop skills in C++ Language.
2. Access how the choice of data structures and algorithm design methods impacts the performance of programs.
3. To Choose the appropriate data structure and algorithm design method for a specified application.
4. Write programs using „C++ Language“.

Course Outcome:

At the end of the practical's, the students shall be able to:

C304P.1	Implement the concept of object oriented programming and data structure algorithms using C++ programming. Also implement the problem solving approaches using variables and operators.
C304P.2	Design the C++ programs using the features of Object Oriented Programming and data structure.
C304P.3	Integrate these data structures using sorting and searching algorithms in C++ programs.

IV Semester Electronics Engineering (CBS)

Sr. No.	Name of Course	University Course Code	University Board	SAR Course Code
1	Applied Mathematics-IV	BEENE401T	Applied Science & Humanities	401(T)
2	Power Devices & Machines	BEENE402T	Electrical	402(T)
3	Electromagnetic Field	BEENE403T	Electronics	403(T)
4	Digital Circuits And Fundamental of Microprocessor	BEENE404T	Electronics	404(T)
5	Signals & Systems	BEENE405T	Electronics	405(T)
6	Environmental Studies	BEENE406T	Applied Science & Humanities	406(T)
7	Power Devices & Machines	BEENE402P	Electrical	407(P)
8	Digital Circuits And Fundamental of Microprocessor	BEENE404P	Electronics	408(P)
9	Software Workshop	BEENE407P	Electronics	409(P)

Name of Course	University Course Code	University Board	SAR Course Code
Applied Mathematics-IV	BEENE401T	Applied Science & Humanities	401(T)

Course Objective:

1. The course will develop an understanding of the elements of error analysis for numerical methods and certain proofs. The course will further develop problem solving skills and develop appropriate numerical methods to solve a differential equation.
2. To extend and formalize knowledge of the theory of probability and random variables , to introduce new techniques for carrying out probability calculations and identifying probability distributions ,to motivate the use of statistical inference in practical data analysis.

Course Outcome :

At the end of the course the students shall be able to:

C401T.1	Apply numerical method to solve algebraic, transcendental and system of simultaneous linear equation. Also solve differential equation and Matrix by numerical method.
C402T.2	Calculate the Z- Transform, inverse Z- Transforms of a sequence , identify its region of convergence and develop an ability to solve problems in various branches of Engineering.
C403T.3	Use series solution to solve differential equation.
C403T.4	Analyze Probability Theory and use it for analysis of data. Understand the basic concepts of probability, random variables, probability distribution, and joint probability distribution. Also apply probability theory via Bayes' Rule.
C403T.5	Calculate the mean, median, mode, range, and standard deviation for a given data set and also use method of moments and moment generating functions.
C403T.6	Collect, analyse the data statistically, describe sampling distributions of sample means and sample proportions using the appropriate distribution, e.g. normal, binomial, etc. and explain the central limit theorem.

Name of Course	University Course Code	University Board	SAR Course Code
Power Devices & Machines	BEENE402T	Electrical	402(T)

Course Objectives:

To teach the basic concepts of power electronics. Also to study the important power devices and machines in detail along with basic applications of SCR as controlled rectifier. To get skill of developing and design related to power electronic circuits.

Course Outcomes:

At the end of the course the students shall be able to:

C402T.1	Explain the basics of different components used in Power Electronics.
C402T.2	Analyze the working and characteristics of different power devices along with their applications in Electronic circuits.
C402T.3	Explain the concept of AC-DC converters which are widely used in industries.
C402T.4	List, classify, analyze Choppers which are widely used in industries.
C402T.5	Understand the concept of Inverters which are widely used in industries.
C402T.6	Classify AC/DC machines and propose their speed control methods.

Name of Course	University Course Code	University Board	SAR Course Code
Electromagnetic Field	BEENE403T	Electronics	403(T)

Course Objectives :

1. To introduce vector algebra, different coordinate system and their applications in electromagnetic theory.
2. To develop a skill set in analyzing and solving problems dealing with the interactions between electric charges at rest and in motion
3. To study electric and magnetic fields from stationary and dynamic charge and current distributions.
4. To study and understand properties of waves its propagation and waveguides
5. To impart the knowledge of radiations, dipoles and potentials in Electromagnetic fields.
6. To inculcate the fundamentals of Antennas and its parameters.

Course Outcomes :

At the end of the course the students shall be able to:

C403T.1	Analyze different coordinate system for mathematical analysis of Electromagnetic Engineering.
C403T.2	Explain the concepts of Electric field, Gauss's law and its applications.
C403T.3	Apply concepts of Biot-Savert's Law, Ampere's circuital Law
C403T.4	Make use of time-varying electromagnetic field as governed by Maxwell's equations.
C403T.5	Use the waveguides for the transmission of electromagnetic waves at higher frequencies.
C403T.6	Explain the basic concepts of Radiation and Elements used for radiation along with the basic terminologies.

