



B.Sc. (Electronics) Syllabus, G.C.W Parade College Jammu
NEP-2020 Pattern for Semesters-I and II w.e.f 2022-23

Syllabus

for

Semesters-I and II

of

Four Years Undergraduate programme

(FYUGP)

in

B.Sc. Electronic Science as per

NEP-2020



Semester-I

Course Type: - Major Theory Course
Course Code: UETMJT-101
Total Marks :100

Course Title: Circuits and Network Analysis
Total Credits:04
Total teaching hours: 60

Objective of Course

- To provide deep knowledge of analog circuits, their parameters and the various methods used to solve the circuits in different conditions.
- To allow the students to learn various network theorems and applying them on complex circuits.
- To provide the knowledge of Steady state and Transient response of RLC circuit.
- To teach the basic concepts of filters their types and usage in analog circuits.

Learning outcomes of the course

The following are the expected outcomes of the course:

- To provide the deep knowledge of scientific and technological aspects of Electronics.
- Updating students with recent trends and technological developments.
- Read, understand and interpret physical information verbal, mathematical and graphical.
- Perform the experimental analysis, interpret and compose the result of the observation.

Scope of the course in terms of:

a) Enhancing the knowledge quotient of the students about the programme of which the course is a part:

- B.Sc. Electronics is the discipline of science, engineering and technology that deals with the electrical circuits that include dynamic electrical parts and components. This degree course is the study and investigation of the fundamentals of Analogue Electronics, Communications, Electromagnetic, Digital System Design, Optoelectronics and Mathematics. In other words, B.Sc. Electronics degree program is the comprehensive study which provides a wide foundation on the basics of electronics.
- B.Sc. Electronics degree candidates have ample of employment opportunities in Communication, Information Technology, Manufacturing, Banking, Finance, Marketing, Education, Entertainment, Defence, Quality Product Manufacturing, Automobiles etc and in different other fields. The degree program provides candidates with skills that are required to design electronic, electrical, computer, automation as well as communication systems.

b) Employment generation:

- After obtaining a BSc in electronics degree, one may start your own business for manufacturing electronic goods and components, seek employment in technical jobs at IT companies or banks or pursue higher education in the same or related fields.

Syllabus

Unit I

12 Hours

Basic circuit concept: Voltage and current sources, series and parallel elements, voltage division and current division.

Circuit analysis: Kirchhoff's current law (KCL), Kirchhoff's voltage law (KVL), node analysis, mesh analysis, star- delta transformation.



Network Theorems: Superposition Theorem, Thevenin's theorem, Norton's theorem, reciprocity theorem, Millman's theorem, Maximum power transfer theorem, Application of theorems to simple networks. Numerical Problems (15% of the marks will be given to numerical).

Unit II

12 Hours

AC circuit analysis: Sinusoidal voltage and current, definition of instantaneous, peak, peak to peak, root mean square and average values, voltage-current relationship in resistor, inductor and capacitor, phasor, complex impedance. Resonance in series and parallel RLC circuits, frequency response of series and parallel RLC circuits, quality (Q) factor and bandwidth.

Unit III

12 Hours

DC transient analysis: Transient analysis of RL, RC, and RLC circuits using differential equations. Laplace transform, properties of Laplace transform and its analysis, solution of problems using Laplace transform and its inverse. Solution of series RL, RC, RLC circuits using Laplace transform.

Unit IV

12 Hours

Two Port Networks: Two port network parameters, open circuit impedance, short circuit admittance, transmission, inverse transmission, hybrid and inverse hybrid, interrelationship of different parameters.

Unit V

12 Hours

Filter fundamentals: Neper, decibel, symmetrical networks, properties, propagation and Z_0 .

Filter types: Pass and stop bands, behavior of characteristic impedance, constant K low pass and high pass filters, m-derived T and Pi sections filters, termination with m derived half sections, band pass and band elimination filters, filter design.

Books Recommended

1. Robert L. Boylestad- Essentials of circuit analysis, Pearson Education (2004)
2. Circuits and Networks by A. Sudhakar, Shyammohan.
3. Circuit Theory and Networks by Bagchi Surajit.
4. Circuit Theory and Network Theory by Karna Satish K.
5. Electrical Circuit Theory and Technology by John Bird.
6. Network Analysis and Synthesis by S.P. Ghosh & A.K. Chakraborty

Examination pattern shall be as under: -

1. 20 marks shall be earmarked for internal assessment (5 marks for attendance +15 for assessment test).
2. Scheme for award of marks for attendance shall be same as followed by the College
3. Internal assessment test shall be conducted after the completion of 40% of the syllabus in a particular course.

Pattern for setting internal assessment test paper: -

The paper shall comprise of three sections: -

- a) Short answer questions – Attempt two questions of 2 marks each out of three questions (Maximum of 30 words each)
- b) Medium answer question - Attempt two questions of 3 marks each out of 3 question (Maximum of 50 words each)
- c) Long answer question - Attempt one question out of two questions of 5 marks each



**B.Sc. (Electronics) Syllabus, G.C.W Parade College Jammu
NEP-2020 Pattern for Semesters-I and II w.e.f 2022-23**

(Maximum of 100 words)

Note: - Questions shall be set in such a way that the syllabi prescribed for the examination is fully represented.

Duration of the paper: - 1hour

Attendance Evaluation

For all the courses- Theory and Practical

Percentage of Attendance	Marks
>90%	05
85% -90%	04
80%-85%	03
75%-80%	02
<75%	Ineligible

Pattern of External Examination:

Total marks: - 80

Time allowed: - 3 hours

The paper shall comprise of three sections:

- Short answer questions - 5 questions of 3 marks each (one question shall be asked from each unit). All questions are compulsory
- Medium answer questions – 5 questions of 7 marks each (one question shall be asked from each unit). All questions are compulsory
- Long answer questions: - 5 questions be set from five units, and the students shall be asked to attempt 2 questions only. Each question shall be of 15 marks.
(The word limit shall be same as is the usual practice in external examination of similar weightage.)



Semester-I

Course Title: Circuits & Network Analysis Lab

Course code: UETMJP-101

Total Credits: 02

Total Marks: 50

Course Type: Major Practical Course

Objectives of the Course

- To provide the practical knowledge of analog circuits and various operations on them.
- To train the students practically to solve the networks using various theorems.
- To provide the practical knowledge of h- parameters and their usage.

Learning outcomes of the course

The following are the expected outcomes of the course:

- To provide the practical knowledge of scientific and technological aspects of Electronics.
- Perform the experimental analysis, interpret and compose the results of the observation.
- To enable students to design filters and their frequency responses.

