

M.D.U., ROHTAK

A) Open Elective Courses

Students of all PG programmes under CBCS (w.e.f. 2017-18) are required to study one open elective course in each of the 2nd and 3rd Semesters for 2-Years Programmes and in each of the 4th and 5th semesters for 3-Years Programmes. They may choose any one of the following courses (excluding the courses offered by the departments of their own subjects, if not stated otherwise).

Open Elective Courses of 2nd Semester:-

Sr. No.	Nomenclature of the course	Course Code	Offered by the Department
1.	Introduction to Bioinformatics	16BINO1	Bioinformatics
2.	Principles and Applications of Agriculture Biotechnology-I	16CBTO1	Biotechnology
3.	Principles and Applications of Biotechnology-I	16CBTO3	Biotechnology
4.	Basic Biochemistry	16BCHO1	Bio-Chemistry
5.	Plant Resource Utilization	16BOTO1	Botany
6.	Cyber Forensic & Security	16CSAO1	Computer Science & Applications
7.	National Security of India	16DSSO1	Defence & Strategic Studies
8.	Basics of Economics	16ECOO1	Economics
9.	Fundamental Aspects of Education	16EDUO1	Education
10.	Environmental Issues	16ENVO1	Environmental Science
11.	Food Adulteration	16FTEO1	Food Technology
12.	Genetics & Society	16GENO1	Genetics
13.	Basics of Geoinformatics	16GEOO1	Geography
14.	Geography of India Systematic and Regional	16GEOO2	Geography
15.	Nationalism in India	16HISO1	History
16.	Fundamentals of Management	16IMSO1	IMSAR
17.	Media & Society	16JRMO1	Journalism
18.	Family Law	16LAWO1	Law
19.	Academic Integrity & Plagiarism	16LISO1	Library & Information Science
20.	Mathematical Techniques and Applications	16MATO1	Mathematics
21.	Parametric & Non-Parametric Tests	16MATO2	Mathematics
22.	Principles of Medical Biotechnology I	16MBTO1	Medical Biotechnology
23.	Microbial World-Diversity and Applications	16MCBO1	Microbiology
24.	Sources of Energy-I	16PHYO1	Physics
25.	Administrative Literacy	16PUBO1	Public Administration
26.	Disaster Management - I	16POLO1	Political Science
27.	Ancient Indian Culture & Philosophy	16SKTO1	Sanskrit
28.	Understanding Sociology	16SOCO1	Sociology

29.	Quantitative Techniques	16STAO1	Statistics
30.	Sampling & Estimation Techniques	16STAO2	Statistics
31.	Computer Science Principles	16CSEO1	UIET (Comp. Sc. & Eng.)
32.	Software Engineering Practices	16CSEO2	UIET (Comp. Sc. & Eng.)
33.	Business skills for Biotechnologists	16MBTO1	UIET (Biotech)
34.	Operations Research	16MMEO1	UIET (Mech. Eng.)
35.	Multimedia Communication	16ECEO1	UIET(Electronics & Comm
36.	Applied Zoology	16ZOOO1	Zoology

CENTRE FOR BIOINFORMATICS

M. D. UNIVERSITY, ROHTAK

CBCS-SCHEME OF EXAMINATION (M.Sc. -Bioinformatics)-2016-17 onwards

Course Title: Introduction to Bioinformatics

Credit: 3 0 0

Course Code: 16BINO1

MM. Th 80+ IA 20

Time: 3 Hours

Note: In all 7 questions are to be set, Question No. 1 is compulsory and to be set covering entire Syllabus. 6 questions will be set with two questions from each unit. Students are required to attempt one compulsory question and 4 other questions, *i.e.*, selecting atleast one from each unit.

UNIT I

Overview of Bioinformatics and Information technology: History, scope and application, Internet and World Wide Web; Generation of computers; Concept of networking; Internet protocols – OSI model; TCP/IP models.

UNIT II

Bioinformatics resources: Biological databases, Basic classification – Sequence & Structure; Generalized & Specialized; Primary & Secondary, with example databases .

Omics science: Introduction to genomics, proteomics, metabolomics, interactomics.

UNIT III

Bioinformatics tools: Information retrieval system (Entrez, SRS); Sequence alignment tools (BLAST, FASTA, CLUSTAL-W/X, MUSCLE, TCOFFEE), Variants of BLAST (BLAST_n, BLAST_p, PSI-BLAST, PHI-BLAST, etc).

M.Sc Agriculture Biotechnology

Semester-II

Course Title: Principles and Applications of Agriculture Biotechnology-I

MM. Th 80+IA 20

Time: 2 h

Course Code No. 16CBTO1

NOTE: In all four questions will be set, two from each unit and one compulsory question of short answer type covering all the two units. Students are required to attempt one compulsory question and two other questions selecting at least one from each unit.

Theory

UNIT I

Tools and techniques used in agriculture biotechnology, restriction digestion (restriction endonucleases, types and mechanism), ligases, alkaline phosphatases, polynucleotide kinase, SI nuclease, DNase, RNase, scoreable and selectable markers. PCR, C-DNA and genomic libraries.

UNIT II

Plant tissue culture and its application in crop improvement. Recombinant DNA technology and cloning vectors, Different methods of gene transfer in plants (*Agrobacterium* mediated transfers, microinjection, electroporation, somatic cell hybridization).

