

DEPARTMENT OF PHYSICS

COURSE CURRICULUM & MARKING SCHEME

M.Sc. PHYSICS

Semester - I

SESSION : 2022-23



ESTD: 1958

GOVT. V.Y.T. PG AUTONOMOUS COLLEGE, DURG, 491001 (C.G.)

(Former Name – Govt. Arts & Science College, Durg)

NAAC Accredited Grade A⁺, College with CPE - Phase III (UGC), STAR COLLEGE (DBT)

Phone : 0788-2212030

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**DEPARTMENT OF PHYSICS
GOVT. V.Y.T. PG. AUTONOMOUS COLLEGE DURG**

Programme Outcomes (POs)

At the end of M. Sc. (Physics) students will be able to:

- PO1: Knowledge:** Acquire an overview of concepts, fundamentals and advancements of science across a range of fields, with in-depth knowledge in at least one area of study. Develop focused field knowledge and amalgamate knowledge across different disciplines.
- PO2: Complementary skills:** Students will be able to engage in critical investigation through principal approaches or methods and through effective information search and evaluation strategies. Employ highly developed conceptual, analytical, quantitative and technical skills and are adept with a range of technologies
- PO3: Applied learning:** Students will be able to apply disciplinary or interdisciplinary learning across multiple contexts, integrating knowledge and practice. Recognize the need for information; effectively search for, evaluate, manage and apply that information in support of scientific investigation or scholarly debate
- PO4: Communication:** Communicate effectively on scientific achievements, basic concepts and recent developments with experts and with society at large. Able to comprehend and write reports, documents, make effective presentations by oral and/or written form.
- PO5: Problem-solving:** Investigate, design and apply appropriate methods to solve problems in science, mathematics, technology and/or engineering.
- PO6: Environment and sustainability:** Understand the impact of the solutions in ethical, societal and environmental contexts and demonstrate the knowledge of and need for sustainable development.
- PO7: Teamwork, collaborative and management skills:** Recognize the opportunities and contribute positively in collaborative scientific research. Engage in intellectual exchange of ideas with researchers of other disciplines to address important research issues

Programme Specific outcomes

At the end of M. Sc. (Physics) students will be able to:

- PSO1** Students are expected to acquire core knowledge in modern physics, including the major premises of classical mechanics, electromagnetic theory, and optical electronics.
- PSO2** Students are also expected to develop written and oral communication skills in optical fibre communicating physics-related topics.
- PSO3** Students would learn how to design and conduct an experiment (or series of experiments) demonstrating their understanding of the scientific method and processes.
- PSO4** Students are expected to understand the analytical methods required to interpret and analyze results and draw conclusions as supported by the experimental data or existing theories.

Name and Signatures

V.C. Nominee	Departmental members
Subject Expert <i>26/07/2022</i>	1. H.O.D Dr. Jagjeet Kaur Saluja <i>26/7</i>
Subject Expert.....	2. Dr. R. S. Singh <i>26/7/22</i>
Alumni (member).....	3. Dr. Anita Shukla <i>26/7/22</i>
Prof. from other Dept. of Sc. Faculty <i>26/7/22</i>	4 Mrs. Sitieshwari Chandrakar <i>26/7/22</i>
Specialist from Industry..... <i>26/7/22</i>	5. Dr. Abhishek Kumar Misra <i>26/7/22</i>
	6. Dr. Kusumanjali Deshmukh <i>26/7/22</i>

DEPARTMENT OF PHYSICS
GOVT. V.Y.T. PG. AUTONOMOUS COLLEGE DURG
Approved Syllabus for M.Sc. (PHYSICS) Semester I by the members of Board of
Studies
For the Session 2022-23

Semester I

The syllabus with the paper combinations is as under

Paper I MPH101: MATHEMATICAL PHYSICS	Paper II MPH102: CLASSICAL MECHANICS
Paper III MPH103: QUANTUM MECHANICS	Paper IV MPH104: ELECTRONIC DEVICES AND DIGITAL ELECTRONICS
Paper V MPHL01: Lab Course I General	Paper VI MPHL02: Lab Course II Microprocessor 8085

Name and Signatures

V.C. Nominee	Departmental members
Subject Expert	1. H.O.D Dr. Jagjeet Kaur Saluja
Subject Expert.....	2. Dr. R. S. Singh
Alumni (member).....	3. Dr. Anita Shukla
Prof. from other Dept. of Sc. Faculty	4 Mrs. Siteshwari Chandrakar
Specialist from Industry.....	5. Dr. Abhishek Kumar Misra
	6. Dr. Kusumanjali Deshmukh.....