Practical Exercises:

1. Familiarization with: -
 - a. Resistances in series, parallel and series- parallel.
 - b. Capacitors and Inductors in series and parallel.
 - c. Multimeter-Checking of components.
2. To find the h- parameters of a circuit.
3. Verification of Kirchoff's laws.
4. Verification of Thevenin's theorem
5. Verification of Norton's theorem
6. Verification of Superposition theorem
7. Verification of Millman's theorem
8. Verification of Reciprocity theorem
9. Verification of Maximum Power Transfer theorem.
10. Designing of a Low Pass RC Filter and study of its frequency response.
11. Designing of a High Pass RC Filter and study of its frequency response.
12. Study of the frequency response of series LCR circuit and determination of its: -
 - a. Resonant Frequency
 - b. Impedance at resonance
 - c. Quality factor (Q)
 - d. Bandwidth
13. To use network theorems on series and parallel RLC circuits.

Examination Pattern

- a. Marks of external examination= 25
- b. Marks of internal evaluation= 25

a. Internal Practical Examination

All the three components of internal assessments are mandatory

Components of internal evaluation of Practical	Marks
Attendance	05
Test	08
Lab Involvement	12
Total	25



**B.Sc. (Electronics) Syllabus, G.C.W Parade College Jammu
NEP-2020 Pattern for Semesters-I and II w.e.f 2022-23**

The practical file related to the number of experiments performed must be duly signed by the teacher in charge and must be authenticated by the HOD Electronics. For appearing in the external practical examination, certified record should also be produced.

b. External Practical Examination

For all the practical papers, there will be an external evaluation. The external examiner will be appointed by the Principal of the college in consultation with the HOD in charge. There will be an internal examiner who will be appointed by the head of the department. The examination will be of three-hour duration and the various components for the evaluation of external examination are given below.

Components of external evaluation of Practical examination	Marks
Test	06
Practical Record File	06
Viva- voce	05
Experimentation/ Data collection	08
Total	25



Semester-I

Course Type: - Minor Theory course

Course Code: UETMNT-101

Total Marks :100

Objective of Course

- To provide deep knowledge of analog circuits, their parameters and the various methods used to solve the circuits in different conditions.
- To allow the students to learn various network theorems and applying them on complex circuits.
- To provide the knowledge of Steady state and Transient response of RLC circuit.
- To teach the basic concepts of filters their types and usage in analog circuits.

Learning outcomes of the course

The following are the expected outcomes of the course:

- To provide the deep knowledge of scientific and technological aspects of Electronics.
- Updating students with recent trends and technological developments.
- Read, understand and interpret physical information verbal, mathematical and graphical.
- Perform the experimental analysis, interpret and compose the result of the observation.

Scope of the course in terms of:

c) Enhancing the knowledge quotient of the students about the programme of which the course is a part:

- B.Sc. Electronics is the discipline of science, engineering and technology that deals with the electrical circuits that include dynamic electrical parts and components. This degree course is the study and investigation of the fundamentals of Analogue Electronics, Communications, Electromagnetic, Digital System Design, Optoelectronics and Mathematics. In other words, B.Sc. Electronics degree program is the comprehensive study which provides a wide foundation on the basics of electronics.
- B.Sc. Electronics degree candidates have ample of employment opportunities in Communication, Information Technology, Manufacturing, Banking, Finance, Marketing, Education, Entertainment, Defence, Quality Product Manufacturing, Automobiles etc and in different other fields. The degree program provides candidates with skills that are required to design electronic, electrical, computer, automation as well as communication systems.

d) Employment generation:

- After obtaining a BSc in electronics degree, one may start your own business for manufacturing electronic goods and components, seek employment in technical jobs at IT companies or banks or pursue higher education in the same or related fields.

Syllabus

Unit I

12 Hours

Basic circuit concept: Voltage and current sources, series and parallel elements, voltage division and current division.

Circuit analysis: Kirchhoff's current law (KCL), Kirchhoff's voltage law (KVL), node analysis, mesh analysis, star- delta transformation.

Network Theorem: Superposition Theorem, Thevenin's theorem, Norton's theorem, reciprocity theorem, Millman's theorem, Maximum power transfer theorem, Application of theorems to simple networks. Numerical Problems (15% of the marks will be given to numerical).



Unit II

12 Hours

AC circuit analysis: Sinusoidal voltage and current, definition of instantaneous, peak, peak to peak, root mean square and average values, voltage- current relationship in resistor, inductor and capacitor, phasor, complex impedance. Resonance in series and parallel RLC circuits, frequency response of series and parallel RLC circuits, quality (Q) factor and bandwidth.

Unit III

12 Hours

DC transient analysis: Transient analysis of RL, RC, and RLC circuits using differential equations. Laplace transform, properties of Laplace transform and its analysis, solution of problems using Laplace transform and its inverse. Solution of series RL, RC, RLC circuits using Laplace transform.

Unit IV

12 Hours

Two Port Networks: Two port network parameters, open circuit impedance, short circuit admittance, transmission, inverse transmission, hybrid and inverse hybrid, interrelationship of different parameters.

Unit V

12 Hours

Filter fundamentals: Neper, decibel, symmetrical networks, properties, propagation and Z_0 .

Filter types: Pass and stop bands, behavior of characteristic impedance, constant K low pass and high pass filters, m- derived T and Pi sections filters, termination with m derived half sections, band pass and band elimination filters, filter design.

Books Recommended

1. Robert L. Boylestad- Essentials of circuit analysis, Pearson Education (2004)
2. Circuits and Networks by A. Sudhakar, Shyammmohan.
3. Circuit Theory and Networks by Bagchi Surajit.
4. Circuit Theory and Network Theory by Karna Satish K.
5. Electrical Circuit Theory and Technology by John Bird.
6. Network Analysis and Synthesis by S.P. Ghosh & A.K. Chakraborty

Examination pattern shall be as under: -

1. 20 marks shall be earmarked for internal assessment (5 marks for attendance +15 for assessment test).
2. Scheme for award of marks for attendance shall be same as followed by the College
3. Internal assessment test shall be conducted after the completion of 40% of the syllabus in a particular course.

