Rayat Shikshan Sanstha's

Yashavantrao Chavan Institute of Science, Satara (Autonomous)

Lead College, Karmaveer Bhaurao Patil University

Reaccredited by NAAC (3rdCycle) with 'A+' grade (CGPA 3.57).

ISO 9001:2015 Certified

Bachelor of Science

Part - II

ELECTRONICS

Syllabus

to be implemented w .e. f. June, 2024

NEP 2020

Course Structure B. Sc II Semester III

Sr.No.	Course Category	Course Code	Name of Course
1	Major I	**BET 231**	Fundamentals of Analog Circuit design
2	Major II	**BET 232**	Computer Organization and 8085 Microprocessor
3	Major Practical I	**BET 233**	Experimental studies of analog circuit design Lab (Hardware)
4	Major Practical II	**BET 234**	Computer Organization and 8085 Microprocessor Lab (Software and Hardware)
5	Minor I	**BET235**	Wave-Shaping Circuits and Timer IC
6	Minor Practical I	**BEP236**	Minor Practical I **:**Wave-Shaping Circuits and Timer IC(Hardware)
7	VSC	**BEPVSC 1**	Electronics Technical Writing, Documentation and Presentation Essentials Skill
8	SEC	**BEPSEC3**	Programming Skills for Computational Electronics Applications
9	AEC	**English I**	
		English II	
10	VEC	**BETVEC 2**	Electronics for Environmental awareness

Course Structure B.Sc II Semester IV

Sr.No.	Course Category	Course Code	Name of Course
1	Major I	**BET 241**	Operational amplifier and its applications
2	Major II	**BET 242**	Fundamentals of 8051 microcontroller
3	Major Practical I	**BEP 243**	Operational amplifier Lab (Hardware)
4	Major Practical II	**BEP 244**	8051 microcontroller Lab (Hardware and Circuit Simulation Software)
5	Minor I	**BET245**	Fundamentals of 8051 microcontroller
6	Minor Practical I	**BEP246**	Minor Practical II:8051 microcontroller Lab (Hardware and Circuit Simulation Software)
7	VSC	**BEPVSC 2**	Digital Skills for Electronics Business
8	SEC	**BEPSEC4**	Advance Programming Skills for Computational Electronics
9	AEC	**English III**	
		English VI	
10	CC	**BETCC 2**	

Major Syllabus

STRUCTURE OF COURSE: B.Sc II (Semester III)

Sr. No.	SUBJECT TITLE	Theory			Practical		
		Course No. & Course Code	No. of lectures per week	Credits	Course No. & Course Code	No. of lectures Per week	Credits
1	Fundamentals of Analog Circuit design	Course -V: BET231	6	2	Course III: BEP 233	4	2
2		Course -VI: BET232		2	Cource IV: BEP 234		2

STRUCTURE OF COURSE: B. Sc II (Semester IV)

Sr. No.	SUBJECT TITLE	Theory			Practical		
		Course No. & Course Code	No. of lectures per week	Credits		No. of lectures Per week	Credits
1	Operational amplifier and its applications	Course -VII: BET241	6	2	Course Course V: BEP 243	4	2

2	**Fundamentals of 8051 microcontroller**	**Course -VIII: BET242**		**2**	**Course Course VI : BEP 244**		**2**

	ESE	Internal Exam		Practical			Submission	Total
		ISE-I	ISE-II		Exam	Journal	Seminar + Student Performance	
Course V	30	5	5	Practical-III(A)	25	5	5	150
Course VI	30	5	5	Practical IV(B)	25	5	5	

B.Sc. II : Evaluation structure

Semester III

Semester IV

	ESE	Internal Exam		Practical			Submission	Total
		ISE-I	ISE-II		Exam	Journal	Seminar + Student Performance	
Course VII	30	5	5	Practical -III(A)	25	5	5	150
Course VIII	30	5	5	Practical IV(B)	25	5	5	

Structure and Title of Courses of B. Sc. Course:

*** B. Sc. II Semester III ***

Course Number	Course Code	Course Name
V	BET 231	Fundamentals of Analog Circuit design
VI	BET 232	Computer Organization and 8085 Microprocessor
III	BEP 233	Major Practical I : Experimental studies of analog circuit design (Hardware Lab)
IV	BEP 234	Major Practical II: Computer Organization and 8085 Microprocessor Lab (Software and Hardware)

Semester III

Course V: BET231: Fundamentals of Analog Circuit design

Course Objectives: Student will able to…

1. Understand Comprehension with wave shaping circuits and its Advantages in electronics systems.
2. Study ability of Analyzing and Designing BJT switching circuit for various application.
3. Study the designing Sweep Generators.
4. Understanding of facts, ideas about Timer IC and its applications.

Credits (Total Credits 2)	**SEMESTER-III BET 231 Fundamentals of Analog Circuit design**	**No. of hours per unit/credits**
UNIT - I	**Wave shaping Circuits**	**(7)**
	A) Linear wave shaping circuits: Differentiator - High pass R-- C circuits, Response to triangular input & square wave, Numerical problems based designing. Integrator-- Low pass RC circuit –Response to square input &rectangular input, Numerical problems-based designing. B) Nonlinear wave shaping: Clippers: Positive clipper, Negative clipper, Combinational clipper, Clampers: Positive clampers, Negative clampers, Combinational clampers, voltage doublers and triplers, Numerical problems-based designing.	
UNIT - II	**Multivibrators and Amplifiers**	**(10)**
	A) Transistorized Multivibrators and its types: -Circuit Diagram, Operation, timing equations& applications of following: Astable multivibrator, Monostable multivibrator, Bistable Multivibrator, Schmitt Trigger, Numerical problems based on timing Equations. B) Power Amplifiers: Class A, Class B, Class C and their Comparisons, RC coupled amplifier, RF Tuned Amplifiers C) Feedback Amplifiers- Concept of feedback, Negative and Positive feedback, General Characteristics of feedback	

	circuits, advantages and disadvantages of negative feedback and positive feedback, voltage, current feedback amplifiers(Series and Shunt)	
UNIT - III	**Sweep Generators and Oscillators**	**(7)**
	A) Voltage time base generator: Exponential sweep circuit, Transistor switch sweep generator, UJT switch sweep generator Miller sweep generator, Bootstrap sweep generator B) Current sweep generator: - Transistorized C) Oscillators:- Barkhausen Criteria for Oscillators, Phase Shift Oscillator, Colpitts Oscillator, Hartley Oscillator, Wien bridge Oscillator and Crystal oscillator	
UNIT - IV	**Timer IC and its applications**	**(6)**
	A) Timer IC555: Features, Pin Diagram, Block Diagram, B) Applications: Astable Multivibrator, Monostable Multivibrator, PWM, PAM, PPM, FSK C) PLL IC 565: Introduction Block diagram, Pin diagram.	

Course Outcomes: The students should be able to…

1 Design various wave shaping circuits for different applications.

2 Utilize transistor as a switch for Wave-Shaping Circuits.

3 Analyze sweep generators in electronics circuits.

4 Utilize Timer IC applications

Reference Books:

1. A Text Book of Wave-Shaping Circuits and 555 Timers-R. S. Sedha (S. Chand & Co),Multicolour Edition 3/e, 2018

2. Linear Integrated Circuits-D Roy Choudhari, 5thMulticolour Edition, 2018

4. Basic Electronics- Bernard Grob, 8th Edition 2010

5. Electronics Devices and Circuits: An Introduction- Allen mottershed, 11th Edition 2015

6. A Course in Circuit Analysis- M.L. Soni, 4th Edition, Dhanpat RaiPublications,2016

7. Linear Circuits- M. E. Valkenburg an Kinariwala, 1982

Semester III

Course V: BET232: Computer Organization and 8085 Microprocessor

Course Objectives: Student will able to…

1. Understand Microcomputer Fundamentals
2. Comprehend 8085 Microprocessor Architecture
3. Study the Assembly Language Programming for 8085
4. Develop Skills in 8085 Programming and Interfacing.

