ABSTRACT ALGEBRA

1. Course Description

Programme : B.Sc
Course Code : U24/MAT/DSC/301
Course Type : DSC III
No. of credits : 4

Max. Hours : 60
Hours per week : 4
Max. Marks : 100

2. Course Objectives

- Exposing the students to learn some basic algebraic structures like groups and rings.
- Training the students to construct the proofs of theorems in a systematic way.

3. Course Outcomes

On completion of the course the student will be able to:

CO 1: Describe the concept of Group and its related topics. **(DESCRIBE)**

CO 2: Classify the properties of special classes of groups such as cyclic and Permutation groups and Explain the proofs of Lagrange's theorem, Cayley's theorem with applications. **(DISCUSS)**

CO 3: Demonstrate normal subgroups, quotient groups, group homomorphism and their Properties. **(DEMONSTRATE)**

CO 4: Develop the concept of Rings and Ideals **(DEVELOP)**

Dr. N. Kishan
Professor of Mathematics
Department of Mathematics
Osmania University
Hyderabad-500 007.

CBCS 2024 **ABSTRACT ALGEBRA**

4. Course Content

MODULE I **(15 Hrs)**

GROUPS

Definition and Examples of Groups - Elementary properties of Groups, Finite Groups, Subgroups
Terminology and notation-Subgroup Tests- Examples of subgroups
Cyclic Groups
Properties of Cyclic Groups -The classification of subgroups of cyclic groups.

Sections- Ch.2, 3, 4 Pg No's 42-58, 60-90.

MODULE II **(15 Hrs)**

PERMUTATION GROUPS AND ISOMORPHISM

Definition and notation, Cycle notation, Properties of Permutations.
Isomorphism - Definition and Examples - Cayley's theorem, Properties of Isomorphism, Automorphism.
Cosets and Lagrange's theorem - Properties of Cosets, Lagrange's Theorem and Consequences , An Application of Cosets to Permutation Groups.

Sections- Ch. 5, 6, 7 Pg No's 93- 116, 120-136, 138-153.

MODULE III **(15 Hrs)**

NORMAL SUBGROUPS AND FACTOR GROUPS

Normal Subgroups ,Factor Groups , Applications of Factor Groups.
Group Homomorphism- Definition and Examples, Properties of Homomorphism, the First Isomorphism theorem.

Sections- Ch 9, 10 Pg No's 174-182, 188-192, 194-210

Dr. N. Kishan
Professor of Mathematics
Department of Mathematics
Osmania University
Hyderabad-500 007.

MODULE IV:

RINGS, FIELD AND IDEALS **(15 HRS)**

Introduction to Rings- Motivation and Definition-Examples of rings, Properties of Rings-Subrings.
Integral Domains- Definition and Examples Fields, Characteristic of a Ring.
Ideals, Prime Ideal and Maximal Ideal

Sections- Ch 12, 13,14 Pg No's 227-235, 237-246, 249-259

5. References

1. Joseph A Gallian, Contemporary Abstract algebra (4th edition)
2. Bhattacharya, P.B Jain, S.K.; and Nagpaul, S.R,Basic Abstract Algebra
3. Fraleigh, J.B, A First Course in Abstract Algebra.
4. Herstein, I.N, Topics in Algebra
5. Robert B. Ash, Basic Abstract Algebra
6. I Martin Isaacs, Finite Group Theory
7. Joseph J Rotman, Advanced Modern Algebra
8. B. Sc Second Year Mathematics, Published by Telugu Akademi

Dr. N. Kishan
Professor of Mathematics
Department of Mathematics
Osmania University
Hyderabad-500 007.

6. Syllabus Focus

a) Relevance to Local , Regional , National and Global Development Needs

Local /Regional/National /Global Development Needs	Relevance
Global	Abstract algebra, particularly the study of groups, rings, and fields, is fundamental in modern cryptography, Computer science, number theory.

b)Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
Skill Development	Module 1	Analyze proofs of important theorems in group, cyclic groups in various areas, such as cryptography, number theory, and geometry.
Skill Development	Module 2	Understand the concept of disjoint cycles. Understand how cosets are used in proving theorems and solving problems in group theory.
Skill Development	Module 3	Explore applications of factor groups in various areas, such as algebra, geometry.
Skill Development	Module 4	Explore applications of rings, integral domains, and ideals in various areas of mathematics and beyond, such as algebraic geometry.

Dr. N. Kishan
Professor of Mathematics
Department of Mathematics
Osmania University
Hyderabad-500 007.

7. Pedagogy

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	Seminar/Workshops/ Presentation	Participative Learning
2.	Quiz	Experiential Learning
3.	Skill Test	Participative Learning

8. Course Assessment Plan

a)Weightage of Marks in Continuous Internal Assessments and End Semester Examination

CO	Continuous Internal Assessments CIA - 40%	End Semester Examination-60%
CO1	CIA-1	Written Exam
CO2	CIA-1	
CO3	CIA-2(Presentation/Seminars)	
CO4	CIA-2 (Skill Test)	

Dr. N. Kishan
Professor of Mathematics
Department of Mathematics
Osmania University
Hyderabad-500 007.

b) Model Question Paper- End Semester Exam

ABSTRACT ALGEBRA (DSC)

Course Code: U24/MAT/DSC/301 **Max. Time : 2 Hrs**

No. Of Credits: 4 **Max. Marks: 60**

SECTION –A

I. Answer the following. **4 x 10= 40 M**

1. a) Prove that in a group G, the identity element is unique.
   b) Show that in a group G the left and right cancellation laws hold.