**Marking Scheme for M.Sc. (PHYSICS) Semester I
Session 2022-23**

Paper No.	Title of the Paper	Marks Allotted in Theory		Marks Allotted in Internal Assessment		Credits
		Max.	Min.	Max.	Min.	
I	MPH101: Mathematical Physics	80	16	20	04	05
II	MPH102: Classical Mechanics	80	16	20	04	05
III	MPH103: Quantum Mechanics	80	16	20	04	05
IV	MPH104: Electronic Devices and Digital Electronics	80	16	20	04	05
V	MPHL01: Lab Course I General	100	34	.....	.....	04
VI	MPHL02: Lab Course II Microprocessor 8085	100	34	.....	.....	04
	Total	520	.....	80	.....	28

04 Theory papers	-	320
04 Internal Assessments	-	80
02 Practical	-	200
Total Marks	-	600

20 marks = 01 credits in Theory Papers and
25 marks = 01 credits in Practical

Name and Signatures

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Subject Expert.....	2. Dr. R. S. Singh
Alumni (member).....	3. Dr. Anita Shukla
Prof. from other Dept. of Sc. Faculty	4 Mrs. Siteshwari Chandrakar
Specialist from Industry.....	5. Dr. Abhishek Kumar Misra
	6. Dr. Kusumanjali Deshmukh.....

The Scheme of Internal Assessment
Session 2022-23
M.Sc. (PHYSICS) Semester I

Paper No.	Paper Name	Test Marks I	Test Marks II	Home Assignment/Seminar III	Total
I	MPH101: Mathematical Physics	20 Marks	20 Marks	20 Marks	Average of Best of Test and Home Assignment/Seminar(20 Marks)
II.	MPH102: Classical Mechanics	20 Marks	20 Marks	20 Marks	Average of Best of Test and Home Assignment/Seminar(20 Marks)
III.	MPH103: Quantum Mechanics	20 Marks	20 Marks	20 Marks	Average of Best of Test and Home Assignment/Seminar(20 Marks)
IV.	MPH104: Electronic Devices and Digital Electronics	20 Marks	20 Marks	Only one seminar (20 marks) Presentation (10 marks) Viva (10marks)	Average of Best of Test and Home Assignment/Seminar(20 Marks)

Note: Compulsory submits one hardcopy and softcopy of ppt after presentation.

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Subject Expert.....	2. Dr. R. S. Singh <i>26/7</i>
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Prof. from other Dept. of Sc. Faculty <i>26/7/22</i>	4 Mrs. Siteshwari Chandrakar <i>26/7/22</i>
Specialist from Industry..... <i>26/7/22</i>	5. Dr. Abhishek Kumar Misra <i>26/7/22</i>
	6. Dr. Kusumanjali Deshmukh..... <i>26/7/22</i>

Question Paper Format and Distribution of Marks for PG Semester Examination

Question paper format for the Post-Graduate Examination have the following main points

The question paper will be of **80 marks**

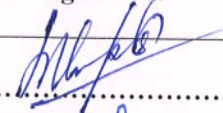
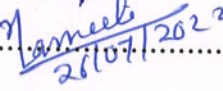
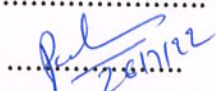
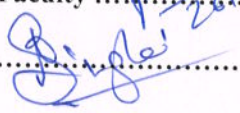





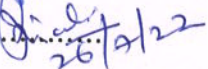
1. Questions will be asked Unit-wise in each question paper.
2. From each Unit, the questions will be asked as follows :
 - Q.1 Very short answer type question
(Answer in one or two sentences) (02 Marks)
 - Q.2 Very short answer type question
(Answer in one or two sentences) (02 Marks)
 - Q.3 Short answer type question (Answer in 200-250 words) (04 Marks)
 - Q.4 Long answer type questions (Answer in 400-450 words) (12 Marks)

Type of Question	Unit-I	Unit-II	Unit-III	Unit-IV
Very Short (2 Questions) (Maximum two sentences)	2 x 2 = 4 Marks	2 x 2 = 4 Marks	2 x 2 = 4 Marks	2 x 2 = 4 Marks
Short (1 Question) 200-250 words	1 x 4 = 4 Marks	1 x 4 = 4 Marks	1 x 4 = 4 Marks	1 x 4 = 4 Marks
Long answer (1 Question) 400-450 words	1 x 12 = 12 Marks	1 x 12 = 12 Marks	1 x 12 = 12 Marks	1 x 12 = 12 Marks

