

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

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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.

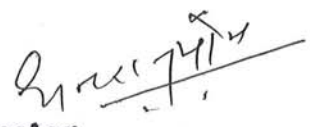
These syllabi are available on the University Website **www.bamu.net**

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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Director,
Board of College and
University Development.

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

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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.

==**==

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, 7th 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 it's geometrical interpretation, vector triple product, gradient of a scalar and it's 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.Murugeshan(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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[17]	B.Sc. Biotechnology (Opt.) (Progressively)	Semester-I to IV,
[18]	B.Sc. Sericulture Technology	Semester-I & II,
[19]	B.Sc. Networking Multimedia	Semester-III & IV,
[20]	B.Sc. Bioinformatics	Semester-I & II,
[21]	B.Sc. Hardware & Networking	Semester-I & II,
[22]	B.Sc. Animation	Semester-I & II,
[23]	B.Sc. Dairy Science & Technology	Semester-III & IV,
[24]	B.Sc. Biochemistry	Semester-III & IV,
[25]	B.Sc. Analytical Chemistry	Semester-III & IV,
[26]	B.Sc. Textile & Int. Decoration with minor changes	Semester-I & II,
[27]	B.Sc. Textile & Int. Decoration	Semester-III & IV,
[28]	B.Sc. Home Science with minor changes	Semester-I & II,
[29]	B.Sc. Home Science	Semester-III & IV,
[30]	B.Sc. Agro.Chem. & Fertilizers	Semester-III & IV,

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[31]	B.Sc. Geology	Semester-III & IV,
[32]	B.A. Statistics with minor changes	Semester-I & II,
[33]	B.A. Statistics	Semester-III & IV,
[34]	B.Sc. Statistics with minor changes	Semester-I & II,
[35]	B.Sc. Statistics	Semester-III & IV,
[36]	B.Sc. Industrial Chemistry	Semester-III & IV,
[37]	B.Sc. Horticultural	Semester-I & II,
[38]	B.Sc. Dry land Agriculture	Semester-I & II,
[39]	B.Sc. Microbiology	Semester-III & IV,
[40]	M.Sc. Computer Science	Semester-I to IV,
[41]	M.Sc. Information Technology	Semester-I to IV.

हा सुधारीत व नवीन तयार केलेल्या अभ्यासक्रमाचा आराखडा शैक्षणिक वर्ष २०१४-१५ करिता मर्यादित असेल व विद्यापरिषदेच्या अंतिम मान्यतेनंतर हे परिपत्रक नियमित ठेवण्याबाबत या कार्यालयाद्वारे नवीन परिपत्रक पारीत करण्यात येईल. तसेच सुधारीत व नवीन तयार केलेल्या अभ्यासक्रमाची प्रत विद्यापीठाच्या संकेतस्थळावर उपलब्ध आहे.

करिता, या परिपत्रकाची सर्व संबंधितांनी नोंद घ्यावी.

विद्यापीठ प्रांगण,
औरंगाबाद-४३१ ००४.
संदर्भ क्र.एस.यु./सा.शा./सबवि /२०१३-१४/
६५९९-७०२
दिनांक :- २७-०५-२०१४.

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संचालक,
महाविद्यालये व विद्यापीठ
विकास मंडळ.

या परिपत्रकाची एक प्रत :-

- १) मा. परिक्षा नियंत्रक, परिक्षा विभाग,
 - २) मा. प्राचार्य, सर्व संलग्नीत महाविद्यालये,
 - ३) संचालक, युनिक यांना विनंती करण्यात येते की, सदरील अभ्यासक्रम विद्यापीठाच्या संकेतस्थळावर उपलब्ध करुण देण्यात यावेत.
 - ४) संचालक, ई-सुविधा केंद्र, विद्यापीठ परिसर,
 - ५) जनसंपर्क अधिकारी, मुख्य प्रशासकीय इमारत,
 - ६) कक्ष अधिकारी, पात्रता विभाग, मुख्य प्रशासकीय इमारत,
 - ७) कक्ष अधिकारी, बी.ए. / बी.एस्सी. / बी.सी.एस./एम.एस्सी. विभाग, परीक्षा भवन,
 - ८) अभिलेख विभाग, मुख्य प्रशासकीय इमारती मागे,
- डॉ. बाबासाहेब आंबेडकर मराठवाडा विद्यापीठ, औरंगाबाद.

