Anekant Education Society's

Tuljaram Chaturchand College, Baramati

(Autonomous)

Four Year B.Sc. Degree Program in Electronics

(Faculty of Science & Technology)

CBCS Syllabus

F.Y.B. Sc. (Electronics) Semester -I

For Department of Electronics

Tuljaram Chaturchand College, Baramati

Choice Based Credit System Syllabus (2023 Pattern)

(As Per NEP 2020)

To be implemented from Academic Year 2023-2024

(Eligibility : 12th Science)

Title of the Programme: F.Y.B.Sc. (Electronics)

Preamble

AES's Tuljaram Chaturchand College has made the decision to change the syllabus of across various faculties from June, 2023 by incorporating the guidelines and provisions outlined in the National Education Policy (NEP), 2020. The NEP envisions making education more holistic and effective and to lay emphasis on the integration of general (academic) education, vocational education and experiential learning. The NEP introduces holistic and multidisciplinary education that would help to develop intellectual, scientific, social, physical, emotional, ethical and moral capacities of the students. The NEP 2020 envisages flexible curricular structures and learning based outcome approach for the development of the students. By establishing a nationally accepted and internationally comparable credit structure and courses framework, the NEP 2020 aims to promote educational excellence, facilitate seamless academic mobility, and enhance the global competitiveness of Indian students. It fosters a system where educational achievements can be recognized and valued not only within the country but also in the international arena, expanding opportunities and opening doors for students to pursue their aspirations on a global scale.

In response to the rapid advancements in science and technology and the evolving approaches in various domains of Electronics and related subjects, the Board of Studies in Electronics at Tuljaram Chaturchand College, Baramati - Pune, has developed the curriculum for the first semester of F.Y.B.Sc. Electronics,which goes beyond traditional academic boundaries. The syllabus is aligned with the NEP 2020 guidelines to ensure that students receive an education that prepares them for the challenges and opportunities of the 21st century. This syllabus has been designed under the framework of the Choice Based Credit System (CBCS), taking into consideration the guidelines set forth by the National Education Policy (NEP) 2020, LOCF (UGC), NCrF, NHEQF, Prof. R.D. Kulkarni's Report, Government of Maharashtra's General Resolution dated 20th April and 16th May 2023, and the Circular issued by SPPU, Pune on 31st May 2023.

BSc (Honours) Electronics is a program, develops a specialized skill set among the graduates to cater the need of industries. The curriculum of B.Sc. Electronics is designed to help the learners to understand, appreciate, analyse and engage with learning of the subject and alsoprovide best learning experience to the graduates. The curriculum is aimed to equip the graduates with competencies like problem solving and analytical reasoning which provide

them high professional competence apart from imparting disciplinary knowledge. The Electronics Department is encourage its faculty to make suitable pedagogical innovations, in addition to teaching/learning processes suggested in the model curriculum, so that the Course/Programme learning outcomes can be achieved.

Significance

In recent years, Electronics has made unprecedented growth in terms of new technologies, new ideas and principles. The research organizations and industries that work in this frontier area are in need of highly skilled and scientifically oriented manpower. This manpower can be available only with flexible, adaptive and progressive training programs and a cohesive interaction among the institutions, universities, and industries. The key areas of study within subject area of Electronics comprise of Semiconductor Devices, VLSI design, Microprocessors & Microcontroller Systems, Computer Coding/ Programming etc. and also modern applied fields such as Embedded Systems, IoT, Data Communication, Robotics, Control Systems, Artificial Intelligence, Nano Electronics and Nano Electronic Devices etc.

Overall, revising the Electronics syllabus in accordance with the NEP 2020 ensures that students receive an education that is relevant, comprehensive, and prepares them to navigate the dynamic and interconnected world of today. It equips them with the knowledge, skills, and competencies needed to contribute meaningfully to society and pursue their academic and professional goals in a rapidly changing global landscape.

Programme Specific Outcomes (PSOs)

PSO1: AcquiretheknowledgeinElectronicDevicesandCircuits,Analog&Digitalcommunication, Embeddedsystems, AI, WSN ,MEMSandothercoreareasof Electronics.