OR

2. Show that every subgroup of a cyclic group is cyclic
3. Every permutation of a finite set can be written as a cycle or as a product of disjoint cycles

OR

4. State and prove Cayley's theorem.
5. State and prove Lagrange's theorem.

OR

6. a) Define group homomorphism.

   b) State and prove First isomorphism theorem.

7. a) Define ring.

   b) State and prove Subring Test.

OR

8. a) Show that a finite integral domain is a field
9. b) Find all maximal ideals in Z_{12} and Z_8

50

SECTION – B

II. Answer any FOUR **4 x 5 = 20 M**

9. Let G be a group, and let a be any element of G. Then prove that $\langle a \rangle$ is a subgroup of G.
10. If H and K are subgroups of G, then show that $H \cap K$ is a subgroup of G.
11. Define permutation and find the order of the following permutation $\begin{bmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 2 & 1 & 5 & 4 & 6 & 3 \end{bmatrix}$.
12. Prove that for every integer a and every prime p , $a^p \bmod p = a \bmod p$.
13. Let a, b belong to a ring R. Then show that :

    i) $a0 = 0a = 0$ ii) $a(-b) = -a(b) = -(ab)$

14. Show that the characteristic of an integral domain is 0 or prime.

Dr. N. Kishan
Professor of Mathematics
Department of Mathematics
Osmania University
Hyderabad-500 007.

ABSTRACT ALGEBRA

PRACTICAL

Programme	**: B.Sc.**	**Max. Hours**	**: 30**
Course Code	**: U24/MAT/DSC/301/P**	**Hours per week**	**: 02**
Course Type	**: DSC III**	**Max. Marks**	**: 50**
No. of credits	**: 1**		

Course Outcomes:

- Identify the algebraic structures, groups, cyclic groups, permutation groups, normal subgroups, rings, fields.
- Apply Cayley's theorem and Lagrange's theorem.

PRACTICAL SESSIONS

1. Groups
2. Subgroups
3. Cyclic Groups
4. Permutations Groups
5. Isomorphism and Cayley's Theorem.
6. Cosets and Lagrange's Theorem.
7. Normal Subgroups and Factor Groups.
8. Group Homomorphisms
9. Rings and Subrings.
10. Integral Domains and Fields.

Dr. N. Kishan
Professor of Mathematics
Department of Mathematics
Osmania University
Hyderabad-500 007.

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MODEL QUESTION PAPER

PRACTICAL

Course Code: U24/MAT/DSC/301/P **Max. Marks : 30**

No. Of Credits: 1 **Time: 2 Hrs**

I. Answer any SIX **6 x 5 = 30 M**

1. Prove that the set G = {0, 1, 2, 3, 4, 5} is an abelian group under addition modulo 6.
2. Show that the set $Ha = \{ x \in G / xa = ax\}$ is a subgroup of a G where a is a fixed element of G.
3. Determine the subgroups , generators and lattice diagram of Z_{12}.
4. Consider the three permutations in S_6

$$\sigma = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 3 & 1 & 4 & 5 & 6 & 2 \end{pmatrix}$$

$$\mu = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 5 & 2 & 4 & 3 & 1 & 6 \end{pmatrix}$$

$$\tau = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 2 & 4 & 1 & 3 & 6 & 5 \end{pmatrix}$$

Compute a) $\sigma^2\mu$ b) $\tau(\sigma^{-1})^2$

5. Let $G = \{ (1), (1\ 3\ 2), (4\ 5\ 6)(7\ 8), (1\ 3\ 2)(4\ 6\ 5), (1\ 2\ 3)(4\ 5\ 6), (1\ 2\ 3)(4\ 5\ 6)(7\ 8)\}$ then find the orbit and stabilizer of 1,2,4,7
6. Prove that the mapping $\emptyset : R^* \to R^*$ under multiplication defined by (i) $\emptyset(x) = |x|$ (ii) $\emptyset(x) = x$ are homomorphisms. Determine its kernel.
7. Prove that $S_1 = \{0,3\}, S_2 = \{0,2,4\}$ are subrings of $Z_6 = \{0,1,2,3,4,5\}$ with respect to addition and multiplication of residue classes modulo 6.
8. Solve $x^2 - 5x + 6 = 0$ and $x^3 - 2x^2 - 3x = 0$ in Z_{12}.

Dr. N. Kishan
Professor of Mathematics
Department of Mathematics
Osmania University
Hyderabad-500 007.

SEMESTER-III

SEC-I -EXPERIMENTAL METHODS AND ERROR ANALYSIS

1. Course Description

Programme: B.Sc. **Max. Hours : 30**
Course Code: U24/PHY/SEC/301 /P **Hours per week: 2**
Type of course: SEC **Max.Marks: 50**
No. of credits: 2

2.Course Objectives

- acquaint the students with a comprehensive understanding of experimental methods and error analysis techniques.