UNIT III

Genetic and Molecular basis of Heterosis and Apomixis and their significance, Mutations and polyploidy in crop improvement, Molecular markers, Marker assisted breeding, QTL mapping, Origin, evolution and cultivation practices of the major crop plants. Improvement of crop plants: increase in iron, protein and amino acids, golden rice colours – anthocyanins, betalaines, crocin and crocetin. Flavours—capsaicin, vanillin, stevioside, thaumatin. Developing vaccine and plantibodies, terminator technology and male sterility

Suggested readings:

1. Hou CT, Shaw JF (2009) – Biocatalysis and agricultural biotechnology, CRC Press, USA
2. Agricultural biotechnology, 1st edition, (2008) Rawat H, Oxford Book Co, India.
3. Agrobiotechnology and plant tissue culture, Bhojwani SS, Soh WY, Oxford & IBH Publ, India
4. Agricultural biotechnology, (2005), Kumar HD, Daya Publ House, India
5. Plant molecular breeding, (2009), Newbury HJ, John Wiley and Sons., USA.
6. Embryology of Angiosperms, (2009), S.S. Bhojwani and S.P. Bhatnagar, Vikas Publ House, India.
7. Ashwani Kumar, Shekhawat NS (2009) – Plant tissue culture and molecular markers: their role in improving crop productivity (IK International)
8. Biotechnology, 4th edition, (2010), H K Das, Wiley India Pvt. Limited, India
8. Biotechnology, 4th edition, (2010), H K Das, Wiley India Pvt. Limited, India

M.Sc Biotechnology

Course Title: Principles and Applications of Biotechnology-I

Semester-II

MM. Th 80+IA20

Time: 2 h

Course Code No. 16CBTO3

NOTE: In all four questions will be set, two from each unit and one compulsory question of short answer type covering all the two units. Students are required to attempt one compulsory question and two other questions selecting at least one from each unit.

UNIT I

Molecular cloning tools; Restriction modification systems: Types I, II and III. Mode of action and nomenclature, DNA modifying enzymes and their applications: DNA polymerases, DNA phosphatases, and DNA ligases; Cloning Vectors: Definition and Properties, Plasmid vectors: pBR and pUC series; Bacteriophage lambda and M13 based vectors, Cosmids, BACs, YACs, linkers and adaptors.

UNIT II

Protein expression vectors: *E. coli* lac and T7 promoter based vectors, yeast YIp, YEp and YCp vectors, Baculovirus based vectors, mammalian SV40 based expression vectors, Methods in Molecular Cloning, Transformation of DNA: Chemical method & Electroporation; Gene delivery: Microinjection, electroporation, biolistic method (gene gun), liposome and viral mediated delivery, Agrobacterium mediated delivery, in vitro culture of plant and animal cells

UNIT III

DNA Amplification and DNA sequencing; PCR, RT-PCR, Sanger's method of DNA Sequencing: traditional and automated sequencing, Introduction to next generation sequencing, Chromosome walking & jumping, shotgun sequencing. Preparation, uses and screening of Genomic and cDNA libraries; Colony hybridization and colony PCR applications of Recombinant DNA Technology; Products of recombinant DNA technology: Products of human therapeutic interest-insulin, antisense molecules, Applications of recombinant DNA in crop improvement, Gene therapy, Recombinant vaccines, Protein engineering, Site directed mutagenesis and Biosensor technology

Suggested readings:

1. Brown, TA (2010) Gene Cloning and DNA Analysis: An Introduction, Sixth Edition. A John Wiley & Sons, Ltd., Publication, Germany.
2. Clark DP, Pazdernik NJ (2009) Biotechnology: Applying the Genetic Revolution. Elsevier Academic Press, USA.
3. Primrose SB, Twyman RM (2006) Principles of Gene Manipulation and Genomics, 7th Edition. Blackwell Publishing, Oxford, U.K.
4. Wiley JM, Sherwood LM, Woolveron CJ (2008) Prescott, Harley and Klein's Microbiology. McGraw Hill Higher Education.
5. Primrose SB and Twyman RM (2008) Genomics: Applications in human biology. Blackwell Publishing, Oxford, U.K.

Open Elective papers offered by Department of Biochemistry

16BCHO1: Basic Biochemistry

Note: Question 1 will be compulsory and will cover the entire syllabus in the form of short questions. Question 2 to 7 will include three questions from each unit and candidate will have to attempt two questions from each unit. Overall, three questions to be attempted. All questions to carry equal marks(16).

MM. Th 80+IA 20

UNIT I:

Cell: definition, general structure and size of some important cells, general functions of cell organelles, basic difference in prokaryotic and eukaryotic cells

Carbohydrates: Definition, classifications and sources of carbohydrates, occurrence and biological functions of monosaccharides, disaccharides, and polysaccharides

Lipids: Introduction, classification and functions of lipids. Saturated and unsaturated fatty acids. Essential fatty acids. Triacylglycerides and their properties,

Amino acids: Nutritional classification of amino acids and physical properties of amino acids.

Proteins: Definition, types, sources, properties and biological significance of proteins, Primary, secondary, tertiary and quaternary structure of proteins.

UNIT 2:

Nucleic acids: Nucleotides & nucleosides, types of DNA and RNA, evidence that DNA is the genetic material, feature of DNA double helix, Size of DNA in prokaryotic and eukaryotic cells.

