

COMMON ELECTIVE II GENERIC / DISCIPLINE SPECIFIC

Sl. No	Title of the Paper
1.	FINANCIAL ACCOUNTING - II
2.	BOTANY-II BOTANY PRACTICALS II
3.	CHEMISTRY II CHEMISTRY PRACTICALS II
4.	PHYSICS – II PHYSICS PRACTICALS – II
5.	ZOOLOGY -II ZOOLOGY PRACTICAL
6.	DISCRETE MATHEMATICS
7.	MATHEMATICS–II
8.	MATHEMATICAL STATISTICS – II
9.	MATHEMATICSFORCOMPETITIVEEXAMINATIONS-II
10.	NUMERICAL METHODS II
11.	RESOURCE MANAGEMENT TECHNIQUES
12.	STATISTICAL METHODS & ITS APPLICATIONS-II

FINANCIAL ACCOUNTING - II

Learning Objectives		
LO1	The students are able to prepare different kinds of accounts such as Hire purchase and Instalments System.	
LO2	To understand the preparation of Branch accounts.	
LO3	To Understand the allocation of Expenses under Departmental Accounts.	
LO4	To gain an understanding about partnership accounts relating to Admission and retirement.	
LO5	Provides knowledge to the learners regarding Partnership Accounts relating to dissolution of firm.	
Prerequisites: Should have studied Accountancy in XII Std		
Unit	Contents	No. of Hours
I	Hire Purchase and Instalment System Hire Purchase System – Accounting Treatment – Calculation of Interest - Default and Repossession - Hire Purchase Trading Account - Instalment System - Calculation of Profit	15
II	Branch Accounts Branch – Dependent Branches: Accounting Aspects - Debtors system -Stock and Debtors system – Distinction between Wholesale Profit and Retail Profit – Independent Branches (Foreign Branches excluded)	15
III	Departmental Accounts Departmental Accounts: Basis of Allocation of Expenses – Inter- Departmental Transfer at Cost or Selling Price.	15
IV	Partnership Accounts - I Partnership Accounts: Fundamental of Partnership - Partnership deed – Admission of a Partner – Revaluation Account – Partners Capital Account – Goodwill- Methods of valuation of Goodwill –Retirement of a Partner – Death of a Partner.	15
V	Partnership Accounts - II Dissolution of Partnership - Methods – Settlement of Accounts Regarding Losses and Assets – Realization account – Preparation of Balance Sheet - One or more Partners insolvent – All Partners insolvent – Application of Garner Vs Murray Theory – Accounting Treatment - Piecemeal Distribution.	15
TOTAL		75
THEORY 20% & PROBLEMS 80%		
Course Outcomes		
CO1	To evaluate the Hire purchase accounts and Instalment systems	
CO2	To prepare Branch accounts	
CO3	To prepare Departmental Accounts	

CO4	To understand the accounting treatment for admission and retirement in partnership
CO5	To know Settlement of accounts at the time of dissolution of a firm.
Textbooks	
1	Radhaswamy and R.L. Gupta: Advanced Accounting, Sultan Chand, New Delhi.
2	M.C. Shukla T.S. Grewal & S.C. Gupta, Advance Accounts, S Chand Publishing, New Delhi.
3	R.L. Gupta and V.K. Gupta, “Financial Accounting”, Sultan Chand, New Delhi.
4	S P Jain and K. L. Narang: Financial Accounting- I, Kalyani Publishers, New Delhi.
5	T.S. Reddy& A. Murthy, Financial Accounting, Margam Publishers, Chennai.
Reference Books	
1	Dr. S.N. Maheswari: Financial Accounting, Vikas Publications, Noida.
2	Dr. Venkataraman& others (7 lecturers): Financial Accounting, VBH, Chennai.
3	Dr.Arulanandan and Raman: Advanced Accountancy, Himalaya publications, Mumbai.
4	Tulsian , Advanced Accounting, Tata MC. Graw hills, India.
5	Charumathi and Vinayagam, Financial Accounting, S.Chand and sons, New Delhi.
NOTE: Latest Edition of Textbooks May be Used	
Web Resources	
1	https://www.slideshare.net/mesharma1/accounting-for-depreciation-1
2	https://www.slideshare.net/ramusakha/basics-of-financial-accounting
3	https://www.accountingtools.com/articles/what-is-a-single-entry-system.html

MAPPING WITH PROGRAMME OUTCOMES

AND PROGRAMME SPECIFIC OUTCOMES

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PSO 1	PSO 2	PSO 3
CO1	3	2	3	3	2	3	2	2	3	2	2
CO2	3	2	3	3	3	2	2	2	3	2	2
CO3	3	2	2	3	3	2	2	2	3	2	2
CO4	3	2	3	3	2	2	2	2	3	2	2
CO5	3	3	3	3	3	3	3	3	3	3	3
TOTAL	16	11	14	15	14	12	11	11	15	11	11
AVERAGE	3.2	2.2	2.8	3	2.8	2.4	2.2	2.2	3	2.2	2.2

BOTANY-II

Learning Objectives	
C1	To be familiar with the basic concepts and principles of plant systematics.
C2	Learn the importance of plant anatomy in plant production systems.
C3	Understand the mechanism underlying the shift from vegetative to reproductive phase.
C4	To learn about the physiological processes that underlie plant metabolism.
C5	To know the energy production and its utilization in plants.
Course outcomes: On completion of this course, the students will be able to:CO	
Programme Outcomes	
1. Understand the fundamental concepts of plant anatomy and embryology.	K1
2. Analyze and recognize the different organs of plants and secondary growth.	K2
3. Understand water relation of plants with respect to various physiological processes.	K3
4. Classify aerobic and anaerobic respiration.	K4
5. Classify plant systematics and recognize the importance of herbarium and virtual herbarium.	K5
UNIT	CONTENTS
I	MORPHOLOGY OF FLOWERING PLANTS: Plant and its parts. Structure and function of root and stem. Leaf and its parts. Leaf types- simple and compound. Phyllotaxy and types. Inflorescence - Racemose, Cymose and Special types. Terminology with reference to flower description.
II	TAXONOMY: Study of the range of characters and plants of economic importance in the following families: Rutaceae, Caesalpiniaceae, Asclepiadaceae, Euphorbiaceae and Cannaceae.
III	ANATOMY Tissue and tissue systems: Simple and complex tissues. Anatomy of monocot and dicot roots - anatomy of monocot and dicot stems - anatomy of dicot and monocot leaves.
IV	EMBRYOLOGY Structure of mature anther and ovule - Types of ovules, structure of embryo sac, pollination -double fertilization, structure of dicotyledonous and monocotyledonous seeds.
V	PLANT PHYSIOLOGY Absorption of water, photosynthesis - light reaction - Calvin cycle; respiration - Glycolysis - Krebs cycle - electron transport system. Growth

	hormones - auxins and cytokinins and their applications.
Extended Professional Component (is a part of internal component only, Not to be included in the External Examination question paper).	Questions related to the above topics, from various competitive examinations UPSC / TRB / NET / UGC – CSIR / GATE / TNPSC / others to be solved (To be discussed during the Tutorial hour).
Skills acquired from this course.	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill

Recommended Texts

1. Sharma, O.P. 2017. Plant Taxonomy. (II Edition). The McGraw Hill Companies.
2. Bhojwani, S.S. Bhatnagar, S.P and Dantu, P.K. 2015. The Embryology of Angiosperms (6th revised and enlarged edition). Vikas Publishing House, New Delhi.
3. Maheshwari, P. 1963. Recent Advances in Embryology of Angiosperms. Intl. Soc. Plant Morphologists, New Delhi.
4. Salisbury, F. B.C.W. Ross. 1991. Plant Physiology. Wassworth Pub. Co. Belmont.
5. Ting, I.P. 1982. Plant Physiology. Addison Wesley Pb. Philippines.