Note:

1. Question no. 1 and Question 2 will be compulsory.
2. Question no. 3 and 4 will consist of 2 optional questions of which one has to be attempted.
3. As mentioned above, two compulsory very short answer type questions (2+2 marks), one short answer type question with internal choice (4 marks) and one long answer type question with internal choice (12 marks) will be asked from each unit.
Thus, there will be questions of 20 marks from each unit and of total 80 marks from all the four units of the syllabus/syllabi.
4. Internal Assessment Examination will be as follows:
 - i. Two Internal Test in each paper (20 marks).
 - ii. Seminar (Power point presentation) in any one of the papers (20 marks).
 - iii. Assignment in each of the remaining papers (excluding the paper of Seminar) (20 marks).
 - iv. Average of marks obtained in best of internal test + seminar in any one paper and marks obtained in internal test + assignment in rest of the papers will be calculated and taken into consideration.

Name and Signatures

<p>V.C. Nominee </p> <p>Subject Expert  26/07/2022</p> <p>Subject Expert.....</p> <p>Alumni (member).....</p> <p>Prof. from other Dept. of Sc. Faculty  26/7/22</p> <p>Specialist from Industry..... </p>	<p>Departmental members</p> <p>1. H.O.D Dr. Jagjeet Kaur Saluja.....  26/7</p> <p>2. Dr. R. S. Singh </p> <p>3. Dr. Anita Shukla </p> <p>4 Mrs. Sitieshwari Chandrakar  26/7/22</p> <p>5. Dr. Abhishek Kumar Misra </p> <p>6. Dr. Kusumanjali Deshmukh.....  26/7/22</p>
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GOVT.V.Y.T. P G AUTONOMOUS COLLEGE, DURG (C.G.)

2022-23

M.Sc. (Physics) Semester - I

Paper - I

MPH101: MATHEMATICAL PHYSICS

COURSE OUTCOMES

After completion of the course, students would able to:

- CO1 Determine the continuity, differentiability of functions, find the complementary function of PI and LDE.
- CO2 Learn to derive solution by series expansion and Legendre, Bessel's, Hermite and Lagurre equation and physical applications of Legendre, Hermite and Lagurres polinomials.
- CO3 Analyze - Basic idea of Group, finite and infinite decimal Vector space and Subspace. Basic idea about matrix Compute eigen Values and eigen vectors, characteristic polynomials and apply to basic digonalization of matrix
- CO4 Distinguish the integral of infinite order into general and singular integrals. Solve and apply linear equation of order two and higher LDE using Laplace's Transformation. Perform Transforms like Laplace's Transformation, Fourier series, Fourier Transformations. Get familiar with the modelling assumption and derive the idea to PDE.

Name and Signatures

V.C. Nominee	Departmental members
Subject Expert <i>26/07/2022</i>	1. H.O.D Dr. Jagjeet Kaur Saluja <i>26/07</i>
Subject Expert.....	2. Dr. R. S. Singh <i>26/07</i>
Alumni (member).....	3. Dr. Anita Shukla <i>26/07/22</i>
Prof. from other Dept. of Sc. Faculty <i>26/07/2022</i>	4 Mrs. Sitieshwari Chandrakar <i>26/07/22</i>
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	6. Dr. Kusumanjali Deshmukh..... <i>26/07/22</i>

GOVT.V.Y.T. P G AUTONOMOUS COLLEGE, DURG (C.G.)

SYLLABUS FOR (2022-23)