3. Course Outcomes

On completion of the course, the student will be able to:

CO1: Summarise techniques for error analysis and propagating errors through mathematical operation(L2).

CO 2: Analyze experimental data using statistical methods (L4).

4. Course Content

MODULE I **(15 Hrs)**

Experimental methods:

Least count of instruments, Instruments for measuring mass, length, time, angle, current, voltage. Fundamental units. Precision and accuracy of measurements, source of error in measurements, necessity of estimating errors, types of errors, reading error of instrument, calibration error, random error, systematic error, significant digits, order of magnitude and rounding of numbers, rounding error, absolute and relative errors, Errors of computation- addition, subtraction, multiplication, division, error in power and roots, propogation of errors , analysis of data, standard deviation, calculation of mean value.

MODULE II **(15 Hrs)**

Statistical Analysis of errors: Mean, Median and Mode and standard deviation, standard deviation of mean, Least square fitting, Normal distribution, covariance and correlation , Binomial distribution , Passion distribution, Chi square Test.

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Demonstrations and Experiments:

1. Determine the least count of various measuring instruments like vernier calipers, micrometers, and rulers.
2. 2.Measuring the mass, length, and time of different objects using appropriate instruments and analysing the precision and accuracy of the measurements.
3. Identifying and quantifying the sources of error in measurements, parallax error in reading scale or zero error in instruments.
4. Calculating the mean, median, and mode of a data set obtain from measurements or observations.
5. Determining the standard deviation of a set of measurements to quantify the spread of data points around the mean.
6. Fitting a straight line to experimental data using the method of least squares to analyse trends and relationship.
7. Conducting a Chi- Square test to assess the goodness of fit between observed and expected frequency in categorical data.

5. Reference Text Books

a. The theory of Errors in Physical Measurements-J C Pal -New Central Book Agency-2010.
b. Data reduction and error analysis for the physical sciences by DK Robinson and P R Bevington.

6. Syllabus Focus

a) Relevance to Local , Regional , National and Global Development Needs

Local /Regional/National /Global Development Needs	Relevance
Global	The curriculum aids to design experiments, conduct measurements, and analyse data considering uncertainties and errors which is essential for producing reliable and reproducible results in scientific research and industrial applications.

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University College of Science
Osmania University
Hyderabad- 500 007, TS

b) Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
Skill Development	Module1: Experimental Methods Module 2: Statistical Analysis of Errors	Error estimation exercise Least square fitting activity

7. Course Assessment Plan

a. Weightage of Marks in Continuous Internal Assessments and End Semester Examination

Formative Assessment - FA (40%)	Summative Assessment - SA (60%)
CIA- 20 Marks Assignment/Problem solving/mini projects	End Semester examination

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University College of Science
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Hyderabad- 500 007, TS

b. Question Paper Pattern

MODEL QUESTION PAPER

PRACTICAL

Course Code: U24/PHY/SEC/301/P Max Time: 1 Hr

Credits: 2 Max. Marks: 30

Answer any ONE of the following. 5 X6=30

1. Discuss the sources of error in measurements and why it is necessary to estimate errors.
2. Describe the different types of errors encountered in experimental measurements.
3. Calculate the absolute and relative errors for a set of measurements.
4. Explain the process of data analysis, including calculating the mean value and standard deviation.
5. Conduct a Chi- square test using a given data set and interpret the results.
6. Describe the process of fitting a straight line to experimental data using the method of least squares.
7. Discuss least square fitting and its application in modelling experimental data .
8. Describe different probability distributions, including the normal distribution, binomial distribution, and Poisson distribution.

HEAD
Department of Physics
University College of Science
Osmania University
Hyderabad- 500 007, TS

Prepared by Course Teacher [Name & Signature]	Checked &Verified by HoD / Programme Coordinator [Name & Signature]	Approved by the Principal
Devy. K	N.S. Kantikar A. Lakshman	

HEAD
Department of Physics
University College of Science
Osmania University
Hyderabad- 500 007, TS

SEMESTER - III

GRAPH THEORY

1. Course Description

Programme : B. Sc **Max. Hours : 30**

Course Code : U24/MAT/SEC/301 **Hours per week: 2**

Type of course : SEC I **Max. Marks : 50**

No. of Credits : 2

2. Course Objectives:

- To thoroughly describe the use of graph theory in resolving minimal spanning tree and shortest path problems..

3. Course Outcome:

CO 1: Explain the basic concepts of graph theory. **(EXPLAIN)**

CO 2: Apply the concept of tree graph to evaluate spanning and minimal spanning trees. **(APPLY)**

Dr. N. Kishan
Professor of Mathematics
Department of Mathematics
Osmania University
Hyderabad-500 007.

4. **Course Content:**

MODULE I: **(15 HRS)**

GRAPHS

Introduction, Basic Terminology, Multigraphs and weighted Graphs, Paths and Circuits, Shortest Paths in weighted graphs, Eulerian Paths and Circuits, Hamiltonian Paths and Circuits

Sections: Ch 5: 5.1 - 5.7, Pg. No's 37 - 159, 174 - 186

MODULE II: **(15 HRS)**

PLANAR GRAPHS, TREES AND CUT SETS

Planar Graphs, Tress, Rooted Trees, Spanning Trees and Cut-Sets, Minimum Spanning Trees.