PSO2: Understandtheprinciplesandworkingofbothhardwareandsoftwareaspectsof Electronicsystems.

PSO3: Gaintheoretical andpractical knowledgeindevelopingareasofElectronics.

PSO4: Toanalyze,designandimplementanalogand digitalelectronicsystems,informationandcommunicationsystems

PSO5**:** Assess the impact of newtechnologiesandsolvecomplex problems.

PSO6: Developresearchorientedskillsandtoinculcatelaboratoryskillsinstudentssothattheycantakeupindependent projects

PSO7: Aptitude to apply Logic thinking and Basic Science knowledge for problem solving in various fields of electronics both in industries and research.

PSO8: To acquire experimental skills, analysing the results and interpret data.

PSO9: Ability to design / develop/manage/ operation and maintenance of sophisticated electronic gadgets / systems / processes that conforms to a given specification within ethical and economic constraints.

PSO10: Capacity to identify and implementation of formulate to solve the electronic related issues and analyse the problems in various sub disciplines of electronics.

PSO11: Capability to use the Modern Tools/Techniques.

Anekant Education Society's

Tuljaram Chaturchand College, Baramati

(Autonomous)

Board of Studies (BOS) in Electronics

From 2022-23 to 2024-25

Sr. No.	Name	Designation
1.	Dr. Deshpande J.D.	Chairman
2.	Dr.Mrs. Pawar A. M.	Member
3.	Dr. Patil S. N.,	Member
4.	Mrs.Rupnawar P. D.,	Member
5.	Dr. Kothawale A. S,	Member
6.	Mrs. Gawade S. A.,	Member
7.	Mrs. Patil S. S.	Invitee
8.	Mrs.Shinde P. K.	Invitee
9.	Mrs.Adsul K. R.	Invitee
10.	Prof. Dr. S. R.Kumbhar	Expert from other University
11.	Dr.SadistapShashikant	Expert from other University
12.	Dr.MudassarShaikh	Expert from University
13.	Mr. Patil Sharad. V.	Industry Expert
14.	Miss. SalunkheYogita.	Meritorious Alumni
15.	Miss EkatpureArti	Student Representative
16.	Mr. KhaireKiran	Student Representative

Credit Distribution Structure for F.Y.B.Sc.-2023-2024 (Electronics)

Level	Semester	Major		Minor	GE/OE	VSC, SEC (VSEC)	AEC, VEC, IKS	OJT, FP, CEP, CC, RP	Cum. Cr./ Sem.	Degree/ Cum. Cr.
		Mandatory	Electives							
4.5	I	**ELE-101-MJM**: Basic Electronics and Network Theorems **ELE-102-MJM:**Fundamentals of Digital Electronics **ELE-103-MJM**Electronics Practical-I **Credits-2+2+2**		--	**ELE-116-OE:** Basic Electronics-I **ELE-117-OE:** Electronics Practical-I Credit- 2+2	**ELE-121-VSC:** Applied Electronics **ELE-126-SEC:** Introduction of Circuit Simulator-I Credit- 2+2	**ENG-131-AEC:** Functional English – I **ELE-137-IKS:** Evolution & Future Prospects of Electronics in India **ELE-135-VEC:**Environmental Science Credit- 2+2+2	**US--CC1:** NSS/NCC/Yoga /Cultural Activity/Sports Credit- 2	22	**UG** **Certificate44**

II	**ELE-151-MJM**Semiconductor Devices & Circuits **ELE-152-MJM**Digital Electronic Circuits **ELE -153-MJM:**Electronics Practical-II Credits-2+2+2		**ELE -161-MN** Introduction to Electronic Devices Credits-2	**ELE -166-OE:** Basic Electronics-II **ELE -167-OE:** Electronics Practical-II Credit- 2+2	**ELE -171-VSC:** Designing of Experimental Electronic Systems **ELE -176-SEC:** Introduction of Circuit Simulator-II Credit- 2+2	**ELE -181-AEC:** Functional English-II **ELE -185-VEC:** Digital and Technological Solutions Credit- 2+2	**US--CC2:** NSS/NCC/Yoga /Cultural Activity/Sports Credit- 2	22
Cum Cr.	**12**	**-**	**2**	**8**	**8**	**10**	**4**	**44**