M.Sc. (Physics) Semester - I

Paper - I

MPH101: MATHEMATICAL PHYSICS

Min. Marks: 16

Max. Marks: 80

- UNIT-I** Basic idea of Group, Finite and infinite group, Identity element, Groups of Vector, Ordered set of numbers, Linear dependence and independence of Vector, Properties of linearly independent and dependent System, subspace
Subspace of n- Vector s, Vector field, orthonormal vectors, orthonormalization by Scmidts orthogonalization method linear transformation of the space, Vector space of n-tuplets, Inner product space, linear transformation, homogeneous and non homogeneous transformation. full linear transformation of a quadratic form,
- UNIT-II** **MATRICES** – Real, symmetric and hermition matrices. matrices with polynomial elements the inverse matrix, orthogonal matrix, independent element of an orthogonal matrix, unitary matrix, independent element of a unitary matrix, Eigen Values and eigen vectors, Digonalization of matrix. Linear equation, Solution of linear equation by Cramer's rule.
- UNIT-III** **Special Functions-** Solution of second order linear differential equation with constant coefficients, Second orders linear ODEs with variable coefficient, Series intregation method of the solution of linear differential equation (Frobenius method), Solution by series expansion and Legendre, Bessel's, Hermite and Lagurre equation, Physical applications, Generating Functions, recurrence formulae, orthogonality, Rodrigueus formula of Legendre, Hermite and Laguerre polynomials.
- UNIT-IV** **Integral Transform** – Laplace's Transformation - Definition of Laplace's transform sectional or piecewise continuity, functions of exponential order, sufficient condition for existence of Laplaces transform, first and second shifting theorem, change of scale property, LT of derivatives and LT of integrals, Inverse LT definition and properties, Inverse LT by Partial fraction, Fourier series, Fourier Transform definition properties linearty theorem similarty theorem and Conjugate theorem, Fourier Transform of derivatives.

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Subject Expert	1. H.O.D Dr. Jagjeet Kaur Saluja
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Specialist from Industry.....	5. Dr. Abhishek Kumar Misra
	6. Dr. Kusumanjali Deshmukh.....

REFERENCES :

1. Laplaces Transfrom by Murray R.S.Spiegel
2. Special function by J.N.Sharma
3. Matrix & Tensors in Physics by R.K.Gupta , A.W.Joshi
4. A.Text book of Matrices by Shanti Narayana.
5. Mathematical method for engineering and physicist. By A.K.Mukhopadhyay.
6. Introduction to mathematical physics by Charlie Harper.
7. Advanced Engineering Mathematics by Jain and Iyenger.
8. Higher Engineering Mathematics by H.K. Das.

Name and Signatures

V.C. Nominee	Departmental members
Subject Expert <i>Samuel</i> 26/07/2022	1. H.O.D Dr. Jagjeet Kaur Saluja <i>J.K. Saluja</i> 26/7
Subject Expert.....	2. Dr. R. S. Singh <i>R.S. Singh</i>
Alumni (member).....	3. Dr. Anita Shukla <i>Anita Shukla</i>
Prof. from other Dept. of Sc. Faculty <i>Prof. P. S. Singh</i> 26/7/22	4 Mrs. Siteshwari Chandrakar <i>S. Chandrakar</i> 26/7/22
Specialist from Industry..... <i>B. Singh</i>	5. Dr. Abhishek Kumar Misra <i>A. Misra</i>
	6. Dr. Kusumanjali Deshmukh <i>K. Deshmukh</i> 26/7/22

GOVT.V.Y.T. P.G. AU TONOMOUS COLLEGE, DURG (C.G.)
2022-23

M.Sc. (Physics) Semester-I
Paper - II

MPH102: CLASSICAL MECHANICS

Course Outcomes

After completion of the course, students would able to:

- CO1 Know the effect of forces during static conditions and understand the true nature of Newtonian mechanics, Lagrangian and Hamiltonian approaches in classical mechanics.
- CO2 Apply Langragian Equation and solve Kinematics and Dynamics of rigid body in detail and ideas regarding Euler's equations of motion
- CO3 Reduce dynamics of many body problem to single body and apply it to solve Planetary Motions
- CO4 Understand Principle of least action and transformations from one set to another and implement it to theory of small oscillations in detail along with basis of Free vibrations

Name and Signatures

Name and Signatures	
V.C. Nominee	Departmental members
Subject Expert <i>[Signature]</i> 26/07/2022	1. H.O.D Dr. Jagjeet Kaur Saluja <i>[Signature]</i> 26/7
Subject Expert.....	2. Dr. R. S. Singh <i>[Signature]</i> 26/7
Alumni (member).....	3. Dr. Anita Shukla <i>[Signature]</i>
Prof. from other Dept. of Sc. Faculty <i>[Signature]</i> 26/7/22	4 Mrs. Siteshwari Chandrakar <i>[Signature]</i> 26/7/22
Specialist from Industry..... <i>[Signature]</i> Dinglei	5. Dr. Abhishek Kumar Misra <i>[Signature]</i>
	6. Dr. Kusumanjali Deshmukh..... <i>[Signature]</i> 26/7/22

GOVT.V.Y.T. P.G. AU TONOMOUS COLLEGE, DURG (C.G.)