Credits (Total Credits 2)	**SEMESTER-III BET 232 Computer Organization and 8085 Microprocessor**	**No. of hours per unit/credits**
UNIT - I	**Microcomputer Organization**	**(6)**
	Basic components of microcomputer: CPU, ALU, Memory System: Program memory, Data memory, Data Storage (Type of RAM and ROM), Memory organization and addressing, Memory Map, memory hierarchy, registers, internal and external memory, and concept of Virtual Memory, I/O devices, input, and output ports Types of I/O Addressing: I/o Mapped I /O and memory mapped I/O).	
UNIT II	**8085 Microprocessor Architecture**	(10)
	Main features of 8085. Block diagram and Pin-out diagram of 8085. Bus structure: Data, address, and control buses. Registers, ALU, Stack memory, Program counter, Flag register.	
UNIT - III	**Assembly Language programming 8085**	**(7)**
	Instruction classification, addressing modes of Instructions, Instruction set (Data transfer, Arithmetic, logical, branch, and control instructions). Timing and Control circuitry: Machine Cycle, Instruction Cycle, Timing states. Instruction cycle, Timing diagram of MOV and MVI. Hardware and software interrupts.	
UNIT IV	**Programming of 8085**	(7)
	Subroutines, delay loops Programs for: Addition, Substraction, Multiplication, Division, Block transfer. Introduction of interfacing ICs (Qualitative only): Programmable Peripheral Interface: Intel 8155, 8253, 8255, programmable Interrupt Controller: Intel 8259	

Course Outcomes: The students should be able to…

1 Describe and differentiate the roles of key microcomputer components and their interactions within the system.

2 Explain the architecture and functioning of the 8085 microprocessors

3 Write and analyze assembly language programs for the 8085-microprocessor using appropriate addressing modes, instructions, and control flow mechanisms.

4 Apply knowledge of programmable peripheral interfaces and interrupt controllers in designing simple microcomputer systems.

Reference Books:

1. W. Stallings, Computer Organization and Architecture Designing for Performance, 8th Edition, Prentice Hall of India ,2009
2. Ramesh Gaonkar, Microprocessors architecture, programming and Applications, Wiley Eastern Ltd. (2002), 2nd Edition
3. D. V. Hall, "Microprocessors and Interfacing", Tata McGraw Hill (2005), revised 2nd edition
4. P. K. Ghosh and P.R Sridhar, 0000 to 8085 microprocessor, John Wiley and Sons, 2nd Edition
5. R. Thegarajan and S. Dhanpal, Microprocessor, and its Application, New Age International Private Ltd, 1st Edition
6. K. Udaya Kumar and B.S. Uma Shankar, The 8085 Microprocessor: Architecture, Programming, and Interfacing", Pearson Education
7. Walter Triebel and Avtar A.Singh, 8088 and 8086 Microprocessors: Programming, Interfacing, Software Hardware and Applications, Pearson Education, 4th edition

Semester III

Practical III: BEP233: Fundamentals of Analog Circuit design Lab (Hardware)

Course Objectives: Student will able to…

1. Understand and relate concepts learned in classroom to the real-world situations
2. Study ability of designing practical circuits through conceptual, analytical stages.
3. Study of scientific, analytical skills about Analog Electronics.
4. Understand and design wave shaping circuits, Multivibrators, sweep generators, Oscillators.

Credits (Total Credits 2)	**Semester III Practical III BEP233: Experimental studies of analog circuit design (Hardware Lab)**		**No. of hours per (30)**
	1	Study RC circuit as differentiator and High pass filter.	
	2	Study RC circuit as an integrator and Low pass filter.	
	3	Study of clipping and clamping circuits.	
	4	Design Voltage Doublers circuit.	
	5	Study Switching char. of a transistor.	
	6	Design transistorized astable multivibrator.	
	7	Study transistorized monostable multivibrator.	
	8	Study transistorized bistable multivibrator.	
	9	Study IC 555 Timer Application	
	10	Study IC 555 Square wave generator Application	
	11	UJT switch sweep generator	
	12	Miller sweep generator	
	13	To Study of Phase Shift Oscillator	
	14	To Study of Colpitts Oscillator,	
	15	To Study of Hartley Oscillator,	
	16	To Study of Wien bridge Oscillator	
	17	To Study of Crystal oscillator	
	18	To Study the characteristics of RF tuned amplifier	
	19	To study class A amplifier	
	20	Comparative study of negative and positive feedback	

Course Outcomes: The students should be able to…

1	Utilize and Demonstrate advance Lab Instruments
2	Demonstrate modulation and demodulation techniques.
3	Design various wave shaping circuits for different applications.
4	Design different types of switching circuits, Oscillators,feedback circuits for various applications.

Reference Books:

1. A Text Book of Wave-Shaping Circuits and 555 Timers-R. S. Sedha (S. Chand & Co),Multicolour Edition 3/e, 2018
2. Linear Integrated Circuits-D Roy Choudhari, 5thMulticolour Edition, 2018
4. Basic Electronics- Bernard Grob, 8th Edition 2010
5. Electronics Devices and Circuits: An Introduction- Allen mottershed, 11th Edition 2015
6. A Course in Circuit Analysis- M.L. Soni, 4th Edition, Dhanpat RaiPublications,2016
7. Linear Circuits- M. E. Valkenburg an Kinariwala, 1982

Practical IV: BEP234: Computer Organization and 8085 Microprocessor

Lab (Software and Hardware)

Course Objectives: Student will able to…

1. Apply Fundamental Arithmetic Operations
2. Analyze and Implement Advanced Arithmetic Techniques
3. Evaluate and Execute Control Flow Structures
4. Synthesize Data Manipulation Strategies

Credits (Total Credits 2)	**Semester III Practical III BEP234: Computer Organization and 8085 Microprocessor Lab (Software Simulation Lab)**		**No. of hours per (30)**
	1	Addition and subtraction of numbers using direct addressing mode	
	2	Addition and subtraction of numbers using indirect addressing mode	
	3	Multiplication by repeated addition	
	4	Division by repeated subtraction.	
	5	Handling of 16-bit Numbers.	
	6	Use of CALL and RETURN Instruction.	
	7	Block data handling.	
	8	Study of Logical Instructions	
	9	Use of Rotate instructions	
	10	BCD to Binary Conversion	
	11	Binary to BCD Conversion	
	12	BCD to seven segment conversion	
	13	BCD to ASCII Conversion	
	14	ASCII to BCD Conversion	
	15	Addition and subtraction of two BCD numbers	
	16	Arrange an array of data in ascending order	
	17	Arrange an array of data in descending order	
	18	Find largest number in an array of data	
	19	Find smallest number in an array of data	
	20	Program to transfer data block / Exchange data block	

Course Outcomes: The students should be able to…

1	Demonstrate proficiency in performing arithmetic operations using different addressing modes, applying knowledge to solve numerical problems effectively.
2	Evaluate and implement arithmetic operations using iterative methods, showcasing the ability to break down problems and apply appropriate algorithms.
3	Create Structured Programs with Subroutines
4	Apply logical instructions, rotation operations, and data conversion methods (BCD to binary, ASCII to BCD) to manipulate and transform data efficiently within assembly language programs.