Pattern for setting internal assessment test paper: -

The paper shall comprise of three sections: -

- a) Short answer questions – Attempt two questions of 2 marks each out of three questions (Maximum of 30 words each)
- b) Medium answer question - Attempt two questions of 3 marks each out of 3 question (Maximum of 50 words each)
- c) Long answer question - Attempt one question out of two questions of 5 marks each (Maximum of 100 words)



**B.Sc. (Electronics) Syllabus, G.C.W Parade College Jammu
NEP-2020 Pattern for Semesters-I and II w.e.f 2022-23**

Note: - Questions shall be set in such a way that the syllabi prescribed for the examination is fully represented

Duration of the paper: - 1 hour

Attendance Evaluation

For all the courses- Theory and Practical

Percentage of Attendance	Marks
>90%	05
85%-90%	04
80%-85%	03
75%-80%	02
<75%	Ineligible

Pattern of External Examination:

Total marks: - 80

Time allowed: - 3 hours

The paper shall comprise of three sections.

- Short answer questions - 5 questions of 3 marks each (one question shall be asked from each unit). All questions are compulsory
- Medium answer questions – 5 questions of 7 marks each (one question shall be asked from each unit). All questions are compulsory
- Long answer questions: - 5 questions be set from five units, and the students shall be asked to attempt 2 questions only. Each question shall be of 15 marks.
(The word limit shall be same as is the usual practice in external examination of similar weightage.)



Semester-I

Course Title: Circuits & Network Analysis Lab

Course code: UETMNP-101

Total Credits:02

Total Marks: 50

Course Type: Minor Practical Course

Objectives of the Course

- To provide the practical knowledge of analog circuits and various operations on them.
- To train the students practically to solve the networks using various theorems.
- To provide the practical knowledge of h- parameters and their usage.

Learning outcomes of the course

The following are the expected outcomes of the course:

- To provide the practical knowledge of scientific and technological aspects of Electronics.
- Perform the experimental analysis, interpret and compose the results of the observation.
- To enable students to design filters and their frequency responses.

Practical Exercises:

1. Familiarization with: -
 - a. Resistances in series, parallel and series- parallel.
 - b. Capacitors and Inductors in series and parallel.
 - c. Multimeter-Checking of components.
2. To find the h- parameters of a circuit.
3. Verification of Kirchoff's laws.
4. Verification of Thevenin's theorem
5. Verification of Norton's theorem
6. Verification of Superposition theorem
7. Verification of Millman's theorem
8. Verification of Reciprocity theorem
9. Verification of Maximum Power Transfer theorem.
10. Designing of a Low Pass RC Filter and study of its frequency response.
11. Designing of a High Pass RC Filter and study of its frequency response.
12. Study of the frequency response of series LCR circuit and determination of its: -
 - a. Resonant Frequency
 - b. Impedance at resonance
 - c. Quality factor (Q)
 - d. Bandwidth
13. To use network theorems on series and parallel RLC circuits.

Examination Pattern

- a. Marks of external examination= 25
- b. Marks of internal evaluation= 25

a. Internal Practical Examination

All the three components of internal assessments are mandatory

Components of internal evaluation of Practical	Marks
Attendance	05
Test	08
Lab Involvement	12
Total	25



**B.Sc. (Electronics) Syllabus, G.C.W Parade College Jammu
NEP-2020 Pattern for Semesters-I and II w.e.f 2022-23**

The practical file related to the number of experiments performed must be duly signed by the teacher in charge and must be authenticated by the HOD Electronics. For appearing in the external practical examination, certified record should also be produced.

b. External Practical Examination

For all the practical papers, there will be an external evaluation. The external examiner will be appointed by the Principal of the college in consultation with the HOD in charge. There will be an internal examiner who will be appointed by the head of the department. The examination will be of three-hour duration and the various components for the evaluation of external examination are given below.

Components of external evaluation of Practical examination	Marks
Test	06
Practical Record File	06
Viva- voce	05
Experimentation/ Data collection	08
Total	25



Semester-II

Course Type: - Major Theory course

Course Code: UETMJT-201

Total Marks :100

Objectives of the Course

- To impart the knowledge of semiconductor diodes, their importance in the field of material science and their various types.
- To give the detail knowledge of Resistors, Capacitors and Inductors, their composition and usage.
- To provide the knowledge of various types of Transistors, their biasing techniques and usage as an important amplifying device.

Course Title: Analog Electronics

Total Credits:04

Total teaching hours: 60

Learning outcomes of the course

The following are the expected outcomes of the course:

- To allow students to perform the experimental analysis of Electronic Componentssuch as Transistors, Diodes, MOSFETs, etc.
- Provide the deep knowledge of amplifiers, their types and applications.
- Read and understand the types of resistors, capacitors and inductors.

Scope of the course in terms of:

e) Enhancing the knowledge quotient of the students about the programme of which the course is a part:

- B.Sc. Electronics is the discipline of science, engineering and technology that deals with the electrical circuits that include dynamic electrical parts and components. This degree course is the study and investigation of the fundamentals of Analogue Electronics, Communications, Electromagnetic, Digital System Design, Optoelectronics and Mathematics. In other words, B.Sc. Electronics degree program is the comprehensive study which provides a wide foundation on the basics of electronics.
- B.Sc. Electronics degree candidates have ample of employment opportunities in Communication, Information Technology, Manufacturing, Banking, Finance, Marketing, Education, Entertainment, Defence, Quality Product Manufacturing, Automobiles etc and in different other fields. The degree program provides candidates with skills that are required to design electronic, electrical, computer, automation as well as communication systems.

f) Employment generation:

- After obtaining a BSc in electronics degree, one may start your own business for manufacturing electronic goods and components, seek employment in technical jobs at IT companies or banks or pursue higher education in the same or related fields.

Syllabus

Unit I

12 Hours

Resistors- fixed and variable resistors, construction and characteristics, color coding of resistors, resistors in series and parallel.

Inductors- fixed and variable inductors, self and mutual inductance, energy stored in inductors, inductors in series and parallel.



Capacitors- fixed and variable capacitors, principles of capacitance, parallel plate capacitor, permittivity, definition of dielectric constant, dielectric strength, energy stored in capacitor, capacitor in series and parallel.

Unit II

12 Hours

Diodes: PN Junction diode, static and dynamic resistances, equivalent circuits, transition and diffusion capacitances, diode load line analysis, diode equation and the I-V characteristics, rectifiers- Full wave, half wave and bridge type- determination of efficiency and ripple, Zener and Avalanche mechanisms, Zener diode and its applications, construction, working and characteristics of LED, Solar cell, Photo diodes, PIN diodes, Tunnel, varactor diode and schottky diode

Unit III

12 Hours

Bipolar junction Transistor (BJT): PNP and NPN transistors, basic transistor action, early effect, input and output characteristics of CB, CE and CC configurations, biasing techniques stabilization and bias compensation, Numerical Problems, Unijunction transistors (UJT): Construction, working and I-V characteristics of UJT, UJT as relaxation oscillator, Phototransistors

Unit IV

12 Hours

Field Effect Transistor (FET): construction of JFET, idea of channel formation, Pinch-off voltage, transfers and output characteristics

MOSFET: MOS diode, basic construction of MOSFET and working, I-V characteristics, enhancement and depletion modes, complimentary MOS (CMOS). Channel Length Modulation and Body effect in MOS transistors. Introduction to MOS amplifier configurations (Common- Source and Common- drain) and their working principles.

