VIJAYANAGARA SRI KRISHNADEVARAYA UNIVERSITY
JNANASAGARA CAMPUS, BALLARI-583105

Department of Studies in Electronics

I & II Semester Syllabus

Bachelor of Science

With effect from 2024-25 and onwards

29/06/24

Name of the Department: Electronics

Semester-I

Course Title: Basic Electronics	**Course code: 24MJELEC1L**
Total Contact Hours: 55	**Course Credits: 04**
Internal Assessment Marks: 20 marks	**Duration of SEE: 03 hours**
Semester End Examination Marks: 80 marks	

Course Outcomes (CO's):

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

1. Describe the passive and active components
2. Distinguish the characteristics of diodes and transistors.
3. Solve the network problems using the different theorems.

Mechanics and Properties of Matter

Unit	Description	Hours
Unit 1	**Circuits Fundamentals:** Passive components –R, L & C- features, types, uses. color coding of resistors & capacitors. charging & discharging of capacitor & growth and decay of current in inductor through resisters. Energy stored in capacitor & inductor. **Transformer-** features, construction & working, turns ratio, types of transformers and losses Energy sources - concept of voltage and current source- Characteristics.	**11 hr**
Unit 2	**AC Circuits:** Fundamental characteristics of sine waves. Parameters of sinewave like Amplitude, period, frequency, average and *rms* value. Complex numbers, J operator Series RL, RC & RLC circuit fed with ac- determination of reactance, impedances and expression for current. **Series RLC circuit** - expression for the resonant frequency, Bandwidth and quality factor. Parallel RLC circuit- expression for the resonant frequency, Bandwidth and quality factor**.**	**11 hr**
Unit 3	**Networks theorems:** Statement, proof and problems of the theorems: Kirchhoff's Laws, Star and delta networks (T & π) and their conversions, Reciprocity theorem, Maximum power transfer theorem for DC only, Superposition theorem, Thevenin's theorem and Norton's theorem.	**11 hr**
Unit 4	**Semiconductor Diodes:** Review of semiconductor, energy band theory of crystals, Intrinsic semiconductors- Atomic structure of Ge and Si, Current Conduction in intrinsic semiconductors, Extrinsic semiconductor – P-type and N-type, conduction in both types of Semiconductors.	**11 hr**

Semiconductor diode-formation of P-N junction & depletion layer. Symbol of diode, Working of P- N junction diode, I-V Characteristics in forward & reverse Bias. Knee voltage, Breakdown voltage, diode testing & ideal diode characteristics.

Study the construction, working, characteristics and uses of the following special purpose diodes Zener diode, photodiode, photocell (solar cell) light emitting diode (LED) and seven segment LED display.

Unit 5 **Transistors:** The bipolar junction transistor, types and symbols, working of NPN & PNP Transistor. Transistor configurations- CB, CE & CC. Current Amplification factors in - CB, CE & CC modes and their relations. Transistors characteristics - input, output & transfer characteristics in CB, CE configurations for both npn & pnp transistors, Leakage currents. Construction, working and characteristics of FET and MOSFET. **11 hr**

Text books:

1. Solid state electronics – by B.L.Theraja
2. Principles of electrons–by V.K.Mehtha
3. Electronic devices & circuits , Jacob Millman & Halkias

Name of the Department: Electronics
Semester-I

Course Title: BASIC ELECTRONICS LAB	**Course code: 24MJELEC1P**
Total Contact Hours: 56	**Course Credits: 02**
Internal Assessment Marks: 10	**Duration of SEE: 03 hours**
Semester End Examination Marks: 40	

Course Outcomes (CO's):

At the end of the course, students will be able to:
1. Verify and apply key electrical theorems.
2. Analyze T and π networks and applications in electrical circuits.
3. Verify and utilize KCL and KVL in various circuit configurations.
4. Determine the resonance frequency in both series and parallel LCR circuits
5. Measure and interpret the characteristics of diodes, and Transistors

List of Experiments

1	Verification of reciprocity theorem.
2	Verification and conversion of T & π networks
3	Verification of KCL & KVL.
4	Verification of superposition theorem.
5	Verification of maximum power transfer theorem
6	Verification of Thevenin's theorem
7	Series LCR circuit-determination resonance frequency.
8	Parallel LCR circuit-determination resonance frequency
9	Measurement of Vpp, T, F of sine and square waves using CRO
10	Characteristics of LED (Minimum Two differentLEDs)
11	Characteristics of PN junction diode
12	BJT–Common Emitter Characteristics

Note:
1. Minimum of EIGHT experiments must be carried out.
2. Experiments may be added as and when required with the approval of BoS.