Vitamins: Sources, examples and classification, important functions of fat soluble and water soluble vitamins

Enzymes: History, general characteristics, nomenclature and IUB classification of enzymes, holoenzyme, apoenzyme, coenzymes, prosthetic groups, cofactors, activators, inhibitors, active site, metalloenzymes and isozymes, Units of enzyme activity, examples of some clinically important enzymes

Factors affecting enzyme activity: pH, temperature, time of incubation, enzyme concentration and substrate concentration. Properties of allosteric enzymes and their significance.

Suggested Readings for 16BCH01: Basic Biochemistry:

1. Lehninger Principles of Biochemistry 4th Ed **By** David L. Nelson and Michael M. Cox, WH Freeman and Company.
2. Principles of Biochemistry **By** Geoffrey Zubay. Publisher: McGraw Hill College.
3. Biochemistry: The Molecular Basis of Life **By** Trudy McKee and James R McKee. Publisher: McGraw-Hill Higher education.
4. Biochemistry: Biomolecules, Mechanisms of Enzyme Action and Metabolism Vol 1 **By** D Voet. John Wiley and Sons.
5. Biochemistry **By** U. S. Satyanarayana
6. Outlines of Biochemistry **By** Eric C Conn, PK Stumpf, G Bruening and Ray H. Doi. John Wiley & Sons.

DEPARTMENT OF BOTANY

Open Elective Paper: Plant Resource Utilization Semester-II: Paper Code: 16BOTO1

MM. Th 80+IA 20
Time: 3 hrs.

Note: The examiner is required to set even questions in all. Question No. 1 will be compulsory and short answer type covering the entire syllabus. The remaining six questions will be set with two questions from each unit. The candidate will be required to attempt Question 1 and four more selecting at-least one from each unit.

UNIT-I

Origin of Agriculture, World Centres of Primary diversity of domesticated plants: Plant Introductions and Secondary Centres.

Botany, Cultivation, Harvesting and uses of Wheat and Rice.

Botany, Cultivation and uses of following fruits and vegetables: Mango, Apple, Banana, Potato, Alliums, Cabbage, Spinach and Tomato

UNIT-II

General Account of the Spices: Ginger, Turmeric, Cinnamon, Clove,

Beverage Plants: Source and general account of Tea and Coffee.

Legumes: Origin, Botany, Cultivation and uses of Pigeon pea, Chick pea, Cluster bean

Medicinal Plants: Plants as sources of drugs, parts used and uses.

Fibres: Types of fibres - Soft fibres, Hard fibres, Surface fibres, Brush fibres and Braiding fibres.

UNIT-III

Gums: Important commercial gums and their uses.

Tannins and Dyes: Sources and their uses.

Vegetable Oils and Fats: Distinction between fatty and essential oils. Drying (Soyabean and linseed), nondrying (Groundnut and Mustard oil) and Semi drying (cottonseed and Sunflower oil) oils and their uses.

Wood and its Uses: Soft woods and hard woods, wood as fuel, construction material Genetic Resources and their conservation.

SUGGESTED READINGS

1. Anonymous. *National Gene Bank: Indian Heritage on Plant Genetic resources* (Booklet). National Bureau of Plant Genetic Resource, New Delhi. 1997.
2. Cobley, L.S. and W.M. Steels. *An Introduction to the Botany of Tropical Crop*

- Plants*. 3rd Ed. The English Language Book Society and Longman, London. 1979.
3. Bole, P.V. and Y. Vaghani. *Field Guide to Common Indian Trees*. Oxford University Press, Mumbai. 1991.
 4. Chandel, K.P.S., G. Shukla and N. Sharma. *Biodiversity in Medicinal and Aromatic Plants in India: Conservation and Utilization*. National Bureau of Plant Genetic Resources, New Delhi. 1996.
 5. Conway, G. and V.W. Rattan. *The Doubly Green Revolution. Food for all in the 21st Century*. Cornell Univ. Press. 1999.
 6. Dastur, J.F. *Medicinal Plants of India and Pakistan*. 3rd Ed. Meyerbooks. 1985.
 7. Hill, A.F. *Economic Botany*. McGraw Hill Book Co. Inc., New York. 1986.
 8. Kirtikar, K.R. & D.D. Basu. *Indian Medicinal Plants*. Vols. I & II. 2nd Ed. Lalit Mohan Basu, Allahabad. 1953.
 9. Kochhar, S.L. *Economic Botany of the Tropics*. 2nd Ed. MacMillan India Ltd., Delhi.
 10. Leonard, W.H. & J.H. Martin. *Cereal Crops*. MacMillan Co., New York, USA. 824 pp. 1963.

DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

OPEN ELECTIVE COURSE

CYBER FORENSIC AND SECURITY

Paper Code: 16CSAO1

MM. Th 80+IA 20

Time: 3Hrs.

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT-1

Introduction to Information Systems: Types of information Systems, Introduction to information security, Need for Information security, Threats to Information Systems, Information Security Investigations.

Security threats - Sources of security threats- Motives - Target Assets and vulnerabilities – Consequences of threats- E-mail threats - Web-threats - Intruders and Hackers, Insider threats, Security Threats to E-Commerce, Cyber-crimes.