Sections : Ch 5 – 5.10, Pg. No's 168 - 173, 174 - 186.
Ch-6 - 6.1, 6.2, 6.6, 6.7, Pg. No's 187 - 194, 205 – 213, 220 - 229.

5. **Reference Books:**

1. C.L. Liu, Elements of Discrete Mathematics, published by Tata McGraw- Hill, 2nd edition, 2000.
2. Kenneth H. Rosen, Discrete Mathematics and its Applications, Tata McGraw Hill 4th Edition 2001.

Dr. N. Kishan
Professor of Mathematics
Department of Mathematics
Osmania University
Hyderabad-500 007.

6. Syllabus Focus

a) Relevance to Local, Regional , National and Global Development Needs

Local /Regional/National /Global Development Needs	Relevance
Global	Graph theory has numerous global applications across various domains like communication networks, biology and medicine, chemistry and computer science and the versatility of graph theory makes it a fundamental tool in solving complex problems across diverse fields.

7. Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
Skill Development	Module 1: Graphs Module 2: Planar Graphs, Trees and Cut Sets:	Using Geogebra software

Dr. N. Kishan
Professor of Mathematics
Department of Mathematics
Osmania University
Hyderabad-500 007.

8. Course Assessment Plan

a) Weightage of Marks in Formative and Summative Assessments

Formative Assessments – FA (50%)	Summative Assessments – SA (50%)
CIA- 20 Marks	End Semester Exam

b) Question Paper Pattern

GRAPH THEORY

THEORY

Course Code : U24/MAT/SEC/301 **Max. Marks : 30M**

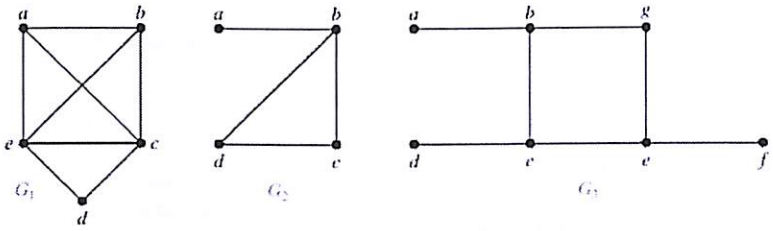
No. Of Credits: 2 **Max. Time : 1 Hour**

SECTION –A

I. Answer any FIVE of the following. **5 x 6 = 30M**

1) (a) Let G = (V , E) be an undirected graph with m edges. Then $2m = \sum_{v \in V} deg(v)$.
   (b) Define complete bipartite graph. Draw $K_{3,2}$.
2) Define Hamilton path and circuit. Determine Hamilton circuit for the following graphsG_1, G_2 *and* G_3 .

Dr. N. Kishan
Professor of Mathematics
Department of Mathematics
Osmania University
Hyderabad-500 007.



3) Find the length of the shortest path between the vertices a and z using Dijkstra's Algorithm.

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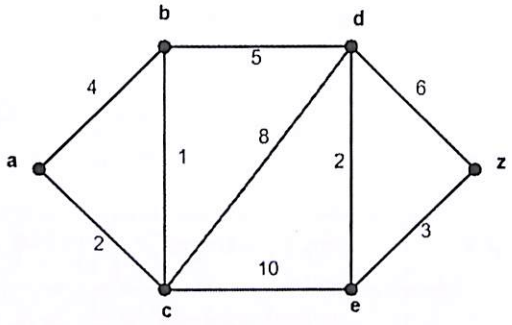
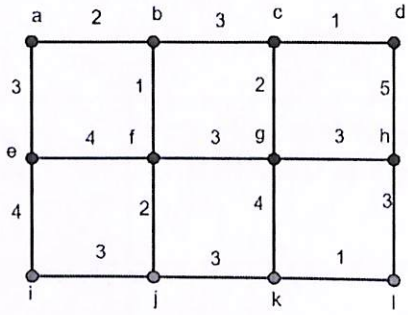
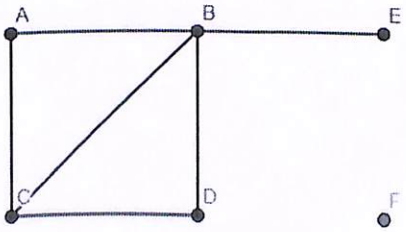


4) State and prove Euler's Formula.
5) Show that a tree with 'n' vertices has' n-1' edges.
6) Find the minimal spanning from the graph.



7) Find the number of vertices , the number of edges and the degree of each vertex in the given undirected graph .



Dr. N. Kishan
Professor of Mathematics
Department of Mathematics
Osmania University
Hyderabad-500 007.

OPTICS

1. Course Description

Programme: B.Sc. **Max. Hours: 60**
Course Code: U24/PHY/DSC/301 **Hours per week: 4**
Type of course: DSC 3 **Max. Marks: 60**
No. of credits: 4

2. Course Objectives

- Acquire knowledge on the principles and phenomena of optics.
- To Equip the students to employ optical principles in research, industrial and technological contexts within the domain of optics.