Exit option: Award of UG Certificate in Major with 44 credits and an additional 4 credits core NSQF course/ Internship OR Continue with Major and Minor

*** 1 credit = 15 Hr.**

Course Structure for F. Y. B.Sc.Electronics (2023 Pattern)

Sem.	Course Type	Course Code	CourseTitle	Theory/ Practical	No.of credits
I	Major Mandatory	**ELE-101-MJM**	Basic Electronics and Network Theorems	Theory	02
	Major Mandatory	**ELE-102-MJM**	Fundamentals of Digital Electronics	Theory	02
	Major Mandatory	**ELE-103-MJM**	Electronics Practical-I	Practical	02
	Open Elective (OE)	**ELE-116-OE**	Basic Electronics-I	Theory	02
	Open Elective (OE)	**ELE-117-OE**	Electronics Practical-I	Practical	02
	Vocational Skill Course (VSC)	**ELE-121-VSC**	Applied Electronics	Theory	02
	Skill Enhancement Course (SEC)	**ELE-126-SEC**	Introduction of Circuit Simulator-I	Practical-	02
	Ability Enhancement Course (AEC)	**ENG-131-AEC**	Functional English – I	Theory	02
	Value Education Course (VEC)	**ELE-135-VEC**	Environmental Science	Theory	02
	Indian Knowledge System (IKS)	**ELE-137-IKS**	Evolution & Future Prospects of Electronics in India	Theory	02
	Co-curricular Course (CC)	--	To be selected from the basket	Theory	02
			Total credits Semester-I		**22**
II	Major Mandatory	**ELE-151-MJM**	Semiconductor Devices & Circuits	Theory	02
	Major Mandatory	**ELE-152-MJM**	Digital Electronic Circuits	Theory	02
	Major Mandatory	**ELE -153-MJM**	Electronics Practical-II	Practical	02
	Minor	**ELE -161-MN**	Introduction to Electronic Devices	Theory	02
	Open Elective (OE)	**ELE -166-OE**	Basic Electronics-II	Theory	02
	Open Elective (OE)	**ELE -167-OE**	Electronics Practical-II	Practical	02
	Vocational Skill Course (VSC)	**ELE -171-VSC**	Designing of Experimental Electronic Systems	Practical	02
	Skill Enhancement Course (SEC)	**ELE -176-SEC**	Introduction of Circuit Simulator-II	Practical	02
	Ability Enhancement Course (AEC)	**ENG -181-AEC**	Functional English-II	Theory	02
	Value Education Course (VEC)	**ELE -185-VEC**	Digital and Technological Solutions	Theory	02
	Co-curricular Course (CC)	--	To be selected from the Basket	Theory	02
			Total Credits Semester-II		**22**
			CumulativeCredits Semester I + Semester II		**44**

CBCS Syllabus as per NEP 2020 for F. Y. B.Sc.Electronics (2023 Pattern)

Name of the Programme : B.Sc.Electronics

Programme Code : USELE

Class : F. Y. B.Sc.

Semester : I

Course Type : Major Mandatory (Theory)

Course Code : ELE-101-MJM

Course Title : Basic Electronics and Network Theorems

No. of Credits : 02

No. of Teaching Hours : 30

Course Objectives:

1. To get familiar with basic electronics components.
2. To understand DC circuit theorems and their use in circuit analysis.
3. To know the AC circuits and related terminologies.
4. To study elementary electronic circuits and applications.

Course Outcomes:

By the end of the course, students will be able to:

CO1. To identify different parameters, specifications of components used in electronics.

CO2. Capability to understand the working principles of the electronic devices and their applications.

CO3. Aptitude to apply Logic thinking and Basic Science knowledge for problem solving in various fields of electronics both in industries and research.

CO4. Capacity to identify and implementation of formulate to solve the electronic related issues and analyze the problems in various sub disciplines of electronics.

CO5. To solve problem based on network theorems.