UNIT-2

Cyber Forensics: Cyber Security, Cyber Security roles, Cyber Security Principles, Difference between information Security and Cyber Security, Types of Computer Forensics Technology, Types of Military Computer Forensic Technology, Types of Law Enforcement: Computer Forensic Technology, Types of Business Computer Forensic Technology, Specialized Forensics Techniques, Hidden Data and How to Find It, Spyware and Adware, Encryption Methods and Vulnerabilities, Protecting Data from Being Compromised Internet Tracing Methods, Security and Wireless Technologies, Avoiding Pitfalls with Firewalls Biometric Security Systems

UNIT-3

Ethical Hacking: Essential Terminology, Hacking windows – Network hacking – Web hacking – Password hacking, Malware, Scanning, Cracking. Digital Evidence in Criminal Investigations: The Analog and Digital World, Training and Education in digital evidence, Evidence Collection and Data Seizure: Why Collect Evidence, Collection Options Obstacles, Types of Evidence, The Rules of Evidence, Volatile Evidence, General Procedure, Collection and Archiving, Methods of Collection, Artifacts, Collection Steps, Controlling Contamination: The Chain of Custody, Reconstructing the Attack, The digital crime scene, Investigating Cybercrime, Duties Support Functions and Competencies.

UNIT-4

Cyber Crimes and Cyber Security Standards: Crime incident Handling Basics: Cyber activism, Tracking hackers, clues to cyber-crime, privacy act, search warrants, common terms, organizational roles, procedure for responding to incidents, reporting procedures, legal considerations, Information Technology Act 2000: Scope, jurisdiction, offense and

contraventions, powers of police, adjudication, Intellectual property issues in cyberspace, ISO, Copyright Act, Patent Law, Cyber Laws in India.

Reference Books:

1. V.K. Pachghare, "Cryptography and Information Security", PHI Learning Private Limited, India.
2. William Stallings and Lawrie Brown, "Computer Security: Principles and Practice", Prentice Hall.
3. Swiderski, Frank and Sydex, "Threat Modeling", Microsoft Press.
4. John W. Rittinghouse, William M. Hancock, "Cyber Security Operations Handbook", ElsevierPub.
5. Deborah G Johnson, "Computer Ethics", 4th Edition, Pearson Education Publication.
6. Earnest A. Kallman, J.P Grillo, "Ethical Decision making and IT: An Introduction with Cases", McGraw Hill Publication.
7. Dr. Surya Prakash Tripathi, RitendraGoyal, Praveen Kumar Shukla, "Introduction to Information Security and Cyber Law", WilleyDreamtech Press.
8. Kenneth J. Knapp, "Cyber Security and Global Information Assurance: Threat Analysis and Response Solutions", IGI Global.
9. Cahnder, Harish, "Cyber Laws and Its Protection", PHI Learning Private Limited, Delhi, India
10. Michael E. Whitman, Herbert J. Mattord, "Principles of Information Security", Cengage Learning Pub.
11. Charles P. Pfleeger, Shari LawrancePfleeger, "Analysing Computer Security", Pearson Education India.
12. Joseph M Kizza, "Computer Network Security", Springer Verlag.

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**OPEN ELECTIVE OFFERED BY THE DEPARTMENT
Of
Defence and Strategic Studies**

SEMESTER-II

**PAPER CODE-16DSSO1
NATIONAL SECURITY OF INDIA**

Maximum Marks: 100

Credits: 3:0:0

Theory Marks: 80

Time Allowed: 3 Hours

Internal Assessment Marks: 20

INSTRUCTION FOR THE PAPER SETTERS

The Paper-Setters/Examiners will have to set Eight Question, selecting two from each out of Unit-I,II, III and IV. And one question consisting of Ten short answer type questions, without it any internal choice covering the entire syllabus be set in Unit V of the question Paper.

The Question Paper will consist of five units: I, II, III, IV and V. Unit-V will be compulsory. The first Four Units will contain two questions each from the respective syllabus and each question will carry 15 marks. Unit V of the question and will contain Ten short answer type question, with any internal choice and will cover the entire syllabus uniformly. Each short answer type question will carry Two marks. The Question Paper should be set strictly according to the syllabus. Separate marks for each question. Should be indicated in the question papers.

UNIT-I

1. **National Security Concepts:-**
 - a) **Definition of National Security, National Defence and National Interest.**
 - b) **Elements of National Security.**

UNIT-II

2. **National Security Structure:-**
 - a) **National Security Council and Cabinet Committee on Security affairs.**
 - b) **Armed Forces, Para-Military Forces.**

UNIT-III

3. Threats to Indian Security:-

- a) Internal – Threats
- b) External – Threats

UNIT-IV

4. India and Its Neighbours:-

- a) India's Geo-Strategic Location
- b) India's Relations with its neighbours

Books Recommended

1. Howard, Michael, "Theory and Practice of War"
2. Howard, Michael, "The Causes of War"
3. Bernard Black, L, "War and Its Causes"
4. Wright, Quincy, "A Study of War"
5. Mao-Tse-Tung, "Guerilla Warfare"
6. Legueur Walter, "Guerilla Warfare"
7. Robert E. Osgood, "Limited War – The Challenges to American Strategy".
8. Rees David, "Korea, the limited War"
9. Kitson Frank, "Low Intensity Operations, Subversion Insurgency, Peace keeping"
10. Osanka F.M., "Modern Guerilla Warfare"
11. Nasution, Abdul H., "Fundamentals of Guerilla Warfare"
12. Brodie, Bernard, "Strategy in the Missile Age"
13. Sampooran Singh, "India and the Nuclear Bomb"
14. Tirpathi, K.S., "Evolution of Nuclear Strategy"

15. **Gupta, Rakesh, "Militarisation of outer-space"**
16. **Encyclopedia Britannica**
17. **Halperin Morton H., "Defence Strategies for the seventies"**
18. **Mir Publications, "Weaponary in Space, The Dilemma of Society"**

MA (Economics)
Semester-II
16ECOO1 - Basics of Economics (Open Elective Paper)

Max. Marks: 100
Time: 3 Hrs.

