

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

Course Objective
&
Course Outcomes

B.E. 3rd Year CBS

V Semester Electronics Engineering (CBS)

Sr. No.	Name of Course	University Course Code	University Board	SAR Course Code
1	Switching Theory & Automata	BEENE501T	Electronics	501(T)
2	Microprocessor & Microcontroller	BEENE502T	Electronics	502(T)
3	Analog Circuits & Design	BEENE503T	Electronics	503(T)
4	Communication Electronics	BEENE504T	Electronics	504(T)
5	Industrial Economics & Entrepreneurship Development	BEENE505T	Applied Science & Humanities	505(T)
6	Microprocessor & Microcontroller	BEENE502P	Electronics	506(P)
7	Analog Circuits & Design	BEENE503P	Electronics	507(P)
8	Communication Electronics	BEENE504P	Electronics	508(P)

Name of Course	University Course Code	University Board	SAR Course Code
Switching Theory & Automata	BEENE501T	Electronics	501(T)

Course Objectives:

The Course Objectives are:

1. To study designing aspects of digital circuits.
2. To study properties of partially ordered sets & lattices.
3. To study minimization of Booleans function by using K-Map, tabulation method, functional decomposition, symmetric function.
4. To study the diagnosis of switching circuits & methods for improving their reliability.
5. To study various aspects of finite state machines.
6. To elaborate the concept of synthesis of sequential circuits.

Course Outcome:

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

C501T.1	Demonstrate basic tools for the design of digital circuits and fundamental concepts used in the design of digital systems
C501T.2	Analyze the structural properties by using Functional Decomposition & Symmetric functions
C501T.3	Describe designing aspects of logic circuits using threshold elements.
C501T.4	Design combinational logic circuits, sequential logic circuits.
C501T.5	Describe behavior, capabilities and structure of finite state machines and sequential machines.
C501T.6	Describe diagnosis of faults of switching circuits & methods of improving their reliability.

Name of Course	University Course Code	University Board	SAR Course Code
Microprocessor & Microcontroller	BEENE502T	Electronics	502(T)

Course Objectives:

1. To understand the basic concept of microprocessor, its architecture, addressing modes and its instruction set.
2. To understand the interfacing of 16-bit microprocessor with memory and peripheral chips, also able to understand its interrupts.
3. To understand the interfacing of 16-bit microprocessor with peripheral devices like IC-8254, IC-8259, IC-8251, IC-8279, etc.
4. To understand architecture of co-processor 8087 with its instruction and interfacing with IC-8237.
5. To learn and understand the architecture, addressing modes and assembly language program of microcontroller 8051.
6. It help to understand the generation of time delay, serial communication, keyboard matrix, LED display using assembly language program of 8051 microcontroller.

Course Outcome:

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

C502T.1	Understand the internal organization of Microprocessor 8086 and write an assembly language programs using its Instruction set.
C502T.2	Interface different peripheral IC's with 8086 microprocessor by employing interfacing concepts.
C502T.3	Design an assembly language program to interface the various peripheral ICs with microprocessor 8086.
C502T.4	Interface math co-processor 8087 with 8086 and write its assembly language program
C502T.5	Demonstrate the internal organization of microcontroller 8051 and explain the concept of interrupt and its uses.
C502T.6	Design an assembly language program to interface the various peripheral ICs with microcontroller 8051.

Name of Course	University Course Code	University Board	SAR Course Code
Analog Circuits & Design	BEENE503T	Electronics	503(T)

Course Objectives

- 1) To studies basic differential amplifier using transistor and its configuration.
- 2) To studies linear applications such as voltage follower, summing amplifier, Instrumentation amplifier, Integrator and differentiator.
- 3) To studies non-linear applications such as comparator, Schmitt trigger, multivibrator circuits for various applications.
- 4) To studies design of regulated power supply using regulated ICS.
- 5) To studies the design of electronic circuits for oscillators.
- 6) To studies the design of electronic circuits for active filters

Course Outcomes:

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

C503T.1	Analyze basic differential amplifier using transistor and its application in op-amp building blocks
C503T.2	Demonstrate the use of op-amp in linear applications
C503T.3	Analyse and make use of op-amp in non-linear applications and design multivibrator circuits using IC 555.
C503T.4	Design the series voltage regulator, IC voltage regulators and SMPS
C503T.5	Compare and design the sinusoidal oscillators & function generator
C503T.6	Design of active filters ,relay driver and Servo Motor & Stepper Motor control circuits