**Dr. Babasaheb Ambedkar Marathawada University
Aurangabad**



Revised Syllabus of Physics

Optional

B.Sc. II Year

Semester III & IV

Effective for Academic Year 2014-15

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.**B.Sc. IInd year Physics Syllabus****(Semester-III and IV)****Revised Syllabus from June 2014**

Semester	Course Code	Paper	Title of Paper	Periods	Marks
III	Physics 201	VII	Mathematical , Statistical Physics and Relativity	45	50
III	Physics 202	VIII	Modern and Nuclear Physics	45	50
III	Physics 203	IX	Practical	45	50
III	Physics 204	X	Practical	45	50
IV	Physics 205	XI	General Electronics	45	50
IV	Physics 206	XII	Solid State Physics	45	50
IV	Physics 207	XIII	Practical	45	50
IV	Physics 208	XIV	Practical	45	50

Scheme of Practical Examination and marks**Practical Examination will be conducted annually****Practical Paper IX + X based on theory Paper VII & VIII (50 + 50 = 100 Marks)****Practical Paper XIII + XIV based on theory paper XI & XII (50 + 50 = 100 Marks)****Experiment– 75 marks + Viva-Voce 15 marks + Record Book/ Journals 10 marks= 100 marks**

B.Sc. IInd year Physics (Semester-III)
(Mathematical, Statistical Physics and Relativity)
Course code PHY-201
Paper-VII

Period-45

Marks-50

1. Differentiation and ordinary differential equation:

Limit of function, partial differentiation, successive differentiation, total differentiation, exact differentiation, chain rule.

Ordinary differential equation, order and degree of differential equation, solution of first order differential equation, and solution of second order linear differential equation with constant coefficient

a) Homogeneous equations, b) Inhomogeneous equation, Special case of exponential right hand to find P.I.

2. Statistical basis and classical statistics:

Introduction, probability, principle of equal a priori probability, probability and frequency, some basis rules of probability theory, permutation and combination, macrostates and microstates, phase space, thermodynamic probability, division of compartments into cells, Maxwell-Boltzmann energy distribution law, evaluation of g_i , α and β , M.B. distribution function for ideal gas, M.B. Speed distribution law.

3. Quantum statics:

Need of quantum statistics, Bose-Einstein distribution law, Planck's radiation law, Fermi-Dirac distribution law, electron gas, Fermi level and Fermi energy, E_{FO} for electrons in a metal, comparison of three static, difference between classical and quantum statistics.

4. Theory of relativity:

Introduction, frame of reference, Galilean transformation equations, Michelson Morley experiment, special theory of relativity, Lorentz transformation equation, length contraction, time dilation, addition of velocities, variation of mass-energy equivalence.

Reference Books:

1. Mathematical Physics- Gupta, Kumar
2. Mathematical Physics- B.S. Rajput (PragatiPrakashan)
3. Heat, thermodynamics & statistical Physics- Brijlal, N. Subrahmanyam, P.S. Hemne. S. Chand Publication
4. Text book of heat and thermodynamics- J.B. Rajam& C. L. Arora.
5. Modern physics – R. Murgeshan, KiruthigaShivprasath, S. Chand Publication.

B.Sc. IInd year Physics (Semester-III)
(Modern and Nuclear Physics)
Course code PHY-202
Paper-VIII

Period-45

Marks-50

1. Photoelectric Effect :

Introduction, Lenard's method to determine e/m for photoelectrons, Richardson and Compton experiment, Relation between photoelectric current and retarding potential, Relation between velocity of photoelectrons and frequency of light, photoelectric cells- (1) Photo- emissive cell (2) Photo- voltaic cell (3) Photoconductive cell, Applications of photoelectric cells.

2. X-rays :

Introduction, The absorption of X-ray's, Laue's experiment, Bragg's Law, The Bragg's X-ray spectrometer, powder crystal method, The Laue method, X-ray spectra, Main features of continuous X-ray spectrum, Characteristics x-ray spectrum.