SYLLABUS FOR (2022-23)

M.Sc. (Physics) Semester-I

Paper - II

MPH102: CLASSICAL MECHANICS

Min. Marks: 16

Max. Marks:80

- UNIT-I** Preliminaries, Newtonian mechanics of one and many particle system; conservation laws. Working theorem, Constraints, their classification principle of virtual work, The basic problem with constraint forces. D'Alemberts principle, degree of freedom, generalized coordinates.
- UNIT-II** Lagrange's equations, Jacobi integral Generalized moment and energy. Gauge function for Lagrangian integrals of motion, concept of symmetry, symmetries of space and time with conservation laws, invariance under Galilean transformation, Special theory of relativity- Lorentz transformations, relativistic kinematics and mass-energy equivalence.
- UNIT-III** Rotating frames, inertial forces, Electromagnetic analogy of the inertial forces terrestrial and astronomical applications of coriolis force. Central force. Two body problem, stability of orbit, conditions for closure, Kepler 's equation, orbits of artificial satellites.
- UNIT- IV** Principle of least action, Hamilton's Principle and characteristic function H-J (Hamilton Jacobi) equation canonical Transformation, Generating Function, Poisson bracket, Poisson theorem, Study of small oscillations using generalized coordinates.

REFERENCES:

1. Classical Mechanics by H.Goldstein
2. Classical Mechanics by N. C.Rana & P.S. Joag
3. Classical Mechanics by J. C. Upadhyaya
4. Classical Mechanics by Gupta Kumar
5. Classical Mechanics by Pouranic

Name and Signatures

Name and Signatures	
V.C. Nominee	Departmental members
Subject Expert <i>26/11/2022</i>	1. H.O.D Dr. Jagjeet Kaur Saluja <i>26/11/22</i>
Subject Expert.....	2. Dr. R. S. Singh <i>26/11/22</i>
Alumni (member).....	3. Dr. Anita Shukla <i>26/11/22</i>
Prof. from other Dept. of Sc. Faculty <i>26/11/22</i>	4 Mrs. Siteshwari Chandrakar <i>26/11/22</i>
Specialist from Industry..... <i>26/11/22</i>	5. Dr. Abhishek Kumar Misra <i>26/11/22</i>
	6. Dr. Kusumanjali Deshmukh. <i>26/11/22</i>

GOVT.V.Y.T. P.G. AUTONOMOUS COLLEGE, DURG (C.G.)

2022-23

M.Sc. (Physics) Semester-I

Paper - III

MPH103: QUANTUM MECHANICS

Course Outcomes

After completion of the course, students would able to:

- CO1 Get familiarize with basic non-relativistic quantum mechanics, old quantum theory, interpretation of wave function, uncertainty principle in quantum mechanics and commutation relations.
- CO2 Appreciate Dirac delta function, box normalization, Hilbert space, matrix mechanics, Schrodinger, Heisenberg and interaction pictures, particle in a box, tunneling through a potential barrier, linear harmonic oscillator.
- CO3 Develop the idea of symmetry in space and time, spherical harmonics, angular momentum, addition of angular momenta and Clebsch-Gordon coefficients.
- CO4 Understand the basic concepts of hydrogen atom in quantum mechanics, time independent perturbation theory and its applications to harmonic oscillator, Zeeman effect without spin and Stark effect.

Name and Signatures

V.C. Nominee	Departmental members
Subject Expert <i>[Signature]</i> 26/07/2022	1. H.O.D Dr. Jagjeet Kaur Saluja <i>[Signature]</i> 26/7
Subject Expert.....	2. Dr. R. S. Singh <i>[Signature]</i> 26/7
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Prof. from other Dept. of Sc. Faculty <i>[Signature]</i> 26/7/22	4 Mrs. Sitieshwari Chandrakar <i>[Signature]</i> 26/7/22
Specialist from Industry..... <i>[Signature]</i>	5. Dr. Abhishek Kumar Misra <i>[Signature]</i>
	6. Dr. Kusumanjali Deshmukh..... <i>[Signature]</i> 26/7/22

GOVT.V.Y.T. P.G. AUTONOMOUS COLLEGE, DURG (C.G.)
SYLLABUS FOR (2022-23)
M.Sc. (Physics) Semester-I
Paper - III
MPH103: QUANTUM MECHANICS