Unit V

12 Hours

CE amplifier: self bias arrangement of CE, dc and ac load line analysis, hybrid equivalent of CE, Quantitative study of the frequency response of the CE amplifier, effect on gain and the bandwidth for cascaded CE amplifier (RC coupled) RC coupling, direct coupling, Transformer coupling and their frequency comparison

Power Amplifiers: Heat sink for power transistors, classification of power amplifiers, Class A, B, C, AB amplifiers, class A large signal amplifier, transformer coupled amplifiers, efficiency of amplifiers, push pull amplifiers, analysis of class B push pull amplifier.

Oscillators: Condition for sustained oscillations, RC phase shift, Hartley, Colpitt's, Crystal and Wien Bridge Oscillators.

Books Recommended:

1. Basic electronics and linear circuits by N.N Bhargava.
2. Integrated electronics by Millman Halkias.
3. S.M. Sze, Physics and technology of semiconductor devices.
4. Robert Boylestad, Electronic devices and circuit theory.
5. S.K Gandhi, Study of Semiconductor Devices.
6. J.B. Gupta, Electronic Devices and Circuit Theory.
7. Microelectronic Circuits by Adel Sedra and Kenneth C. Smith.



Examination pattern shall be as under: -

1. 20 marks shall be earmarked for internal assessment (5 marks for attendance +15 for assessment test).
2. Scheme for award of marks for attendance shall be same as followed by the College
3. Internal assessment test shall be conducted after the completion of 40% of the syllabus in a particular course.

Pattern for setting internal assessment test paper: -

The paper shall comprise of three sections: -

- a) Short answer questions – Attempt two questions of 2 marks each out of three questions (Maximum of 30 words each)
- b) Medium answer question - Attempt two questions of 3 marks each out of 3 question (Maximum of 50 words each)
- c) Long answer question - Attempt one question out of two questions of 5 marks each (Maximum of 100 words)

Note: - Questions shall be set in such a way that the syllabi prescribed for the examination is fully represented

Duration of the paper: - 1hour

Attendance Evaluation

For all the courses- Theory and Practical

Percentage of Attendance	Marks
>90%	05
85%-90%	04
80%-85%	03
75%-80%	02
<75%	Ineligible

Pattern of External Examination:

Total marks: - 80

Time allowed: - 3 hours

The paper shall comprise of three sections.

- a) Short answer questions - 5 questions of 3 marks each (one question shall be asked from each unit). All questions are compulsory
- b) Medium answer questions – 5 questions of 7 marks each (one question shall be asked from each unit). All questions are compulsory
- c) Long answer questions: - 5 questions be set from five units, and the students shall be asked to attempt 2 questions only. Each question shall be of 15 marks.
(The word limit shall be same as is the usual practice in external examination of similar weightage.)



Semester-II

Course Title: Analog Electronics Lab
Total Credits:02
Course Type: Major Practical Course

Course code: UETMJP-201
Total Marks: 50

Objectives of the course

- To train the students to bias semiconductor diodes, transistors & MOSFET in different modes.
- To practically allow the students to use the transistor in various configurations.
- To provide the practical knowledge of applications of semiconductor devices and giving the detail analysis on them.

Learning outcomes of the course

The following are the expected outcomes of the course:

- To allow students to perform the experimental analysis of Electronic Components such as Transistor, Diodes, MOSFETs, etc.
- Provide deep knowledge of amplifiers and their experimental analysis.

Practical Exercises:

1. To study the I-V characteristics of diode-conventional and Zener diode.
2. To study the I-V characteristics of BJT in CB configuration.
3. To study the I-V characteristics of BJT in CE configuration.
4. To study the I-V characteristics of BJT in CC configuration.
5. To study the I-V characteristics of common source FET/MOSFET configuration.
6. To study the I-V characteristics of common drain FET/MOSFET configuration.
7. To study the I-V characteristics of common gate FET/MOSFET configuration.
8. Study of fixed bias arrangement for transistor.
9. To study the Zener diode as voltage regulator.
10. To study I/O waveforms of half wave/ Full wave.
11. To study the ripple factor of half wave/ Full wave.
12. To study diode as shunt clipping element.
13. To study diode as clamping element.
14. To study UJT as relaxation oscillator.
15. To study Zener diode as clipper.

Examination Pattern

- a. Marks of external examination= 25
- b. Marks of internal evaluation= 25

a. Internal Practical Examination

All the three components of internal assessments are mandatory

Components of internal evaluation of Practical	Marks
Attendance	05
Test	08
Lab Involvement	12
Total	25



**B.Sc. (Electronics) Syllabus, G.C.W Parade College Jammu
NEP-2020 Pattern for Semesters-I and II w.e.f 2022-23**

The practical file related to the number of experiments performed must be duly signed by the teacher in charge and must be authenticated by the HOD Electronics. For appearing in the external practical examination, certified record should also be produced.

b. External Practical Examination

For all the practical papers, there will be an external evaluation. The external examiner will be appointed by the Principal of the college in consultation with the HOD in charge. There will be an internal examiner who will be appointed by the head of the department. The examination will be of three-hour duration and the various components for the evaluation of external examination are given below.

Components of external evaluation of Practical examination	Marks
Test	06
Practical Record File	06
Viva- voce	05
Experimentation/ Data collection	08
Total	25



Semester-II

Course Type: - Minor Theory course

Course Code: UETMNT-201

Total Marks :100

Objectives of the Course

- To impart the knowledge of semiconductor diodes, their importance in the field of material science and their various types.
- To give the detail knowledge of Resistors, Capacitors and Inductors, their composition and usage.
- To provide the knowledge of various types of Transistors, their biasing techniques and usage as an important amplifying device.

Course Title: Analog Electronics

Total Credits:04

Total teaching hours: 60

Learning outcomes of the course

The following are the expected outcomes of the course:

- To allow students to perform the experimental analysis of Electronic Components such as Transistors, Diodes, MOSFETs, etc.
- Provide the deep knowledge of amplifiers, their types and applications.
- Read and understand the types of resistors, capacitors and inductors.