Name of Course	University Course Code	University Board	SAR Course Code
Digital Circuits And Fundamental of Microprocessor	BEENE404T	Electronics	404(T)

Course Objectives :

To acquaint students with various basic digital gates used in digital system and develop logical circuits using Boolean gates, construction of various logic circuits using basic gates.

Course Outcome :

At the end of the course the students shall be able to

C404T.1	Identify, classify, make use of the Combinational Circuits using Logic Gates.
C404T.2	Design Arithmetic and Logical Circuits.
C404T.3	Explain the Sequential Logic Circuits using Flip-Flop..
C404T.4	Design Sequential Circuits such as Register, Counter and Sequence Generator.
C404T.5	Elucidate the Digital Logic Family.
C404T.6	Explain the Basic Fundamentals of 8085 Microprocessor.

Name of Course	University Course Code	University Board	SAR Course Code
Signals & Systems	BEENE405T	Electronics	405(T)

Course Objectives:

The concept of this subject enables students to understand how signals, systems and inference combine in prototypical tasks of communication, control and signal processing.

To study different types of Signals and Systems, its mathematical analysis pertaining to communication and signal processing.

Course Outcomes:

At the end of the course the students shall be able to

C405T.1	Model the different types of signals and systems using appropriate mathematical techniques & Apply Fourier series and Fourier transform for analysis of signals.
C405T.2	Apply the concept of probability theory pertaining to communication system.
C405T.3	Apply the concept of Source coding and decoding schemes for application needed.
C405T.4	Describe and distinguish the different analog modulation schemes.
C405T.5	Describe and distinguish the different digital modulation schemes.
C405T.6	Apply the knowledge of information theory for comparing various codes in digital communication.

Name of Course	University Course Code	University Board	SAR Course Code
Environmental Studies	BEENE406T	Applied Science & Humanities	406(T)

Course Objectives:

1. To understand the importance of environment
2. To understand the importance of resources and their conservation
3. To understand various ecosystems
4. To understand Biodiversity
5. To understand different types of pollution
6. To understand social issues
7. To understand the importance of human rights & value education

Course Outcomes:

At the end of the course the students shall be able to

C406T.1	Understand the importance and become aware of the upcoming environmental issues
C406T.2	Understand the importance of natural resources and can work for their conservation
C406T.3	Gain knowledge about the various ecosystems existing in nature and their importance for conservation of nature.
C406T.4	Learn about the biodiversity at local, national and global levels and the importance of wild life conservation
C406T.5	Gain knowledge about different types of environmental pollution, their effects and control of pollution for the benefit of mankind.
C406T.6	Develop analytical skills, critical thinking and demonstrate problem solving skills using scientific technique.

Name of Course	University Course Code	University Board	SAR Course Code
Power Devices & Machines	BEENE402P	Electrical	407(P)

Course Objectives :

To teach the basic concepts of power electronics. Also to study the important power devices and machines in detail along with basic applications of SCR as controlled rectifier. To get skill of developing and design related to power electronic circuits.

Course Outcome :

At the end of the practical's the students shall be able to:

C402P.1	Understand the working and nature of characteristics of different power components used in Power Devices.
C402P.2	Be able to calculate performance parameters for different devices and perform different tests on Transformers and motors for calculating the losses, efficiency, regulation etc
C402P.3	Understand the concept of starters used for starting AC/DC motors and their speed control methods.

Name of Course	University Course Code	University Board	SAR Course Code
Digital Circuits And Fundamental of Microprocessor	BEENE404P	Electronics	408(P)

Objectives :

To learn the basic methods for the design of digital circuits and provide the fundamental concepts used in the design of digital systems.

Outcome :

At the end of the practical's the students shall be able to:

C404P.1	Understand the fundamental of basic logic gates and their use in combinational and sequential circuits.
C404P.2	Demonstrate the use of digital components as a switching element.
C404P.3	Construct basic arithmetic and logical circuits required in Microcomputer System.

Name of Course	University Course Code	University Board	SAR Course Code
Software Workshop	BEENE407P	Electronics	409(P)

Course Objectives :

1. To instill in students the ability to formulate and solve engineering problems in electric and electronic circuits involving both steady state and transient conditions using MATLAB and pSpice.
2. Learn to use the pSpice simulation software tool for the analysis of Electrical and Electronic Circuits.
3. Learn to insert simple instructions to MATLAB, to find the solution of a system of linear algebraic equations, with constant (real and complex) coefficients.

Course Outcome :

At the end of the practical's the students shall be able to:

C407P.1	Formulate and verify the mathematical equation using MATLAB.
C407P.2	Implement and Plot various functions using different graphical techniques.
C407P.3	Draw, analyze and plot the electronic circuits using pSpice Software.