Reference Books:

1. Solid state electronics – by B.L.Theraja
2. Principles of electrons–by V.K.Mehtha
3. Electronic devices & circuits , Jacob Millman & Halkias

Name of the Department: Electronics

Semester-II

Course Title: Electronic Circuits	**Course code: 24MJELEC2L**
Total Contact Hours: 55	**Course Credits: 04**
Internal Assessment Marks: 20 marks	**Duration of SEE: 03 hours**
Semester End Examination Marks: 80 marks	

Course Outcomes (CO's):

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

1. Analyze power supplies (Advanced).
2. Design different Transistor Biasing Systems.
3. Explain Basics Of Amplifiers.
4. Explain power amplifier and feedback amplifier.

Electronic Circuits

Unit	Description	Hours
Unit 1	**DC Regulated power supplies:** Block diagram of regulated power supply, Rectification: Half wave rectifier, center tapped Full wave rectifier and Bridge rectifier- determination of efficiency and ripple factors. Filters: function of Series inductor filter, shunt capacitor filter, LC filter and CLC / filter.	**11 hr**
	Voltage regulators: Zener diode regulator, series transistor and shunt transistor regulator and IC regulator 78XX and 79XX series. LM 317 & 337 regulator, SMPS.	
Unit 2	**Transistor Biasing:** Need for biasing, essentials of transistor biasing, DC load line Analysis, Operating point- determination of operating point - problems. Temperature effect on Q-point, Thermal Runaway. Stability factor- definition & importance	**11 hr**
	Biasing circuits: - designing , stability factors of the following biasing circuits. Base resister bias / fixed bias, Base bias with emitter Feed back, Base bias with collector feed back, Voltage divider/ universal biasing method. Problems.	
Unit 3	**Single stage transistor amplifier and Multistage transistor amplifier**: CE amplifier with voltage divider network- circuit, function and AC equivalent circuits.	
	Hybrid parameter - definitions, CE, CC & CB hybrid equivalent models and expressions. Derivations for voltage gain, current gain, input impedance and output impedance of CE amplifier in terms of h- parameters. Classification of amplifier based on different parameters, different amplifier couplings and their comparison RC-coupled two stage amplifier freq.-response and band width advantage of RC coupled amplifier	**11 hr**
	Transformer coupled amplifier – frequency response Emitter follower circuit - construction, working and analysis. Darling tonpair of transistors.	

Unit 4 **Power amplifiers:** Transistor audio power amplifier. Difference b/w voltage and power amplifiers Transformer coupled class –A power amplifiers –expression for maximum efficiency, Class-B push –pull amplifiers –power efficiency of amplifiers, cross over distortion & harmonics distortion , complementary symmetry push pull amplifiers. Concept of heat sink used in power transistor, single tuned amplifiers. **11 hr**

Unit 5 **Feed back in amplifier:** Concept of feed back in amplifiers - positive & negative feedback Effect of –ve feedback on amplifier characteristics - expression for voltage gain, input impedance, output impedance & band width Comparative study of negative feedback on amplifiers characteristics with positive feedback. **11 hr**

Reference Books:

1. Electronic devices & circuits - Jacob Millman & Halkias,
2. Electronic device & circuits theory - Robert Boylsted & Louis Nashelsky
3. Fundamental of electronics – B. Basavaraj
4. Applied electronics – R S Sedha

Name of the Department: Electronics
Semester-II

Course Title: Electronic Circuits LAB	**Course code: 24MJELEC2P**
Total Contact Hours: 56	**Course Credits: 02**
Internal Assessment Marks: 10	**Duration of SEE: 03 hours**
Semester End Examination Marks: 40	

Course Outcomes (CO's):
At the end of the course, students shall be able to:

1. Able to make connections using breadboard.
2. Design Different Power Supply Systems Using IC's.
3. Design Amplifier Circuits and analyze their Performance.
4. Analyze Performance Of power Amplifier Circuits and Feedback Systems

Thermal Physics and Waves Lab

List of Experiments:

1. Half- wave rectifier–determination of ripple factor with & without shunt capacitor filter.
2. Full -wave rectifier – determination of ripple factor with & without shunt capacitor filter
3. Bridge- rectifier – determination of ripple factor with & without shunt capacitor filter.
4. Zener diode voltage regulator- load regulation curve.
5. Series Transistor voltage regulator- load regulation curve.
6. IC 78xx regulated power supply- load regulation curve.
7. IC 79xx regulated power supply- load regulation curve.
8. Single stage RC coupled amplifier- frequency response curve.
9. Emitter follower- determination of voltage gain, current gain, input impedance and output impedance.
10. Determination of hybrid parameters for the CE amplifier.
11. Complementary symmetry push pull amplifier.
12. Single tuned amplifier – frequency response

Note:

1. Minimum of EIGHT experiments must be carried out.
2. Experiments may be added as and when required with the approval of BoS.

