

S-25 March, 2013 AC after Circulars from Circular No.153 & onwards

- 17 -

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY
CIRCULAR NO.ACAD/NP/B.Sc.-Ist Yr./SEM.-I & II/157/2013

It is hereby notified for information of all concerned that, on the recommendations of the Boards of Studies, Ad-hoc Boards, and Faculty of Science, the Academic Council at its meeting held on 25-03-2013 has accepted the **following revised syllabi** for **B.Sc. First Year progressively under the Faculty of Science :-**

Sr. No.	Revised Syllabus	
[1]	B.Sc. [Physics]	Semester- I & II,
[2]	B.Sc. [Dairy Science & Technology]	Semester- I & II,
[3]	B.Sc. [Industrial Chemistry]	Semester- I & II,
[4]	B.Sc. [Geology]	Semester- I & II,
[5]	B.Sc. [Chemistry]	Semester- I & II,
[6]	B.Sc. [Botany]	Semester- I & II,
[7]	B.Sc. [Electronics] Science	Semester- I & II,
[8]	B.Sc. [Fisheries]	Semester- I & II,
[9]	B.Sc. [Microbiology]	Semester- I & II,
[10]	B.A. [Statistics]	Semester- I & II,
[11]	B.Sc. [Statistics]	Semester- I & II,
[12]	B.Sc. [Zoology]	Semester- I & II,
[13]	B.Sc. [Textile and Interior Decoration]	Semester- I & II,
[14]	B.Sc. [Home Science]	Semester- I & II,
[15]	B.A. / B.Sc. [Mathematics]	Semester- I & II.

This is effective from the **Academic Year 2013-2014** and onwards.

These syllabi are available on the University Website **www.bamu.net**

All concerned are requested to note the contents of this circular and bring the notice to the students, teachers and staff for their information and necessary action.

University Campus,
Aurangabad-431 004.
REF.NO.ACAD/NP/B.SC.-IST YEAR/
Sem-I & II/2013/5132-541
A.C.S.A.I.No.327[9].

Date:- 08-05-2013.

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[Signature]
Director,
Board of College and
University Development.

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S-25 March, 2013 AC after Circulars from Circular No.153 & onwards

- 18 -

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Copy forwarded with compliments to :-

- 1] **The Principals, affiliated concerned Colleges,
Dr. Babasaheb Ambedkar Marathwada University.**
- 2] **The Director, University Network & Information Centre, UNIC, with
a request to upload the above all syllabi on University Website
[www.bamu.net].**

Copy to :-

- 1] The Controller of Examinations,
- 2] The Superintendent, [B.Sc. Unit],
- 3] The Superintendent, [B.A. Unit],
- 4] The Superintendent, [Eligibility Unit],
- 5] The Programmer [Computer Unit-1] Examinations,
- 6] The Programmer [Computer Unit-2] Examinations,
- 7] The Director, [E-Suvidha Kendra], in-front of Registrar's Quarter,
Dr. Babasaheb Ambedkar Marathwada University,
- 8] The Public Relation Officer,
- 9] The Record Keeper,
Dr. Babasaheb Ambedkar Marathwada University.

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S*/-080513/-

**DR. BABASAHEB AMBEDKAR
MARATHWADA UNIVERSITY,
AURANGABAD.**



Revised Syllabus of

B.SC. IST YEAR

PHYSICS

SEMESTER-I & II

[Effective from 2013-14 & onwards]

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
B. Sc. I Year Physics Syllabus
Semester I & II
(Revised syllabus Effective from June 2013)


Semester	Course Code	Paper	Title of Paper	Periods	Marks
I	Phy101	I	Mechanics, Properties of Matter and Sound	45	50
I	Phy102	II	Heat and Thermodynamics	45	50
I	Phy103	III	Practical	45	50
II	Phy104	IV	Geometrical and Physical Optics	45	50
II	Phy105	V	Electricity and Magnetism	45	50
II	Phy106	VI	Practical	45	50

Note: - Scheme of Practical Examination

Student should perform one experiment in semester-II from paper III+VI

Scheme of Practical Examination

Experiment- (75marks) + Oral (15marks) + Record book (10 marks) = 100 Marks


 30.1.2013
 Chairman
 BOS in physics

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
B. Sc. I Year Physics Syllabus
Semester I & II
(Revised syllabus Effective from June 2013)