3. Nuclear forces and models :

Introduction, Binding energy, Nuclear stability, Nuclear forces , Meson theory of nuclear forces, liquid drop model, shell model, Energy released in Fission , Chain reaction, Atom bomb, Nuclear Reactors, Nuclear fusion, Source of stellar energy.

4. Particle Accelerators and Detectors :

Linear accelerator, Cyclotron, Synchrocyclotron, Betatron, Ionisation chamber, proportional counter, Geiger – Muller counter.

Reference Books:

1. Modern Physics-J. B. Rajan
2. Modern Physics- R. Murugesan, Er.Kirutyhiga, Sivaprasath. S. Chand Publication
3. Nuclear Physics- Kaplan
4. Nuclear Physics- B.N. Srivastava
5. Atomic and nuclear physics-N. Subramanyan and Brijlal.

B.Sc. IInd year (Semester-III)
Physics Practical
Course code PHY-203
Paper-IX

Marks-50

1. 'h' by Photo cell
2. e/m by Thomson's tube method.
3. Determination of absolute value of B_H and B_V using Earth Inductor
4. Stefan's constant by using thermo couple
5. Measurement of low resistance using potentiometer.
6. Frequency of A.C. mains using sonometer.
7. Specific rotation by Laurent's half shade polarimeter.
8. Cauchy's constant by spectrometer

Note: At least six experiments should be performed.

B.Sc. IInd year (Semester-III)
Physics Practical
Course code PHY-204
Paper-X

Marks-50

- 1 Thermal conductivity of rubber tube.
2. Study of temperature dependence of total radiation.
3. To draw the histogram of theoretical Gaussian curve.
4. Comparison of capacities by Desauty's method.
- 5 Velocity of sound using Helmholtz resonator.
- 6 Surface tension by Ferguson's method.
- 7 R. P. of Telescope/microscope.
8. Determination of Wavelength of light by Newton's ring

Note: At least six experiments should be performed.

B.Sc. IInd year Physics (Semester-IV)
(General Electronics)
Course code PHY-205
Paper-XI

Period-45

Marks-50

1. Semiconductor :

Introduction, Construction, Working and Characteristics of semiconductor diode, Zener diode, Zener diode characteristics, Transistor (PNP and NPN), Transistors characteristics (CE, CB and CC), Construction, Working and Characteristics of FET & MOSFET.

2. Transistor Biasing and Amplifiers :

Transistor biasing, Selection of operating point, bias stability, transistor biasing circuits - fixed bias or base bias, collector feedback bias, emitter feedback bias or self-bias.

Single stage transistor amplifier, frequency response of RC coupled amplifier, Noise in amplifiers, feedback in amplifiers, Op-Amp characteristics, inverting & non-inverting amplifier, Op-Amp as an adder and subtractor.

3. Oscillators and Multivibrators:

Two port network representation of a transistor, Hybrid parameters or h – parameters, Positive feedback, Basic principle of Oscillators, requirements of feedback, RC Oscillator (Phase shift Oscillator), LC Oscillator (Hartley Oscillator) Transistorised. Astable multivibrator, monostable multivibrator, bistable Multivibrator,

4. Modulation and demodulation :

Modulation, Amplitude modulation, Modulation index, frequency modulation, phase modulation, demodulation, advantages of frequency modulation over amplitude modulation.

Reference Books:

1. Basic principle of electronics- V. K. Mehta.
2. Basic Electronics & Linear circuits- N.N. Bhargawa.
3. An introduction to Electronics edition-II or III – A.P. Malvino.
4. Radio engineering- M.L. Gupta.
5. An introduction of Electronics – K. J. M. Rao.

B.Sc. IInd year Physics (Semester-IV)
(Solid State Physics)
Course code PHY-206
Paper-XII

Period-45

Marks-50

1. Crystal Structure :

Introduction, Crystal lattice- plane lattice, space lattice, translation vectors, Unit cell, (primitive, non primitive Wigner-Sietz primitive cell) Basis, symmetry operations, point groups and space groups, type of lattices (two dimensional and three dimensional lattices), lattice directions and planes, Miller indices, Inter planer spacing, simple crystal structure.