3. Course Outcomes

On completion of the course, the student will be able to:

CO1: Apply the principles of wave motion and superposition to explain the phenomena of Interference, diffraction and polarisation (L3).

CO2: Discuss the concept of diffraction and differentiate between Fresnel & Fraunhofer Diffraction (L2).

CO3: Demonstrate the methods of polarization by reflection, refraction and scattering (L3).

CO4: Analyse the principles of laser operation, Holography , Optical Fibers and their applications(L4).

4. Course Content

MODULE-I **(15 Hrs)**

Interference:

Principle of superposition – coherence – temporal coherence and spatial coherence – conditions for Interference of light.

Interference by division of wave front: Fresnel's Biprism – determination of wave length of light. Determination of thickness of a transparent material using Biprism – change of phase on reflection – Lloyd's mirror experiment.

Interference by division of amplitude: Oblique incidence of a plane wave on a thin film due to reflected and transmitted light (Cosine law) – Colours of thin films – Non reflecting films – interference by a plane parallel film illuminated by a point source –Interference by a film with two non-parallel reflecting surfaces (Wedge shaped film) – Determination of diameter of wire-Newton's rings in reflected light with and without contact between lens and glass plate, Newton's rings in transmitted light (Haidinger Fringes) – Determination of wave

length of monochromatic light–Michelson Interferometer– types of fringes –Determination of wavelength of monochromatic light, Difference in wavelength of sodium D1,D2 lines and thickness of a thin transparent plate.

MODULE-II **(15 Hrs)**

Diffraction:

Introduction – Distinction between Fresnel and Fraunhofer diffraction Fraunhofer Diffraction: Diffraction due to single slit and circular aperture – Limit of resolution – Fraunhofer diffraction due to double slit – Fraunhofer diffraction pattern with N slits (diffraction grating)- Determination of wave length of light in normal and oblique incidence methods using diffraction grating. Fresnel diffraction-Fresnel's half period zones – area of the half period zones –zone plate – Comparison of zone plate with convex lens – Phase reversal zone plate – diffraction at a straight edge – difference between interference and diffraction.

MODULE-III **(15 Hrs)**

Polarization

Polarized light: Methods of Polarization, Polarization by reflection, refraction, Double refraction, selective absorption, scattering of light – Brewsters law – Malus law – Nicol prism polarizer and analyzer – Refraction of plane wave incident on negative and positive crystals (Huygen's explanation) – Quarter wave plate, Half wave plate – Babinet's compensator – Optical activity, analysis of light by Laurent's half shade polarimeter.

MODULE-IV

Lasers, Fiber Optics and Holography **(15 Hrs)**

Laser: Introduction – Spontaneous Emersion – Stimulated Emersion – Population Inversion. Laser Principle – Einstein Coefficients – Types Of laser – He-Ne Laser – Ruby Laser – Applications of Laser.

Fiber Optics: Introduction- Optical fibers-Types of optical fibers-Step and graded index fibers-Rays and modes in an optical fiber-Fiber material-Prrinciples of fiber communication and advantages of the communication.

Holography: Basic principles of Holography-Gabor Hologram-Recording of Hologram-reconstruction of image from Hologram-Applications of Hologram.

HEAD
Department of Physics
University College of Science
Osmania University
Hyderabad- 500 007, TS

5. **Reference Text Books**

1.Optics by Ajoy Ghatak. *The McGraw-Hill companies.*

2.Optics by Subramaniyam and Brijlal. *S. Chand & Co.*

3.Fundamentals of Physics. **Halliday/Resnick/Walker.*C. Wiley India Edition 2007.***

4.Optics and Spectroscopy. R. Murugeshan and Kiruthiga Siva Prasath. *S. Chand & Co.*

5.Second Year Physics – *Telugu Academy.*

6.Lasers and Non-Linear Optics-B.B. Laud.

7.Principles of lasers-O. Svelto

8.Optical Fiber Communications- by Gerad Keiser.

6. **Syllabus Focus**

a) Relevance to Local, Regional, National and Global Development Needs

Local /Regional/National /Global Development Needs	Relevance
Global	The course addresses the theoretical principles, experimental techniques, and practical applications across various optical phenomena thereby enabling the students to apply their knowledge in research, industry, and technological development in the field of optics.

b) Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
Skill Development	Module 1 Module 2 Module 3 Module 4	The practical conducted in the laboratory provides hands-on experience and exposure to the concepts covered in each module of the syllabus. Group activity to learn concepts and important focal areas using seminars, brain tree mapping and discussions.

7. **Pedagogy**

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	Experiential Learning	Experiments/Quiz
2.	Participative Learning	Presentation/Seminar
3.	Problem solving	Group Discussions, Assignments

8. **Course Assessment Plan**

a. Weightage of Marks in Continuous Internal Assessments and End Semester Examination

Cos	Continuous Internal Assessments – CIA (40%)	End Semester Examination (60%)
CO1	CIA-I(Written Exam)	Written Exam
CO2	CIA-I(Written Exam)	
CO3	CIA-II (Skill Tests)	
CO4	CIA-II (Assignments)	

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b. Model Question Paper- End Semester Exam

OPTICS

Course Code: U24/ PHY / DSC/301 **Time: 2 hours**
Max Marks: 60

SECTION -A

I. Answer All **4X10=40 M**

1. Explain the construction and working of Fresnel biprism. Explain how the wave length of a given source is determined using Fresnel's biprism.