Topics and Learning Points

Unit 1: Basic Elements: (10L)

Electronics components: Resistors, capacitors, Inductors,Transformer, Switches, Relays, Fuses, Batteries, Cables, Connectors (with reference to circuit symbol, working principle, types, specifications and applications). Color coding of resistors, series and parallel combinations of resistors, capacitors & Inductors.

Unit 2: Basic Electric Circuits (10L)

Concept of Ideal & Real voltage and current source, internal resistance, DC source, AC source (amplitude, wavelength, period, frequency, peak value, peak to peak values, RMS values), Charging and discharging of a capacitor, Resonance, LCR series resonance circuits, concept of impedance, quality factor, bandwidth RC Filters (First order low pass & high pass only)

Unit 3: Network Theorems (10L)

Network terminology (Active & passive elements, Node, Branch, loop, mesh), Ohms law, voltage and current dividers, Kirchhoff's Laws (KCL, KVL), Thevenin's theorem, Norton's theorem, Maximum power transfer theorem, Superposition theorem, numerical problems related to all theorems

Reference Books:

1. Basic Electronics: Bernard Grob, McGraw Hill Publication, 8th Revised Edition,2010
2. Electronic Principles: Albert Malvino, David J Bates, McGraw Hill 7th Edition. 2012
3. Circuits and Networks Analysis and Synthesis: Sudhkar and S. P. Shyammohan, Tata McGraw-Hill Publishing Company Limited, 3rd Edition, (2006).
4. Principles of Electronics: V.K. Mehta, S.Chand and Co.
5. A text book of electrical technology: B.L.Theraja, S.Chand and Co.
6. Basic Electronics and Linear Circuits: Bhargava N.N., Kulshreshtha D.C., Gupta S.C., Tata McGraw Hill.

CBCS Syllabus as per NEP 2020 for F. Y. B.Sc.Electronics (2023 Pattern)

Name of the Programme : B.Sc.Electronics

Programme Code : USELE

Class : F. Y. B.Sc.

Semester : I

Course Type : Major Mandatory (Theory)

Course Code : ELE-102-MJM

Course Title : Fundamentals of Digital Electronics

No. of Credits : 02

No. of Teaching Hours : 30

Course Objectives:

1. To know about different number systems and codes.
2. To understand logic gates and truth tables.
3. To understand Boolean Laws and k map techniques.
4. To understand different arithmetic circuits.

Course Outcomes:

By the end of the course, students will be able to:

CO1. To solve problems based on inter-conversion of number systems.
CO2. To reduce expressions using Boolean Laws.
CO3. To reduce expressions using k-map in SOP and POS forms.
CO4. Capacity to identify and implementation of the formulate to solve the arithmetic circuits and analyze the problems in digital electronics
CO5. Capability to understand the working principles of the logical devices and their applications

Topics and Learning Points

Unit I: Number Systems and Digital Codes (8L)

Number Systems - Introduction to decimal, Octal, Binary and hexadecimal number systems, Inter conversions – Decimal to Binary, Octal, Hexadecimal; Binary to Decimal, Octal, Hexadecimal; Octal to Binary, Decimal, Hexadecimal; Hexadecimal to Binary, Octal, Decimal.

Codes - BCD, Excess-3 and Gray

Interconversion- Binary to Gray and Gray to Binary, Decimal to BCD, Decimal to Excess-3, Alphanumeric representation using ASCII code.

Unit II: Logic Gates (7L)

Positive and Negative logic, Concept of Logic Gates – Statement, Symbol, Expression, Truth table of basic gates, Derived Gates.

Derived Logic Gates- Statement, symbol, Expression, Truth Table of derived gates EX OR, and EXNOR.Parity checker using EX OR gates.

Pinout diagrams - IC 7400, IC 7402, IC 7432, IC 7408, IC 7486 (Top/Bottom Views)

Unit III: Boolean algebra and Karnaugh Map (8L)

Boolean Laws – Insertion, union, Tautology,Complement, Double Negation, Commutation, Association, Distribution, Absorption.

Boolean Expressions in SOP and POS Form, Conversion of SOP and POS into their standard form, Minimization of Complex Boolean Expression using Boolean Algebraic Techniques.