Reference Books:

1. W. Stallings, Computer Organization and Architecture Designing for Performance, 8th Edition, Prentice Hall of India ,2009
2. Ramesh Gaonkar, Microprocessors architecture, programming and Applications, Wiley Eastern Ltd. (2002), 2nd Edition
3. D. V. Hall, "Microprocessors and Interfacing", Tata McGraw Hill (2005), revised 2nd edition
4. P. K. Ghosh and P.R Sridhar, 0000 to 8085 microprocessor, John Wiley and Sons, 2nd Edition
5. R. Thegarajan and S. Dhanpal, Microprocessor, and its Application, New Age International Private Ltd, 1st Edition
6. K. Udaya Kumar and B.S. Uma Shankar, The 8085 Microprocessor: Architecture, Programming, and Interfacing", Pearson Education
7. Walter Triebel and Avtar A.Singh, 8088 and 8086 Microprocessors: Programming, Interfacing, Software Hardware and Applications, Pearson Education, 4th edition

Minor Syllabus

Cource Structure for Bsc II (Semester III)

Theory				Practical				
Course Title	**Course Code**	**Lecture per week**	**Credits**	**Course**	**Course Title**	**Course Code**	**Lecture per week**	**Credits**
Wave-Shaping Circuits and Timer IC	**BET 235**	**2**	**2**	**Practical I**	**Minor Practical I**	**BEP 236**	**2**	**2**

Structure and Title of Courses of B. Sc. Course:

*** B. Sc. II Semester III ***

Course Number	Course Code	Course Name
V	BET235	Wave-Shaping Circuits and Timer IC
Lab I	BEP236	Minor Practical III**: Wave-Shaping Circuits and Timer IC(Hardware Lab)**

Semester III

Course VI: BET 235: Wave-Shaping Circuits and Timer IC

Course Objectives: Student will able to…

1. Understand Linear Wave Shaping Circuits
2. Explore Nonlinear Wave Shaping Techniques
3. Investigate Transistor Switching Circuits
4. Study Sweep Generators and Timer ICs

Credits **(Total Credits 2)**	**SEMESTER-III** **BET 235** **Wave-Shaping Circuits and Timer IC**	**No. of hours per unit/credits**
UNIT - I	**Wave shaping Circuits**	**(7)**
	A) Linear wave shaping circuits: Differentiator - High pass R-- C circuits, Response to triangular input & square wave, Numerical problems based designing. Integrator-- Low pass RC circuit –Response to square input &rectangular input, Numerical problems-based designing. B) Nonlinear wave shaping: Clippers: Positive clipper, Negative clipper, Combinational clipper, Clampers: Positive clampers, Negative clampers, Combinational clampers, voltage doublers and triplers, Numerical problems-based designing.	
UNIT - II	**BJT Switching Circuits**	**(9)**
	A) Transistor as a switch, Transistor Switching Times. B) Transistorized Multivibrators and its types: -Circuit Diagram, Operation, timing equations& applications of following:-, Astable multivibrator, Monostable multivibrator, Bistable Multivibrator, Schmitt Trigger, Numerical problems based on timing Equations.	

UNIT - III	**Sweep Generators**	**(7)**
	A) Voltage time base generator: Exponential sweep circuit, Transistor switch sweep generator, UJT switch sweep generator Miller sweep generator, Bootstrap sweep generator B) Current sweep generator: - Transistorized	
UNIT - IV	**Timer IC and its applications**	**(7)**
	A) Timer IC555: Features, Pin Diagram, Block Diagram, B) Applications: Astable Multivibrator, Monostable Multivibrator, PWM, PAM, PPM, FSK C) PLL IC 565: Introduction Block diagram, Pin diagram.	

Course Outcomes: The students should be able to…

1 Apply Knowledge of Linear Wave Shaping
2 Implement Nonlinear Wave Shaping Techniques
3 Design and Analyze Transistor Switching Circuits
4 Implement and Utilize Timer IC applications

Reference Books:

1. A Text Book of Wave-Shaping Circuits and 555 Timers-R. S. Sedha (S. Chand & Co),Multicolour Edition 3/e, 2018
2. Linear Integrated Circuits-D Roy Choudhari, 5th Multicolour Edition, 2018
4. Basic Electronics- Bernard Grob, 8th Edition 2010
5. Electronics Devices and Circuits: An Introduction- Allen mottershed, 11th Edition 2015
6. A Course in Circuit Analysis- M.L. Soni, 4th Edition, Dhanpat RaiPublications,2016
7. Linear Circuits- M. E. Valkenburg an Kinariwala, 1982

Semester III

Lab I: BEP236: Wave-Shaping Circuits and Timer IC Lab (Hardware)

Course Objectives: Student will able to…

1. Understand Fundamental Concepts of RC Circuits
2. Study Nonlinear Circuit Techniques
3. Examine Transistor Characteristics and Multivibrators
4. Study Timer IC Applications and Modulation Techniques

Credits **(Total Credits 2)**	**Semester III** **Lab I** **Minor Practical -III** **BEP 236: Wave-Shaping Circuits and Timer IC Lab (Hardware Lab)**		**No. of hours per (30)**
	1	Study RC circuit as differentiator and High pass filter.	
	2	Study RC circuit as an integrator and Low pass filter.	
	3	Study of clipping and clamping circuits.	
	4	Design Voltage Doublers circuit.	
	5	Study Switching char. of a transistor.	
	6	Design transistorized astable multivibrator.	
	7	Study transistorized monostable multivibrator.	
	8	Study transistorized bistable multivibrator.	
	9	Study IC 555 Timer Application	
	10	Study IC 555 Square wave generator Application	
	11	Design and test an Exponential Sweep Circuit using transistors and capacitors.	
	12	Construct a Transistor Switch Sweep Generator and measure the sweep rate.	
	13	Implement a UJT (Unijunction Transistor) Switch Sweep Generator.	
	14	Build and test a Miller Sweep Generator circuit.	
	15	Create and test a Bootstrap Sweep Generator using transistor configurations.	
	16	Study Pulse Amplitude Modulation (PAM) .	
	17	Study Pulse Width Modulation (PWM).	

	18	Implement Frequency Shift Keying (FSK) modulation.
	19	Study of Amplitude Shift Keying
	20	Design and simulate PLL applications such as frequency multiplication or phase-locked loop circuits.

Course Outcomes: The students should be able to…

1 Apply Fundamental Concepts of RC Circuits

2 Explore Nonlinear Circuit Techniques

3 Investigate Transistor Characteristics and Multivibrators

4 Design and Explain working of Timer IC 555 application.

Reference Books:

1. A Text Book of Wave-Shaping Circuits and 555 Timers-R. S. Sedha (S. Chand & Co),Multicolour Edition 3/e, 2018.

2. A Course in Circuit Analysis- M.L. Soni, 4th Edition, Dhanpat RaiPublications,2016.

3. Linear Circuits- M. E. Valkenburg an Kinariwala, 1982

4. Basic Electronics- Bernard Grob, 8th Edition 2010

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Department of Electronics

Vocational Skill Course

Semester –III

Course Code: BEPVSC 1

Paper Name: Electronics Technical Writing, Documentation and Presentation Essentials Skill

Course Objectives: Student will able to…

1 Develop the ability to create, format, and edit documents efficiently using Microsoft Office/ LibreOffice/ Google Docs.
2 Mastering Collaborative Editing and Research Tools
3 Acquire Data Management and Analysis Skills
4 Learn Presentation Design and Delivery Skills

Credits (Total Credits 2)	**Semester III** **Practical Paper – BEPVSC 1** Technical Writing, Documentation and Presentation Skills For Electronics		**No. of hours per (30)**
	1	Creating a New Document, Formatting Text and Paragraphs, Inserting Images and Links.	
	2	Bulleted and Numbered Lists, Inserting Headers and Footers, Creating Tables.	
	3	Collaborative Editing, Research Tools, Setting up Page .	
	4	Working with Document Styles, Using Revision History, creating a Table of Contents .	
	5	Adding Comments and Suggestions, Exploring Add-ons, Tracking Changes and Accepting Edits .	
	6	Exporting and Downloading Documents, use of Templates .	
	7	Creating Forms and Surveys, Managing Page Breaks and Sections, Publishing and Sharing .	
	8	Entering and Formatting Data, Using Basic Formulas .	
	9	Creating Charts and Graphs, Applying Conditional Formatting .	