References:

1. Basic Electronics: A Text-lab Manual – By Paul B. Zbar, Albert Paul Malvino
2. Experimental electronics – by S.V. Subramanyam.

Evaluation Process:

A. Continuous Assessment Scheme (Major Courses: ELECTRONICS): Internal

Sl. No.	Component	Maximum Marks
01	Two Session Tests with proper record for assessment (5+5 = 10)	10
02	Assessment of Skill development activities/Seminars/Group Discussion etc., with proper record	05
03	Assignment with proper record	05
	TOTAL	**20**

B. Elective / SEC Courses: Internal

Sl. No.	Component	Maximum Marks
01	Two Session Tests with proper record for assessment	05
02	Assessment of Skill development activities/Seminars/Group Discussion etc., with proper record	05
	TOTAL	**10**

C. Internal Assessment for Practical: Internal

1	Test with proper record for assessment	05
2	Record / Journal	05
	Total	**10**

D. Practical Semester End Examination External (Duration: 3Hrs)

No	Component	Maximum Marks
1	Circuit Diagram/Ray diagram/Tabular Column with proper labeling and units.	10
2	Experimental Skill (proper readings)	12
3	Graph/calculations/Result with Accuracy	08
4	Viva	10
	Total Marks	**40**

E. Project Work Assessment during VI semester: Internal

1	Regular project progress assessment	05 Marks
2	Presentation	05 Marks
	Total	10 Marks

F. Semester End examination assessment for Project

1	Project Report	20 Marks
2	Final Presentation	10 Marks
3	Viva Voice	10 Marks
	Total	40 Marks

THEORY EXAMINATION QUESTION PAPER PATTERN FOR MAJOR SUBJECTS
(Semesters I –VI)

B.Sc. Semester-I Degree Examination; 2024-25
(Semester Scheme 2024-25)

SUBJECT: ELECTRONICS

Course Name: _____[Course Code]

Time: 3 Hours **Max. Marks: 80**

Instructions to candidates:

1) All sections are compulsory
2) Draw neat and labeled diagrams wherever necessary.

SECTION-A

[1]. Answer **all** the following questions: **(10×2=20)**

a)

b)

c)

d)

e)

f)

g)

h)

i)

j)

Note for paper setters: Set Two questions from each Unit.

SECTION-B

Answer any **Four** of the following: **(4×5=20)**

[2].

[3].

[4].

[5].

[6].

[7].

Note for paper setters: Set at least One question from each Unit.

SECTION -C

Answer any **Four** of the following: **(4×10=40)**

[8].

[9].

[10].

[11].

[12].

[13].

Note for paper setters: Set at least One question from each Unit.

General Note: Preferably at least 25% of questions must be of numerical type

THEORY EXAMINATION QUESTION PAPER PATTERN FOR ELECTIVE SUBJECTS

B.Sc. Semester-V/VI Degree Examination; 2024-25
(Semester Scheme 2024-25)

SUBJECT: ELECTRONICS

Course Name: _____[Course Code]

Time: 1.5 Hours **Max. Marks: 40**

Instructions to candidates:

1) All sections are compulsory
2) Draw neat and labeled diagrams wherever necessary.

SECTION-A

[1]. Answer **all** the questions: **(5×2=10)**

a)

b)

c)

d)

e)

Note for paper setters: Set at least ONE question from each Unit.

SECTION-B

Answer any **Two** of the following: **(2×5=10)**

[2].

[3].

[4].

Note for paper setters: Set at least One question from each Unit.

SECTION -C

Answer any **TWO** of the following: **(2×10=20)**

[5].

[6].

[7].

Note for paper setters: Set at least One question from each Unit.

THEORY EXAMINATION QUESTION PAPER PATTERN FOR SKILL ENHANCEMENT SUBJECTS

B. Sc. Semester-III/IV Degree Examination; 2024-25
(Semester Scheme 2024-25)

SUBJECT: ELECTRONICS

Course Name: _____[Course Code]

Time: 1.5 Hours **Max. Marks: 40**

QUESTION PAPER PATTERNS FOR ALL SKILL PAPERS IS

40 MULTIPLE CHOICE QUESTIONS.