DeMorgan's Theorems, Introduction to k-map, Minimization Techniques using K-map (2 , 3 and 4 Variables).

Unit IV: Arithmetical Operations and Arithmetical Circuits (7L)

Basic Binary Rules for addition and subtraction, 1's and 2's complement of binary numbers, Subtraction of binary numbers using 1's and 2's complement, Half adder, Full adder, Half Subtractor, Parallel Adder, Universal Adder/Subtractor. Study of IC 7483, IC 4008.

Reference Books:

1. Digital Electronics : Principles, Devices and Applications - Anil K. Maini (Wiley)
2. Digital Fundamentals - Floyd T.N. and Jain R.P. (Pearson Educations)
3. Digital system Design – M. Morris Mano(Pearson Education)
4. Digital Principles and Applications –Leach, Malvino, Saha (TMH)

CBCS Syllabus as per NEP 2020 for F. Y. B.Sc.Electronics (2023 Pattern)

Name of the Programme : B.Sc.Electronics

Programme Code : USELE

Class : F. Y. B.Sc.

Semester : I

Course Type : Major Mandatory (Practical)

Course Code : ELE-103-MJM

Course Title : Electronics Practical

No. of Credits : 02

No. of Teaching Hours : 60

Course Objectives:

1. To teach students how to know, identify, draw different symbols, logic diagrams and circuit diagrams.
2. To develop skill of circuit connections.
3. To train them to design and analyse circuits for specific purpose.
4. To motivate them to work on different mini projects.

Course Outcomes:

By the end of the course, students will be able to:

CO1. To identify different components, devices, IC's, as well as their types.
CO2. To understand basic parameters.
CO3. To know operation of different instruments used in the laboratory.
CO4. To connect circuit and do required performance analysis
CO5. Capability to develop experimental skills, analyzing the results and interpret data..
CO6. Develop hobby projects.

List of Practicals: (Any 8)

1. Study of electronic components (Resistor, Capacitor, inductor, Transformer, Switches, Fuses, Connectors, Cables, Diodes, Transistors, IC's)
2. Use of measuring electronic Instruments (Multimeter, Signal Generators, Power supply)
3. Measurement of signal parameters (amplitude, period, frequency, peak voltage, peak to peak voltage, RMS value)
4. Verification of network theorems: KCL and KVL.
5. Verification of Superposition Theorem.
6. Verification of network theorems: Thevenin/ Norton/ Maximum Power Transfer.
7. Build and test Clipper / Clampercircuit.

8. Study of filters (First order passive Low pass & High pass filter)
9. LCR series resonance
10. Verification of logic gates using IC's (7400, 7402, 7408, 7404, 7432, 7486)
11. Realization of basic gates using universal gates (NAND, NOR)
12. Study of Half & Full adder using gates.
13. Code converter : Binary to Gray and Gray to Binary
14. Design of Parity checker/ Generator using XOR gates.
15. Verification of DE Morgan's theorem
16. To study Universal adder & Subtractor

Activity:(Any one Activity equivalent to two experiments)

Students must perform at least one additional activity out of two activities in addition to eight experiments mentioned above. Total Laboratory work with additional activities should be equivalent to ten experiments.

- Industrial Visit / Study Tour / Field visit

CBCS Syllabus as per NEP 2020 for F. Y. B.Sc.Electronics (2023 Pattern)

Name of the Programme : B.Sc.Electronics

Programme Code : USELE

Class : F. Y. B.Sc.

Semester : I

Course Type : Open Elective (OE)

Course Code : ELE-116-OE

Course Title : Basic Electronics 1

No. of Credits : 02

No. of Teaching Hours : 30

Course Objectives:

1. To get familiar with basic active and passive components
2. To understand DC circuit theorems and their use in circuit analysis
3. To study characteristic features of semiconductor components
4. To study elementary electronic circuits and applications

Course Outcomes:

By the end of the course, students will be able to:

CO1. Getting the fundamental knowledge Electronics Devices and components and
CO1.CO2. Understand the concept of Circuit&Theorems.
CO3. Understand the basic material and properties of semiconductors
CO4. Explore constructional features and I-V characteristics of of basic semiconductor devices diode, Transistors
CO5. Apply basic concepts of P-N junction in developing simple application circuits

Topics and Learning Points

Unit 1: PassiveComponents (10L)

Study of basic circuit elements and passive components (with special reference to working principle, circuit symbols, types, specifications and applications): Resistor, Capacitor, Inductor, Transformer, Cables, Switches, Fuses, Batteries.