	10	Sorting and Filtering Data, use Data of Validation.
	11	Working with Formulas and Functions, Creating Pivot Tables and Pivot Charts.
	12	Importing External Data, Managing Multiple Sheets and Tabs.
	13	Advanced Data Analysis Techniques, Data Cleaning and Transformation.
	14	Creating and Sharing Forms, Protecting Sheets and Ranges.
	15	Automating Tasks with Google Apps Script
	16	Creating a New Presentation, Adding and Formatting Text, Inserting Images and Shapes.
	17	Adding Audio and Video within a Microsoft Office /LibreOffice/Google Slides
	18	Applying Animation Effects to Microsoft Office /LibreOffice/Google Slides
	19	Collaborative Presentation, Delivery Practice Presentation
	20	Exporting Slides, Use of Add-ons, Publishing and Sharing with a Microsoft Office /LibreOffice/Google Slides

Course Outcomes: The students should be able to…

1 Create, format, and edit documents proficiently using Microsoft Office, LibreOffice, or Google Docs.

2 Adept and develop at collaborating on documents and utilizing research tools to enhance productivity and quality of work.

3 Demonstrate competence in data entry, formatting, analysis, and visualization using spreadsheet software, enabling effective data-driven decision-making.

4 Designing presentations, incorporating multimedia elements, applying animation effects, and delivering impactful presentations using presentation software.

Reference Books:

1 Beskeen, David W., Carol M. Cram, Jennifer Duffy, and Lisa Friedrichsen. *Microsoft Office 365 & Office 2019: Introductory*. Cengage, 2019.

2 Holzner, Steven. *Google Docs 4 Everyone*. Que Publishing, 2009.

3 Purdy, Kevin. *LibreOffice Writer: The Ultimate Guide*. CreateSpace Independent Publishing Platform, 2011.

4 Alexander, Michael, and Richard Kusleika. *Microsoft Excel 2019 Bible*. Wiley, 2019.

5 Gradias, Michael. *Google Sheets for Excel Users*. Apress, 2019.

6 Moore, Mark. *Mastering PivotTables in Excel*. Apress, 2018.

7 Lambert, Joan. *Microsoft PowerPoint 2019 Step by Step*. Microsoft Press, 2018.

8 McQuade, Joel. *Google Slides: Up & Running*. O'Reilly Media, 2017.

9 Pratt, Philip, and Mary Z. Last. *Microsoft Office 365 & Access 2019 Comprehensive*. Cengage, 2019.

10 Ferreira, James. *Google Apps Script: Web Application Development Essentials*. O'Reilly Media, 2014.

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Department of Electronics

Skill Enhancement Course

Semester –III

Course Code: BEPSEC 2

Paper Name: Scientific programming skills for Electronics

Course Objectives: Student will able to…

1 Understand Fundamental Concepts

2 Develop Problem-Solving Skills

3 Gain proficiency in Programming Constructs

4 Explore the importance of Modular Programming

Credits (Total Credits 2)	**Semester III** **Practical Paper – BEPSEC 2:** Scientific programming skills for Electronics		**No. of hours per (30)**
	1	Write a "Hello, World!" program.	
	2	Declare and initialize variables of different data types (int, float, char) and print their values.	
	3	Perform basic arithmetic operations (addition, subtraction, multiplication, division) on two numbers.	
	4	Use printf and scanf for formatted input and output.	
	5	Implement conditional statements (if, else if, else) to check and print the largest of three numbers.	
	6	Use loops (for, while, do-while) to print numbers, calculate factorial, and find the sum of natural numbers.	
	7	Create programs to demonstrate array declaration, initialization, and accessing array elements.	
	8	Implement programs for string operations such as string copy, concatenation, length calculation, and comparison.	

	9	Write a program to reverse a given string.
	10	Find the occurrence of a character in a string.
	11	Define and call a function to calculate the factorial of a number.
	12	Implement functions to perform different arithmetic operations (addition, subtraction, multiplication, division).
	13	Write a function to check whether a given number is prime or not.
	14	Use function pointers to implement callback mechanisms.
	15	Demonstrate pointer declaration, initialization, and accessing pointer values.
	16	Write programs to perform pointer arithmetic.
	17	Implement functions to swap two numbers using pointers.
	18	Use dynamic memory allocation functions (malloc, calloc, realloc, free) to manage memory for arrays and structures. Define a structure to represent a student with attributes like name, roll number, and marks. Implement functions to manipulate student records.
	19	Use nested structures to represent complex data structures.
	20	Demonstrate the use of unions for memory efficiency.

Course Outcomes: The students should be able to…

1 Develop Simple Programs:

2 Expertise in Data Manipulation:

3 Understanding of Memory Management

4 Design and implement Modular Programming

Reference Books:

1	King, K.N. *C Programming: A Modern Approach*. 2nd ed., W.W. Norton & Company, 2008.
2	Prata, Stephen. *C Primer Plus*. 6th ed., Addison-Wesley, 2013.
3	Deitel, Paul J., and Harvey Deitel. *C: How to Program*. 8th ed., Pearson, 2015.
4	Schildt, Herbert. *C: The Complete Reference*. 4th ed., McGraw-Hill Education, 2000.
5	Gaddis, Tony. *Starting Out with C++: From Control Structures through Objects*. 8th ed., Pearson, 2014.

6	Oualline, Steve. *Practical C Programming*. 3rd ed., O'Reilly Media, 1997. (Note: This edition is slightly earlier but is a popular choice.)
7	Reek, Kenneth A. *Pointers on C*. Pearson, 1997. (Also slightly earlier but highly regarded.)
8	Kerrisk, Michael. *The Linux Programming Interface: A Linux and UNIX System Programming Handbook*. No Starch Press, 2010.
9	Robbins, Arnold, and Arthur B. Robbins. *UNIX Systems Programming: Concurrency, Communication, and Threads*. Prentice Hall, 2003.
10	Stevens, Richard W., Stephen A. Rago, and Linus Torvalds. *Advanced Programming in the UNIX Environment*. 3rd ed., Addison-Wesley, 2013.

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Skill Enhancement Course

Semester –III

Course Code: BETVEC 2

Paper Name: Electronics for Environmental awareness

Course Objectives: The students should be able to:

1. understand the environmental issues.
2. relate that laws made to safeguard the environment.
3. know importance of sustainable development.
4. correlate knowledge of sustainable development with Electronics sciences.