Scope of the course in terms of:

g) Enhancing the knowledge quotient of the students about the programme of which the course is a part:

- B.Sc. Electronics is the discipline of science, engineering and technology that deals with the electrical circuits that include dynamic electrical parts and components. This degree course is the study and investigation of the fundamentals of Analogue Electronics, Communications, Electromagnetic, Digital System Design, Optoelectronics and Mathematics. In other words, B.Sc. Electronics degree program is the comprehensive study which provides a wide foundation on the basics of electronics.
- B.Sc. Electronics degree candidates have ample of employment opportunities in Communication, Information Technology, Manufacturing, Banking, Finance, Marketing, Education, Entertainment, Defence, Quality Product Manufacturing, Automobiles etc and in different other fields. The degree program provides candidates with skills that are required to design electronic, electrical, computer, automation as well as communication systems.

h) Employment generation:

- After obtaining a BSc in electronics degree, one may start your own business for manufacturing electronic goods and components, seek employment in technical jobs at IT companies or banks or pursue higher education in the same or related fields.

Syllabus

Unit I

12 Hours

Resistors- fixed and variable resistors, construction and characteristics, color coding of resistors, resistors in series and parallel.

Inductors- fixed and variable inductors, self and mutual inductance, energy stored in inductors, inductors in series and parallel.



Capacitors- fixed and variable capacitors, principles of capacitance, parallel plate capacitor, permittivity, definition of dielectric constant, dielectric strength, energy stored in capacitor, capacitor in series and parallel.

Unit II

12 Hours

Diodes: PN Junction diode, static and dynamic resistances, equivalent circuits, transition and diffusion capacitances, diode load line analysis, diode equation and the I-V characteristics, rectifiers- Full wave, half wave and bridge type- determination of efficiency and ripple, Zener and Avalanche mechanisms, Zener diode and its applications, construction, working and characteristics of LED, Solar cell, Photo diodes, PIN diodes, Tunnel, varactor diode and schottky diode

Unit III

12 Hours

Bipolar junction Transistor (BJT): PNP and NPN transistors, basic transistor action, early effect, input and output characteristics of CB, CE and CC configurations, biasing techniques stabilization and bias compensation, Numerical Problems, Unijunction transistors (UJT): Construction, working and I-V characteristics of UJT, UJT as relaxation oscillator, Phototransistors

Unit IV

12 Hours

Field Effect Transistor (FET): construction of JFET, idea of channel formation, Pinch-off voltage, transfers and output characteristics

MOSFET: MOS diode, basic construction of MOSFET and working, I-V characteristics, enhancement and depletion modes, complimentary MOS (CMOS). Channel Length Modulation and Body effect in MOS transistors. Introduction to MOS amplifier configurations (Common- Source and Common- drain) and their working principles.

Unit V

12 Hours

CE amplifier: self bias arrangement of CE, dc and ac load line analysis, hybrid equivalent of CE, Quantitative study of the frequency response of the CE amplifier, effect on gain and the bandwidth for cascaded CE amplifier (RC coupled) RC coupling, direct coupling, Transformer coupling and their frequency comparison

Power Amplifiers: Heat sink for power transistors, classification of power amplifiers, Class A, B, C, AB amplifiers, class A large signal amplifier, transformer coupled amplifiers, efficiency of amplifiers, push pull amplifiers, analysis of class B push pull amplifier.

Oscillators: Condition for sustained oscillations, RC phase shift, Hartley, Colpitt's, Crystal and Wien Bridge Oscillators.

Books Recommended:

1. Basic electronics and linear circuits by N.N Bhargava.
2. Integrated electronics by Millman Halkias.
3. S.M. Sze, Physics and technology of semiconductor devices.
4. Robert Boylestad, Electronic devices and circuit theory.
5. S.K Gandhi, Study of Semiconductor Devices.
6. J.B. Gupta, Electronic Devices and Circuit Theory.
7. Microelectronic Circuits by Adel Sedra and Kenneth C. Smith.



Examination pattern shall be as under: -

1. 20 marks shall be earmarked for internal assessment (5 marks for attendance +15 for assessment test).
2. Scheme for award of marks for attendance shall be same as followed by the College
3. Internal assessment test shall be conducted after the completion of 40% of the syllabus in a particular course.

Pattern for setting internal assessment test paper: -

The paper shall comprise of three sections: -

- a) Short answer questions – Attempt two questions of 2 marks each out of three questions (Maximum of 30 words each)
- b) Medium answer question - Attempt two questions of 3 marks each out of 3 question (Maximum of 50 words each)
- c) Long answer question - Attempt one question out of two questions of 5 marks each (Maximum of 100 words)

Note: - Questions shall be set in such a way that the syllabi prescribed for the examination is fully represented

Duration of the paper: - 1hour

Attendance Evaluation

For all the courses- Theory and Practical

Percentage of Attendance	Marks
>90%	05
85%-90%	04
80%-85%	03
75%-80%	02
<75%	Ineligible

Pattern of External Examination:

Total marks: - 80

Time allowed: - 3 hours

The paper shall comprise of three sections.

- a) Short answer questions - 5 questions of 3 marks each (one question shall be asked from each unit). All questions are compulsory
- b) Medium answer questions – 5 questions of 7 marks each (one question shall be asked from each unit). All questions are compulsory
- c) Long answer questions: - 5 questions be set from five units, and the students shall be asked to attempt 2 questions only. Each question shall be of 15 marks.
(The word limit shall be same as is the usual practice in external examination of similar weightage.)



Semester-II

Course Title: Analog Electronics Lab
Total Credits:02
Course Type: Minor Practical Course

Course code: UETMNP-201
Total Marks: 50

Objectives of the course

- To train the students to bias semiconductor diodes, transistors & MOSFET in different modes.
- To practically allow the students to use the transistor in various configurations.
- To provide the practical knowledge of applications of semiconductor devices and giving the detail analysis on them.

Learning outcomes of the course

The following are the expected outcomes of the course:

- To allow students to perform the experimental analysis of Electronic Components such as Transistor, Diodes, MOSFETs, etc.
- Provide deep knowledge of amplifiers and their experimental analysis.

Practical Exercises:

1. To study the I-V characteristics of diode-conventional and Zener diode.
2. To study the I-V characteristics of BJT in CB configuration.
3. To study the I-V characteristics of BJT in CE configuration.
4. To study the I-V characteristics of BJT in CC configuration.
5. To study the I-V characteristics of common source FET/MOSFET configuration.
6. To study the I-V characteristics of common drain FET/MOSFET configuration.
7. To study the I-V characteristics of common gate FET/MOSFET configuration.
8. Study of fixed bias arrangement for transistor.
9. To study the Zener diode as voltage regulator.
10. To study I/O waveforms of half wave/ Full wave.
11. To study the ripple factor of half wave/ Full wave.
12. To study diode as shunt clipping element.
13. To study diode as clamping element.
14. To study UJT as relaxation oscillator.
15. To study Zener diode as clipper.