2. Bonding and Band theory of solids :

Introduction, concept of inters-atomic forces, cohesive energy and types of bonding, primary bonds- (ionic bonds, covalent bond and metallic bond), secondary bonds- (Vander Walls bonds and hydrogen bonds).

The Kroning-Penney model, Energy versus Wave vector relationship, different representations (Brillouin zone)

3. Thermal properties of solids :

Classical theory of lattice heat capacity (Concept and comparison with experimental values), Einstein's theory of lattice heat capacity, Debye's model of lattice heat capacity, density of modes, limitations of Debye's model.

4. Free electron theory of metals and Transport properties:

Drude-Lorentz's classical theory, electrical conductivity, thermal conductivity, Wiedemann Franz law, significance of Fermi energy level, Hall effect, Hall voltage and Hall coefficient, experimental determination of Hall coefficient, Importance of Hall effect.

Reference Books:

1. Physics for degree student – C. L. Arora & Dr. P. S. Hemne – S. Chand publication
2. Solid State Physics and Electronics – R. K. Puri & V.K. Babbar- S. Chand publication
3. Fundamentals of Solid State Physics- Saxena, Gupta, Saxena – Pragati prakashan, Meerat
4. Solid State Physics, Revised VIth Editions, S.O. Pallai.
5. Introduction to Solid State Physics, VIIth Edition, C. Kittel.

B.Sc. IInd year (Semester-IV)
Physics Practical
Course code PHY-207
Paper-XIII

Marks-50

1. Energy band gap of semiconductor using thermister.
2. I.V. Characteristics of solar cell.
3. Calibration of bridge wire using Carry-Foster's bridge.
4. Determination of absolute capacity of condenser using B.G.
5. Full wave rectifier with Π filter.
6. Viscosity of liquid using Searle's viscometer.
7. High resistance by leakage through condenser.
8. Viscosity of liquid by oscillating disc method

Note: At least six experiments should be performed.

B.Sc. IInd year (Semester-IV)
Physics Practical
Course code PHY-208
Paper-XIV

Marks-50

- 1 Transistor characteristics in CE configuration.
2. Transistor characteristics in CB configuration
3. Study of CE amplifier
4. Hartly Oscillator using transistor.
- 5 Wien Bridge Oscillator using transistor/ Op-Amp
- 6 Op-Amp as adder/subtractor
- 7 JFET characteristics. (r_p , g_m and μ)
8. Self-inductance by Owen's Bridge

Note: At least six experiments should be performed.

Additional activity

- 1. Organize study tour industrial/research institute**
- 2. Conduct Seminars**

QUESTION PAPER PATTERN

B.Sc. S.Y. (III & IV Semester)

PHYSICS

Time: 2.00 Hours

[Max. Marks: 50]

NOTE 1. All Questions carry equal marks

2. Use of logarithmic table and electronic pocket calculator is allowed.

Q1 Chapt.I (Long question) 10marks

OR

Chapt.II (Long question)

Q2 Chapt.III (Long question) 10 marks

OR

Chapt.IV (Long question)

Q3 Attempt following 10 marks

a) Chapt. I (short question)

b) Chapt. II (short question)

Or

a) Chapt. III (short question) 10 marks

b) Chapt. IV (short question)

Q4 Attempt any two 10 marks

a) Chapter I Problem

b) Chapter II Problem

c) Chapter III Problem

d) Chapter IV Problem

Q. 5 MCQ 10 marks

Ten MCQ's having four alternatives based on theory and numerical.