Unit 2: Semiconductor Devices- Diode (10L)

Study of semiconductor active components (with reference to symbol, working principle, I-

Vcharacteristics, parameters, specifications, applications): p-n junction diode, zener diode, varactor diode, light emitting diode, photo diode.Clipper and clamper

Unit 3: Semiconductor Devices- Transistor and its types:(10L)
BJT: symbol, types, construction, working principle, I-Vcharacteristics, parameters, specifications, concept of amplifier, configurations of transistors (CC,CE& CB) Brief study of : Uni-Junction Transistor (UJT), Junction Field Effect Transistor (JFET),Metal Oxide Semiconductor FET (MOSFET) , Applications of transistors.

Reference Books:

1. Electronic Principles : Albert Malvino, David J Bates, McGraw Hill 7th Edition. 2012
2. Principles of Electronics: V.K. Mehta, S.Chand and Co.
3. A text book of electrical technology: B.L.Theraja, S.Chand and Co.
4. Basic Electronics and Linear Circuits: Bhargava N.N., Kulshreshtha D.C., Gupta S.C., Tata McGraw Hill.

CBCS Syllabus as per NEP 2020 for F. Y. B.Sc.Electronics (2023 Pattern)

Name of the Programme : B.Sc.Electronics

Programme Code : USELE

Class : F. Y. B.Sc.

Semester : I

Course Type : Open Elective (OE)

Course Code : ELE-117-OE

Course Title : Electronics Practical

No. of Credits : 02

No. of Teaching Hours : 60

Course Objectives:

1. To teach students how to know, identify, draw different symbols, logic diagrams and circuit diagrams.
2. To develop skill of circuit connections.
3. To train them to design and analyse circuits for specific purpose.
4. To motivate them to work on different mini projects.

Course Outcomes:

By the end of the course, students will be able to:

CO1. To identify different components, devices, IC's, as well as their types.
CO2. To understand basic parameters.
CO3. To know operation of different instruments used in the laboratory.
CO4. To connect circuit and do required performance analysis
CO5. Capability to develop experimental skills, analyzing the results and interpret data.
CO6. Develop hobby projects.

List of Practicals: (Any 8)

1. Study of Basic Electronic Devices -Multimeters
2. Study of Basic Electronic Devices - Signal Generators
3. Study of Basic Electronic Devices - CRO
4. Study of different resistors and its color coding.
5. Study of Passive and Active Components.
6. Study of Transformers.
7. Study of relay and Switches.
8. Study of voltage sources in series, parallel and series- parallel

9. Charging and Discharging of Capacitor
10. Voltage and Current divider
11. Diode characteristics
12. Rectifier circuits
13. Study of transistor charactristics
14. Study of UJT characteristics
15. Study of Zener voltage regulator
16. Clipper/ Clamper

CBCS Syllabus as per NEP 2020 for F. Y. B.Sc.Electronics (2023 Pattern)

Name of the Programme : B.Sc.Electronics

Programme Code : USELE

Class : F. Y. B.Sc.