Reference books

1. Lawrence.G.H.M. 1985. An Introduction to Plant Taxonomy, Central Book Depot, Allahabad.
2. Bhojwani, S.S and Bhatnagar, S.P. 2000. The Embryology of Angiosperms (4th revised and enlarged edition). Vikas Publishing House, New Delhi.
3. Pandey, B.P. 2012. Plant Anatomy. S Chand Publishing.
4. Jain, VK. 2006. Fundamentals of Plant Physiology, S. Chand and Company Ltd.
5. Rajni Gupta. 2012. Plant Taxonomy: Past, Present and Future. [Vedams \(P\) Ltd. New Delhi.](#)
6. Jain, V.K. 2006. Fundamentals of Plant Physiology, S.Chand and Company Ltd., New Delhi.
7. Verma, S.K. 2006. A Textbook of Plant Physiology, S.K.Chand & Co., New Delhi.

Web Resources

1. https://books.google.co.in/books/about/Plant_Taxonomy.html?id=0bYs8F0Mb9gC&redir_esc=y
2. https://books.google.co.in/books/about/PLANT_TAXONOMY_2E.html?id=Roi0lwSXFuUC&redir_esc=y
3. <https://archive.org/EXPERIMENTS/plantanatomy031773mbp>
4. <https://www.amazon.in/Embryology-Angiosperms-6th-S-P-Bhatnagar-ebook/dp/B00UN5KPQG>
5. <https://www.crcpress.com/Plant-Physiology/Stewart-Globig/p/book/9781926692692>

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	3	3	3	3	3	3	3	3	3	3
CO 2	3	3	3	3	3	3	3	3	3	3
CO 3	2	3	3	3	3	1	3	3	3	3
CO 4	3	3	2	3	3	3	3	2	3	2
CO 5	3	2	2	2	2	2	2	1	2	2

S-Strong (3) M-Medium (2) L-Low(1)

BOTANY PRACTICALS II

Learning Objectives	
C1	To enhance information on the identification of each taxonomical group by developing the skill-based detection of the morphology and microstructure of microorganisms, algae, and fungi.
C2	To comprehend the fundamental concepts and methods used to identify Bryophytes, Pteridophytes and Gymnosperms through morphological changes and evolution, anatomy and reproduction.
C3	To be familiar with the basic concepts and principles of plant systematics.
C4	Understanding of laws of inheritance, genetic basis of loci and alleles.
C5	To learn about the physiological processes that underlie plant metabolism.
Course outcomes: On completion of this course, the students will be able to:CO	
	Programme Outcomes
1. To study the internal organization of algae and fungi.	K1
2. Develop critical understanding on morphology, anatomy and reproduction of Bryophytes, Pteridophytes and Gymnosperms..	K2
To study the classical taxonomy with reference to different parameters.	K3
4. Understand the fundamental concepts of plant anatomy and embryology	K4
To study the effect of various physical factors on photosynthesis.	K5
EXPERIMENTS	
<ol style="list-style-type: none"> 1. Make suitable micro preparation of the types prescribed in Algae, Fungi, Bryophytes, Pteridophytes and Gymnosperms. 2. Micro photographs of the cell organelles ultra structure. 3. Simple genetic problems. 4. To describe in technical terms, plants belonging to any of the family prescribes and to identify the family. 5. To dissect a flower, construct floral diagram and write floral formula. 6. Demonstration experiments <ol style="list-style-type: none"> 1. Ganong's Light screen 2. Ganong's respiroscope 7. To make suitable micro preparations of anatomy materials prescribed in the syllabus. 8. Spotters - Algae, Fungi, Bryophytes, Pteridophytes, Gymnosperms and Angiosperm anatomy, Embryology, Cell biology and Biotechnology. 	
Extended Professional Component (is a part of internal component only, Not to be included in the External Examination question paper).	Questions related to the above topics, from various competitive examinations UPSC / TRB / NET / UGC – CSIR / GATE / TNPSC / others to be solved (To be discussed during the Tutorial hour).
Skills acquired from this course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill
Recommended Texts	
1. Sharma, O.P. 2017. Bryophyta, MacMillan India Ltd, New Delhi.	

2. Sharma, O.P. 2012. Pteridophyta, Tata McGraw-Hills Ltd, New Delhi.

Subramaniam, N.S. 1996. Laboratory Manual of Plant Taxonomy. Vikas Publishing House Pvt. Ltd., New Delhi.

4. Benjamin, A. Pierce. 2012. Genetics- A conceptual Approach. W.H. Freeman and Company, New York, England.

oggle G.R and G.J. Fritz. 2002. Introductory Plant Physiology. Prentice Hall of India, New Delhi.

Reference Books

1. Strickberger, M.W. 2005. Genetics (III Ed). Prentice Hall, New Delhi, India.
2. Nancy Serediak and M. Huynh. 2011. Algae identification lab Guide. Accompanying manual to algae identification field guide, Ottawa Agriculture and Agri food Canada publisher.
3. Mohammed Gufran Khan, Shite Gatew and Bedilu Bekele. 2012. Practical manual for Bryophytes and Pteridophytes. Lambert Academic Publishing.
4. Aler Gingauz. 2001. Medicinal Chemistry. Oxford University Press & Wiley Publications.
5. Steward, F.C. 2012. Plant Physiology Academic Press, US

sources

1. <https://www.amazon.in/Practical-Manual-Pteridophyta-Rajan-Sundara/dp/8126106883>
2. <https://www.google.co.in/books/edition/Gymnosperms/3YrT5E3Erm8C?hl=en&gbpv=1&dq=gymnosperms&printsec=frontcover>
3. <https://www.amazon.in/Computational-Phytochemistry-Satyajit-Dey-Sarker-ebook/dp/B07CV96NZJ>
4. <https://medlineplus.gov/genetocs/understanding/basics/cell/>
5. <https://apan.net/meetings/apan45/files/17/17-01-01-01.pdf>
6. http://www.cuteri.eu/microbiologia/manuale_microbiologia_pratica.pdf
7. <https://www.amazon.in/Manual-Practical-Bryophyta-Suresh-Kumar/dp/B0072GNFX4>

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	3	3	3	3	3	3	3	3	3	3
CO 2	3	3	3	3	3	3	3	3	3	3
CO 3	2	3	3	3	3	1	3	3	1	3
CO 4	3	3	2	3	3	3	3	2	3	3
CO 5	3	2	2	2	2	2	2	1	2	2

S-Strong (3)

M-Medium (2)

L-Low(1)