(Minimum two MCQ's from each chapter)

S-30th May, 2015 AC after Circulars from Circular No.1 & onwards

- 6 -

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY**CIRCULAR NO.ACAD/SU/Sci./B.Sc. & M.Sc. Syll./5/2015**

It is hereby notified for information to all the concerned that, on the recommendation of the Faculty of Science the Academic Council at its meeting held on 30-05-2015 has accepted the **revised semester-wise syllabi as mentioned against their names in the Faculty of Science as under :-**

Sr. No.	Name of the Subject	Semester
[1]	B.Sc. Computer Science Degree Course	III & IV
[2]	B.Sc. Information Technology Degree Course	III & IV
[3]	B.C.A. Science Degree Course	III & IV
[4]	B.Sc. Animation Degree Course	III & IV
[5]	B.Sc. Bioinformatics Degree Course	III & IV
[6]	B.Sc. Computer Science [Optional]	III & IV
[7]	B.Sc. Information Technology [Optional]	III & IV
[8]	B.Sc. Computer Applications [Optional]	III & IV
[9]	B.Sc. Computer Maintenance [Optional]	III & IV
[10]	B.Sc. Environmental Science [Optional]	V & VI
[11]	B.Sc. Bio-Chemistry [Optional]	V & VI
[12]	B.Sc. Forensic Science Degree Course	V & VI
[13]	B.Sc. Industrial Chemistry [Optional]	V & VI
[14]	B.Sc. Electronics [Optional]	V & VI
[15]	B.Sc. Zoology [Optional]	V & VI
[16]	B.Sc. Microbiology [Optional]	V & VI
[17]	B.Sc. Instrumentation Practice [Optional]	V & VI
[18]	B.Sc. Statistics [Optional]	V & VI
[19]	B.A. Statistics [Optional]	V & VI
[20]	B.A. / B.Sc. Mathematics [Optional]	V & VI
[21]	B.Sc. Home Science Degree Course	V & VI
[22]	B.Sc. Textile Interior Decoration Degree Course	V & VI
[23]	B.Sc. Fishery Science [Optional]	V & VI
[24]	B.Sc. Dairy Science & Technology [Optional]	V & VI
[25]	B.Sc. Botany [Optional]	V & VI
[26]	B.Sc. Physics [Optional]	V & VI
[27]	M.Sc. Computer Science	III & IV
[28]	M.Sc. I.T.	III & IV

This is effective from the Academic Year 2015-16 & onwards as appended herewith.

All concerned are requested to note the contents of the 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/SU/SCI./
2015/3761-4160
Date:- 16-06-2015.

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Director,
Board of College and
University Development.

..2..

S-30th May, 2015 AC after Circulars from Circular No.1 & onwards

- 7 -

:: 2 ::

Copy forwarded with compliments to:-

- 1] The Principals, affiliated concerned colleges,
Dr. Babasaheb Ambedkar Marathwada University

Copy to :-

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

***-

S*/-160615/-

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

PHYSICS SYLLABUS

B. Sc. III Year

Semester V & VI

Effective from academic year 2015-16

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.
B. Sc. IIIrd year Physics Syllabus
(Semester-V and VI)
Revised syllabus from June 2015

Semester	Course Code	Paper	Title of Paper	Periods	Marks
V	301	XV	Classical & Quantum Mechanics	45	50
V	302	XVI	Electrodynamics	45	50
V	303	XVII	Practical	45	50
V	304	XVIII	Practical	45	50
VI	305	XIX	Atomic, Molecular Physics & Laser	45	50
VI	306	XX	Non-conventional energy sources and Optical fiber	45	50
VI	307	XXI	Practical	45	50
VI	308	XXII	Practical	45	50

Scheme of practical examination and marks

Practical examination will be conducted annually

Practical : paper XVII+XVIII based on theory paper XV & XVI (50+50= 100 Marks)

Practical : paper XXI + XXII based on theory paper XIX & XX (50+50= 100 Marks)

Experiment : Paper XVII+XVIII – Experiment 75 marks + Viva-Voce 15 Marks + Record Book/Journals 10 Marks + = 100 Marks

Experiment : Paper XXI + XXII - Experiment 70 marks + Viva-Voce 10 Marks + Record Book/Journals 10 Marks + Submission of project report 10 Marks = 100 Marks

B.Sc. IIIrd year Physics (Semester-V)
Classical and Quantum Mechanics
Course code PHY-301
Paper-XV

Period-45**Marks-50****Chapter 1. Classical Mechanics****[11]**

Mechanics of Particle, Mechanics of system of particles Constraints, Classification of Constraints, Virtual Work, D'Alembert's principle, Lagrange's equation, Simple application of Lagrangian formulation –Simple Pendulum, Particle in space, Linear Harmonic Oscillator, Atwood's Machine .