Min. Marks: 16

Max. Marks: 80

- UNIT-I Origin of Quantum Mechanics** : Born's statistical and Bohr-Heisenberg (Copenhagen) interpretations of wave function, Superposition of states and collapse of wave function, Schrodinger cat experiment, EPR paradox.
Mathematical Formalism : Linear vector space, Wave function as a vector in Hilbert space, Dirac's bra and ket notations, orthogonality and completeness conditions, Observables and operators, Properties of Hermitian operators, Expectation values, Unitary transformations, Position and momentum representation, Ehrenfest's theorem, Dirac delta function.
- UNIT-II Uncertainty principle** : Heisenberg uncertainty principle, its theoretical proof and applications.
Quantum Dynamics : Rectangular potential barrier and tunneling, Linear Harmonic oscillator solution using creation and annihilation operators, Schrodinger, Heisenberg & Interaction pictures.
- UNIT-III Angular momentum** : Definition of angular momentum, eigenvalues and Eigen functions of orbital and total angular momenta, Spherical harmonics, Angular momentum matrices, Spin and parity operators, symmetry and conservation principle, Pauli spin matrices, Addition of two angular momenta, Clebsch- Gordon coefficients for $j_1 = j_2 = 1/2$.
- UNIT-IV Hydrogen Atom** : Radial equation, asymptotic solution, eigen values and eigen functions, degeneracy; Laguerre polynomials.
Perturbation Theory : Time independent perturbation theory – non-degenerate and degenerate cases, removal of degeneracy, applications to (i) harmonic oscillator, (ii) first order Stark effect in hydrogen and (iii) Zeeman effect without electron spin.

Name and Signatures

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Subject Expert.....	2. Dr. R. S. Singh
Alumni (member).....	3. Dr. Anita Shukla
Prof. from other Dept. of Sc. Faculty	4 Mrs. Sitieshwari Chandrakar
Specialist from Industry.....	5. Dr. Abhishek Kumar Misra
	6. Dr. Kusumanjali Deshmukh

REFERENCES :

1. Introduction to Quantum Mechanics by David J. Griffiths
2. Quantum Mechanics by B. H. Bransden and C. J. Joachain
3. Quantum Mechanics by L. I. Schiff
4. Quantum Mechanics : Concepts & Applications by Nouredine Zettili
5. Quantum Mechanics : Non-relativistic Theory by L. D. Landau & E.M. Lifshitz
6. Quantum Mechanics by Mathews and Venkatesan.

Name and Signatures

V.C. Nominee	Departmental members
Subject Expert <i>Harneeta</i> <i>26/07/2022</i>	1. H.O.D Dr. Jagjeet Kaur Saluja <i>Jagjeet Kaur</i> <i>26/7</i>
Subject Expert.....	2. Dr. R. S. Singh <i>R.S. Singh</i> <i>26/7</i>
Alumni (member).....	3. Dr. Anita Shukla <i>Anita Shukla</i>
Prof. from other Dept. of Sc. Faculty <i>Pankaj</i> <i>26/7/22</i>	4 Mrs. Siteshwari Chandrakar <i>Siteshwari</i> <i>26/07/22</i>
Specialist from Industry..... <i>Singh</i>	5. Dr. Abhishek Kumar Misra <i>Abhishek</i>
	6. Dr. Kusumanjali Deshmukh..... <i>Kusumanjali</i> <i>26/7/22</i>

GOVT.V.Y.T. P.G. AUTONOMOUS COLLEGE, DURG (C.G.)

2022-23

M.Sc. (Physics) Semester-I

Paper - IV

MPH104: ELECTRONIC DEVICES AND DIGITAL ELECTRONICS

Course Outcomes

After completion of the course, students would able to:

- CO1 Understand transistor and diode characteristics and apply it to design electronic circuits and microwave devices of desired configurations.
- CO2 Identify and model various Photonic devices, their working principle and applications in numerous present day technologies.
- CO3 Implement laws of Boolean algebra for reduction for various logic circuits and create K-Map.
- CO4 Recognize microprocessor 8085 and its basic working along with familiarization of all type of memory devices.

Name and Signatures

V.C. Nominee	Departmental members
Subject Expert <i>Manoj</i> 26/07/2022	1. H.O.D Dr. Jagjeet Kaur Saluja <i>Jagjeet</i> 26/7
Subject Expert.....	2. Dr. R. S. Singh <i>R.S. Singh</i>
Alumni (member).....	3. Dr. Anita Shukla <i>Anita</i>
Prof. from other Dept. of Sc. Faculty <i>P. Singh</i> 26/7/22	4 Mrs. Sitieshwari Chandrakar <i>Sitieshwari</i> 26/7/22
Specialist from Industry..... <i>D. Singh</i>	5. Dr. Abhishek Kumar Misra <i>Abhishek</i>
	6. Dr. Kusumanjali Deshmukh <i>Kusumanjali</i>

GOVT.V.Y.T. P.G. AUTONOMOUS COLLEGE, DURG (C.G.)