OR

2. Discuss the construction and working of Michelson Interferometer.

3. Describe Fraunhofer diffraction due to a single slit and deduce the position of maxima and minima. Draw the representation graph of intensity distribution.

OR

4. Explain the theory of fresnel's diffraction of light at a straight edge and explain the intensity distribution in diffraction pattern.

5. Explain the construction and working of Nicol's Prism. How it is used as a polarizer and analyser.

OR

6. What is Optical rotation?Explain in detail about the principle and working of Laurent's half shade Polarimeter.

7. Distingiush between Spontaneous and Stimulated emission.. Explain the working of He-Ne laser with the help of energy level diagram.

OR

8. What are the types of optical fibers? Derive expression for acceptance angle and Numerical aperture.

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Department of Physics
University College of Science
Osmania University
Hyderabad- 500 007, TS

SECTION –B

II. Answer Any FOUR : **4X5=20 M**

9. Write short notes on non-reflecting films.

10. Calculate the wavelength of light in Newton's ring experiment, where the diameter of 5 th and 15 th rings are 0.336cm and 0.590 cm respectively and the radius of the plano-convex lens used is 100 cm.

11. Explain the dispersive power of a grating.

12. Explain the limit of resolution of optical instruments based on Rayleigh criterion.

13. Calculate the thickness of a quarter wave plate of quartz for light of wavelength 5893 AU, if μ_o =1.533 and μ_e =1.544.

14. Explain the principle of Holography.

c. Question Paper Blueprint

Modules	Hours Allotted in the Syllabus	CO Addressed	Section A (No. of Questions)	Total Marks	Section B (No. of Questions)	Total Marks
1	15	CO-1	2	4x10=40	6 (By taking at least one question from each unit).	4x5=20
2	15	CO-2	2			
3	15	CO-3	2			
4	15	CO-4	2			

9. CO-PO Mapping:

CO	PO	Cognitive Level	Class room sessions (hrs)
1	1,2	Understand	15
2	1,2	Analyse	15
3	1,2	Apply	15
4	1,7	Remember	15

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Department of Physics
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OPTICS
PRACTICAL MODEL QUESTION PAPER
SEMESTER -III

Program: B.SC Max. Hours: 45

Course Code: U24/PHY/DSC/301/P Hours per week: 2

Course Type: DSC 1 Max. Marks: 50

No. Of Credits: 1

1. **Course Objectives**
   - Ability to use skills/techniques to perform experimentation.
2. **Course Outcomes:**

CO1: Recognise the attributes which characterizes a wave.

CO2: Discuss the important and fascinating areas of interference with many experiments associated with it.

3. PRACTICAL SESSIONS

1. Thickness of a wire using wedge method.
2. Determination of wavelength of light using Biprism.
3. Determination of Radius of curvature of a given convex lens by forming Newton's rings.
4. Resolving power of grating.
5. Study of optical rotation-polarimeter.
6. Dispersive power of a prism
7. Determination of wavelength of light using diffraction grating minimum deviation method.
8. Wavelength of light using diffraction grating – normal incidence method.
9. Resolving power of a telescope.
10. Refractive index of a liquid and glass (Boys Method).
11. Pulfrich refractometer – determination of refractive index of liquid.
12. Wavelength of Laser light using diffraction grating.

4. Reference Books

1. D.P. Khandelwal, "A laboratory manual for undergraduate classes" (Vani Publishing House, New Delhi).
2. S.P. Singh, "Advanced Practical Physics" (PragatiPrakashan, Meerut).
3. Worsnop and Flint- Advanced Practical physics for students.
4. "Practical Physics" R.K Shukla, Anchal Srivastava

HEAD
Department of Physics
University College of Science
Osmania University
Hyderabad- 500 007, TS

OPTICS
PRACTICAL MODEL QUESTION PAPER

SEMESTER -III

Course Code: **U20/PHY/DSC/301/P**

Max Time: 2 hrs
Max. Marks: 50

Answer any ONE of the Following

1. Determine thickness of a wire using wedge method.
2. Using Biprism determine wavelength of light.
3. Evaluate radius of curvature of a given convex lens by forming Newton"s rings.
4. Determine resolving power of grating.
5. Calculate optical rotation of sucrose using polarimeter.
6. Determine dispersive power of a prism using spectrometer.
7. Calculate the wavelength of light using diffraction grating by minimum deviation method.
8. Determine wavelength of light using diffraction grating by normal incidence method.
9. Determine resolving power of a telescope.
10. Calculate refractive index of a liquid and glass by Boys Method.
11. Determine refractive index of liquid with Pulfrich refractometer.
12. Evaluate wavelength of Laser light using diffraction grating.