Examination Pattern

- a. Marks of external examination= 25
- b. Marks of internal evaluation= 25

a. Internal Practical Examination

All the three components of internal assessments are mandatory

Components of internal evaluation of Practical	Marks
Attendance	05
Test	08
Lab Involvement	12
Total	25



**B.Sc. (Electronics) Syllabus, G.C.W Parade College Jammu
NEP-2020 Pattern for Semesters-I and II w.e.f 2022-23**

The practical file related to the number of experiments performed must be duly signed by the teacher in charge and must be authenticated by the HOD Electronics. For appearing in the external practical examination, certified record should also be produced.

b. External Practical Examination

For all the practical papers, there will be an external evaluation. The external examiner will be appointed by the Principal of the college in consultation with the HOD in charge. There will be an internal examiner who will be appointed by the head of the department. The examination will be of three-hour duration and the various components for the evaluation of external examination are given below.

Components of external evaluation of Practical examination	Marks
Test	06
Practical Record File	06
Viva- voce	05
Experimentation/ Data collection	08
Total	25



Semester-I

Course Title: Basic Electronics
Course Code: UETMDT-101
Total Teaching Hours: 45

Course Type: Multidisciplinary
Total Credits:03
Total Marks: 75

Objective of Course

- This course imparts basic knowledge of electronic components and their properties.
- Familiarization of electronic signals and their measurements using multimeter.
- To understand the knowledge of number systems, logic gates, Boolean algebra in Digital electronics.

Learning outcomes of the course

The following are the expected outcomes of the course:

- To provide the deep knowledge of scientific and technological aspects of Digital Electronics.
- Read, understand and interpret Boolean expressions into Logic circuits.

Scope of the course in terms of:

a) Enhancing the knowledge quotient of the students about the programme of which the course is a part:

- B.Sc. Electronics is the discipline of science, engineering and technology that deals with the electrical circuits that include dynamic electrical parts and components. This degree course is the study and investigation of the fundamentals of Analogue Electronics, Communications, Electromagnetic, Digital System Design, Optoelectronics and Mathematics. In other words, B.Sc. Electronics degree program is the comprehensive study which provides a wide foundation on the basics of electronics. This degree program provides candidates with skills that are required to design electronic, electrical, computer, automation as well as communication systems such as:
 - Installing and maintaining electrical systems, equipment and devices
 - Testing equipment, instruments and systems
 - Quality assurance skills
 - Commercial experience, construction experience or industrial experience
 - Repairing wiring systems

b) Employment generation:

- After choosing skill & multidisciplinary in Electronics as one of the subjects in BA/B.Com/BCA, one may start your own business for manufacturing electronic goods and components, seek employment in technical jobs at IT companies or banks or pursue higher education in the same or related fields.

Syllabus

Unit I

12 Hours

Basic components: Electronics components, Types: Active and passive components (Resistors, Capacitors, Inductors), their applications. Color Coding of Resistors, Types of Resistors, Series and parallel combination of Resistors. Concept of Current and Voltage sources. Ohms Law. (Numerical Problems).

Unit II

11 Hours

Electrical signals: Alternating current (AC) and Direct current (DC), Sinusoidal signals, Triangular wave, square wave. Calculation of amplitude, frequency, time period, RMS value and Peak-to-peak voltage of AC signal. Properties of electrical signals. Measurement of electrical Signals using Multimeter. (Numerical Problems).



Unit III

11 Hours

Digital Electronics-I: Number System and Codes: Decimal, Binary, Octal, Hexadecimal number systems and their conversions. 1's and 2's complement of binary numbers. Binary arithmetic operations: Addition, Subtraction, Multiplication and Division. (Numerical Problems).

Unit IV

11 Hours

Digital Electronics-II: Boolean algebra: Basic postulates and fundamental theorems, Reduction of Boolean expressions. Logic Gates; OR, AND, NOT, NOR, NAND, XOR, XNOR, Universal gates, logic circuits and realization. (Numerical Problems).

Reference Books:

1. Basic Electronics by V. K. Mehta.
2. Basic Electronics by B. L. Theraja.
3. Digital Electronics by D.A. Godse, A.P. Godse.
4. Digital Electronics by R. P Jain.

Examination pattern shall be as under: -

Internal Assessment: 15 marks

1. 15 marks shall be earmarked for internal assessment (5 marks for attendance +10 for assessment test).
2. Scheme for award of marks for attendance shall be same as followed by the College.
3. Internal assessment test shall be conducted after the completion of 40% of the syllabus in a particular course. (10 marks)

Pattern for setting internal assessment test paper

The paper shall comprise of three sections: -

- a) Short answer questions – Attempt two questions of 1 mark each out of three questions (Maximum of 20 words each)
- b) Medium answer question - Attempt two questions of 2 marks each out of 3 questions (Maximum of 30 words each)
- c) Long answer question - Attempt one question out of two questions each of 4 marks (Maximum of 50 words)

Note: Questions should be set in such a way that the entire syllabus prescribed for the examination is represented.

Duration of the paper: - $\frac{3}{4}$ hour (45 Minutes)

Pattern of External Examination:

Total marks: - 60

Time allowed: - 2.5 hours

The paper shall comprise of 3 sections:

- a) Short answer questions - 4 questions of 3 marks each. The questions shall be set in such a way that the whole syllabus prescribed for a course is represented. All questions are compulsory.
- b) Medium answer questions – 4 questions of 6 marks each (one question shall be asked from each unit). All questions are compulsory
- c) Long answer questions: - 4 questions be set from four units, and the students shall be asked to attempt 2 questions only. Each question shall be of 12 marks.

Note:- Minimum of 4 Lab visits per semester for demonstration of Electronic components/Equipments.



Semester-II

Course Title: Basic Electronics
Course Code: UETMDT-201
Total Teaching Hours: 45

Course Type: Multidisciplinary
Total Credits:03
Total Marks: 75

Objective of Course

- This course imparts basic knowledge of electronic components and their properties.
- Familiarization of electronic signals and their measurements using multimeter.
- To understand the knowledge of number systems, logic gates, Boolean algebra in Digital electronics.

Learning outcomes of the course

The following are the expected outcomes of the course:

- To provide the deep knowledge of scientific and technological aspects of Digital Electronics.
- Read, understand and interpret Boolean expressions into Logic circuits.