Written Exam:80
Internal Assessment: 20

Unit -1

What is an Economy? Control problems of an Economy: What, how and for whom to produce, concept of production possibility function and opportunity cost.

Unit-II

Consumer's equilibrium – meaning of utility, marginal utility, conditions of consumer's equilibrium.

Unit-III

Demand, market demand, determinants of demand, demand schedule, price elasticity of demand, factors affecting price elasticity of demand.

Unit-IV

Cost and Revenue: Total cost, Total fixed cost, Total variable cost.

Average cost: Average fixed cost, average variable cost

Revenue- Total revenue and marginal revenue, -meaning their relationship

Note:

(A) Nine questions would be set in all.

(B) Question No. 1 based on the entire syllabus, would be compulsory. It would contain eight short answer questions of two marks each.

(C) There would be two questions (16 marks each) from each of four units.

(D) Candidates would be required to attend five questions (one compulsory and selecting one from each unit).

Reading List:

- D.N. Divedi: Principles of Economics, 2nd Edition, Vikas Publication House.
- R Dutta and K P M Sundaram: Indian Economy, S Chand
- A.N.Agarwal: Indian Economy, Problems of Development and Planning, New Age.
- Mishra and Puri: Indian Economy, Himalaya.

OPEN ELECTIVE - I (FUNDAMENTAL ASPCETS OF EDUCATION)

16EDUO1

Time: 3 Hours

Credits: 03

Max. Marks: 100

(Theory: 80, Internal: 20)

NOTE FOR PAPER SETTER

- I Paper setter will set 9 questions in all, out of which student will be required to attempt 5 questions
- II Q. No. 1 will be compulsory and will carry 16 marks. It will comprise of 4 short answer type questions of 4 marks each to be selected from the entire syllabus.
- III Two long answer type questions will be set from each of four units, out of which the students will be required to attempt one question from each unit. Long answer questions will carry 16 marks each.
- IV All questions carry equal marks

COURSE OBJECTIVES:

After completing the course, the students will be able to:

- understand nature and functions of education and philosophy and their relationship
- explain the meaning, types and scope of educational technology
- acquaint the learner with the process of development and assessment and its implication in teaching learning process
- develop an understanding of different stages of growth and development.
- understand the concept of educational sociology and sociology of education.
- acquaint students with the basics of social organization and its concept.
- develop an understanding of different factors influencing social organization-folkways, mores, institutions; values.

COURSECONTENTS

UNIT – I

Education and Philosophy

- Concept of Education and Philosophy.
- Nature of Education and Philosophy.
- Relationship of Education and Philosophy.
- Need of Philosophical Foundations of Education.
- Branches of Philosophy; Metaphysics, Epistemology and Axiology, their implications for Education; Philosophical redirection of educational research in recent times.

UNIT–II

- Educational Technology.** Meaning, Nature, Approaches, Types, Scope And Significance Of Educational Technology
- Programmed Instruction: Concept, Principles and Styles of Programmed Instruction
- Development of Programmed Instructional Material.
- ICT In Education; Computer Assisted Instruction, Computer Managed Learning And
- Process of development of Computer based instructional material, Web Integrated Learning.
- E-Learning and Virtual classrooms.

UNIT-III

Developmental Aspects of the Learner

Educational Psychology: Concept and scope

Concept of Teaching and learning

Role of Educational Psychology in the Teaching –learning process

Concept of Growth and development and principles' of development and its implications to teaching and learning process.

Genetic epistemology of Jean Piaget.

Motivation: Need, types and how can a teacher motivate students for learning.

Factors affecting Learning.

UNIT – IV

Concept of Educational Sociology and Sociology of Education

Social organization and its concepts.

Factor influencing social organization-folkways, mores, institutions; values.

Dynamic characteristics of social organization and its educational implications.

Education as an investment.

Brain drain: Concept, factors responsible for Brain drain, how to check brain drain from our country.

Suggested Readings:

Andrews, T.W. (1961).Methods in Psychology, New York: John Wiley and Sons, Inc.

Baller, Warren R., Don, C.(1962). The Psychology of Human Growth and Development, New York: Holt, Rinehart and Winston.

Banerjee A.C. & Sharma S.R. (1999) : Sociological and Philosophical issues in Education, Jaipur : Book Enclave.

Bhushan, A & Ahuja, M. (1992), Educational Technology, Meerut : Vikas Publication.

Bloom, B.S. (1972), Taxonomy of Educational Objectives. A Hand Book- I (Cognitive Domain), New York: Devid Mokey Campo.

Chauhan S.S.(1978), A Textbook of Programmed Instruction, New Delhi : Sterling Publishers.

Das, R.C.(1993), Educational Technology: A Basic Text, New Delhi: Sterling Publishers.

Dave, R.H (1969). Taxonomy of educational objectives and achievement testing; development of educational testing vol. 1. London: University of London Press.