Title of the Course	CHEMISTRY II
Prerequisites	Chemistry for physical sciences -I
Objectives of the course	<p>This course aims at providing knowledge on the</p> <ul style="list-style-type: none"> • Co-ordination Chemistry and Water Technology • Carbohydrates and Amino acids • basics and applications of electrochemistry • basics and applications of kinetics and catalysis • Various photochemical phenomenon
Course Outline	<p>UNIT I Co-ordination Chemistry and Water Technology Co-ordination Chemistry: Definition of terms-IUPAC Nomenclature - Werner's theory - EAN rule - Pauling's theory - Postulates - Applications to $[\text{Ni}(\text{CO})_4]$, $[\text{Ni}(\text{CN})_4]^{2-}$, $[\text{Co}(\text{CN})_6]^{3-}$ Chelation - Biological role of Haemoglobin and Chlorophyll (elementary idea) - Applications in qualitative and quantitative analysis.</p> <p>Water Technology: Hardness of water, determination of hardness of water using EDTA method, zeolite method- Purification techniques- BOD, COD.</p> <p>Unit II Carbohydrates and Amino acids Carbohydrates: Classification, preparation and properties of glucose, fructose and sucrose. Discussion of open chain ring structures of glucose and fructose. Glucose -fructose interconversion. Properties of starch and cellulose.</p> <p>Amino acids: Classification - preparation and properties of alanine, preparation of dipeptides using Bergmann method. RNA and DNA (elementary idea only).</p> <p>UNIT III Electrochemistry Galvanic cells - Standard hydrogen electrode - calomel electrode - standard electrode potentials -electrochemical series. Strong and weak electrolytes - ionic product of water -pH, pKa, pKb. Conductometric titrations - pH determination by colorimetric method - buffer solutions and its biological applications - electroplating - Nickel and chrome plating - Types of cells -fuel cells-corrosion and its prevention.</p>

	<p>UNIT IV Kinetics and Catalysis</p> <p>Order and molecularity. Integrated rate expression for I and II (2A \square Products) order reactions. Pseudo first order reaction, methods of determining order of a reaction – Half-life period – Catalysis - homogeneous and heterogeneous, catalyst used in Contact and Haber’s processes. Concept of energy of activation and Arrhenius equation.</p> <p>UNIT V Photochemistry</p> <p>Grothus-Draper’s law and Stark-Einstein’s law of photochemical equivalence, Quantum yield - Hydrogen-chloride reaction. Phosphorescence, fluorescence, chemiluminescence and photosensitization and photosynthesis (definition with examples).</p>
<p>Extended Professional Component (is a part of internal component only, Not to be included in the external examination question paper)</p>	<p>Questions related to the above topics, from various competitive examinations UPSC/ JAM /TNPSC others to be solved (To be discussed during the Tutorial hours)</p>
<p>Skills acquired from this course</p>	<p>Knowledge, Problem solving, Analytical ability, Professional Competency, Professional Communication and Transferable skills.</p>
<p>Recommended Text</p>	<ol style="list-style-type: none"> 1. V.Veeraiyan, Textbook of Ancillary Chemistry; High mount publishing house, Chennai, first edition,2009. 2. S.Vaithyanathan, Text book of Ancillary Chemistry; Priya Publications, Karur,2006. 3. Arun Bahl, B.S.Bahl, Advanced Organic Chemistry; S.Chand and Company, New Delhi, twenty third edition, 2012. 4. P.L.Soni, H.M.Chawla, Text Book of Organic Chemistry; Sultan Chand & sons, New Delhi, twenty ninth edition, 2007.
<p>Reference Books</p>	<ol style="list-style-type: none"> 1. P.L.Soni, Mohan Katyal, Text book of Inorganic chemistry; Sultan Chand and Company, New Delhi, twentieth edition, 2007. 2. R.Puri, L.R.Sharma, M.S.Pathania, Text book Physical Chemistry; Vishal Publishing Co., New Delhi, forty seventh edition, 2018.
	<ol style="list-style-type: none"> 3. B.K,Sharma, Industrial Chemistry; GOEL publishing house, Meerut, sixteenth edition, 2014.
<p>Website and e-learning source</p>	

Course Learning Outcomes (for Mapping with POs and PSOs)**On completion of the course the students should be able to****CO 1:** write the IUPAC name for complex, different theories to explain the bonding in coordination compounds and water technology**CO 2:** explain the preparation and property of carbohydrate, amino acids and nucleic acids.**CO 3:** apply/demonstrate the electrochemistry principles in corrosion, electroplating and fuel cells.**CO 4:** identify the reaction rate, order for chemical reaction and explain the purpose of a catalyst.**CO 5:** outline the various type of photochemical process.

CO /PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3
CO2	3	3	3	3	3
CO3	3	3	3	3	3
CO4	3	3	3	3	3
CO5	3	3	3	3	3
Weightage	15	15	15	15	15
Weighted percentage of Course Contribution to PSOs	3.0	3.0	3.0	3.0	3.0

Level of Correlation between PSO's and CO's

CO /PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	3	3
CO2	3	3	3	3	3
CO3	3	3	3	3	3
CO4	3	3	3	3	3
CO5	3	3	3	3	3
Weightage	15	15	15	15	15
Weighted percentage of Course Contribution to POs	3.0	3.0	3.0	3.0	3.0

Level of Correlation between PO's and CO's

Title of the Course	CHEMISTRY II Practical
Objectives of the course	This course aims to provide knowledge on <ul style="list-style-type: none"> • identification of organic functional groups • different types of organic compounds with respect to their properties. • determination of elements in organic compounds..
	SYSTEMATIC ANALYSIS OF ORGANIC COMPOUNDS The analysis must be carried out as follows:
	(a) Functional group tests [phenol, acids (mono & di) aromatic primary amine, amides (mono & di), aldehyde and glucose]. (b) Detection of elements (N, S, Halogens). (c) To distinguish between aliphatic and aromatic compounds. (d) To distinguish – Saturated and unsaturated compounds.
Reference Books	V.Venkateswaran, R.Veerasingam, A.R.Kulandaivelu, Basic Principles of Practical Chemistry; Sultan Chand & sons, Second edition, 1997.
Course Learning Outcomes (for Mapping with POs and PSOs) On completion of the course the students should be able to CO 1: gain an understanding of the use of standard flask and volumetric pipettes, burette. CO 2: design, carry out, record and interpret the results of volumetric titration. CO 3: apply their skill in the analysis of water/hardness. CO4: analyze the chemical constituents in allied chemical products	

CO /PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3
CO2	3	3	3	3	3
CO3	3	3	3	3	3
CO4	3	3	3	3	3
Weightage	12	12	12	12	12
Weighted percentage of Course Contribution to PSOs	3.0	3.0	3.0	3.0	3.0

Level of Correlation between PSO's and CO's

CO /PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	3	3
CO2	3	3	3	3	3
CO3	3	3	3	3	3
CO4	3	3	3	3	3
Weightage	12	12	12	12	12
Weighted percentage of Course Contribution to POs	3.0	3.0	3.0	3.0	3.0

Level of Correlation between PO's and CO's

COURSE TITLE	PHYSICS –II
COURSE OBJECTIVES	To understand the basic concepts of optics, modern Physics, concepts of relativity and quantum physics, semiconductor physics, and electronics.