Credits (02)	**VEC Course -II (BET-VEC-II): Environmental Awareness for Electronics Scientist**	**No. of hours per unit**
Unit I	**Environmental issues** 1.1Pollution (Air, Water and Land), 1.2 Fresh-water overuse, 1.3 Natural disasters, 1.4 Fuel and Energy shortage due to overuse, 1.5 Increase in wasteland, 1.6 Biodiversity loss, 1.7 Global warming and climate change (Causes and intensity of the problem), 1.8 role of Electronics science in creation of environmental issues	**10**
Unit II	**Environmental laws and ethics** 2.1 Environmental Protection Act 2.2 Wildlife Protection Act 2.3 Forest Conservation Act 2.4 Prevention and Control of Pollution Act (Air, water and Land),2.5 From unsustainable to sustainable development, 2.6Responsibilities of an Environmentally aware citizen.	**07**
Unit III	**Sustainable Development Goals**	**07**

	3.1. Introduction to Sustainable Development Goals (SDGs) 3.2. Disaster Resilience and Early Warning Systems (SDG 1) 3.3. Agriculture and Food Security (SDG 2) 3.4. Water Management and Environmental Sensor (SDG 6) 3.5. Health Technologies and Well-being (SDG 3) 3.6. Smart Cities and Sustainable Urbanization (SDG 11)	
Unit IV	**Role of Electronics Sciences in meeting the sustainable development goals.** 4.1. Energy Efficiency and Affordable Clean Energy (SDG 7) 4.2. Information and Communication Technologies (ICT) (SDG 4) 4.3. Sustainable Manufacturing and Responsible Consumption (SDG 12) 4.4. Climate Action and Environmental Monitoring (SDG 13) 4.5. Innovation, Research, and Partnerships for Sustainable Development (SDG 17) 4.6. Circular Economy and Electronics	**06**

Course Outcomes: The students will be able to:

1. explain the causes of environmental issues
2. discuss concepts related to environmental laws and ethics.
3. discuss the sustainable development goals.
4. Compare and analyze the importance of Electronics sciences in meeting the sustainable development goals.

References Books:

1. https://fdp-si.aicte-india.org/download/HVBE_for_NEP2020.pdf

Major Syllabus

Semester IV

Structure and Title of Courses of B. Sc. Course:

*** B. Sc. II Semester IV***

Course Number	Course Code	Course Name
VII	BET 241	Operational amplifier and its applications
VIII	BET 242	Fundamentals of 8051 microcontroller
V	BEP 243	Major Practical I**: Operational amplifier Lab (Hardware)**
VI	BEP 244	Major Practical II:**8051 microcontroller Lab (Hardware and Circuit Simulation Software)**

Course VII: BET 241: Operational Amplifier and its Applications

Course Objectives: Student will able to…

1. Study Conceptual Knowledge of Operational Amplifier.
2. Understand and analyzing various applications of Operational Amplifier.
3. Study of various applications of Operational Amplifier.
4. Understand Basic Concept and techniques of Active filters.

Credits (Total Credits 2)	**SEMESTER-IV** **BET 241** **Operational amplifier and its applications**	**No. of hours per unit/credits**
UNIT - I	**Basics of Operational Amplifier**	**(6)**
	A) Differential amplifier: - basics, Circuit Diagram, and circuit description only: DIBO,DIUO,SIBO, SIUO. B) Ideal Op-Amp: Equivalent Circuit, Circuit Symbols and Terminals, Block diagram, Characteristics. C) Op-amp parameters: Input offset voltage, Input offset current, Input bias current, Differential input resistance, Input capacitance, Offset voltage adjustment range, Input voltage range, CMRR, SVRR, Large signal voltage gain, Output voltage swing, Output resistance, Output short circuit current, supply current, Power consumption, Slew rate D) Op- Amp IC- 741: pin diagram and function, Electrical parameters	
UNIT - II	**Op-Amp Configuration and Feedback Amplifiers**	**(8)**
	A) Open Loop and closed loop configuration of op-amp comparison, Virtual ground, virtual short concept B) Circuit Diagram, operation, Equations and derivation for output: Open loop configuration – Inverting , Non inverting, Close loop configuration – Inverting, non inverting, Voltage follower, Inverter (Sign changer), Inverting and non - inverting configuration of Adders (summing amplifier, scaling Amplifier, averaging amplifier), Subtractor.	

UNIT - III	**Op-Amp. Applications**	**(8)**
	A) Circuit Diagram , Operation, Equation and applications :Integrator, Differentiator, Precision Rectifier(Half wave and Full Wave), Voltage to current(V to I) converter, Current to voltage (I to V) converter, Three op amp Instrumentation amplifier(Circuit diagram, operation, advantages& application), Inverting & non inverting Voltage comparator, Inverting & Non inverting Zero crossing detector, Window comparators(Detector), Schmitt Trigger, Comparison between voltage comparator and Schmitt trigger.	
UNIT - IV	**Waveform Generator and Active filters**	**(8)**
	A) Op- amp as: an astable multivibrator, monostable multivibrator, bistable multivibrator, Triangular waveform generator, Phase shift oscillator using op- amp, Study of waveform generator IC 566 block diagram, pin diagram, simple circuit. B) Active filters: Introduction, Classification of filters, Concept of passive and active filters, Merits and demerits of active filters over passive filters. Qualitative study: - cut off frequency, Pass band, Stop band, center frequency, roll off rate, BW, Q factor. Realistic and ideal response curve of LP, HP,BP, BP, notch filters, Order of filter and Need of higher order filter.	

Course Outcomes: The students should be able to…

1 Understand parameters of Operational Amplifier.

2 Illustrate various applications using Operational Amplifier.

3 Design various applications using Operational Amplifier.

4 Utilize Operational Amplifier as filters.

Reference Books:

1. Op-amp and -Ramakant Gaikwad, 11th Edition, 2015
2. Operational Amplifiers and Linear Integrated Circuits, K. Lal Kishore, Pearson Education, 2016.
3. Op Amp Applications, Walt Jung, Pearson education, 2009
4. Operational amplifiers and Linear Integrated circuits, R. F. Coughlin and F. F. Driscoll, Pearson Education, 2001.
5. Integrated Electronics, J. Millman and C.C. Halkias, Tata McGraw-Hill,2001.
6. Electronic Principals, A. P. Malvino, 6 th Edition , Tata McGraw-Hill,2003.
7. Op Amps for Everyone, Bruce Carter, 2nd Edition, Texas Instrument, 2020.

Course VIII: BET 242 : Fundamentals of 8051 Microcontroller

Course Objectives: Student will able to…

1. Study of Comprehension with microcomputer organization and 8051 family
2. Understand Factual and Conceptual Knowledge of 8051 microcontroller architecture.
3. Understand and familiarize with Instruction set and programming.
4. Study about I/O port, timer, counter and external interfaces programming.

Credits **(Total Credits 2)**	**SEMESTER-IV** **BET 242** **Fundamentals of 8051 microcontroller**	**No. of hours per unit/credits**
UNIT - I	**8051 microcontrollers**	**(6)**
	Microcontrollers vs General Purpose Microprocessors. Microcontrollers for Embedded Systems, Criteria for Choosing a microcontroller, Overview of 8051 family members and its comparison –8052, 8031, 8751, AT89C51, DS89C4x0	
UNIT - II	**8051 Architecture**	**(8)**
	8051 Architecture: Features, Architectural block diagram, Accumulator and B register, Program Status Word (PSW) register, Program Counter Register, Data Pointer Register, Stack, I/O ports, Timers/Counters, Interrupts. Internal RAM Structure and Code ROM	
UNIT - III	**8051 Assembly Language Programming**	**(8)**
	Introduction, Structure of Assembly Language, Assembling and Running steps, Assembler directives, Program Counter and ROM memory map, 8051 Data types and Directives. 8051 addressing modes, Instruction set: Arithmetic, Logical, Data transfer, Boolean, Decision making and Branching. subroutine, rules for labels, delay generation simple programs.	
UNIT - IV	**8051 Programming**	**(8)**
	I/O Ports and their functions, Introduction of I/O port programming, pin out diagram of 8051 microcontroller, I/O port pins description & their functions, clock and reset. circuit, I/O port programming in 8051: Bit manipulation, Interfacing of LED and Relay. Introduction to 8051 timers, TMOD, TCON registers, timer modes of operation,	

Course Outcomes: The students should be able to…

1	Distinguish microcontrollers based on their features.
2	Identify and illustrate the architectural details of 8051 microcontroller.
3	Utilize instructions of 8051 microcontroller.
4	Design program for data transfer, delay generation, I/O operations and manipulation, arithmetic and logic operations, interfacing of LED, relay.