Chapter 2. Origin of Quantum theory**[12]**

Introduction, Failure of Classical mechanics, Black body Radiation (Distribution of Energy), Plank's Quantum theory-Plank's Quantum postulates, linear momentum of photon in terms of wave vector, Plank's radiation law-Wein's law and Rayleigh's law, Einstein's equation: Quantum theory of photoelectric effect, Quantum effect.

Chapter 3. Wave Particle duality**[12]**

Introduction, de-Broglie's hypothesis for matter waves, de-Broglie's wavelength in terms of energy and temperature, de-Broglie phase velocity and particle velocity (relation between them), Group velocity, Relation between group velocity and phase velocity, Davisson-Germer Experiment, Heisenberg uncertainty principle, Applications of Heisenberg uncertainty principle (1) Nonexistence of electrons in nucleus (2) Binding energy of an electron in an atom.

Chapter 3. The Schrodinger Equation and its applications**[10]**

Wave Function (Ψ) of a moving particle, Time dependent Schrodinger's wave equation, Expectation value, Operators, Time independent Schrodinger equation (steady state form), particle in one dimensional box, Quantization of energy and momentum.

Reference Books

- 1) Classical Mechanics- H- Goldstein
- 2) Classical Mechanics – N.C. Rana and P.S. Joag
- 3) Classical Mechanics – Gupta, Kumar and Sharma
- 4) Introduction of Classical Mechanics – R.G. Takwale& P.S. Puranik.
- 5) Physics for degree student – C.L. Arora, P.S. Hemne (Ist edition S. Chand Publication).
- 6) Quantum Chemistry- Donald Allan Macquarie (Viva-Books Pvt. Ltd.).
- 7) Mathematics for Chemistry- Donald Allan Macquarie (Viva Books Pvt. Ltd.).
- 8) Concepts of Modern Physics - Arthur Beiser, ShobhitMahajan, S. RaiChoudhary (VIth Edition- Mc- Graw Hill).
- 9) Perspective of Modern Physics – Arthur Beiser.

B.Sc. IIIrd year Physics (Semester-V)**Electrodynamics****Course code PHY-302****Paper-XVI****Period-45****Marks-50****Chapter 1. Electrostatics****[12]**

Introduction : Electric field lines , electric flux and Gauss law, the divergence of E, Curl of E, Application of Gauss law: i) Electric field due to a uniform charged sphere ii) Electric field due to charged cylinder, Gaussian pillbox, Poisson's equation, Laplace's equation, Uniqueness theorem (First and Second)

Chapter 2. Time varying field**[10]**

Faraday's Law of Electromagnetic induction, Lenz's law, Self-Induction, Mutual Induction, equation of continuity, Maxwell's displacement current, Maxwell's equation (Derivation, Differential form)

Chapter 3. Electromagnetic waves III**[15]**

Origin of electromagnetic waves, characteristics of electromagnetic wave, electromagnetic wave equations in a conducting medium, transverse nature of electromagnetic wave, plane polarized electromagnetic wave, The Poynting Vector, Poynting theorem, Polarization of Electromagnetic waves

Chapter 4. Interaction of Electromagnetic waves with matter**[08]**

Boundary condition for the electromagnetic field vector $-\mathbf{B}, \mathbf{E}, \mathbf{D}$ and $\mathbf{H}$ at the interface between the two media, reflection and refraction at the boundary of two non conducting media.