UNITS	COURSE DETAILS
UNIT-I	OPTICS: Definition of interference – air wedge – determination of diameter of a thin wire by air wedge – diffraction – diffraction of light vs sound – normal incidence – experimental determination of wavelength using diffraction grating (no theory) – polarization – polarization by double refraction – Brewster's law .
UNIT-II	ATOMIC PHYSICS: Mass number – atomic number – nucleons – vector atom model – various quantum numbers – Pauli's exclusion principle – electronic configuration – periodic classification of elements – photo electric effect – Einstein's photoelectric equation – applications of photoelectric effect: solar cells, LED, photodiode.
UNIT-III	NUCLEAR PHYSICS: Magic numbers – shell model – nuclear energy – mass defect – binding energy – radioactivity – uses – half life – mean life - radio isotopes and uses – controlled and uncontrolled chain reaction – nuclear fission – energy released in fission – critical size- atom bomb – nuclear fusion – thermonuclear reactions – differences between fission and fusion.
UNIT-IV	INTRODUCTION TO RELATIVITY AND GRAVITATIONAL WAVES: frame of reference – postulates of special theory of relativity – Galilean transformation equations – Lorentz transformation equations – derivation – length contraction – time dilation – twin paradox – mass-energy equivalence.
UNIT-V	SEMICONDUCTOR PHYSICS: p-n junction diode – forward and reverse biasing – characteristic of diode – zener diode – characteristic of zener diode – voltage regulator – full wave bridge rectifier – construction and working – advantages (no mathematical treatment) – USB cell phone charger – introduction to e-vehicles and EV charging stations.
TEXT BOOKS	<ol style="list-style-type: none"> 1. R.Murugesan (2005), AlliedPhysics,S.ChandandCo,NewDelhi. 2. K.ThangarajandD.Jayaraman(2004), AlliedPhysics,PopularBookDepot,Chennai. 3. BrijlalandN.Subramanyam(2002), TextbookofOptics,S.ChandandCo,NewDelhi. 4. R.Murugesan (2005), ModernPhysics,S.ChandandCo,NewDelhi. 5. A.SubramaniyamAppliedElectronics, 2ndEdn.,NationalPublishingCo.,Chennai.
REFERENCE BOOKS	<ol style="list-style-type: none"> 1. ResnickHallidayandWalker (2018), FundamentalsofPhysics, 11thEdn.,JohnWilleyandSons, Asia Pvt.Ltd.,Singapore. 2. D.R.KhannaandH.R. Gulati (1979).Optics, S.ChandandCo.Ltd.,New Delhi. 3. A.Beiser (1997), ConceptsofModernPhysics,TataMcGrawHillPublication,NewD

	<p>elhi.</p> <p>4. Thomas L. Floyd (2017), Digital Fundamentals, 11thEdn., Universal Book Stall, NewDelhi.</p> <p>5. V.K.Metha(2004), Principlesofelectronics, 6thEdn., S.Chandand Company, New Delhi.</p>
WEB RESOURCES	<p>1. https://www.berkshire.com/learning-center/delta-p-facemask/https://www.youtube.com/watch?v=QrhxU47gtj4https://www.youtube.com/watch?time_continue=318andv=D38BjgUdL5Uandfeature=emb_logo</p> <p>2. https://www.youtube.com/watch?v=JrRrp5F-Qu4</p> <p>3. https://www.validyne.com/blog/leak-test-using-pressure-transducers/</p> <p>4. https://www.atoptics.co.uk/atoptics/blsky.htm -</p> <p>5. https://www.metoffice.gov.uk/weather/learn-about/weather/optical-effects</p>

METHOD OF EVALUATION:

Continuous InternalAssessment	End Semester Examination	Total	Grade
25	75	100	

COURSE OUTCOMES:

Attheendofthecourse,the studentwillbeableto:

COURSE OUTCOMES	CO1	Explaintheconceptsof interferencediffractionusingprinciplesof superpositionofwaves and rephrase the concept of polarization based on wave patterns
	CO2	Outline the basic foundation of different atom models and variousexperiments establishing quantum concepts. Relate the importance ofinterpretingimprovingtheoreticalmodelsbasedonobservation. Appreciateinterdisciplinarynatureofscience and in solar energy related applications.
	CO3	Summarizethepropertiesofnuclei, nuclearforcesstructureofatomicnucleusandnuclear models. Solveproblems on delayratehalf-lifeand mean-life.Interpret nuclear processes likefission and fusion. Understand the importance of nuclear energy, safety measures carried and get our Govt.agencies like DAE guiding the country in the nuclear field.
	CO4	Todescribethebasicconceptsofrelativitylikeequivalenceprinciple, inertialframes and Lorentz transformation. Extend their knowledge on concepts ofrelativityandvice-versa. Relate this with current research in this field and get an overview of research projects of National and International importance, like LIGO, ICTS, and opportunities available.
	CO5	Summarize the working of semiconductor devices like junction diode, Zenerdiode, transistors and practical devices we daily use like USB chargers and EV charging stations.

MAPPING WITH PROGRAM OUT COMES:

Map course outcomes (CO) for each course with program outcomes (PO) in the 3-point scale of STRONG (S), MEDIUM (M) and LOW (L).

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	S	S
CO2	M	S	S	S	M	S	S	S	S	M
CO3	M	S	S	S	S	M	S	S	S	S
CO4	S	S	S	S	S	S	S	M	S	S
CO5	M	S	S	S	S	S	S	S	S	S

COURSE TITLE	PHYSICS PRACTICALS – II
COURSE OBJECTIVES	Apply various Physics concepts to understand concepts of Light, electricity and magnetism and waves, set up experimentation to verify theories, quantify and analyse, able to do error analysis and correlate results
Minimum of Eight Experiments from the list: <ol style="list-style-type: none"> 1. Radius of curvature of lens by forming Newton's rings (N and λ are given). 2. Thickness of a wire using air wedge. 3. Wavelength of mercury lines using spectrometer and grating. 4. Refractive index of material of the lens by minimum deviation. 5. Refractive index of liquid using liquid prism (hollow prism). 6. Determination of AC frequency using sonometer. 7. Specific resistance of a wire using PO box. 8. Thermal conductivity of poor conductor using Lee's disc. 9. Determination of figure of merit of table galvanometer. 10. Determination of Earth's magnetic field using field along the axis of a coil. 11. Characterisation of Zener diode (Forward and Reverse). 12. Construction of Zener / IC regulated power supply (IC 7805). 13. Construction of AND, OR gates using diodes and NOT gate using transistor. 14. NOR gate as a universal building block (AND, OR, NOT gates). 	