Scope of the course in terms of:

c) Enhancing the knowledge quotient of the students about the programme of which the course is a part:

- B.Sc. Electronics is the discipline of science, engineering and technology that deals with the electrical circuits that include dynamic electrical parts and components. This degree course is the study and investigation of the fundamentals of Analogue Electronics, Communications, Electromagnetic, Digital System Design, Optoelectronics and Mathematics. In other words, B.Sc. Electronics degree program is the comprehensive study which provides a wide foundation on the basics of electronics. This degree program provides candidates with skills that are required to design electronic, electrical, computer, automation as well as communication systems such as:
 - Installing and maintaining electrical systems, equipment and devices
 - Testing equipment, instruments and systems
 - Quality assurance skills
 - Commercial experience, construction experience or industrial experience
 - Repairing wiring systems

d) Employment generation:

- After choosing skill & multidisciplinary in Electronics as one of the subjects in BA/B. Com/BCA, one may start your own business for manufacturing electronic goods and components, seek employment in technical jobs at IT companies or banks or pursue higher education in the same or related fields.

Syllabus

Unit I

12 Hours

Basic components: Electronics components, Types: Active and passive components (Resistors, Capacitors, Inductors), their applications. Color Coding of Resistors, Types of Resistors, Series and parallel combination of Resistors. Concept of Current and Voltage sources. Ohms Law. (Numerical Problems).

Unit II

11 Hours

Electrical signals: Alternating current (AC) and Direct current (DC), Sinusoidal signals, Triangular wave, square wave. Calculation of amplitude, frequency, time period, RMS value and Peak-to-peak voltage of AC signal. Properties of electrical signals. Measurement of electrical Signals using Multimeter. (Numerical Problems).



Unit III

11 Hours

Digital Electronics-I: Number System and Codes: Decimal, Binary, Octal, Hexadecimal number systems and their conversions. 1's and 2's compliment of binary numbers. Binary arithmetic operations: Addition, Subtraction, Multiplication and Division. (Numerical Problems).

Unit IV

11 Hours

Digital Electronics-II: Boolean algebra: Basic postulates and fundamental theorems, Reduction of Boolean expressions. Logic Gates; OR, AND, NOT, NOR, NAND, XOR, XNOR, Universal gates, logic circuits and realization. (Numerical Problems).

Reference Books:

1. Basic Electronics by V. K. Mehta.
2. Basic Electronics by B. L. Theraja.
3. Digital Electronics by D.A. Godse, A.P. Godse.
4. Digital Electronics by R. P Jain.

Examination pattern shall be as under: -

Internal Assessment: 15 marks

1. 15 marks shall be earmarked for internal assessment (5 marks for attendance +10 for assessment test).
2. Scheme for award of marks for attendance shall be same as followed by the College.
3. Internal assessment test shall be conducted after the completion of 40% of the syllabus in a particular course. (10 marks)

Pattern for setting internal assessment test paper:

The paper shall comprise of three sections: -

- a) Short answer questions – Attempt two questions of 1 mark each out of three questions (Maximum of 20 words each)
- b) Medium answer question - Attempt two questions of 2 marks each out of 3 questions (Maximum of 30 words each)
- c) Long answer question - Attempt one question out of two questions each of 4 marks (Maximum of 50 words)

Questions should be set in such a way that the entire syllabus prescribed for the examination is represented

Duration of the paper: - $\frac{3}{4}$ hour (45 Minutes)

Pattern of External Examination:

Total marks: - 60

Time allowed: - 2.5 hours

The paper shall comprise of 3 sections:

- a) Short answer questions - 4 questions of 3 marks each. The questions shall be set in such a way that the whole syllabus prescribed for a course is represented. All questions are compulsory.
- b) Medium answer questions – 4 questions of 6 marks each (one question shall be asked from each unit). All questions are compulsory
- c) Long answer questions: - 4 questions be set from four units, and the students shall be asked to attempt 2 questions only. Each question shall be of 12 marks.
- d) **Note:- Minimum of 4 Lab visits per semester for demonstration of Electronic components/Equipments.**



Semester-I

Course Title: Internet of Things – I
Course Code: UETSET-101
Total Teaching Hours: 30

Course Type: Skill Enhancement Course
Credits:02
Total Marks: 50

Objective of Course

- To describe the foundational concepts of electronics which is required to build smart IOT devices.
- The course starts with the introduction to internet of things (IOT) followed by basic electronic components, devices, and tools to design the smart electric circuits.

Learning outcomes of the course

The following are the expected outcomes of the course:

- To provide the deep knowledge of software and hardware interfacing concepts.
- To enable students to design small IOT based Kits for different applications.

Scope of the course in terms of:

e) Enhancing the knowledge quotient of the students about the programme of which the course is a part:

- B.Sc. Electronics is the discipline of science, engineering and technology that deals with the electrical circuits that include dynamic electrical parts and components. This degree course is the study and investigation of the fundamentals of Analogue Electronics, Communications, Electromagnetic, Digital System Design, Optoelectronics and Mathematics. In other words, B.Sc. Electronics degree program is the comprehensive study which provides a wide foundation on the basics of electronics. This degree program provides candidates with skills that are required to design electronic, electrical, computer, automation as well as communication systems such as:
 - Installing and maintaining electrical systems, equipment and devices
 - Testing equipment, instruments and systems
 - Quality assurance skills
 - Commercial experience, construction experience or industrial experience
 - Repairing wiring systems

f) Employment generation:

- After choosing skill & multidisciplinary in Electronics as one of the subjects in BA/B. Com/BCA, one may start your own business for manufacturing electronic goods and components, seek employment in technical jobs at IT companies or banks or pursue higher education in the same or related fields.

Syllabus

Unit-1

15 hours

- a) Introduction to IOT: definition, key features, architecture, advantages, disadvantages, and challenges. Applications to IOT in areas of homes automation, energy systems, agriculture, health, Industry, logistics and environment.
- b) Introduction to Electricity: Concept of electric charge, voltage, current. AC and DC voltage and current. Ohm's Law. Resistors, capacitors, and inductors: types and specifications. Serial and parallel circuits. Voltage divider and current divider. Transformer: uses and operation. Fuse: uses and rating. Relays: working and uses.



Unit-2

15 hours

- Electronic Devices** Diodes: specifications, operation, and characteristics. Zener diode: specifications and characteristics. Transistor: types, specifications and operation. Transistor as switch.
- DC Power Supplies** Rectifiers: construction and working of full wave and centre tap. Filters: concept and types. IC voltage regulation fixed and variable.
- Electronic Instruments and Tools:** Basic operation of voltmeter, ammeter, ohmmeter, multimeter, functional generators, and cathode ray oscilloscope. Screwdriver set. Tweezers, Nose Pliers, Wire cutter. Liquid solder pest, magnifying lamp. Brush, nipper. Bread board. Soldering iron station.