SYLLABUS FOR 2022-23

M.Sc. (Physics) Semester-I

Paper - IV

MPH104: ELECTRONIC DEVICES AND DIGITAL ELECTRONICS

Min. Marks: 16

Max. Marks.:80

- UNIT-I** **Transistors:** - BJT, JFET, MOSFET and MESFET: Structure working, Derivation of the equation for I-V characteristics under different condition.
- Microwave Devices:** - Gunn diode (Transferred Electron Devices), Transit time devices—IMPATT diodes, TRAPATT Diode.
- UNIT-II** **Photonic Devices** - Radiative and non-radiative transition, optical Absorption bulk and thin flim, photo conductive device (LDR), Photo detectors, solar cell open circuit voltage and short circuit current LED (high frequency limit effect of surface and indirect recombination current, operation of LED) laser condition for population inversion in active region, light confinement factor, optical gain.
- UNIT-III** **Digital Electronic Devices:** Logic gates: OR, AND, NOT, NAND, NOR, Ex-OR, Ex-NOR GATES, Number system: binary numbers, binary to decimal conversion, decimal to binary conversion, binary addition, binary subtraction, 1's compliment, 2s compliments, binary multiplication and division, octal and hexadecimal numbers, BCD code and gray code. Boolean Algebra: De Morgen's theorem, laws and theorems of Boolean algebra, sum of product and product of sums simplification, Karnaugh map simplification.
- UNIT-IV** **Memory Devices:** RAM, ROM, PROM, EPROM, A/D and D/A converters, Static and dynamic random access memories (SRAM and DRAM), NMOS and CMOS, charge coupled devices (CCD) Microprocessor: introduction to a microprocessor. INTEL 8085 Architecture and pin diagram, CPU, Instruction set for 8085 microprocessor and programs.

V.C. Nominee	Departmental members
Subject Expert	1. H.O.D Dr. Jagjeet Kaur Saluja
Subject Expert.....	2. Dr. R. S. Singh
Alumni (member).....	3. Dr. Anita Shukla
Prof. from other Dept. of Sc. Faculty	4 Mrs. Siteshwari Chandrakar
Specialist from Industry.....	5. Dr. Abhishek Kumar Misra
	6. Dr. Kusumanjali Deshmukh.....

REFERENCES:

- 1 Handbook of Electronics by Kumar & Gupta.
- 2 Principles of Electronics by V.K. Mehta.
- 3 Fundamental; of Digital Circuit by A. Anand Kumar.
- 4 Digital Electronics by R.P. Jain.
- 5 Microprocessor by Vibhute.
- 6 8085 microprocessor by Ramesh Gaonkar.
- 7 Microwave devices and circuits by Samuel Y. liao.
- 8 Microwave & Radar Engineering by M. Kulkarni.

Name and Signatures

V.C. Nominee	Departmental members
Subject Expert <i>Ramesh Gaonkar</i> 26/07/2022	1. H.O.D Dr. Jagjeet Kaur Saluja <i>J. Kaur</i> 26/7
Subject Expert.....	2. Dr. R. S. Singh <i>R. S. Singh</i>
Alumni (member).....	3. Dr. Anita Shukla <i>Anita Shukla</i>
Prof. from other Dept. of Sc. Faculty <i>P. S. Patil</i> 26/7/22	4 Mrs. Sitieshwari Chandrakar <i>S. Chandrakar</i> 26/7/22
Specialist from Industry..... <i>S. J. Patil</i>	5. Dr. Abhishek Kumar Misra <i>A. K. Misra</i>
	6. Dr. Kusumanjali Deshmukh..... <i>K. Deshmukh</i> 26/7

GOVT.V.Y.T. P.G. AUTONOMOUS COLLEGE, DURG (C.G.)

2022-23

M.Sc. (Physics) Semester- I

Paper V

MPHL01: LAB-COURSE I - GENERAL

Course Outcomes

Students are expected to understand various theory and principles concerned with mechanics, semiconductor electronics and Optics and will be able to do the following in connection of the same.