Mangal. S.K. (2009). Essentials of Educational Technology. New Delhi: Prentice Hall of India pvt. Ltd.

Sharma, Hemant Lata (2014). Innovative inputs in ICT. Jalandhar: Amit Prakashan.

Sharma, Hemant Lata & Sharma, Savita (2010). Learning to Learn With Love : Theory and Practices of Co-operative Learning, New Delhi : Gagandeep Publication.

Pnadey, K.P.(1983). Perspective in Social Foundation of Education, Amitash Prakashan, Ghaziabad.

Kamat, A.R.,(1985).Education and Social Change in India, Samaiya Publishing Co., Bombay.

Maunheim, K.et al.,(1962). An Introduction to Sociology of Education. Routledge and Kegam Paul,London.

Mossish , Loor., (1972). Sociology of Education: An introduction, George Allen and Unwin, Londo

Walia J.A., (2011): Philosophical, Sociological and Economic Bases of Education, Jalandhar: Ahim Paul Publishers

Semester –II

Open Elective

16ENVO1: Environmental Issues

MM. Th 80+IA 20

Time : 3 Hours.

Note: 1. Seven questions will be set in all.

2. Question No. 1 will be objective covering the entire syllabus & compulsory. The remaining six questions will be set with two questions from each unit. The candidate will be required to attempt five in total, Question I and four by selecting at least one from each unit.

Unit-1

Global Environmental Issues: Green House effect – causes and associated hazards, Ozone layer depletion – causes and associated hazards, Deforestation, Human Population Growth. Environmental problems associated with urbanization, industrialization, modernization of agriculture

Unit-2

Regional Environmental Issues: Forest and Wildlife management, desertification, reclamation of degraded land; Human intervention on wetlands, siltation and eutrophication, reclamation of wetlands, Mining and Environment, Open cast mining, Oil exploration and transportation, Deforestation and their impact on environment.

Unit-3

Pollution: Air Pollution : Causes of air pollution, Some important pollutants of air (CO, SO_x, NO_x and HC and Particulates) – their sources and effects on living and non-living organisms. Water Pollution: Sources of pollution of surface and ground water, Types of water pollutants. Solid Waste – Sources, characterization, disposal and management. Soil Pollution sources of soil pollution, Pollution and residual toxicity from the application of insecticides, pesticides and fertilizers; Soil erosion.

List of Recommended Books

1. Fundamentals of Environmental Science: G. S. Dhaliwal, G. S. Sangha and P. K. Raina, Kalyani Publication
2. Environmental Chemistry : A. K. De
3. Environmental Chemistry : B.K. Sharma, and H. Kaur
4. Fundamentals of Ecology : E. P. Odum
5. Environmental Science (6th ed) (1997): Jr. G. T. Miller, Wadsworth Pub. Co.

Food Adulteration

PAPER CODE: 16FTEO1

There will be seven questions in all. The first question will be compulsory and short answer type covering the entire syllabus. The remaining six questions will be set with two questions from each unit. The candidate will be required to attempt question 1 and four more selecting atleast one from each unit.

MM. Th 80+IA 20

Time: 3h

Unit I

Basic food groups, Function of foods and its general composition.

Food Quality & Safety, various aspects of food quality & safety, challenges of food safety.

Food adulteration and contamination, common food contaminants & adulterants

Unit II

Food Adulteration: Nature of adulterants, methods of evaluation of food adulterants and toxic constituents in foods, common food adulterants & their detection on various foods like

- a) Milk and Milk products
- b) Oils and fats
- c) Spice and condiments
- d) Wheat and other flours
- e) Sugar and Preserve
- f) Fruit and Vegetable products
- g) Beverages Alcoholic and Non-Alcoholic

Unit III

Food Laws and Regulation: Prevention of Food Adulteration Act 1954, Food Safety and Standards Act (2006), Food Safety and Standards Authority of India (FSSAI), BIS, FPO, APEDA.

Recommended Books:

1. Gould, W.A and Gould, R.W. (1998). Total Quality Assurance for the Food Industries, CTI Publications Inc. Baltimore.
2. Furia, T.E. Ed. 1980. Regulatory Status of Direct Food Additives. CRC Press, Florida.
3. Rekha S. Singhal , Pushpa R. Kulkarni, Dananesh V. Rege, (1997). Hand Book of Indices of food Quality and Authenticity, wood head Publishing Ltd.
4. Siva Kiran, R.R. (2012). Manual for Detection of Common Food Adulterants, First Edition, IAPEN.
5. Battershal, J.P. (2013). Food Adulteration & its detection, General Books LLC.
6. Prevention of Food Adulteration Act, 4th Edition, Ashoka Law House, 2002

Open Elective Paper (offered by Department of Genetics)

Paper Code: 16GENO1

Genetics & Society

Credits: 3

Time: 3 Hrs

Internal Assessment Marks: 20

Max. Marks: 80

Instructions

There will be a total of seven questions. Question No. 1 will be compulsory and shall contain eight to ten short answer type questions without any internal choice and it shall cover the entire syllabus. The remaining six questions will include two questions from each unit. The students will be required to attempt one question from each of the four units. The students will attempt four questions in all.