Reference Books:

1. Introduction to Electrodynamics-David J. Griffiths, Third Edition.
2. Mechanics and Electrodynamics - Brijlal N. Subrahmanyam, JivanSeshan
3. Classical Electrodynamics – S.P. Pure
4. Electrodynamics- B.B. Laud
5. Electrodynamics-Gupta, Kumar and Singh, Pragati Prakashan, Meerut
6. Electromagnetic waves and fields –R.N.Singh

B.Sc. IIIrd year Physics (Semester-V)

Practical

Course code PHY-303

Paper-XXI

Period-45

Marks-50

List of experiments

1. Measurement of the focal length of a given convex lens using laser
2. Spectral response of photoconductor (LDR)
3. Diffraction of grating using laser beam
4. e by Millikan's oil drop method
5. Study of thermocouple (Fe-Cu) and to find inversion temperature
6. Refractive Index R.I. of Optical fiber
7. constant of B.G. by standard condenser method
8. study of absorption spectra of iodine and determination of its wavelength using grating

Note :- At least Six experiments should be performed.

B.Sc. IIIrd year Physics (Semester-V)

Practical

Course code PHY-304

Paper-XXII

Marks-50

List of experiments

1. Beam divergence of a diode laser
2. Determination of the diameter of a thin wire using laser
3. To study the interference of light using optical fibers
4. Determination of wavelength of He-Ne laser by transmission grating and reflection grating
5. λ by Koenig's method
6. Edser's A pattern
7. e/m by Thomson methods by Excel
8. Surface tension by Ripple's method

Note :- At least Six experiments should be performed.

B.Sc. IIIrd year Physics (Semester-VI)
Atomic, Molecular Physics and LASER
Course code PHY-305
Paper-XIX

Period-45**Marks-50**

- Chapter 1. The Atom model** [10]
Introduction, Thomson atom model, the Rutherford nuclear atom model, drawbacks of Rutherford atomic model, the Bohr's atom model, Bohr's theory of origin of spectral lines, diagrammatic representation of the series spectrum of the H-atom in the light of Bohr's theory.
- Chapter 2. Vector Atom Model** [15]
Introduction-vector atom model, Quantum numbers associated with the vector atom model, L-S coupling, j-j coupling, The Pauli's exclusion principle, Selection rules, Intensity Rules, Interval Rule, Normal Zeeman effect, Anomalous Zeeman effect, Stark effect and its experimental study.
- Chapter 3. Molecular spectra** [15]
Introduction, origin of pure rotational spectrum of a molecule, origin of vibration-rotation spectrum of a molecule, Rayleigh's law of scattering, Raman effect-Discovery, experimental study, Applications of Raman effect-molecular structure, Nature of liquids, Crystal Physics, Nuclear Physics, Chemical effects.
- Chapter 4. LASER** [10]
Introduction, induced absorption, spontaneous emission, stimulated emission, population inversion, properties of laser beam, laser pumping, Types of laser-Ruby laser, He-Ne laser, carbon dioxide (CO₂) laser, Applications of laser-Biological, medical and industrial.

Reference Books

1. Atomic Physics – J.B. Rajam, S. Chand & Company Ltd.
2. Physics for degree students – C.L. Arora, Dr. P.S. Hemne, S. Chand Publication
3. Modern Physics – R. Murugesan, Er. KiruthigaSivaprasath, S. Chand Publication
4. Introduction of Atomic Spectra-white.
5. Fundamentals of Molecular Spectroscopy- C.N. Banwell and E.M. McCash (McGraw Hill International Edition)

B.Sc. IIIrd year Physics (Semester-VI)
Non-conventional energy sources and Optical fiber
Course code PHY-306
Paper-XX

Period-45

Marks-50

Chapter1. Non-conventional energy sources (12)

Introduction, Biomass, wind energy, tidal energy/Ocean energy, geothermal energy, biogas hydro energy, wind energy, solar energy
 Biogas plant-fixed dome type

Wind energy: Introduction to wind energy, terms and definition: wind, wind farm, wind turbine, vertical axis wind turbine (VAWT), horizontal axis wind turbine (HAWT), propeller (wheel), wind mill, types of wind turbines generator units, monoblade HAWT, twin blade HAWT, merits and limitation of wind energy.

Chapter 2. Solar Photovoltaic Systems: (10)

Introduction to photovoltaic systems, Solar Cell fundamentals: i) Semiconductor, ii) P-N junction, iii) Generation of electron-hole pair by photon absorption, iv) $I-V$ characteristics of solar cell

Electrical storage: Lead acid battery, basic battery theory

Chapter 3. Introduction of optical fiber (10)

Introduction, importance of optical fiber, classification of optical fiber- stepped index fiber, stepped index monomode fiber, Disadvantages of monomode fiber, plastic fiber, latest developed types of optical fibers- HPSUV; HPSIR; Halide; Tapered.