- CO1 Design and resolve circuits for electronic applications.
- CO2 Record data as required by the experimental objectives.
- CO3 Analyse recorded data and formulate it to get desired results.
- CO4 Interpret results and check for attainment of proposed objective.

Name and Signatures

V.C. Nominee	Departmental members
Subject Expert <i>[Signature]</i> <i>26/07/2022</i>	1. H.O.D Dr. Jagjeet Kaur Saluja <i>[Signature]</i> <i>26/07/2022</i>
Subject Expert.....	2. Dr. R. S. Singh <i>[Signature]</i> <i>26/07/2022</i>
Alumni (member).....	3. Dr. Anita Shukla <i>[Signature]</i> <i>26/07/2022</i>
Prof. from other Dept. of Sc. Faculty <i>[Signature]</i> <i>26/07/2022</i>	4 Mrs. Siteshwari Chandrakar <i>[Signature]</i> <i>26/07/2022</i>
Specialist from Industry..... <i>[Signature]</i>	5. Dr. Abhishek Kumar Misra <i>[Signature]</i> <i>26/07/2022</i>
	6. Dr. Kusumanjali Deshmukh..... <i>[Signature]</i> <i>26/07/2022</i>

GOVT.V.Y.T. P.G. AUTONOMOUS COLLEGE, DURG (C.G.)
SYLLABUS FOR (2022-23)

M.Sc. (Physics) Semester- I

Paper V

MPHL01: LAB-COURSE I - GENERAL

Min. Marks: 34

Max. Marks: 100

Scheme of Marks:

Max. Marks: 100 marks

Expt : 60 marks

Sessional: 20 marks

Viva: 20 marks

List of Experiments

The following experiments or similar experiments of equal standard are to be performed

1. Study of temperature dependence of resistivity of a semiconductor by four probe method.
2. Determination of Lande's factor of DPPH using Electron Spin Resonance (ESR) Spectrometer.
3. Measurement of Hall Co-efficient to identify p or n type semiconductors.
4. Determination of Young's modulus "Y" by Newton's Rings.
5. Determination of Young's modulus "Y" by Carno's method.
6. Determination of "e/m" by Millican's oil drop method.
7. Calibration of drum of a Constant Deviation Spectrometer.
8. Verification of Fresnel's formula.
9. Study of characteristics of negative temperature coefficient Thermister.
10. Analysis of elliptically polarized light by Babinet's Compensator.
11. Determination of refractive index of a liquid Abbe's refractometer.
12. Determination of numerical aperture and bending loss of an Optical fiber.
13. Photoconductivity rise and decay studies and determination of photoconductivity gain.
14. Photo diode characteristics.
15. Photo Transistor characteristics.
16. Determination of Planck Constant with the help of a photo cell.
17. To determine the dielectric constant and permittivity of a solid by resonance method.

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GOVT.V.Y.T. P.G. AUTONOMOUS COLLEGE, DURG (C.G.)

2022-23

M.Sc. (Physics) Semester- I

Paper VI

MPHL02: LAB-COURSE I I – MICROPROCESSOR 8085

Course Outcomes

Students are expected to understand various working and application of microprocessor and will be able to:

- CO1 Write a program in assembly language for a given problem statement
- CO2 Implement of various mathematical operations through the program.
- CO3 Validate the outputs obtained from the program.
- CO4 Formulate mathematical operation for any Problem.

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GOVT.V.Y.T. P.G. AUTONOMOUS COLLEGE, DURG (C.G.)
SYLLABUS FOR (2022-23)
M.Sc. (Physics) Semester- I
Paper VI

MPHL02: LAB-COURSE II – MICROPROCESSOR 8085

Min. Marks: 33

Max. Marks: 100

Scheme of Marks:

Max. Marks: 100 marks
Expt : 60 marks
Sessional: 20 marks
Viva: 20 marks

List of Experiments

- 1 Write a program to add two 8-bit numbers.
- 2 Write a program to subtract two 8 bit numbers.
- 3 Write a program to multiply two 8 bit numbers.
- 4 Write a program to divide two 8 bit numbers.
- 5 Write a program to add ten data bytes.
- 6 Write a program to transfer a block of data in forward order.
- 7 Write a program to transfer a block of data in reverse order.
- 8 Write a program to arrange data in ascending order.
- 9 Write a program to arrange data in descending order.
- 10 Write a program to find positive numbers in an array.

References

1. Microprocessor Architecture, Programming and Application with the 8085- Ramesh Gaonkar
2. 8085 Microprocessor and its Application – Nagoor Kani

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