Semester	Course Code	Paper	Title of Paper	Periods	Marks
I	Phy101	I	Mechanics, Properties of Matter and Sound	45	50
I	Phy102	II	Heat and Thermodynamics	45	50
I	Phy103	III	Practical	45	50
II	Phy104	IV	Geometrical and Physical Optics	45	50
II	Phy105	V	Electricity and Magnetism	45	50
II	Phy106	VI	Practical	45	50

Note: - Scheme of Practical Examination

Student should perform one experiment in semester-II from paper III+VI

Scheme of Practical Examination

Experiment- (75marks) + Oral (15marks) + Record book (10 marks) = 100 Marks

B. Sc. I Year Physics (Semester-I)
(Mechanics, Properties of Matter and Sound)
Course Code – Phy101
Paper – I

Periods – 45

Marks – 50

1. Mechanics: -

13 periods

Compound Pendulum- expression of time period, Interchangeability of centre of suspension and oscillation, Kater's Pendulum.

Newton's law of Gravitation (Statement only) , Gravitational Field , Gravitational Potential, Gravitational Potential of mass, Gravitational potential and field due to spherical shell and solid sphere (at a point, outside , inside and on the surface).

2. Elasticity: -

10 periods

Introduction , Moduli of Elasticity (Elastic constants) , Twisting couple on a cylinder, Bending of Beam – Bending moment, cantilever loaded at free end – (a) When weight of beam is ineffective, (b) When weight of beam is effective, Depression of Beam loaded at centre

3. Viscosity and Surface Tension: -

12 Periods

Viscosity - Introduction, energy of liquid in motion, Bernoulli's Theorem, practical applications: (i) Law of hydrostatic pressure (ii) Filter pump, Poiseuille's formula.

Surface Tension - Introduction, Difference of pressure across a curved surface, Determination of S.T. by Jaeger's method.

4. Ultrasonic and Acoustics: -

10 periods

Ultrasonic - Piezo – electric effect, Piezo – electric Generator, Magnetostriction effect, Magnetostriction oscillator, Applications of ultrasonic – Depth of sea, Chemical effects, Medical applications.

Acoustics - Reverberation, Acoustical demands of an auditorium, Sabine's Law – Derivation of Reverberation time, conditions of good acoustical designs of room.

References:-

- 1) Elements of Properties of Matter – D. S. Mathur
(S. Chand , 11 th edition , 1992)
- 2) Physics for Degree students – C. L. Arora and P.S.Heme
(S. Chand , 1 st edition 2010)
- 3) Mechanics and Electrodynamics – Brijlal ,N. Subrahmanyam , Jivan Seshan
(S.Chand , 7 th edition)
- 4) Text Book of sound – Khanna and Bedi
(Atma Ram and sons, 1989 edition)
- 5) Text Book of sound – N. Subrahmanyam and Brijlal
(Vikas Publishing House 2 nd Revised edition)

B. Sc. I Year Physics (Semester-I)
(Heat and Thermodynamics)
Course Code – Phy102
Paper – II

Periods – 45

Marks – 50

1) Thermal Conductivity: -

10 periods

Transference of heat, Coefficient of thermal conductivity, Rectilinear flow of heat along a metal bar, Methods of radial flow of heat-(i)spherical shell method and (ii)Flow of heat along the wall of a cylindrical tube, comparison of conductivities of different metals.

2) Real Gases and Transport Phenomena: -

12 periods

Real Gases – Introduction, Reason for modification of gas equation, Van der Waals equation of state , comparison with experimental curves, critical constants, constants of Van der Waals equation.

Transport phenomena–Introduction, Mean free path, sphere of influence, and expression for mean free path, variation of mean free path with temperature and pressure, transport phenomena, viscosity, Thermal conductivity (their interrelationship, dependence on temperature and pressure).

3) Thermodynamics: -

12 periods

Adiabatic process, Adiabatic equation of a perfect gas, Isothermal process, Indicator diagram, work done during isothermal process and adiabatic process, reversible and irreversible process, Second law of thermodynamics. (Kelvin and Clausius statement), Heat engines, Carnot's ideal heat engine, Carnot's cycle (work done and Efficiency).