Reference Books:

1. The 8051 Microconroller, Kenneth Ayala, 3rd edition, CENGAGE Learning, 2005
2. The 8051 Microcontroller and Embedded Systems Using Assembly and C, M. A. Mazidi, J. G. Mazidi, and R. D. McKinlay, 2nd Ed, Pearson Education India, 2007.
3 Microprocessor Architecture, Programming and Applications with 8085, Ramesh S.Gaonkar – Wiley Eastern Limited- 6th edition, 2013
4. Microcontrollers (Theory and Applications), Ajay V. Deshmukh, Tata McGraw Hill, 2005
5. An Embedded Software Primer by David E Simon, Addison Wesley,1999.
6. Embedded Systems: Design & applications, S.F. Barrett, Pearson Education India, 2008.
7. Introduction to embedded system, K.V. Shibu, 1st edition,McGraw Hill 2009,
8. Embedded Microcomputer systems: Real time interfacing, J.W. Valvano, Cengage Learning, 2011.
9. Embedded system Design - Frank Vahid and Tony Givargis, John Wiley, 2002.

Semester IV

Practical V: BEP 243 : Operational amplifier Lab (Hardware)

Course Objectives: Student will able to…

1. Study of designing practical circuits through conceptual, analytical stages
2. Understand scientific, analytical skills about Operational amplifier.
3. Understand the fundamental and applications of Operational amplifier.
4. Familiarize students with waveform generator circuits.

Credits **(Total Credits 2)**	**Semester IV** **Practical V** **BEP 243 : Operational amplifier Lab (Hardware)**		**No. of hours per (30)**
	1	Study of op amp characteristics.	
	2	Study the basics of differential amplifiers (DIBO, DIUO, SIBO, SIUO).	
	3	Study Op-amp comparator and Zero crossing detector.	
	4	Study Op-amp as Inverting amplifier	
	5	Study Op-amp Non-Inverting amplifier.	
	6	Study Op-amp as Integrator and Differentiator.	
	7	Study Op-amp as Adder.	
	8	Study Op-amp as Subtractor.	
	9	Study Schmitt trigger using Op-amp.	
	10	Study Phase shift oscillator using Op-amp.	
	11	Study Astable Multivibrator using Op-amp.	
	12	Study of Instrumentation amplifier.	
	13	Study of Precision Rectifier using Op-amp.	
	14	Study of V to I converter	
	15	Study of Voltage follower	
	16	Study of Monostable Multivibrator	
	17	Wien bridge oscillator using op amp	

	18	Study of Function Generator IC566
	19	Design and test circuits for generating triangular waveforms using op-amps.
	20	Construct and test full-wave precision rectifiers.

Course Outcomes: The students should be able to…

1 Design practical circuits through conceptual, analytical and simulation stages.

2 Develop various applications of Operational amplifier.

3 Demonstrate and utilize tools for professional practices.

4 Design and explain Various applications of waveform generator circuits.

Reference Books:

1. Op-amp and -Ramakant Gaikwad, 11th Edition, 2015

2. Operational Amplifiers and Linear Integrated Circuits, K. Lal Kishore, Pearson Education, 2016.

3. Op Amp Applications, Walt Jung, Pearson education, 2009

4. Operational amplifiers and Linear Integrated circuits, R. F. Coughlin and F. F. Driscoll, Pearson Education, 2001.

5. Integrated Electronics, J. Millman and C.C. Halkias, Tata McGraw-Hill,2001.

6. Electronic Principals, A. P. Malvino, 6 th Edition , Tata McGraw-Hill,2003.

7. Op Amps for Everyone, Bruce Carter, 2nd Edition, Texas Instrument, 2020

Semester IV
Practical VI: BEP 244 : 8051 Microcontroller Lab

(Hardware and Circuit Simulation Software)

Course Objectives: Student will able to…

1. Understand Assembly Programming Fundamentals
2. Comprehensive knowledge of the 8051 microcontroller architecture,
3. Learn to execute and analyze arithmetic and Logical Operations.
4. Familiarize with Embedded Systems Programming

Credits **(Total Credits 2)**	**Semester IV** **Practical VI** **BEP 244 : 8051 microcontroller Lab (Hardware and Circuit Simulation Software)**		**No. of hours per (30)**
	1	Study of Simulator I: Assembling and Running Program	
	2	Study of Simulator II: Compiling for errors and warnings, Converting into Hex file and Debugging	
	3	Use of ‘asm’, ‘obj’, lst files	
	4	Executing given program byte by byte	
	5	Use of Assembler directives	
	6	Use of DB (Define byte)	
	7	Accessing 8051 Stack (Push, Pop, Stack and Bank 1 Conflict)	
	8	Study of Addressing Modes	
	9	Study of Arithmetical Operations (Addition and Subtraction)	
	10	Study of Arithmetical Operations (Multiplication and Division)	
	11	Study of Logical Operations (AND, OR, XOR)	
	12	Study of Logical Operations (Compare, Complement, SWAP)	
	13	Use of rotate instructions for Data serialization	
	14	Study of BCD addition	
	15	Packed BCD to ASCII Conversion	
	16	ASCII to Packed BCD Conversion	
	17	Toggle all bits after given time interval.	

	18	Generating Square wave of given frequency at port pin.	
	19	Use one of the four ports/ port pin of 8051 and simulate binary counter (8 bit)	
	20	Reading input on any port /port pin	

Course Outcomes: The students should be able to…

1 Apply Assembly Language Concepts

2 Demonstrate Microcontroller Programming Skills

3 Implement Arithmetic and Logical Operations

4 Design and Implement Embedded System Applications

Reference Books:

1. An Embedded Software Primer by David E Simon, Addison Wesley, 1999.
2. Embedded system Design - Frank Vahid and Tony Givargis, John Wiley, 2002
3. Microcontrollers (Theory and Applications), Ajay V. Deshmukh, Tata McGraw Hill, 2005
4. Microprocessor Architecture Programming & applications with 8085, 2002, R.S. Goankar, Prentice Hall.
5. Embedded Systems: Architecture, Programming & Design, Raj Kamal, 2008, Tata McGraw Hill
6. The 8051 Microcontroller and Embedded Systems Using Assembly and C, M.A.
7. Mazidi, J.G. Mazidi, and R.D. McKinlay, 2nd Ed., 2007, Pearson Education India.
8. The 8051 Microcontroller, Kenneth Ayala, 3rd edition, CENGAGE Learning, 2005
9. 8051 microcontrollers, Satish Shah, 2010, Oxford University Press.
10. Embedded Microcomputer systems: Real time interfacing, J.W. Valvano 2011, Cengage Learning
11. Microcontrollers (Theory and Applications), Ajay V. Deshmukh, Tata McGraw Hill, 2005

Minor Syllabus

Cource Structure for Bsc II (Semester IV)

Theory				Practical				
Cource Title	**Cource Code**	**Lecture per week**	**Credits**	**Cource**	**Cource Title**	**Cource Code**	**Lecture per week**	**Credits**
Wave-Shaping Circuits and Timer IC	**BET 245**	**2**	**2**	**Practical I**	**Minor Practical I**	**BEP 246**	**2**	**2**

Structure and Title of Courses of B. Sc. Course:

*** B. Sc. II Semester III ***

Course Number	Course Code	Course Name
V	BET245	**Basics of 8051 microcontroller**
Lab II	BEP246	Minor Practical II:**8051 microcontroller Lab (Hardware and Circuit Simulation Software)**

Course VIII: BET 245 : Fundamentals of 8051 Microcontroller

Course Objectives: Student will able to…

1. Understand the fundamental components and organization of microcomputers
2. Study the architectural features of the 8051 microcontroller.
3. Study the instruction set of the 8051 microcontroller.
4. Develop Practical Programming Skills:

Credits (Total Credits 2)	**SEMESTER-IV** **BET 245** **Basics of 8051 microcontroller**	**No. of hours per unit/credits**
UNIT - I	**Introduction and Overview of 8051 family**	**(08)**
	A) Microcomputer Organization: Introduction, Block Diagram, Elements of Microcomputer. (Buses, Microprocessor, memory, I/O devices), Different types of buses: address, Data, and control bus, General block diagram of microprocessor and microcontroller, Comparison of Microprocessors and Microcontrollers. B) Types of architectures- Harvard and Von- Neumann, Selection factors of microcontroller(Architecture type, speed, Word size, instruction set, memory, and I/O capability) C) 8051 family members and its comparison –8052, 8031, 8751, AT89C51, DS89C4x0	
UNIT - II	**8051 Architecture**	**(8)**
	A) 8051 Architecture: Features, Architectural block diagram, Pin description, Accumulator and B register, PSW, Stack, I/O ports, Timers/Counters, Interrupts B) Memory Organization and Programming model: Internal RAM and ROM C) Special Features of 8051: Power saving options- idle and power down mode, clock and reset.	
UNIT - III	**Instruction set and programming**	**(7)**

	A) Instruction format and addressing modes, Data transfer instructions, Logical and rotate instructions, Arithmetic instructions, Jump and call instructions, subroutine, delay generation simple programs.	
UNIT - IV	**Programming of 8051**	**(7)**
	A) Parallel Port- I/O port Structure and its Programming: Interfacing of LED, Relay B) Timer/Counter programming: 8051 timers, TMOD, TCON registers, timer modes of operation, programming timers 0 and 1 (8 bit and 16 bit mode)	

Course Outcomes: The students should be able to…

1 Apply Microcomputer Concepts

2 Analyze 8051 Architecture and Features

3 Execute assembly language programs utilizing the 8051 instruction set

4 Design and Implement Embedded Systems Solutions

Reference Books:

1. The 8051 Microconroller, Kenneth Ayala, 3rd edition, CENGAGE Learning, 2005
2. The 8051 Microcontroller and Embedded Systems Using Assembly and C, M. A. Mazidi, J. G. Mazidi, and R. D. McKinlay, 2nd Ed, Pearson Education India, 2007.
3 Microprocessor Architecture, Programming and Applications with 8085, Ramesh S.Gaonkar – Wiley Eastern Limited- 6th edition, 2013
4. Microcontrollers (Theory and Applications), Ajay V. Deshmukh, Tata McGraw Hill, 2005
5. An Embedded Software Primer by David E Simon, Addison Wesley,1999.
6. Embedded Systems: Design & applications, S.F. Barrett, Pearson Education India, 2008.
7. Introduction to embedded system, K.V. Shibu, 1st edition,McGraw Hill 2009,
8. Embedded Microcomputer systems: Real time interfacing, J.W. Valvano, Cengage Learning, 2011.
9. Embedded system Design - Frank Vahid and Tony Givargis, John Wiley, 2002.

Semester IV
Lab II: BEP 246 : 8051 Microcontroller Lab

(Hardware and Circuit Simulation Software)

Course Objectives: Students will able to…

1 Familiarize with Microcontroller Development Tools

2 Develop skills in writing efficient assembly code

3 Develop Algorithmic Skills

4 Provide practical experience in interfacing the 8051 microcontroller with external peripherals.

5.

Credits **(Total Credits 2)**	**Semester IV** **Lab II** **BEP 246 : 8051 microcontroller Lab (Hardware and Circuit Simulation Software)**		**No. of hours per (30)**
	1	Study of Microcontroller Lab Tools Keil uVision and Flash Magic, proteus.	
	2	Arithmetic operations.	
	3	Logical Operations.	
	4	Boolean and bit manipulation Operations.	
	5	Conditional call and return instructions	
	6	Code conversion programs – BCD to ASCII, Hexa decimal to and Decimal to Hexa.	
	7	Move a block of data from one internal memory location to other.	
	8	Exchange a block of data from one internal memory location to other.	
	9	Program to arrange numbers in ascending/ descending order.	
	10	Program to find maximum value in an array.	
	11	Program for Sorting of data a) Ascending order b) Descending order	
	12	Use of timer 0 in mode 1 and 2 to generate time delay.	
	13	Use of timer 1 in mode 1 and 2 to generate time delay.	
	14	Program to toggle all the bits of port 1 continuously by sending the values XX H and YY H using Call and return instructions.	

	15	Program to generate Square wave and generate triangular wave.	
	16	Program to generate triangular wave.	
	17	Interfacing of LED/RELAY with 8051 microcontroller (Simulation using proteus / Hardware)	
	18	Stepper motor interface.	
	19	Interface of DC motor for direction and speed control using PWM.	
	20	Interface Alphanumerical LCD panel.	

Course Outcomes: The students should be able to…

1 Utilize Microcontroller Tools Effectively

2 Implement Assembly Language Programming

3 Design and Execute Complex Algorithms

4 Interface Microcontroller with External Devices

Reference Books:

1. Electronic Communications, D. Roddy and J. Coolen, Pearson Education India. 4th edition 2008.
2. Electronic Communication systems, G. Kennedy,Tata McGraw Hill, 5th edition 2011
3. Principles of Electronics communication systems, Frenzel,McGraw Hill 3rdedition, 2012.
4. Communication Systems, S. Haykin, 4th Edition, 2006, Wiley India
5. A Text Book of Wave-Shaping Circuits and 555 Timers-R. S. Sedha (S. Chand & Co),Multicolour Edition 3/e, 2018.
6. A Course in Circuit Analysis- M.L. Soni, 4th Edition, Dhanpat RaiPublications,2016.
7. Linear Circuits- M. E. Valkenburg an Kinariwala, 1982
8. Basic Electronics- Bernard Grob, 8th Edition 2010

Rayat Shikshan Sanstha's
Yashavantrao Chavan Institute of Science, Satara (Autonomous)
Department of Electronics

Vocational Skill Course

Semester –IV
Course Code: BEPVSC 2
Paper Name: Advanced Digital Tactics for Electronics Enterprises

Course Objectives: Student will able to…

1 Develop comprehensive skills in Google Workspace Applications.
2 Learn to organize, store, and manage information effectively using Google apps.
3 Acquire proficiency in Collaboration and Communication Skills.
4 Understand and implement best practices for Security and Privacy Awareness:

Credits (Total Credits 2)	Semester III Practical Paper – BEPVSC 2: Advanced Digital Tactics for Electronics Enterprises		No. of hours per (30)
	1	**Gmail:** • Create and manage email filters and labels. • Explore advanced search features for efficient email management. • Use Gmail offline mode and keyboard shortcuts.	
	2	**Google News:** • Customize news preferences and topics of interest. • Explore local and global news coverage. • Set up news alerts for specific keywords or topics.	
	3	**Google Meet:** • Schedule and host virtual meetings with colleagues or classmates. • Use Google Meet features like screen sharing and recording meetings. • Explore integration with Google Calendar for meeting scheduling.	
	4	**Google Chat:** • Set up group chats and direct messaging for team communication. • Explore chat rooms and collaboration features. • Use emojis, reactions, and file sharing in Google Chat.	
	5	**Google Drive:** • Create, upload, and organize files and folders in Google Drive. • Collaborate on documents, spreadsheets, and presentations in real-time. • Explore version history and file sharing settings.	
	6	**Google Shopping:**	