METHOD OF EVALUATION:

Continuous Internal Assessment	End Semester Examination	Total	Grade
25	75	100	

ZOOLOGY -II

Learning Objectives

CO1	To enable students to learn basic concepts relating to aspects of respiratory, circulatory, excretory nervous and sensory physiology.
CO2	To enable students to comprehend the processes involved during development
CO3	To enable students to learn basic concepts of immunity and the working of immune organs and familiarize them with the recommended vaccination schedule
CO4	To enable students to comprehend the basic concepts of human genetics and patterns of inheritance
CO5	To enable students to learn about aspects of animal behaviour such as foraging, courtship, nest construction, parental care and learning

UNIT	Details	No. of Hours	Course Objectives
I	Respiration- Respiratory pigments and transport of gases. Mechanism of blood clotting. Types of excretory products – Ornithine cycle. Structure of neuron – Conduction of nerve impulse, Mechanism of vision and hearing.	12	CO1
II	Fertilization, Cleavage, Gastrulation and Organogenesis in Frog; Placentation in mammals	12	CO2
III	Innate and Acquired - Active and Passive; Antigens and Antibodies; Immunological responses in humans; Vaccination schedule	12	CO3
IV	Human Genetics: Human Chromosomes – Sex Determination in Humans; Patterns of Inheritance: Autosomal Dominant, Autosomal Recessive, X-linked, Y-linked, Mitochondrial, Multiple Allelic and Polygenic; Genetic Counselling	12	CO4
V	Animal Behaviour: Foraging, Courtship Behaviour, Shelter and Nest Construction, Parental Care, Learning Behaviour	12	CO5
Total		60	
Course Outcomes			

Course Outcomes	On completion of this course, students will;		
CO1	Recall the parts and working of body organs and developmental stages, name the patterns of inheritance and list different types of animal behaviour	PO1	
CO2	Analyse the different developmental stages	PO1, PO2	
CO3	Analyse the working of body and immune systems	PO4, PO6	
CO4	Analyse the different patterns of inheritance	PO4, PO5, PO6	
CO5	Relate the behaviour of animals to physiology. Analyse the different types of behaviour	PO3, PO8	
Text Books (Latest Editions)			
1.	Verma P.S. & Agarwal - Developmental Biology, Chordata embryology S. Chand & Co.		
References Books (Latest editions, and the style as given below must be strictly adhered to)			
1.	Owen, J. A., Punt, J. & Stranford, S. A. - Kuby Immunology. New York: W.H. Freeman & Company		
2.	Klug, W. S., Cummings, M. R. & Spencer, C - Concepts of Genetics. (12th ed.). New Jersey: Pearson Education		
3.	Mathur, R.- Animal Behaviour. Meerut: Rastogi.		
4.	Verma P.S. & Agarwal - Developmental Biology, Chordata embryology S. Chand & Co.		
Web Resources			
1.	Continuous Internal Assessment Test		
2.	Assignments		
3.	Seminars		
4.	Attendance and Class Participation		
5.	End Semester Examination		
Methods of Evaluation			
Internal Evaluation	Continuous Internal Assessment Test		25 Marks
	Simple definitions, MCQ, Recall steps, Concept definitions		
	MCQ, True/False, Short essays, Concept explanations, Short summary or overview		
	Suggest idea/concept with examples, Suggest formulae, Solve problems, Observe, Explain		
External Evaluation	Problem-solving questions, Finish a procedure in many steps, Differentiate between various ideas, Map knowledge		75 Marks
	Longer essay/ Evaluation essay, Critique or justify with pros and cons		100 Marks

Mapping with Programme Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8
CO 1	S							
CO 2	M	S						
CO 3				S		S		

CO 4				S	S	M		
CO 5			S					S

S-Strong(3)

M-Medium (2)

L-Low (1)

ZOOLOGY II PRACTICAL

COURSE OBJECTIVES:

- To make them familiarize with basic laboratory techniques in related to Zoology
- .To make them understand the taxonomic position, body organization and evolutionary relationship of species.
- To inculcate the significance of various invertebrates and chordates in their ecosystem.
- To highlight the information on economic aspects of Zoology.
- To comprehend the theoretical and practical applications of species diversity.

UNIT-I: DISSECTION:

1. Earthworm - Digestive and Nervous system.
2. Cockroach- Digestive and Nervous system.
3. Prawn – Nervous system

UNIT-II: MOUNTING:

1. Mouth parts – honeybee, cockroach and mosquito (slide).
2. Earthworm – body setae and penial setae.
3. Fish – cycloid scale, ctenoid scale and placoid scale.
4. Pila – Radula (Slide)
- 5.

UNIT III: SPOTTERS

Invertebrata – Amoeba, Paramecium, Trypanosoma, Euglena, Plasmodium, Leucosolenia, Sycon sponge, Aurelia, Obelia, planaria, Liver fluke, Tapeworm, Cockroach, Planaria, Earthworm, Nereis, Leech, Prawn/Shrimp, Scorpion, Grasshopper, Fresh water mussel, Pila, Starfish.

UNIT IV: SPOTTERS

Protochordata and Vertebrata Amphioxus, Shark, Catla, Frog, Salamander, Calotes, Chamaeleon, Turtle, Cobra, Viper, Pigeon, Rat, Bat, Rabbit. Sphygmomanometer, stethoscope, rain guage

UNIT V: SPOTTERS

Commercial important species:

Apiculture (Apiary devices) - Newton's beehive, honey extracting devices, honey, wax
Sericulture - Bombyx mori, cocoons, silk thread, rearing appliances. Aquaculture - Catla, Rohu, Mrigal, fresh water prawn (Macrobrachium rosenbergii), marine shrimp– (Penaeus monodon / Litopenaeus vannamei). Vermiculture – earthworm species - types.

COURSE OUTCOMES:

Upon successful completion of this course the students would be able to:

- Practically identify species (fresh and preserved) along with its larval forms.
- Analyze the relationship among animals to their habitat
- . • Recognize the diversity of invertebrate species from Protozoa to Echinodermata.
- Recognize the significance and economic value of sericulture and apiculture.
- Gain knowledge on significance of aquaculture and their economic role.
- Understand the significance of vermiculture technology and their ecological and economic importance.

ALLIED ZOOLOGY PRACTICAL**Mark distribution for practical exam**

Time: 3hrs

Max.Marks: 75

Question no.	Experiment	Marks
I.	Major practical-Dissection	25
II	Minor practical-Mounting	10(2x5=10)
III.	Spotters(Any five)	30(5x6=30)
IV.	Record work	10
	Total	75