Name of Course	University Course Code	University Board	SAR Course Code
Communication Electronics	BEENE504T	Electronics	504(T)

Course Objectives:

The course objectives are:

1. To study the basic concept of communication and different modulation system based on basic parameters.
2. To study the concept of noise, properties & its effects.
3. To study the AM, FM, PM process & compute modulation Index.
4. To study the fundamentals of AM and FM Receivers.
5. To develop knowledge about fundamentals of Broadband Communication Systems.

Course Outcomes:

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

C504T.1	Describe the different blocks in communication system and distinguish different Amplitude modulation schemes with their advantages, disadvantages and applications.
C504T.2	Analyze the Generation and Detection of FM Signal and Compare Amplitude & Angle modulation schemes.
C504T.3	Differentiate between various Pulse & Digital Modulation - Demodulation Techniques.
C504T.4	Identify Different type of Noises and its Sources.
C504T.5	Describe the different Radio Receiver components.
C504T.6	Differentiate Multiplexing Techniques and understand different Broadband communication links.

Name of Course	University Course Code	University Board	SAR Course Code
Industrial Economics & Entrepreneurship Development	BEENE505T	Applied Science & Humanities	505(T)

Course Objectives :

- 1) To study of the scope of an industrial economics
- 2) To study Market Structure
- 3) To study Banking
- 4) To study the concept of Entrepreneurship Development
- 5) To study concept of Financing
- 6) To Study different types of organization.

Course Outcomes :

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

C505T.1	Understand the scope of an industrial economics and entrepreneurship development.
C505T.2	Analyze key areas of business development
C505T.3	Identify sources of finance for business development.
C505T.4	Apply techniques for project preparation.
C505T.5	Understand various methods of taxation and tax benefits
C505T.6	Understand significance of entrepreneurship and economic growth.

Name of Course	University Course Code	University Board	SAR Course Code
Microprocessor & Microcontroller	BEENE502P	Electronics	506(P)

Course Objective:

1. To understand the basic concept of microprocessor, its architecture, addressing modes and its instruction set.
2. To perform a practical on microprocessor and microcontroller based system.
3. To perform assembly language programming for 8/16 bit data for various instructions.
4. To perform the interfacing of 16-bit microprocessor with memory and peripheral chips.
5. To perform the interfacing of 16-bit microprocessor with other peripheral devices like IC-8254, IC-8259, IC-8251, IC-8279, etc.
6. To perform the programming for the generation of time delay, serial communication, keyboard matrix, LED display using assembly language program of 8051 microcontroller.

Course Outcomes:

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

C502P.1	Analyze the internal organization of Microprocessor and Microcontroller and demonstrate the instruction set by performing the Assembly languages programs.
C502P.2	Demonstrate the simulation of the programming on software and verify the results.
C502P.3	Design interface of 8086 & 8051 with keyboard / Display, ADC/DAC, Stepper motor along with some peripheral ICs like 8254, 8259, etc.

Name of Course	University Course Code	University Board	SAR Course Code
Analog Circuits & Design	BEENE503P	Electronics	507(P)

Course Objectives:

1. To learn about various types of analog systems.
2. To study the practical aspects of linear and non-linear applications of OP-AMP.
3. To design the oscillators using OP-AMP and Transistors.
4. To study frequency response of different circuits based on operational amplifier.

Course Outcome:

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

C503P.1	Test and design analog electronic circuits using OP-AMP
C503P.2	Test and design voltage regulators
C503P.3	Analyze and Design the oscillators and active filters.

Name of Course	University Course Code	University Board	SAR Course Code
Communication Electronics	BEENE504P	Electronics	508(P)

Course Objectives:

1. To perform practical based on analog and digital modulation techniques.
2. To study the analysis of AM and FM receivers.
3. To study ASK, FSK and PSK techniques.
4. To perform Matlab based practical for different modulation techniques.