Semester : I

Course Type : Vocational Skill Course (VSC)

Course Code : ELE-121-VSC

Course Title : Applied Electronics

No. of Credits : 02

No. of Teaching Hours : 30

Course Objectives:

1) Apply knowledge of computer architecture and organization appropriate to thediscipline
2) Analyze given processing element, and identify and define the computing requirements.
3) Design, implement, and evaluate a microcontroller-based system, process, component, or
4) program to meet desired needs.
5) Use current techniques, skills, and tools necessary for Low-Level computing

Course Outcomes:

By the end of the course, students will be able to:

CO1. To understand types of memory and its parameters
CO2. To know the bus architecture and IO device communication.
CO3. Understand the CPU and memory organization.
CO4. To know the serial and parallel communication and interfacing concept.
CO5. Understand the architecture of Embedded system and its application
CO6. To have better idea on C and embedded C programming.
CO7. Understand the basic interfacing devices to controller and its programming

Topics and Learning Points

UNIT- 1: Memory **[10]**

Memory Architecture, Memory Hierarchy, Introduction to USB storage device, Memory parameters (Access time, speed, capacity, cost), Vertical & horizontal Memory expansion (increasing the capacity, increasing word size, increasing the capacity and word size), Associative Memory, Cache memory, cache mapping techniques, virtual memory.

UNIT- 2: Computer Organization **[10]**

Concept of Address Bus, Data Bus, Control Bus. Register based CPU organization, stack organization, I/O organization: need of interface, block diagram of general I/O interface. Working

concepts like polling, interrupt initiated data transfer. Concept of DMA, DMA transfer, DMA Controller Serial communication: Synchronous, asynchronous and their data transmission formats, RS–232, General block diagram of UART, USB.

UNIT- 3: Introduction To Embedded System[10]

History & need of Embedded System, Definition of an embedded system, Basic components of Embedded System, characteristics of embedded systems, Applications of embedded systems.Classification of Embedded System, Advantage & Disadvantage, Introduction to Embedded C, Difference between C & Embedded C, Basic structure of embedded C program, interfacing LED, Switch, sensors etc.

Reference Books:

1. Fundamental of Digital electronics : R.P. Jain
2. Digital design : M. Morris Mano, Prentice-Hall of India
3. Computer System Architecture : Morris Mano, Prentice-Hall of India
4. Embedded C - Michael J Point
5. The Pentium Microprocessor : James Antonakos
6. Microprocessors and Interfacing Programming and Hardware: Douglas V. Hall- TATA McGRAW-HILL EDITION
7. The Intel Microprocessors : Barry B. Brey- Pearson Education Asia
8. Embedded System, Architecture and programming,Rajkamal,TMH,2008

CBCS Syllabus as per NEP 2020 for F. Y. B.Sc.Electronics (2023 Pattern)

Name of the Programme : B.Sc.Electronics

Programme Code : USELE

Class : F. Y. B.Sc.

Semester : I

Course Type : Skill Enhancement Course (SEC)

Course Code : ELE-126-SEC

Course Title : Introduction of Circuit Simulator-I

No. of Credits : 02

No. of Teaching Hours : 60

Course Objectives:

1. To develop hands-on skills of students
2. To promote entrepreneurship among the students
3. To enhance technical knowledge
4. To increase employment opportunities of students
5. To develop hands on working experience with reference to Solve, Simulate and Analyse Electrical & Electronics Circuits using PSPICE environments.

Course Outcomes:

By the end of the course, students will be able to:

CO1. Create, design and develop problem solving ability
CO2. Understand state of the art, technology and development
CO3. Develop soft skills needed.
CO4. Get knowledge of self-employability.
CO5. Identify Electronic components and understand simulating tool
CO6. Explain PSPICE EDA tools

Topics and Learning Points

1. Study of PSPICE environment.
2. Study of Simulation and Circuit Schematic using PSPICE
3. Pspice simulation of resistive circuit
4. Pspice simulation of capacitive circuit
5. Pspice simulation of diode clipper
6. Pspice simulation of nodal analysis for dc circuits
7. Pspice simulation of transient and parametric analysis of series RLC circuits using step and pulse input
8. Pspice simulation of transient and parametric analysis of series RLC circuits using sine input

9. Analysis of three phase circuit representing generator transmission line and load
10. Pspice simulation of D.C. Circuit for determining Thevenin's equivalent
11. Pspice simulation of maximum power transfer theorem for dc circuits
12. Pspice simulation of superposition theorem for dc circuits
13. Pspice simulation of ac circuits
14. Pspice simulation of transformer circuit
15. Pspice simulation of ac sweep of filter with ideal op-amp (filter circuit)
16. Pspice simulation of rectifier circuit (peak detector).
17. Pspice simulation of AM modulated signal