4) Entropy and Thermodynamic relations: -

11 Periods

General notation of entropy, change of entropy is independent of path, change of entropy in reversible and irreversible process, Formulation of second law in terms of entropy, Maxwell's thermodynamical relations, Applications of Maxwell's relations –i) Clausius – Clapeyron equation , ii) T-ds equations.

Reference Books:-

- 1) Heat Thermodynamics and Statistical Physics - Brijlal, N.Subrahmanyam , P.S. Heme (S.Chand , 2007 Edition) .
- 2) Text Book of Heat and Thermodynamics–J. B. Rajam, C.L. Arora (S. Chand, 9th Edition)
- 3) Heat and Thermodynamics– S. S. Singhal, J. P. Agarwala, S.Prakash (Pragati Prakashan)
- 4) Thermodynamics & Statistical physics-S. L. Kakani

B. Sc. I Year Physics (Semester- II)
(Geometrical and Physical Optics)
Course Code – Phy104
Paper – IV

Periods – 45

Marks – 50

1) Geometrical Optics and Optical Instruments: - 12 periods

Cardinal points of optical system - Focal points, Principal points, Nodal points and corresponding planes, coaxial lens system - equivalent focal length and cardinal points.
Huygens's Eyepiece, Ramsden's eyepiece and their cardinal points,

2) Interference: - 10 periods

Interference in thin film due to reflected and transmitted light, wedge shaped thin film, Newton's rings by reflected light, determination of wavelength, Michelson's Interferometer, type of fringes, determination of wavelength and difference in wavelength.

3) Diffraction: 13 periods

Introduction, Diffraction at a thin wire , Fraunhofer diffraction at double slit (Interference and diffraction maxima, minima), Plane Transmission diffraction grating, Determination of wavelength (Normal incidence), Resolving power of optical instruments (Rayleigh's criterion), R. P. of prism and grating.

4) Polarization: - 10 periods

Introduction, Malus law, Double refraction, Huygens's theory of double refraction in uniaxial crystal, Nicol prism.
Optical activity, Fresnel's theory of optical rotation, specific Rotation, Laurentz's half – shade polarimeter, Determination of specific rotation of sugar solution.

Reference Books:-

- 1) Text Book of optics – N. Subrahmanyam & Brijlal (S. Chand, 1987 Edition)
- 2) Optics and Spectroscopy – R.Murugesan, K. Sivaprasath(S. Chand , 7 th Revised Edition)
- 3) A text book of optics- D. S. Mathur.
- 4) Optics- Ghatak. IInd edition.

B. Sc. I Year Physics (Semester- II)
(Electricity and Magnetism)
Course Code – Phy105
Paper – V

Periods – 45

Marks – 50

1) Vector Algebra : -

12Periods

Dot and cross product (Revision), scalar triple product and its geometrical interpretation, vector triple product, gradient of a scalar and its physical interpretation, Divergence and curl of vector function and their physical interpretation, line, surface and volume integrals, Gauss's divergence theorem and Stoke's theorem .

2) Electrostatics: -

13 Periods

Coulomb's Law , Electric field , field due to point charge, flux of electric field, Gauss's law (with proof) , Differential form of Gauss law , electric potential , potential due to a point charge, Potential and field due to electric dipole.

Dielectrics, polarization of dielectric, Gauss's law in dielectrics, Relation between **D**, **E** and **P**.

3) Magnetostatics: -

10 Periods

Magnetic field , Magnetic induction , magnetic flux , Biot-Savart law, Magnetic induction due to straight conductor carrying current , magnetic induction on the axis of solenoid ,Ampere's Law, Differential form Ampere's Law, Moving coil ballistic Galvanometer - expression for charge.

4) Transient Currents: -

10 periods

Growth and decay of current in a circuit containing L and R , charge and discharge of a capacitor through resistor, Growth and decay of charge in LCR circuit.

Reference Books: -

- 1) Mathematical Methods in physics – D.Biswas(New central book agency , 2009 edition)
- 2) Electricity and Magnetism – R.Murugesan(S. Chand, 2008 edition)
- 3) Electrodynamics – Gupta, Kumar, Singh (Pragati Prakashan, Meerut, 18th edition 2005)
- 4) Foundations of Electromagnetic Theory-Ritz, Milford, Chirstey IIIrd edition.