Title of the Course	DISCRETE MATHEMATICS
Objectives of the Course	This course aims to develop mathematical maturity and ability to deal with abstraction and to develop construction and verification of formallogical manipulation.
Course Outline	<p>UNIT I: RECURRENCE RELATIONS AND GENERATING FUNCTIONS Recurrence - Polynomials and their Evaluations - Recurrence Relations - Solution of Finite Order Homogeneous [linear] Relations - Solutions of Non-homogeneous Relations. (Chap V . Sections:1 to 5)</p> <p>UNIT II: MATHEMATICAL LOGIC TF Statements - Connectives - Atomic and Compound Statements - Well-formed [StatementFormulae]- Truth Table of a Formula-Tautology -Tautological Implications and Equivalence of Formulae. (Chap IX . Sections:1 to 8)</p> <p>UNIT III: MATHEMATICAL LOGIC [CONTD.] Replacement process - Functionally complete sets of connectives and Duality law – NormalForms-PrincipalNormalForms.(Chap IX . Sections: 9 to 12)</p> <p>UNIT IV: LATTICES Lattices [omit example 15 PpNo.10.6]- Some properties of Lattices - New Lattices (omit remark Pp 10.14)-Modular and Distributive Lattices (omit theorem 10 and 17,Example 4-Pp10.23, Example 11-Pp10.24) (Chap X . Sections:1 to 4)</p> <p>UNIT-V BOOLEAN ALGEBRA Boolean Algebra (omit theorem 25) - Boolean Polynomials- Karnaugh Maps (omit K- map for 5 and 6 variables) (Chap X . Sections:5 to 7)</p>
Skills acquired from this course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill
Recommended Text	M.K.Venkataraman, N.Sridharan and N.Chandrasekaran, [2003] Discrete Mathematics, The National Publishing company, chennai.
Reference Books	<p>Oscar Levin, Discrete Mathematics, 3rd Edition,2016.</p> <p>B. A. Davey & H. A. Priestley (2002). <i>Introduction to Lattices and Order</i> (2nd edition). Cambridge University Press.</p> <p>Edgar G. Goodaire& Michael M. Parmenter (2018). <i>Discrete Mathematics with Graph Theory</i> (3rd edition). Pearson Education.</p> <p>Rudolf Lidl& Günter Pilz (1998). <i>Applied Abstract Algebra</i> (2nd edition). Springer.</p> <p>Kenneth H. Rosen (2012). <i>Discrete Mathematics and its Applications: With Combinatorics and Graph Theory</i> (7th edition). McGraw-Hill.</p> <p>C. L. Liu (1985). <i>Elements of Discrete Mathematics</i> (2nd edition). McGraw-Hill.</p>
Website and e-Learning Source	https://nptel.ac.in

Course Learning Outcomes:

This course will enable the students to:

CO Number	CO Statement	Knowledge Level
-----------	--------------	-----------------

CO1	Analyse and perceive various graph theoretic concepts and familiarize with their applications.	K4, K5
CO2	Describe about partially ordered sets, Boolean algebra, lattices and their types.	K1
CO3	Apply Karnaugh map for simplifying the Boolean expression	K3
CO4	Demonstrate the skill to construct simple mathematical proofs and to validate.	K2, K6
CO5	Achieve greater accuracy, clarity of thought and language.	K6

CO	Programme Outcomes (PO)							Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5	
1	2	3	2	3	3	3	3	3	3	3	2	2	2.67
2	3	2	2	2	3	3	3	2	2	2	2	3	2.42
3	2	2	2	2	3	3	3	3	3	3	2	3	2.58
4	3	2	2	3	3	3	2	3	3	3	3	2	2.67
5	3	2	2	3	3	2	2	3	3	2	2	3	2.5
	Mean Overall Score												2.57
	Result												High

Title of the Course	MATHEMATICS–II
Objectives of the Course	<ul style="list-style-type: none"> • To discuss and analyze the concept of gradient, divergence and curl and its properties. • To be familiar with Green's, Gauss and Stoke's theorem in vector integrals. • To find the solution of first order linear partial differential equations. • To solve the ordinary differential equations by using Laplace and Inverse Laplace Transform.
Course Outline	<p>Unit – I: Differentiation of Vectors Differentiation of vectors – Differential operators – Solenoidal – Irrotational – Directional derivative – Gradient – Divergence and curl – Formula involving operator ∇ . (Chapter 8: Pages: 329 - 363)</p> <p>Unit – II: Integration of Vectors Line integrals – Surface integrals – Volume integrals – Statements of Gauss divergence, Green's, Stoke's theorems and its applications – verifications. (Chapter 8: Pages: 364 - 390, 395 - 418 excluding Green's theorem in space- problems)</p> <p>Unit – III: Partial Differential Equations Formation of partial differential equations by eliminating arbitrary constants and arbitrary functions – Solutions of standard types of first order equations: $f(p, q) = 0, f(x, p) = g(y, q), f(x, p, q) = 0, f(y, p, q) = 0, f(z, p, q) = 0: z = px + qy + f(p, q)$ (Chapter 6: Pages: 252 - 269)</p> <p>Unit – IV: Laplace Transforms Definition – Laplace transforms of $e^{at}, \cos at, \sin at, \cosh at, \sinh at, t^n, e^{at}f(t), t^n f(t), f'(t), f''(t)$. (Chapter 7: Pages: 289 - 298)</p> <p>UNIT-V: Inverse Laplace transforms – Solving differential equations of second order with constant coefficients using Laplace transform. (Chapter 7: Pages: 299 - 317 excluding simultaneous equations - problems)</p>
Extended Professional Component is a part of internal component only, Not to be included in the External Examination question paper)	Questions related to the above topics, from various competitive examinations UPSC/TNPSC/other to be solved (To be discussed during the Tutorial hour)
Skills acquired from this course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferable Skill

Recommended Text	S. Narayanan, P. Kandhasamy, R. HanumanthaRao and T.K. Manickavasagam Pillai, Ancillary Mathematics, Volume II, S. Viswanathan Printers, Chennai 2010.
Reference Books	<ol style="list-style-type: none"> 1. P. Balasubramaniam, K. G. Subramanian, Ancillary Mathematics, Volume – I, Tata McGraw – Hill publishing company limited, New Delhi, 1996. 2. P. DuraiPandian, S. UdayaBaskaran, Allied Mathematics, Volume – I, Muhil publishers, 1st Edition, Chennai, 1997. 3. P. Kandsamy and K. Thilagavathy, Allied Mathematics volume – I, Volume – II, S. Chand & Company, New Delhi, 2004. 4. Shanti Narayan, P.K. Mittal, Differential Calculus, S. Chand & Co, New Delhi, 2005. 5. A. Singaravelu, Allied Mathematics, Meenakshi Agency, Chennai, 2001. 6. P.R. Vittal, Allied Mathematics, Margham Publications, Chennai, 1999.

Course Learning Outcomes:

This course will enable the students to:

CO Number	CO Statement	Knowledge Level
CO1	discuss and analyze the concept of gradient, divergence and curl and its properties.	K2, K4
CO2	recognize the importance of Green's, Gauss and Stoke's theorem in vector integrals.	K1
CO3	find solution of first order linear partial differential equations using Lagrange's method.	K5
CO4	solve the ordinary differential equations by using Laplace Transform.	K3
CO5	develop Fourier series of the periodic functions.	K6

Mapping of CO with PO and PSO

Programme Outcomes (PO)							Programme Specific Outcomes (PSO)					Mean Scores of COs
PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5	
2	2	1	3	2	2	1	3	3	3	2	2	2.17
2	3	2	2	3	2	3	2	3	2	3	2	2.42
3	3	2	2	3	3	3	2	3	2	3	2	2.58
3	3	2	2	3	1	3	3	2	3	2	1	2.33
3	2	1	2	1	2	2	2	2	2	1	3	1.92