Reference Books:

1. Essential Electronic Design Automation (EDA), Mark.D.Birnbaum, Prentice Hall, 2004
2. Introduction ToPSpice Using OrCADfor Circuits and Electronics, Muhammad H. Rashid,Paperback – Import,3rd Edition, 2003.
3. Printed circuit Board – Design & Technology by Walter C. Bosshart, TMH.
4. Printed Circuit Board –Design, Fabrication, Assembly & Testing, R.S. Khandpur, TMH,3rd Edition,2017.
5. Electronic Devices and circuit theory, Robert Boylstead and Louis Nashelsky, PHI, 10th Edition, 2009.

CBCS Syllabus as per NEP 2020 for F. Y. B.Sc.Electronics (2023 Pattern)

Name of the Programme : B.Sc.Electronics

Programme Code : USELE

Class : F. Y. B.Sc.

Semester : I

Course Type : Indian Knowledge System (IKS)

Course Code : ELE-137-IKS

Course Title : Evolution & Future Prospects of Electronics in India

No. of Credits : 02

No. of Teaching Hours : 30

Course Objectives:

1. Study traditional Indian knowledge system.
2. To study history of Electronic industry development in India.
3. To study evolution of Science and technology in India
4. To Study development of new technology and its applications.

Course Outcomes:

By the end of the course, students will be able to:

CO1. Describe the traditional Indian knowledge system.

CO2. Analyse the need to protect traditional Indian knowledge system.

CO3. Understand the history and development of Electronics technology in India.

CO4. To learn today's electronics technology in India.

Topics and Learning Points

1. Introduction to Electronics Knowledge System:

Define traditional knowledge, nature and characteristics, scope and importance, kinds of traditional knowledge. The need for protecting traditional knowledge, the value of traditional knowledge in the global economy, Role of Government to harness traditional knowledge.

2. Science and Technology in India:

Milestones of India in Science and Technology, IKS in ancient India and in modern India, History of Electronic industry development in India, Achievements of Indians in Science and Technology in Ancient and medieval India, Nobel laureates of India in Science, Achievements of Indians in Science & Technology in the modern era.

3. Future Prospects:

Impact of New Technologies and Applications, social networking sites- Facebook, LinkedIn, Instagram, myspace, twitter, Online chat, video chatting, Internet telephony- voice, video, blogs, ChatGPT, IoT, Artificial Intelligence.

Reference Books:

1. A.K. Maini and J. Ramamurthy, Making sense of electronics: Understanding discreet components and their applications, , Tata McGraw-Hill Education, 2008.
2. Charles Harrell, Designing Electronics for Manufacturing and Testability: A Guide to Designing Automated, Cost-Effective Manufacturing and Test Systems, by Wiley, 2015.
3. Hamid R. Arabnia, Embedded Systems Design Challenges in the Electronic InTech, 2013.
4. Asok Kumar Das and Chandra ShekharBose , Artificial Intelligence in Electronics and Communication, , Cambridge University Press, 2004.
5. NitinGautam , Handbook of Electronics Manufacturing Engineering– CRC Press, 2016
6. Electronic Communication - Dennis Roddy, John Coolen, Pearson Education
7. Communication Electronics: Principles and Applications, Louis Frenzel , McGraw Hill Education

Examination Pattern / Evaluation Pattern

Teaching and Evaluation (for Major, Minor, AEC, VEC, IKS courses)

Course Credits	No. of Hours per Semester Theory/Practical	No. of Hours per Week Theory/Practical	Maximum Marks	CE 40 %	ESE 60%
1	15 / 30	1 / 2	25	10	15
2	30 / 60	2 / 4	50	20	30
3	45 / 90	4 / 6	75	30	45
4	60 / 120	4 / 8	100	40	60

Teaching and Evaluation (for VSC, SEC & CC courses)

- Evaluation to be done by Internal & External Experts
- No descriptive end semester written examination
- Evaluation to be done at Department level preferably prior to commencement of Theory /Practical Examinations
- Evaluation to be done on the Skills gained by student