Prepared by Course Teacher [Name & Signature]	Checked &Verified by HoD / Programme Coordinator [Name & Signature]	Approved by the Principal
Devy. K.	R.S. Kanthi Kala	

HEAD
Department of Physics
University College of Science
Osmania University
Hyderabad- 500 007, TS

SEMESTER-III
PROGRAMMING IN JAVA

1. Course Description

Programme: B.Sc. **Max. Hours: 60**

Course Code: U24/CSC/DSC/301 **Hours per week: 4**

Type of course: DISCIPLINE SPECIFIC CORE **Max. Marks: 100**

No. of credits: 4

2. Course Objectives

- To introduce the object-oriented programming concepts and apply them in solving problems.
- To apply Object Oriented principles like inheritance, polymorphism to develop programs.

3. Course Outcomes

After the successful completion of the course, the student will be able to:

CO1: ***Illustrate*** an integrated development environment to write, compile, run, and test simple object- oriented Java programs. (Cognitive Level 3)

CO2: ***Explain*** concept of classes, objects, members of a class and relationships among them needed for a specific problem (Cognitive Level 2)

CO3: ***Demonstrate*** the concepts of polymorphism and inheritance. (Cognitive Level 3)

CO4: ***Define*** the concept of Exceptional Handling in JAVA (Cognitive Level 1)

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4. Course Content

MODULE I: PROCEDURAL ORIENTED PROGRAMMING (15 hrs)

Introduction to Java- Introduction to Java, Identifiers, Variables, Assignment Statements, Assignment Expressions, Constants, Data types and Operations, Console Input using Scanner class, Selections, Looping, Arrays.

MODULE II: OBJECT ORIENTED PROGRAMMING (15 hrs)

Objects and classes-Introduction, Defining classes for Objects, Constructing Objects Using Constructors, Static Variables, Constants and Methods, Visibility Modifiers, Data Field Encapsulation, Passing Objects to Methods; The this Reference, Class Abstraction and Encapsulation.

MODULE III: INHERITANCE AND POLYMORPHISM (15 hrs)

Inheritance and polymorphism-Introduction, Super classes and Subclasses, Types of Inheritance, Using the super Keyword, Overriding Methods, Overriding vs. Overloading, Polymorphism, Static vs. Dynamic Binding, Preventing Extending and Overriding -Final Methods; Abstract Classes and Interfaces.

MODULE IV: EXCEPTION HANDLING (15 hrs)

Exception Handling-Introduction, Exception-Handling Overview, Exception-Handling Advantages, Exception Types, Declaring Exceptions, Throwing Exceptions, Catching Exceptions, Getting information from Exceptions, Object Class, String Class, Array Class, Command-Line Arguments.

5. References

1. Programming with Java, by BalaguruSamy,3rd Edition,2007
2. Liang, Y. Daniel. Introduction to JAVA Programming (7th Edition). Pearson Education,2008.
3. An Introduction to Object-Oriented Programming with Java, by C. Thomas Wu,2009.

6. Syllabus Focus

a) Relevance to Local, Regional, National and Global Development Needs

Local /Regional/National /Global Development Needs	Relevance
GLOBAL DEVELOPMENT	Java is a high-level, class-based, object-oriented programming language that is designed to have as few implementation dependencies as possible.

b) Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
SD	Module -1,2	Solving real world problems using OOP techniques.
EMP	Module 1,2,3,4	Solve problems using JAVA Framework and I/O classes.

7. Pedagogy

S. No	Student Centric Methods Adopted	Type/Description of Activity
1.	Participative Learning	Seminar Presentation
2.	Experiential Learning	Quiz
3.	Participative Learning	Group Discussion
4	Problem solving	Code Debugging

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8. Course Assessment Plan

a. Weightage of Marks in Continuous Internal Assessments and End Semester Examination

COs	Continuous Internal Assessments – CIA (40%)	End Semester Examination (60%)
CO1	CIA 1 Written Test	Written Exam
CO2	CIA 1 Written Test	
CO3	CIA-2 Skill Test	
CO4	CIA-3 Assignment	

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b. Question Paper Pattern

PROGRAMMING IN JAVA

Course Code: U24/CSC/DSC/301 **Time: 2 hrs**

Credits:4 **Max Marks:60**

SECTION - A

I. Answer the following: **4 x 10 = 40 M**

1. Explain the data types that are supported in Java?

OR

2. Discuss various loop statements available in Java? Show their syntax.
3. Define a constructor. Explain the various types of constructors with an example.

OR

4. How static methods can be defined and accessed. Explain with an example.
5. Write a short note on inheritance. Write a program to demonstrate inheritance.

OR

6.Define the: abstract classes & interfaces. What are the similarities and differences between abstract classes and interfaces?

7. Define Exception. Explain the following terms with respect to exception handling. i) try ii) catch iii) throw iv) finally.

OR

8.a) What is command line argument in java

b) Write a program to convert lower case string to uppercase.

SECTION – B

Answer any FOUR **4 x 5 = 20 M**

9. Write a program to search a number in an array.
10. Write a program to demonstrate constructors.
11. Explain class abstraction and class encapsulation with appropriate examples.
12. Explain the differences between method overloading and method overriding
13. Explain types of Access Modifiers.
14. What is the purpose of declaring exceptions? How do you declare an exception? Give an example.