B. Sc. I Semester
Physics paper III (Phy103)
List of experiment

1. Determination of acceleration due to gravity by Kater's pendulum.
2. Y by bending of a beam loaded at center.
3. Determination of Y by Cantilever (Oscillation method)
4. η by Maxwell's needle.
5. M.I. by bifilar suspension.
6. Determination of Y and η of the material of a flat spiral spring.
7. S.I. by Jaeger's method.
8. Determination of coefficient of viscosity by Poisseuille's method.

Note: - At least six experiments should be performed.

B.Sc. II Semester
Physics Paper VI (Phy106)
List of experiment

1. γ by Searle's apparatus.
2. M.I. of fly wheel.
3. Thermal conductivity of bad conductor by Lee's disc method.
4. Study of CRO
(Measurement of frequency and voltage sensitivity AC/DC.)
5. Field along axis of circular coil.
6. I-H curve.
7. Calibration of spectrometer.
8. Dispersive power of prism.

Note: - At least six experiments should be performed.

Additional activities

a. Demonstration of experiment

1. Signal generator and CRO (sine, Square wave signal, measurement of ac voltage and frequencies).
2. Spectrometer (Reading and scale, observe the spectrum, measure refractive index for different colors).
3. Electromagnetic induction using two coil.
4. Determination of least count and range for at least four measurement instruments.

b. Mini Project /Seminars/ Hands on activities.

1. Students should carry out one mini project or seminar.
2. Study of any two laboratory equipments.

c. Study tour (industrial/research institute)

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S*/-110513/-

**Dr. Babasaheb Ambedkar Marathawada University
Aurangabad**



Syllabus
of
B.Sc. III Year
PHYSICS
Semester-V & VI

Effective from academic Year June 2011-12

**Dr. Babasaheb Ambedkar Marathwada University,
Aurangabad.**

**B.Sc. Physics (Optional) course structure in Semester
system.**

(Semester Vth and VIth)

B.Sc. Third Year

Semester	Course Code	Paper Number	Title of Paper	Marks
V	PHY – 501	XVII	Classical and Quantum Mechanics	50
	PHY – 502	XVIII	Solid State Physics and Semiconductor Devices	50
	PHY – 503	XIX	Practical Paper	50
	PHY – 504	XX	Practical Paper	50
VI	PHY – 601	XXI	Atomic and Molecular Spectra, Nuclear Physics	50
	PHY – 602	XXII	Solid State and Nano Physics, Electronics	50
	PHY – 603	XXIII	Practical Paper	50
	PHY – 604	XXIV	Practical Paper	50

B.Sc. Third Year (Vth Semester)

Course – PHY- 501- Paper XVII Marks: - 50

Classical and Quantum Mechanics----- (45 periods)

- 1. Basic concept of Classical Mechanics:** Mechanics of particle, Mechanics of System of Particles, constraints, Holonomic and Non Holonomic constraints, Virtual work, Alembert's Principle, Lagrange's equations, Simple Application of Lagrange's formulation- Linear Harmonic Oscillator, simple Pendulum.
- 2. Quantum Theory:** Origin of Quantum theory, Black body Radiations, Distribution of energy in the Spectrum of black body Radiation, Photoelectric effect, Laws of photoelectric emission, Ritz combination principle, Planck's radiation.
- 3. De Broglie's Wave and Uncertainty Principle:** Inadequacy of classical mechanics, two slit experiment, superposition Principle, Wave particle dualism for light and matter, De Broglie's Wave, De Broglie's model of the atom, wave Velocity and group velocity, Heisenberg uncertainty Principle.
Application of uncertainty Principle – (1) Energy and radius of Bohr First Orbit (2) Why electron cannot present in the nucleus.
- 4. Schrodinger Equation and its Application:** Concept of Wave function “ Ψ ”, Schrodinger Equations- Time dependent form, Expectation Value, Operators, Time Independent Schrodinger equation (Steady State form), Particle in one dimensional box, energy Quantization, Wave function.