Chapter4. Fiber cables and fabrication (13)

Fiber fabrication: Classification of fiber fabrication techniques; external chemical vapour deposition (external CVD), axial vapour deposition (AVD), internal chemical vapour deposition (internal CVD)

Fiber Cables: Construction, Strength members, cable tensile loading, minimum bend radius losses incurred during installation of cables or during subscriber service testing of cable, selection criteria, optical cable fiber laying in telephone.

References:

- 1) Optoelectronics; R. A. Barapate (Tech-Max Publication, Pune)
- 2) Principles of Solar Cells, LEDs and Diodes: The role of the PN junction; ADRIAN KITAI (2011 John Wiley & Sons, Ltd)
- 3) Light Sources: Technologies and Applications; Spiros Kitsinelis (CRC Press Taylo & Francis Group, FL 33487-2742) - 2011
- 4) Energy technology (non-conventional, renewable, and conventional) - S. Rao, Dr. B.B. Parulekar, Khanna Publishers.
- 5) Non-conventional energy resources- B.H. Khan, G.D. Rai, R.P. Khare, IInd edition, McGraw Hill Education (India) Private Limited, New Delhi.
- 6) Non-conventional Energy Sources- G.D. Rai, Khanna Publisher
- 7) Solar energy and Rural development- S.H. Pawar, C.D. Lokhande & R.N. Patil
- 8) Solar energy, Fundamentals and applications- Garg, Prakash Tata McGraw Hill
- 9) Fiber Optics and Optoelectronics – R.P. Khare, Oxford University Press.

B.Sc. IIIrd year Physics (Semester-VI)

Practical

Course code PHY-307

Paper-XVII

Marks-50

List of experiments

1. Thermal conductivity by Forb's method
2. Rydberg constant
3. B-H curve using magnetometer
4. Determination of Debye's temperature (e.g. Tin)
5. Determination of dielectric constant of liquid/solid
6. Resistance measurement of semiconductor by Vaders Pau's method
7. I-H Curve by Excel
8. Rydberg constant Excel

Note:- At least Six experiments should be performed.

B.Sc. IIIrd year Physics (Semester-VI)

Practical

Course code PHY-308

Paper-XVIII

Marks-50

List of experiments

1. Temperature coefficient of resistance of semiconductor
2. Measurement of thickness of thin film by gravimeter/optical/electrical method
3. Temperature of sodium flame
4. Hartmann's dispersion formula
5. Maxwell's bridge (measurement of inductance using impedance at different frequency)
6. λ by grating (normal incidence)
7. Transistorized Regulated power supply using Zener diode.
8. Bridge Rectifier

Note:- At least Six experiments should be performed.

Compulsory Activities

Organize a visit / study tour to Thermoelectric / Hydroelectric Power station, Wind mill, Solar farm and submit project report along with a photograph during the final practical examination.

OR

Organize study tour to industry / Research centre and submit a report at the time of final practical examination.

QUESTION PAPER PATTERN
B.Sc.F.Y.(I & II Semester)
PHYSICS

Time : 2.30 Hours

Max.Marks :50

Note:-1.All questions carry equal marks

2.Use of logarithmic table and electronic pocket calculator is allowed.

Q.1.Chapt. I (Long question)

10 Marks

OR

Chapt.II (Long question)

Q.2.Chapt.III (Long question)

10 Marks

OR

Chapt.IV (Long question)

Q.3. a)Chapt. I (Short question)
b)Chapt.II(Short question)

10 Marks

OR

a)Chapt.III (Short question)
b)Chapt.IV (Short question)

Q.4.Attempt any two

10 Marks

- a)Chapter I Problem
- b)Chapter II Problem
- c)Chapter III problem
- d)Chapter IV oproblem

Q.5. MCQ

10 Marks

Ten MCQ's having four alternatives based on theory and numerical (Minimum two MCQ's from each chapter)