Reference Books:

- Internet of Things, Jeeva Jose. Khanna Publishing
- Introduction to IoT, S. Misra, A. Mukherjee, A. Roy, Cambridge University Press
- OP-Amps and Linear Integrated Circuit, R. A. Gayakwad, Prentice Hall
- Basic Electrical Engineering, V.K Mehta and Rohit Mehta, S Chand & Company
- A Textbook of Electrical Technology, B L Theraja and AK Theraja, S Chand & Company
- Practical Electronics: A Self-Teaching Guide, Ralph Morrison, Wiley
- Electrical and Electronic Measurement and Instrument, R.K. Rajput, S.Chand & Company Ltd

Examination pattern shall be as under: -

Internal Assessment: 10 marks

- Internal Assessment shall be based on Unit-I

Pattern for setting internal assessment test paper

The paper shall comprise of three sections: -

- Short answer questions – Attempt two questions of 1 mark each out of three questions (Maximum of 20 words each)
- Medium answer question - Attempt two questions of 2 marks each out of 3 questions (Maximum of 30 words each)
- Long answer question - Attempt one question out of two questions of 4 marks each (Maximum of 50 words)

Duration of the paper: - $\frac{3}{4}$ hour (45 Minutes)

Pattern of External Examination:

Total marks: - 40

Time allowed: - 2 hours

The paper shall comprise of 3 sections

- Short answer questions - 4 questions of 2 marks each. Two questions shall be set from each unit in such a way that the whole syllabus prescribed for a course is represented. All questions are compulsory.
- Medium answer questions – 4 questions of 5 marks each. Two questions shall be set from each unit in such a way that the whole syllabus prescribed for a course is represented. All questions are compulsory
- Long answer questions: -4 questions of 12 marks be set from two units, and the students shall be asked to attempt 1 question only. Each question shall be of 12 marks.



Semester-II

Course Title: Internet of Things – I
Course Code: UETSET-201
Total Teaching Hours: 30

Course Type: Skill Enhancement Course
Credits:02
Total Marks: 50

Objective of Course

- To describe the foundational concepts of electronics which is required to build smart IOT devices.
- The course starts with the introduction to internet of things (IOT) followed by basic electronic components, devices, and tools to design the smart electric circuits.

Learning outcomes of the course

The following are the expected outcomes of the course:

- To provide the deep knowledge of software and hardware interfacing concepts.
- To enable students to design small IOT based Kits for different applications.

Scope of the course in terms of:

g) Enhancing the knowledge quotient of the students about the programme of which the course is a part:

- B.Sc. Electronics is the discipline of science, engineering and technology that deals with the electrical circuits that include dynamic electrical parts and components. This degree course is the study and investigation of the fundamentals of Analogue Electronics, Communications, Electromagnetic, Digital System Design, Optoelectronics and Mathematics. In other words, B.Sc. Electronics degree program is the comprehensive study which provides a wide foundation on the basics of electronics. This degree program provides candidates with skills that are required to design electronic, electrical, computer, automation as well as communication systems such as:
 - Installing and maintaining electrical systems, equipment and devices
 - Testing equipment, instruments and systems
 - Quality assurance skills
 - Commercial experience, construction experience or industrial experience
 - Repairing wiring systems

h) Employment generation:

- After choosing skill & multidisciplinary in Electronics as one of the subjects in BA/B. Com/BCA, one may start your own business for manufacturing electronic goods and components, seek employment in technical jobs at IT companies or banks or pursue higher education in the same or related fields.

Syllabus

Unit-1

15 hours

- a) Introduction to IOT: definition, key features, architecture, advantages, disadvantages, and challenges. Applications to IOT in areas of homes automation, energy systems, agriculture, health, Industry, logistics and environment.
- b) Introduction to Electricity: Concept of electric charge, voltage, current.AC and DC voltage and current. Ohm's Law. Resistors, capacitors, and inductors: types and specifications. Serial and parallel circuits. Voltage divider and current divider. Transformer: uses and operation. Fuse: uses and rating. Relays: working and uses.



Unit-2

15 hours

- Electronic Devices** Diodes: specifications, operation, and characteristics. Zener diode: specifications and characteristics. Transistor: types, specifications and operation. Transistor as switch.
- DC Power Supplies** Rectifiers: construction and working of full wave and centre tap. Filters: concept and types. IC voltage regulation fixed and variable.
- Electronic Instruments and Tools:** Basic operation of voltmeter, ammeter, ohmmeter, multimeter, functional generators, and cathode ray oscilloscope. Screwdriver set. Tweezers, Nose Pliers, Wire cutter. Liquid solder pest, magnifying lamp. Brush, nipper. Bread board. Soldering iron station.

Reference Books:

- Internet of Things, Jeeva Jose. Khanna Publishing
- Introduction to IoT, S. Misra, A. Mukherjee, A. Roy, Cambridge University Press
- OP-Amps and Linear Integrated Circuit, R. A. Gayakwad, Prentice Hall
- Basic Electrical Engineering, V.K Mehta and Rohit Mehta, S Chand & Company
- A Textbook of Electrical Technology, B L Theraja and AK Theraja, S Chand & Company
- Practical Electronics: A Self-Teaching Guide, Ralph Morrison, Wiley
- Electrical and Electronic Measurement and Instrument, R.K. Rajput, S.Chand & Company Ltd

Examination pattern shall be as under: -

Internal Assessment: 10 marks

- Internal Assessment shall be based on Unit-I

Pattern for setting internal assessment test paper

The paper shall comprise of three sections: -

- Short answer questions – Attempt two questions of 1 mark each out of three questions (Maximum of 20 words each)
- Medium answer question - Attempt two questions of 2 marks each out of 3 questions (Maximum of 30 words each)
- Long answer question - Attempt one question out of two questions of 4 marks each (Maximum of 50 words)

Duration of the paper: - $\frac{3}{4}$ hour (45 Minutes)

Pattern of External Examination:

Total marks: - 40

Time allowed: - 2 hours

The paper shall comprise of 3 sections

- Short answer questions - 4 questions of 2 marks each. Two questions shall be set from each unit in such a way that the whole syllabus prescribed for a course is represented. All questions are compulsory.
- Medium answer questions – 4 questions of 5 marks each. Two questions shall be set from each unit in such a way that the whole syllabus prescribed for a course is represented. All questions are compulsory.
- Long answer questions: - 4 questions of 12 marks be set from two units, and the students shall be asked to attempt 1 questions only. Each question shall be of 12 marks.