PROGRAMMING IN JAVA
PRACTICAL

1. Course Description

Programme: B.Sc. **Max. Hours: 30**

Course Code: U24/CSC/DSC/301/P **Hours per week: 2**

Type of course: DISCIPLINE SPECIFIC CORE **Max. Marks: 50**

No. of credits: 1

2. Course Objective:

1. To write an Object-Oriented computer program to solve specified problems.
2. To apply Object Oriented principles like inheritance, polymorphism to develop programs.

3. Course Outcomes:

CO1: ***Illustrate*** an integrated development environment to write, compile, run Object- Oriented Java programs.

CO2: ***Demonstrate*** the concepts of polymorphism and inheritance, error handling techniques in solving problems.

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PRACTICAL SESSIONS

1. Basic Programs using arithmetic operators, logical & relational operators
2. Programs on Conditional statements
3. Programs on Looping
4. Programs on Arrays
5. Implementing Classes and methods
6. Constructors and constructor overloading (default, parameterized)
7. Method overloading,
8. Passing Objects as parameters to methods
9. Programs using Static member data and static methods, this keyword
10. Programs on Visibility Modifiers
11. Single inheritance and Multilevel inheritance (using super keyword)
12. Program to perform String operations
13. Program to perform methods of Array class
14. Program on Abstract Classes and Interfaces
15. Programs on Exception Handling- Declaring, Throwing, Catching Exceptions, getting information from Exceptions, finally Block

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PROGRAMMING IN JAVA

MODEL QUESTION PAPER

Course Code: U24/CSC/DSC/301/P **Max. Marks: 50**

Credits:1 **Max. Time: 2 hrs**

Answer any TWO

1. Write a java program to implement method overriding.
2. Write a java program to illustrate usage of try/catch with the finally clause.
3. Write a java program to implement Multilevel inheritance

c) Question Paper Blueprint

Modules	Hours Allotted in the Syllabus	COs Addressed	Section A (No. of Questions)	Total Marks	Section A (No. of Questions)	Total Marks
1	15	CO-1	2	10	2	5
2	15	CO-2	2	10	2	5
3	15	CO-3	2	10	1	5
4	15	CO-4	2	10	1	5

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SEMESTER-III

WEB DESIGNING

1. Course Description:

Programme: B.Sc. **Max. Hours: 30**

Course Code: U24/CSC/SEC/301 **Hours per week: 2**

Type of course: SKILL ENHANCEMENT COURSE **Max. Marks: 50**

No. of Credits: 2

2. Course Objective:

- To equip the students with skills required for designing the front end of web applications and understand principles of creating an effective web page.

3. Course Outcomes:

This SEC paper will help students to enhance their overall skills and to

- **CO1**: ***Illustrate*** skills in developing simple HTML webpages. (Cognitive Level 3)
- **CO2**: ***Design*** and development an effective website using HTML Forms and CSS. (Cognitive Level 6)

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4. Course Content:

MODULE I: INTRODUCTION TO XHTML **(15 Hrs)**

Introduction to the internet, WWW, Web browsers, web servers, Uniform Resource Locator, Multipurpose Internet Mail Extensions, The Hypertext Transfer Protocol, Introduction to XHTML, Tags for: Basic Text Markup, images, hyperlinks, ordered and unordered Lists, tables, nested tables.

MODULE II: FORMS AND CASCADING STYLE SHEETS **(15 Hrs)**

XHTML Forms – Text field, password, dropdown lists, radio buttons, check boxes. Cascading Style Sheet - Introduction, Levels of style sheets, style Specification Formats, selector forms, Property Value Forms, Font Properties, List Properties and the Box Model.

5. References:

1. Programming the World Wide Web" by Robert W.Sebesta, , Pearson Edition.
2. "HTML Black Book", by Holzner, DreamTech Press.
3. "Internet & World Wide Web: How to program" by Deitel, P. J., Deitel, H. M., & Deitel, Pearson,Fourth edition

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University College of Engineering (A)
Osmania University,
Hyderabad-500 007.

6. Syllabus Focus:

a) Relevance to Local, Regional, National and Global Development Needs

Local /Regional/National /Global Development Needs	Relevance
Global	The ability to analyse, identify and define the technology required to build and implement a website

b) Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
Skill Development	Modules I ,II	Mini Project

7. Course Assessment Plan:

a) Weightage of Marks in Formative and Summative Assessments

Formative Assessment - FA (50%)	Summative Assessment - SA (50%)
CIA-20 marks Mini project/Assignment/ Problem solving/Case studies.	End Semester exam-30 Marks.

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b) Question Paper Pattern

MODEL QUESTION PAPER

PRACTICAL

Course code: U24/CSC/SEC/301
Credits: 2

Max Time: 1Hr
Max. Marks: 30M

Answer the following.

1. Design a web page using targeted frames depicting the courses offered in the college.
2. Create a web page, for the menu items in the restaurant using embedded style sheets.

Prepared by	Checked & verified by	Approved by
Ms. D.B.Rekha **Teaching Faculty**	**Ms. D.Sowjenya** **HOD**	**Dr. Uma Joseph** **Principal**

PROFESSOR
Department of Computer Science & Engineering
University College of Engineering (A)
Osmania University,
Hyderabad-500 007.