Course Outcome:

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

C504P.1	Demonstrate and analyse different Analog Modulation & De-Modulation techniques used in Electronic Communication system.
C504P.2	Demonstrate different Pulsating Modulation & De-Modulation techniques and plot the waveforms.
C504P.3	Demonstrate Time division Multiplexing & De- Multiplexing.

VI Semester Electronics Engineering (CBS)

Sr. No.	Name of Course	University Course Code	University Board	SAR Course Code
1	Microwave Engineering	BEENE601T	Electronics	601(T)
2	Digital Signal Processing	BEENE602T	Electronics	602(T)
3	Control System Engg.	BEENE603T	Electrical	603(T)
4	Digital Communication	BEENE604T	Electronics	604(T)
5	Functional English	BEENE605T	Applied Science & Humanities	605(T)
6	Microwave Engineering	BEENE601P	Electronics	606(P)
7	Digital Signal Processing	BEENE602P	Electronics	607(P)
8	Electronics Workshop Practice	BEENE606P	Electronics	608(P)
9	Industrial Visit	BEENE607P	Electronics	609

Name of Course	University Course Code	University Board	SAR Course Code
Microwave Engineering	BEENE601T	Electronics	601(T)

Course Objectives :

1. To study the principles of the advanced microwave engineering and to understand the theoretical principles underlying microwave devices and networks.
2. To study the design of passive and active microwave components like Micro strip line, guided wave device
3. To study Klystron amplifier and oscillator.
4. To study magnetron as an oscillator and its working.
5. To study the high frequency transmission lines and measurement of impedance using smith chart.
6. Describe the transmission and waveguide characteristics for impedance matching and filter design circuits
7. To understand the scattering parameters of various active and passive devices.

Course outcomes :

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

C601T.1	Understand the working of microwave active devices like Klystron and limitation of Conventional low frequency devices.
C601T.2	Understand the working of magnetron (M type active device) used as an oscillator.
C601T.3	Describe the various parameters of microwave components and design impedance matching network for any transmission line using smith chart.
C601T.4	Analyze the microwave networks and passive components with the help of scattering matrix.
C601T.5	Acquire knowledge about the measurements to be done at microwaves.
C601T.6	Demonstrate the various solid state devices and its applications.

Name of Course	University Course Code	University Board	SAR Course Code
Digital Signal Processing	BEENE602T	Electronics	602(T)

Course Objectives:

1. To study the basic concepts of digital signal processing.
2. To study analysis and processing of signals for different kind of applications and retrieval of information from signals.
3. To understand the physical significance of circular convolution and its relation with linear convolution.
4. To study designing of digital filters and its realization.
5. To study analysis of signals using the discrete Fourier transform (DFT) and Z-Transform.
6. To study behavior of discrete time systems using Z-Transform.

Course Outcome:

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

C602T.1	Identify discrete-time signals and systems and determine the response. Understand the concept of sampling and reconstruction.
C602T.2	Describe z-transform for analysis of signals and systems.
C602T.3	Describe the discrete Fourier transform (DFT) for analysis of signals and system.
C602T.4	Design and implement digital IIR filter for various applications..
C602T.5	Design and implement digital FIR filter for various applications.
C602T.6	Describe the concept of multi rate signal processing and how to apply it for the wavelet transform.

Name of Course	University Course Code	University Board	SAR Course Code
Control System Engg.	BEENE603T	Electrical	603(T)

Course Objectives:

The Course Objectives are:

1. To study the fundamental concepts of Control systems and mathematical modeling of the system.
2. To study the concept of time response and frequency response of the system.
3. To study controllers & compensators.
4. To study the basics of stability analysis of the system.

Course Outcomes:

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

C603T.1	Understand control systems in brief- its types, classifications. Identify its basic elements & write the Mathematical Modelling.
C603T.2	To understand utility of Laplace transforms and transfer functions for modelling complex interconnected systems
C603T.3	Analyze the steady state and transient response characteristics of different order systems for standard test signals and find the relative stability.
C603T.4	Analyze the stability of the system using various frequency response method
C603T.5	Analyze the use and need of different types of compensators
C603T.6	The ability to derive, interpret and solve problems using modern state space control methods for continuous time systems.