Title of the Course	MATHEMATICAL STATISTICS - II
Objectives of the Course	<ul style="list-style-type: none"> • To test the significance of sampling • Finding the Goodness of Fit • To derive the various measures of t and F distributions • To Analyze the correlation coefficient and Regression lines
Course Outline	<p>Unit I: Introduction-Types of Sampling-Parameter and Statistic-Tests of significance-Procedure for testing of hypothesis - Test of significance for large samples - Sampling of attributes-Sampling of variables.</p> <p>Unit II: Introduction - Student's t - distribution - Applications of t-distribution</p> <p>Unit III: -F-distribution -Applications of F-distribution.</p> <p>Unit IV: Meaning of Correlation –Scatter Diagram – Karl Pearsons's Coefficient of Correlation – Rank Correlation</p> <p>Unit V: Introduction - Linear regression</p>
Extended Professional Component (is a part of internal component only, Not to be included in the External Examination question paper)	Questions related to the above topics, from various competitive examinations UPSC / TNPSC / others to be solved (To be discussed during the Tutorial hour)
Skills acquired from this course	Knowledge, problem solving, analytical ability, professional competency, professional communication and transferable skill.
Text Book	<p>S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, Sultan Chand & Co, New Delhi, Reprint 2019.</p> <p>Unit I: Ch 14 (Full)</p> <p>Unit II: Ch 16 (Sec 16.1-16.3.3)</p> <p>Unit III : Ch 16 (Sec 16.5-16.6.5)</p> <p>Unit IV: Ch 10 (Sec 10.1-10.4, 10.7.1)</p> <p>Unit V: Ch. 11 (Sec 11.1-11.2.5)</p>
Recommended Text	<p>1. Vittal, P.R. (2004). <i>Mathematical statistics</i>. Margham Publications.</p> <p>2. Kapur, J. N & Saxena, H. C. (2010). <i>Mathematical statistics (20th ed.)</i>. S. Chand & Company Ltd.</p>
Website and e-Learning Source	https://nptel.ac.in

CO No.	CO-Statements	Cognitive Levels (K-levels)
	On successful completion of this course, students will be able to	
CO-1	Recognize the parameters and statistics to test the significance of sampling	K1
CO-2	Finding the Goodness of Fit	K2
CO-3	Derive the various measures of Chi-square, t and F distributions	K3
CO-4	Correlation coefficients between Observed and Estimated values	K4
CO-5	Analyse the Regression lines	K4

Semester	Course Code	Title of the Course									Hours	Credits
II	21UMA23AC02	ALLIED-2: STATISTICS-II									6	4
Course Outcomes ↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO-1	1	2	2	2	2	3	3	2	2	2	2.1	
CO-2	2	3	1	2	2	2	2	3	3	2	2.2	
CO-3	2	3	2	1	3	2	2	3	2	2	2.2	
CO-4	3	2	3	3	1	2	2	2	3	2	2.3	
CO-5	3	1	2	2	2	2	3	2	2	3	2.2	

Title of the Course	MATHEMATICS FOR COMPETITIVE EXAMINATIONS-II
Objectives of the Course	After taking the course, To prepare the students for competitive examinations
Course Outline	Unit I: Time and work – Time and distance – Problems on Trains. (Book 1: Chapters 15, 17, 18).
	Unit II: Simple interest, compound interest – Bar graphs – Pie charts – Line graphs. (Book 1: Chapters 21, 22, 37, 38, 39).
	Unit III: Logical sequence of words – Arithmetical reasoning – Inserting the missing character. (Book 2, Section: 1, Chapters 13–15)
	Unit IV: Data sufficiency – Decision making – Verification of truth of the statement. (Book 2, Section: 1, Chapters 16, 17, 20.)
	Unit V: Non-verbal reasoning – Analytical reasoning – Grouping of identical figures. (Book 2, Section: 3, Chapter 3, 4, 13)

Extended Professional Component (is a part of internal component only, Not to be included in the External Examination question paper)	Questions related to the above topics, from various competitive examinations UPSC/TNPSC/other to be solved (To be discussed during the Tutorial hour)
Skills acquired from this course	Knowledge, problem solving, analytical ability, professional competency, professional communication and transferable skill.
Recommended Text	1. R.S. Aggarwal, <i>Quantitative Aptitude for Competitive Examinations</i> , Revised Edition, S. Chand and Company Ltd., Ram Nagar, New Delhi, Reprint 2022. 2. R.S. Aggarwal, <i>A Modern Approach To Verbal And Nonverbal Reasoning</i> , S. Chand, 2018.
Reference Books	V.V.K. Subbiraj, <i>Test of Reasoning – Verbal/Non-Verbal & General Intelligence for Competitive Examinations</i> , Sura Books, 2007

Course Learning Outcomes

This course will enable the students to:

CO Number	CO Statement	Knowledge Level
CO1	make critique of quantitative information using proportional reasoning	K5
CO2	Interpret and compare weighted averages, indices, ranking.	K2
CO3	identify uses and misuses of percentages related to a proper understanding of the bases.	K1
CO4	examining and estimating percentages as rates per 100	K3, K4
CO5	solve for an unknown quantity in proportional situation	K6

E-learning source: www.tcyonline.com/tests/mathematics-competitive-exam
<http://www.indiabix.com/online-test/non-verbal-reasoning-test>
<http://books.tamilcube.com/career/aptitude-test/non-verbal-reasoning/non-verbal-reasoning-questions-001.aspx>
<https://www.kent.ac.uk/careers/tests/spatialtest.htm>
<http://www.careerbless.com/aptitude/qa/home.php>
<http://www.careerride.com/online-aptitude-test.aspx>

Title of the Course	NUMERICAL METHODS II
Pre-requisite	12 th Standard Mathematics
Objectives of the Course	<ul style="list-style-type: none"> ➤ To evaluate derivatives using Newton's forward and backward differences formulae. ➤ To acquire the knowledge about evaluation of numerical integration. ➤ To evaluate the solution of linear homogeneous difference equations with constant coefficients. ➤ To obtain numerical solutions to the ordinary differential equations.
Course Outline	<p>Unit I: Numerical Differentiation: Derivatives using Newton's Forward and Backward Difference Formulae Derivatives using Stirling's Formula- Derivatives using Divided Difference Formula- Maxima and Minima using the above Formulae. Chapter 7 :Section 7.1 to 7.4 & 7.6</p> <p>Unit II: Numerical Integration: Trapezoidal Rule-Simpson's One-Third Rule - Simpson's Three-Eighth Rule- Weddle's Rule. Chapter 7 :Section 7.9 & 7.13 to 7.15</p> <p>Unit III: Difference Equations: Linear Homogenous and Non Homogenous Difference Equation with constant coefficients- particular integrals for a^x, x^m, $\sin kx$, $\cos kx$, $a^x F(x)$. Chapter 8 :Section 8.1 to 8.4 & 8.6</p> <p>Unit IV: Numerical solution of Ordinary Differential Equations (I order only): Taylor's series method- Picard's method. Chapter 9: Section 9.5 ,9.6</p> <p>Unit V: Numerical solution of Ordinary Differential Equations (I order only): Euler's Method- Modified Euler's Method-Runge-Kutta Method (Fourth Order only). Chapter 9 : Section 9.7,9.9 to 9.11</p>
Extended Professional Component (is apart of internal component only, Not to be included in the External Examination question paper)	Questions related to the above topics, from various competitive examinations UPSC /TNPSC /others to be solved (To be discussed during the Tutorial hour)
Skills acquired from this course	Knowledge, problem solving, analytical ability, professional competency, professional communication and transferable skill.
Recommended Text	P.Kandasamy, K.Thilagavathy (2003) Calculus of Finite differences & Numerical Analysis, S. Chand & Company Ltd., New Delhi-55.
Reference Books	<ol style="list-style-type: none"> 1. B.D. Gupta. (2001) <i>Numerical Analysis</i>. Konark Pub. Ltd., Delhi 2. M.K. Venkataraman. (1992) <i>Numerical methods for Science and Engineering</i> National Publishing Company, Chennai. 3. S. Arumugam. (2003) <i>Numerical Methods</i>, New Gamma Publishing, Palayamkottai. 4. H.C. Saxena. (1991) <i>Finite differences and Numerical analysis</i> S.Chand & Co., Delhi