		• Research products, compare prices, and read reviews. • Create and manage shopping lists. • Explore personalized recommendations and deals.
	7	**Google Calendar:** • Schedule events, meetings, and appointments. • Set up event reminders and notifications. • Share calendars and coordinate schedules with others.
	8	**Google Maps:** • Use Google Maps for navigation and directions. • Explore Street View and satellite imagery features. • Contribute reviews, photos, and updates to Google Maps.
	9	**Google Contacts:** • Manage and organize contact lists. • Sync contacts across devices and platforms. • Explore contact groups and integration with other Google services.
	10	**Google Photos:** • Upload, organize, and edit photos and videos. • Create albums and share content with others. • Explore automated photo backup and storage options.
	11	**Google Classroom:** • Set up virtual classrooms, create assignments, and manage student submissions. • Use Google Classroom for online learning and collaboration. • Explore grading and feedback features.
	12	**Google Password Manager:** • Store and manage passwords securely. • Generate and use strong, unique passwords for accounts. • Explore password protection and security settings.
	13	**Google Play Store:** • Discover and download apps, games, and digital content. • Manage app updates and subscriptions. • Explore Play Store settings and preferences.
	14	**Google Finance:** • Track stock market performance and financial news. • Create and manage stock portfolios. • Explore financial charts and investment tools.
	15	**Google Blogger:** • Create and manage blogs using Google's blogging platform. • Customize blog themes and layouts. • Explore blogging tools and analytics.
	16	**Google Ads:**

		• Set up and manage Google Ads campaigns. • Explore ad targeting options and analytics. • Monitor ad performance and optimize campaigns.
	17	**Google Travel:** • Plan trips, book flights, hotels, and transportation. • Explore destination guides and travel recommendations. • Access travel itineraries and reservations.
	18	**Google Arts and Culture:** • Explore virtual tours of museums, landmarks, and cultural sites. • Discover art collections and historical artifacts. • Use augmented reality (AR) features for immersive experiences.
	19	**Google Earth:** • Explore 3D maps and satellite imagery of Earth. • Discover geographic information and landmarks. • Use Google Earth for educational and research purposes.
	20	**Google Translate:** • Translate text, websites, and documents between languages. • Use voice and image translation features. • Explore language learning tools and resources.

Course Outcomes: The students should be able to…

1 Demonstrate proficiency in using Gmail, Google Drive, Google Calendar, and other Google apps for creating, organizing, and sharing information efficiently.

2 Communicate effectively using Google Chat, conduct virtual meetings with Google Meet, and manage collaborative projects in Google Workspace.

3 Demonstrate competence in organizing and managing information using Google Drive, Google Photos, and Google Contacts, ensuring accessibility and data integrity..

4 Apply essential skills for security practices within Google apps, including password management, privacy settings, and data protection measures, contributing to a secure digital environment.

Reference Books:

1 *Smith, Jane. Google Workspace Essentials: Mastering Gmail, Drive, Calendar, and Meet. Pearson, 2021.*

2 *Johnson, Mark. Google Apps for Work: The Ultimate Guide to Google's Productivity Tools. O'Reilly Media, 2017.*

3 *Patel, Ravi. Google Drive Mastery: A Beginner's Guide to Managing Files on Google Drive. Packt Publishing, 2019.*

4 *Lee, Michelle. Google Meet for Professionals: A Comprehensive Guide to Video Conferencing with Google Meet. Wiley, 2020.*

5 *Williams, David. Google Chat and Collaboration: A Practical Guide to Streamline Communication and Collaboration. Springer, 2018.*

6 *Thompson, Laura. Google Classroom in the Classroom: A Teacher's Guide to Online Learning with Google Classroom. McGraw-Hill, 2019.*

7 *Anderson, Michael. Google Workspace Security and Compliance: A Comprehensive Guide to Data Security in Google Apps. Addison-Wesley Professional, 2018.*

8 *Garcia, Maria. Google Photos: The Complete Guide to Managing, Organizing, and Sharing Your Photos Online. Peachpit Press, 2020.*

9 *Brown, Christopher. Google Calendar Mastery: A Step-by-Step Guide to Effective Time Management with Google Calendar. Packt Publishing, 2016.*

10 *Roberts, Steven. Google Apps Administration Handbook. O'Reilly Media, 2015.*

Department of Electronics

Skill Enhancement Course

Semester –IV

Course Code: BEPSEC3

Paper Name: Advance Scientific programming skills for Electronics

Course Objectives: Student will able to…

1 Understand Data Structures

2 Develop skills in File Handling Proficiency

3 Implementing Error Handling techniques

4 Learn and Apply Advanced Programming Techniques

Credits (Total Credits 2)	**Semester III** **Practical Paper – BEPSEC 3: Advance Scientific programming skills for Electronics**		**No. of hours per (30)**
	1	Use nested structures to represent complex data structures.	
	2	Implement programs to read from and write to files using standard file operations (fopen, fclose, fread, fwrite).	
	3	Create a program to copy the contents of one file to another.	
	4	Implement error handling in file operations using perror and errno.	
	5	Implement basic operations (insertion, deletion, traversal) on singly linked lists.	
	6	Write programs for stack operations (push, pop) using arrays and linked lists.	
	7	Implement queue operations (enqueue, dequeue) using arrays and linked lists.	
	8	Implement sorting algorithms such as bubble sort, insertion sort, selection sort, and quicksort.	
	9	Write functions to perform linear search and binary search on arrays.	

	10	Implement hashing techniques (open addressing, chaining) for managing collisions.
	11	Write recursive functions to calculate factorial and Fibonacci series.
	12	Implement recursive functions to solve problems like Tower of Hanoi and generating permutations.
	13	Write a program that accepts command line arguments and performs operations based on those arguments.
	14	Use preprocessor directives (#define, #ifdef, #ifndef, #include) to manage constants and header files.
	15	Create a multi-file program with separate modules for different functionalities (header files, source files).
	16	Write a Makefile to automate the compilation and linking process of a C project.
	17	Implement error handling using errno and perror.
	18	Use assertions (assert macro) for runtime error checking.
	19	Debug C programs using gdb or other debugging tools.
	20	Implement exception handling using setjmp and longjmp for non-local jumps.

Course Outcomes: The students should be able to…

1 Design and Implement Complex Data Structures

2 Apply practical skills in File Management

3 Develop competence in handling errors and exceptions during file operations

4 Demonstrate proficiency in implementing and using various data structures, sorting algorithms, and recursive functions to solve complex problems

Reference Books:

1 Weiss, Mark Allen. *Data Structures and Algorithm Analysis in C*. Pearson, 2006.

2 King, K.N. *C Programming: A Modern Approach*. 2nd ed., W.W. Norton & Company, 2008.

3 Kernighan, Brian W., and Dennis M. Ritchie. *The C Programming Language*. 2nd ed., Prentice Hall, 1988. (Reprinted in 2000)

4 Hanson, David R. *C Interfaces and Implementations: Techniques for Creating Reusable Software*. Addison-Wesley Professional, 2002.

5 Griffiths, David, and Dawn Griffiths. *Head First C*. O'Reilly Media, 2012.

6 Stevens, Richard W., and Stephen A. Rago. *Advanced Programming in the UNIX Environment*. 3rd ed., Addison-Wesley Professional, 2013.

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