Name of Course	University Course Code	University Board	SAR Course Code
Digital Communication	BEENE604T	Electronics	604(T)

Course Objectives:

The Course Objectives are:

1. To study basic components of digital communication systems.
2. To understand the designing aspects of optimum receivers for digital modulation techniques.
3. To study the different digital modulation techniques.
4. To study the designing of digital communication systems under various performance constraints.

Course Outcomes:

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

C604T.1	Model the digital communication system using appropriate mathematical techniques.
C604T.2	Apply the concept of Source coding and decoding techniques used in digital Communication.
C604T.3	Describe digital modulation concept and Compare different digital modulation techniques.
C604T.4	Describe and apply the concept of Waveform coding and decoding techniques.
C604T.5	Describe and apply the concept of coding and decoding techniques used in telecommunication.
C604T.6	Describe the spread spectrum Communication concepts.

Name of Course	University Course Code	University Board	SAR Course Code
Functional English	BEENE605T	Applied Science & Humanities	605(T)

Course Objectives:

Functional grammar is a communicative resource. It explores the way in which English Grammar can be used in text. It enables the speaker and writers to interact with one another. Learning English helps the students to acquire the basic knowledge of the language.

Course Outcomes:

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

C605T.1	Clear the concept of grammar usage and vocabulary.
C605T.2	Prepare student for analytical approach to English language for competitive exams like TOFEL, GRE.
C605T.3	Student learns the correct method for formal correspondence while drafting professional and technical correspondence. They also learn documentation and to convey different message to different kind of audience
C605T.4	Enhance reading ability and speed. To understand the basic concept given in the text.

Name of Course	University Course Code	University Board	SAR Course Code
Microwave Engineering	BEENE601P	Electronics	606(P)

Course Objective :

1. To study the different microwave components and compare them with conventional devices.
2. To perform the characteristics of Klystron tube as an amplifier using mode diagram.
3. To perform the transmission characteristics of microwave components like Tees, Directional Coupler, etc.
4. To perform the transmission characteristics of non-reciprocal devices like Isolator, Circulator, Twist (gyrator) etc.
5. To perform the V-I characteristics of Gunn Diode.
6. To perform and draw the polar pattern of Horn antenna.

Course Outcomes :

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

C601P.1	Use a microwave test bench in analyzing various types of microwave measurements.
C601P.2	Characterize microwave devices in terms of the directionality of communication.
C601P.3	To understand working principle of non-reciprocal devices like Isolator, Circulator, Twist (gyrator) etc and verify its results.

Name of Course	University Course Code	University Board	SAR Course Code
Digital Signal Processing	BEENE602P	Electronics	607(P)

Course Objective:

1. To understand principle & working of digital signal processing for various applications.
2. To understand Z transforms and discrete time Fourier transforms for the analysis of digital signals and systems.
3. To design and implement FIR & IIR filter and analysis of their frequency response.
4. Represent discrete-time signals analytically and visualize them in the time domain.
5. Understand the Transform domain and its significance and problems related to computational complexity.
6. Be able to specify and design any digital filters using MATLAB

Course Outcomes:

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

C602P.1	Understand the key theoretical principles underpinning DSP in a design procedure through design examples
C602P.2	Learn how to use a powerful general-purpose mathematical package using skills and modern engineering tools such as MATLAB to design and simulate a DSP systems
C602P.3	Understand the architecture of a digital signal processor and some programming issues in fixed-point digital signal processor in real-time implementation for specific applications

Name of Course	University Course Code	University Board	SAR Course Code
Electronics Workshop Practice	BEENE606P	Electronics	608(P)

Course Objectives:

1. To make students familiar with measuring instruments like CRO, DSO and Signal Generator.
2. To make students familiar with Interfacing Peripheral with computer.
3. To understand PCB Designing process
4. To enable students to design & fabricate their own Hardware.

Course Outcome:

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

C606P.1	Use DSO and Spectrum Analyzer.
C606P.2	Design PCB using PCB designing software.
C606P.3	Design & fabricate mini project

Name of Course	University Course Code	University Board	SAR Course Code
Industrial Visit	BEENE607P	Electronics	609

Course Outcome:

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

C607P.1	Apply this knowledge during their project and may be useful in future.
C607P.2	Use different tools (computer tools and statistics) to aid the assessment processes
C607P.3	Understand what professional ethics are and how do ethics affect the outcomes of laws and regulation