Reference Books

- 1.** Classical Mechanics – Herbert Goldstein
- 2.** Classical Mechanics – J.C. Upadhayaya
- 3.** Classical Mechanics – Gupta – Kumar (Pragati publication)
- 4.** Perspective of Modern Physics – Bezier
- 5.** Quantum Mechanics – Robert Eisberg
- 6.** Modern Physics – J. B. Rajam
- 7.** Quantum Mechanics – B. S. Rajput
- 8.** Elements of Quantum Mechanics – Kamal Singh-S.P. Singh.
- 9.** Atomic and nuclear Physics – N. Subramayam- Brijlal (S. Chand Publication)

B.Sc. Third Year (Vth Semester)

Course – PHY- 502 - Paper XVIII Marks: - 50

**Solid State Physics and Semiconductor Devices
(45 periods)**

- 1. Crystal Structure:** Introduction, Crystal lattice and translation vectors, unit cell, Basis, Symmetry operations , point groups and space groups, types of lattices (Plane lattice and Space lattice with bcc and fcc), Lattice directions and planes, Miller indices, simple Crystal structure.
- 2. Bonding and Band Theory of Solids:** Introduction, Concept of inter-atomic forces, Cohesive energy and types of bonding, Primary bonds (ionic bonds, Covalent bond and metallic bond), secondary bonds(Vander walls bond and hydrogen bonds)
The Bloch theorem (only statement and properties), The Kroning Perry model, Energy versus Wave Vector relationship --- different representations (Brillouin Zones).
- 3. Semiconductor devices:** - Introduction, construction, working and characteristics of semiconductor diode, Zener diode, transistor (n-p-n and p-n-p transistor), Transistor characteristics (CB, CE, CC), JFET (Construction and its characteristics).
- 4. D.C.Circuits:** Introduction, Thevenin's theorem, Norton's theorem, Superposition theorem, Maximum power transfer theorem

Reference Books

- 1.** Solid State Physics --- S.O Pillai.
- 2.** Crystography Applied to solid sate Physics --- A.R. Verma,
O.N. Srivastava
- 3.** Solid State Physics ----- Gupta Kumar
- 4.** Fundamental of solid State Physics ---- Sexena, Gupta,
Sexena
- 5.** Solid state Physics ----- Deccar
- 6.** Solid State Physics ----- R.K. puri, V.K. Babbar
- 7.** Principle Electronics ---- V.K. Mehta
- 8.** A text Book of Electrical technology ----- B.L. Thereja and A
K Thereja

B.Sc. Third Year (Vth Semester)

Course – PHY- 503 - Paper XIX Marks: - 50

List of Experiments -----

1. γ by Koenig's method
2. Surface tension by ripple's method
3. Edser "A" Pattern
4. Determination of wavelength of sodium light using Biprism.
5. Measurement of velocity of sound in free air(Expt: 55, Advanced level Practical Physics by M. Nelkon and J.M. Ogbran, 4th edition, publication)
6. Energy band gap of semiconductor using thermister.
7. Determination of Rydberg constant using Microsoft excels.
8. Determination of I-H curve using Microsoft excels.

List of Experiments -----

1. . 'e' by Millikan's oil drop method
2. Voltage regulation using Zener diode (Line and load regulation).
3. Study of transistor characteristics in CE configuration.
4. Study of transistor characteristics in CB configuration
5. Study of Emitter follower.
6. To study bridge rectifier without using any filter (trace wave form using CRO)
7. Determination of e/m using Microsoft excels.
8. Study transistor characteristics in CE and CB configuration and determination of α and β using Microsoft excels

☀ **Note: At least six experiments should be performed for each paper.**

B.Sc. Third Year (VI th Semester)

Course – PHY- 601 - Paper XXI

Marks: - 50

Atomic and Molecular Spectra, Nuclear Physics (45 periods)

- 1. Atomic Physics:** spectra of hydrogen, deuteron, alkali atoms, spectral terms, doublet fine structure, screening constants of alkali spectra for s, p, d and f states, selection rules singlet, triplet fine structure in alkaline earth spectra, L-S and J-J coupling
- 2. Molecular physics:** Molecular spectra, experimental study, Rotational spectra, Intensities of rotational lines, vibrational spectra, Rotational and vibrational bands and their theoretical explanations
Raman effect, results of Raman effect, Practical important of Raman effect.
- 3. Nuclear forces and Models:** Introduction of nuclear forces, nuclear binding energy, theoretical and practical estimate of dependence of binding energy, saturation, short range type, Nuclear fission and fusion, magic number, shell models, Liquid drop model.
- 4. Particle Accelerators:** Particle accelerator, linear resonance accelerator, cyclotron, synchro cyclotron, Vande-graff generator,