Unit I

Basic principles of inheritance of characters, Chromosomes and genes, pedigree-gathering family history symbols, construction of pedigree ; Consanguinity and its effects; Sex linked anomalies: Haemophilia, Colour blindness; Sex limited and sex influenced traits. Human Health and Disease: Common syndrome according to numerical and structural alteration: Klinefelter, Down's, Turner, Achondroplasia,; Inherited enzyme defects in man: Albinism, Galactosemia; Multifactorial disorders: Diabetes, Schizophrenia, Huntington's disease, Alzheimer's disease; Methods of genetic testing, Prenatal diagnosis, New born screening; DNA fingerprinting; Paternity testing, Individual Identification.

Unit II

GM World: Green revolution, Application r-DNA technology in agriculture: Transgenic crops, Gene gun, GM foods, Ht, Bt and others, Concerns about bio-safety of genetically modified organism (GMO) (Allergen, toxicity, impact on biodiversity etc.); Indian regulatory system for testing of GMOs in laboratory, field trials and commercial release of transgenic ; potential benefits of GMOs.

Unit III

Microbial innovations in pharmaceutical, health, agricultural and industrial sectors; Strategies for selection and improvement of industrial strains of microorganisms; Stem cell research, Cloning designer babies, Organ banking, Transgenic animals, Creating transgenic animals, In vitro fertilization, Genetic counseling and reproductive decisions, Eugenics;

Role of Genetics for the improvement of Health, Agriculture and environment.

Suggested books:

- 1 Principles of Genetics by D. Peter Snustad and Michael J Simmons
- 2 Genes in the Environment- Rosie S. Hails, Wiley-Blackwell Publications
- 3 The Science of Genetics by Alan G. Atherly, Jack R. Girton, John F. McDonald
- 4 Principles and branches of Medical Genetics, Emery and Rimoih, Churchill Livingstone, Newyork, Vol-1-3.
- 5 Industrial Microbiology, G. Reed (editor), CBS Publishers (A VI Publishing Company).
- 6 Modern Microbial Genetics (2002)-Streips U. N. and Yasbin R.E., Wiley-Liss
- 7 Plant Biotechnology (2006) - B. D. Singh, Kalyani Publishers
- 8 Plant Biotechnology-The Genetic Manipulation of Plants (2003) Slater A. Scott N. & Fowler M., Oxford University Press Inc Nigel Jen,
- 9 Animal Cell Biotechnology: Methods and protocols, Humana Press.
- 10 Genetics in Medicine 7th Ed (2007) - Thompson and Thompson, Saunders
- 11 Primose SB, Molecular Biotechnology, Panima, 2001

M.A. Geography Semester-II Session 2016-17 onwards

Open Elective: 16GEOO1

BASICS OF GEOINFORMATICS

Credit: 03 (3+0+0)

End Semester Exam: 80 marks

Internal Assessment: 20 marks

Total: 100 marks Time: 3hrs

Learning Objectives

This course is designed to give students an exposure to basics of geospatial technologies. It offers to learn the techniques of generation and management of earth surface information. An inter and multi disciplinary approach has been used to make subject interesting and useful for students. Latest technology of GPS is included to understand use of modern day navigation and surveying.

Learning Outcomes

Students will be able to learn the use of latest geospatial technology. It will help them to understand the spatial phenomena in a better manner with availability of real time and accurate information. These technologies being modern and interdisciplinary in nature will enable the students to apply this knowledge in various fields of life.

Unit – I

Aerial Photography

Aerial photography: history and development, advantages and limitations; Classifications of aerial photographs; Geometry of an aerial photograph; Scale of an aerial photograph; Availability and procurement of aerial photographs in India; Aerial photograph vs map.

Unit – II

Remote Sensing.

Introduction to Remote Sensing; electromagnetic radiation; stages of remote sensing; energy interactions in atmosphere; energy interactions with earth surface features and spectral signatures. Remote Sensing applications in land use/land cover, urban, environment, forest and disaster studies.

Unit – III

Remote Sensing

Remote Sensing platforms: airborne and space borne; satellite orbits: geostationary and near polar; Image data characteristics: resolutions- spatial, spectral, radiometric and temporal; Sensors and their types; Satellite missions of ISRO .

Unit – IV

GIS and GPS

Geographic Information System (GIS): definition and applications; GIS and remote sensing integration; components and elements of GIS; representation of earth surface features in GIS; introduction to Global Positioning System; GPS satellites constellations; GPS segments; Applications of GPS.

Note (i): Open Elective to be chosen from the basket of Open Electives (OEs) provided by the University.

(ii) The question paper will have five units. First four units of question paper will contain two questions from each unit. Candidate(s) are required to attempt one question from each unit. Unit-V shall be compulsory and shall contain eight short answer type questions covering entire syllabus. All questions carry equal marks.

Recommended Readings:

[Paul Wolf](#), [Bon DeWitt](#), and [Benjamin Wilkinson](#). Elements of Photogrammetry with Application in GIS. USA: Mc-Graw Hill Education.2014.

Avery, T.E., and G.L. Berlin. Fundamentals of Remote Sensing and Airphoto Interpretation, Macmillan, New York.1992.

Campbell, J.B. Introduction to Remote Sensing, Guilford, New York.1996.

Curran, Paul J. Principles of Remote Sensing, Longman, London & New York. 1985.

Joseph, G. Fundamentals of Remote Sensing, Universities Press Hyderabad. 2005.

Lillisand, T.M. and P. W. Kiefer. Remote Sensing and Image Interpretation, New York. John Wiley & Sons.1986.