Website and e-Learning Source	https://ocw.mit.edu/courses/22-15-essential-numerical-methods-fall-2014/pages/syllabus/ https://ocw.mit.edu/courses/18-330-introduction-to-numerical-analysis-spring-2004/
--------------------------------------	--

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

CLO1: After studied unit -1, the student will be able to evaluate derivatives by applying Newton’s forward and backward differences formulae.

CLO2: After studied unit -2, the student will be able to evaluate integrations by applying the trapezoidal rule, Simpson’s rules, and Weddle’s rule.

CLO3: After studied unit -3, the student will be able to find a complete solution to linear difference equations.

CLO4: After studied unit -4, the student will be able to estimate approximate numerical solutions of ordinary differential equations by Euler, Picard and Taylor.

CLO5: After studied unit -5, the student will be able to estimate approximate numerical solutions of ordinary differential equations by Runge-Kutta methods.

	POs						PSOs		
	1	2	3	4	5	6	1	2	3
CLO1	3	1	3	2	4	-	3	2	1
CLO2	2	1	3	1	4	-	3	2	1
CLO3	3	1	3	1	2	-	3	2	1
CLO4	3	1	3	2	4	-	3	2	1
CLO5	3	1	3	2	4	-	3	2	1

RESOURCE MANAGEMENT TECHNIQUES

Learning Objective		
LO1	To provide adequate knowledge on the application of resource management techniques in business.	
LO2	To impart knowledge on the construction of mathematical models for managerial decisions.	
LO3	To provide basic understanding of optimal utilization of limited resources by applying the techniques.	
LO4	To acquire knowledge about waiting line theory	
LO5	Knowledge about decision theory	
UNIT	Contents	No. of Hours
I	Introduction to Operation Research - Scope - LPP - Graphical Method - Simplex Method of solving Linear Programming Problems (Simple problems only)	12
II	Transportation Model - Basic Feasible Solution –Northwest corner- least cost method – VAM- balanced & unbalanced TP.	12
III	Assignment Model and Assignment Algorithm –Unbalanced - maximization & minimization - Restricted Assignment problems.	12
IV	Project Management - Network Analysis – CPM - Network Construction - Critical Path and Duration - PERT - Time Estimates for PERT –project length - distinction Between PERT and CPM.	12
V	Game Theory - Meaning - Rules of Game - Saddle Point - Pure strategies – value of the game – Dominance Property - Different Methods of Solving Game Theory problems (No LPP Method).	12
	Total	60
Course Outcomes		Programme Outcome
CO	Upon completion of the course the students would be Able to:	
1	Apply quantitative techniques to formulate business problems into linear programming problems for optimization of results.	PO1
2	Utilize Assignment and transportation model to maximize profit and minimize cost in business.	PO1, PO2
3	Use CPM and PERT to plan, schedule and control project activities.	PO3, PO5
4	Propose the best strategy and predict how firms behave in a specific strategic situation	PO5

5	Develop and apply systematic and analytical decision skills to determine the best choice using decision trees	PO3, PO6
Text Book		
1. P.R. Vittal&V.Malini Operation Research, Margham publications,Chennai 2018. 2. V.K Kapoor , Operation Research Techniques for Management, Sultan Chand &sons, New Delhi 2017.		
Reference Books		
1. M.Sathya Narayana & Lalitha Raman, Operations Research, Himalaya publishing house, Mumbai, 2001		
2. Dr.P.K Gupta & DR. Manmohan, problems in Operations Research, Sultan Chand & sons New Delhi 2018.		
Web Resources		
1. https://www.onlinemathlearning.com › linear-programming-example		

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO 2	PSO3	PSO4	PSO 5	PSO6
CO 1	3	3	3	3	3	3
CO 2	3	3	2	3	3	3
CO 3	3	2	2	3	2	3
CO 4	3	3	3	2	2	3
CO 5	3	2	3	2	3	2
Weight age of course contributed to each PSO	15	13	13	13	13	14

S-Strong-3 M-Medium-2L-Low-1

STATISTICAL METHODS & ITS APPLICATIONS-II

Learning Objective		
LO1	To increase the span of attention of concepts	
LO2	To link concepts related to one unit with other units	
LO3	Give clarity on the intended learning outcomes of the unit.	
LO4	To acquire knowledge about Test of Significance-	
LO5	Knowledge about Analysis of variance.	
UNIT	Contents	No. of Hours
I	Probability Sample Space-events-probability-Addition and Multiplication Theorem-conditional probability - Baye's Theorem and simple problems	12
II	Probability Distribution Binomial, Poisson, Normal distribution and fitting distribution	12
III	Index Number Weighted and UN weighted Index Numbers – Cost of Living Index Number – Average of Relative Price Indices-Quality Index Number- Test on index Numbers- Time reversal test, Factors reversal test.	12
IV	Test of Significance (Small Samples Tests) Small sample tests with regard to Mean, Difference between Means and Paired t test , F-test - Definition of Chi-square test – Assumptions – Characteristics– Chi-square tests for Goodness of fit and Independence of attributes – Simple Problems.	12
V	Analysis of variance –One and Two way classifications-Basic principle of design of Experiments Randomization, L.S.D.	12
	Total	60
Course Outcomes		Programme Outcome
CO	Upon completion of the course the students would be Able to:	
1	Know and understand about Sample Space-events-probability	PO1
2	Know and understand about Standard Probability distributions	PO1, PO2
3	Know and understand about Index Numbers	PO3, PO5
4	Know and understand about Test of Significance	PO5

5	Understand the Analysis of variance	PO3, PO6
Text Book		
1. Fundamental of Mathematical Statistics-S.C. Gupta&V.K. Kapoor-SultanChand		
Reference Books		
2. Fundamental of Applied Statistics-S.C.Gupta& V.K.Kapoor–Sultan Chand		
3. Statistical Methods-Snedeco rG.W.& Cochran W.G. oxford &+DII		
Web Resources		
https://nptel.ac.in/courses/111107105		

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO 2	PSO3	PSO4	PSO 5	PSO6
CO 1	3	3	3	3	3	3
CO 2	3	3	2	3	3	3
CO 3	3	2	2	3	2	3
CO 4	3	3	3	2	2	3
CO 5	3	2	3	2	3	2
Weight age of course contributed to each PSO	15	13	13	13	13	14

S-Strong-3 M-Medium-2L-Low-1