Reference Books

- 1.** Introduction of Atomic spectra- White.
- 2.** Atomic Physics – Herzberg.
- 3.** Atomic and Nuclear Physics – N.Subramanayam and Brijlal
- 4.** Nuclear Physics – Rajkumar
- 5.** Elements of nuclear physics – M.L Pandya, R.P. Yadhave
- 6.** An Introduction to Nuclear Physics – M.R. Bhiday, Mrs V. A. Joshi
- 7.** Nuclear Physics – B.N Shrivastav
- 8.** Nuclear Physics – Kaplan

B.Sc. Third Year (VI th Semester)

Course – PHY- 602- Paper XXII Marks:-50

Solid State and Nano Physics, Electronics ----- (45 periods)

1. Thermal Properties of Solids: Classical theory of lattice heat capacity(Concept and Comparison with experimental values), Concept of Einstein's theory of lattice heat capacity, density of modes of vibrations(in 1-D, 2-D and 3-D), Debye's model of lattice heat capacity(derivation), limitation of Debye's model.

2. Nano Physics: Introduction, one dimensional nanoscale, two dimensional nanoscale, three dimensional nanoscale, Application of nanomaterial: - Composites, Coating and surfaces, Magnetic Materials.

3. Transistor -- Biasing : Introduction, Faithful amplification, Transistor biasing, stabilization, Essential of a transistor biasing circuit, stability factor, Method of transistor biasing, Base Resistor method, biasing with feedback resistor, Voltage divider biasing method.

4. Operational Amplifier (OP -Amp) : Definition of OP- Amp, Characteristics of Op- Amp , parameters- CMRR, Gain of inverting and non-inverting OP-Amp, Buffer, Adder, Subtractor, Integrator and Differentiator.

Reference Books

1. Solid State Physics --- S.O Pillai.
2. Crystography Applied to solid sate Physics --- A.R. Verma, O.N. Srivastava
3. Solid State Physics ----- Gupta Kumar
4. Fundamental of solid State Physics ---- Sexena, Gupta, Sexena
5. Solid state Physics ----- Deccar
6. Solid State Physics ----- R.K. puri, V.K. Babbar
7. Electronics Principles and Applicaton (Vth Edition) – John D Ryder
8. Electronics – K. J. M. Rao.
9. Principle of electronics ----- A.P. Malvino.
10. College Physics --- R.T. Sarode (Himalaya Publication)
11. Nanotechnology : Nanostructure and Nanomaterials ----- M. Balkrishanarao and K. Krishana Reddy

B.Sc. Third Year (VIth Semester)

Course – PHY- 603 - Paper XXIII Marks : - 50

List of Experiments -----

1. Hartsmann's Dispersion formula
2. Maxwell's Bridge (Measurement of inductance using impedance at different frequencies).
3. Determination of wavelength using diffraction grating (Normal incidence).
4. Constant of B.G by standard condenser Method.
5. Calibration of Bridge wire using Carry foster Bridge.
6. "h" by Photocell.
7. OP – Amp as Adder and Subtractor..
8. Study of absorption spectra of Iodine and determination of its wavelength using grating.

Course – PHY- 604 - Paper XXIV Marks: - 50

List of Experiments -----

1. Study of CE amplifier.
2. Study of wien bridge oscillator using transistor / OPAMP.
3. Study of Hartley Oscillator using transistor.
4. To study the characteristics of JFET (Determination of μ , g_m rd).
5. To verify the Thevenin's theorem.
6. To verify the superposition theorem
7. To plot the graph between current and frequency in series LCR circuit and to find the resonant frequency quality factor and band width (Practical Physics- by C.L. Arora)
8. To study JFET characteristics by using Microsoft Excel.

☼ Note: At least six experiments should be performed for each paper.

**Dr. Babasaheb Ambedkar Marathwada University,
Aurangabad.**

**B.Sc. Physics (Optional) course structure in Semester
system.**

B.Sc. Third Year (Semester Vth and VIth)

Question Paper Pattern

Time : 1.5 Hours

Marks : 30.

Q. 1. Attempt Any One 10

(a) Chapter 1

(b) Chapter 3

Q. 2. Attempt Any One 10

(a) Chapter 2

(b) Chapter 4

Q. 3. Attempt Any One 10

(a) I. Chapter 1

II. Chapter 3

(b) I. Chapter 2

II. Chapter 4

**Note : In Question No. 3, five marks should be devoted
to problem.**