Burrough, P.A. and McDonnell, R.A. Principles of Geographic Information System. Oxford: Oxford University Press. 1998.

Chang, Kang-tsung. Introduction to Geographic Information Systems. New Delhi: Tata McGraw-Hill.2006.

Doberstein, Dan. Fundamentals of GPS Receivers: A Hardware Approach. New York: Springer

MA GEOGRAPHY SEMESTER-II SESSION 2016-17 ONWARDS

Open Elective 16GEOO2
GEOGRAPHY OF INDIA: SYSTEMATIC AND REGIONAL

Credit: 03 (3+0+0)

Exam: 80 marks

Internal Assessment: 20 marks

Total: 100 marks

Time: 3 hrs

Learning Objectives

History, geography and culture have comprised to make India into a major force in South Asia. The course provides an insight into different aspects of India's regional vitality towards unity, stability and progress.

Learning Outcomes

The student will get familiarised with the geographic dimensions of India in terms of its political and administrative characteristics; aspects of its regional vitality; and formation of regions.

Unit-I

India: a historical-geographical expression; Size, location, and boundaries; Physical environment; Historical setting.

Unit-II

Unity in diversity of India: Unifying mechanism and divisive streaks; Evolution of the administrative map of India since Independence.

Unit-III

Regional vitality of India; multiculturalism in India; the Indian diaspora; India's cultural landscape.

Unit -IV

Regionalisation schemes of India: Physiographic (S.P. Chatterjee); Climatic (Koeppen and Trewartha); Agricultural (Jasbir Singh and C.B. Mamoria); and Industrial (B.N. Sinha).

Note (i): Open Elective to be chosen from the basket of Open Electives (OEs) provided by the University.

(ii) The question paper will have five units. First four units of question paper will contain two questions from each unit of the syllabus. Candidate(s) are required to attempt one question from each unit. The unit five shall be compulsory and shall contain eight short answer type questions covering entire syllabus. All questions carry equal marks.

Recommended Readings:

1. Ahmad, Aijazuddin. 1999. *Social Geography*. Rawat Publication, New Delhi.

2. Chandna, R.C. 2002. *Geography of Population*. 5th edn. Kalyani Publishers, Delhi.
3. Deshpande, C.D. 1992. *India: A Regional Interpretation*, ICSSR and Northern Book Center, New Delhi.
4. Hussain, M. 2014. *Geography of India*. 5th edn. McGraw Hill Education, New Delhi.
5. Singh, Jagdish. 2003. *India: A Comprehensive Systematic Geography*. Gyanodya Prakashan, Gorakhpur.
6. Spate O.H.K. & A.T.A. Learmonth. 1967. *Geography of India and Pakistan*, Methuen, London.
7. Sukhwal, B. L. 1971. *India: A Political Geography*. Allied Publishers, New Delhi.
8. Tirtha, Ranjit. 2000. *Emerging India*. Rawat Publications, Jaipur.
9. Tiwari, R.C. 1999. *Geography of India*. Prayag Publishers, Allahabad.
10. Wadia, D. N. 1953. *Geology of India*. Macmillan & Co., London.

HISTORY

Paper: Nationalism In India

Paper Code: 16HISO1

Max.Marks : 100

Theory : 80

I.A : 20

Time : 3 Hrs.

Note: Nine questions are to be set in all spreading into five units Each of the first four units shall contain two questions from each unit of the syllabus and Unit-V (Q. No. 9) which will be compulsory, shall contain eight short answer type questions (two marks each) covering the entire syllabus. The Candidates shall be asked to attempt five questions in all selecting one question from each unit including compulsory question. All questions shall carry equal marks.

Unit – I

1. Approaches to Indian Nationalism : Conceptual Debates.
2. Emergence of Organized Nationalism.

Unit-II

1. Trends till 1919
2. Gandhian Movements - Nature, Programme, Social Composition, Limitations and Challenges.

Unit-III

1. Revolutionary and Left Movements.
2. Subhash Bose and INA and Telengana.
3. States' Peoples' Movements.

Unit-IV

1. Working of Congress and Non-Congress Provincial Ministries.
2. Communal Politics and Partition.

Suggested Readings :

- Desai, A.R. : Social Background of Indian Nationalism, Bombay, 1949
- Tara Chand : History of the Freedom Movement Vol. I, II, III, IV (4 Vols.), Delhi, 1961
- Majumdar, R.C. : History of Freedom Movement Vol. I, II, III, Calcutta, 1962-63
- Chandra Bipan and others : Communalism in Modern India, New Delhi, 1987
- " : Struggle for Independence of Indi, New Delhi, 1987
- Dhankhar, Jaiveer S. : A Short History of Hindustan Socialist Republic an Association, Delhi, 2001
- " : Prelude to Pakistan, Delhi, 2000
- Mahrotra, S.R. : The Emergence of Indian National Congress, Delhi, 1971
- Sarkar, S. : Modern India 1885-1947, New Delhi, 1983

Note : In addition, students are advised to consult the current Research Journals of History.

FUNDAMENTALS OF MANAGEMENT
Course Code: 16IMSO1

MM: Th 80+IA 20

Time: 3 hours

Course Objective:

The objective of this course is to expose the students to basic concepts of management and to enable them to gain appreciation for emerging ideas, techniques, procedures and practices in the field of management.

Unit -I

Introduction: concept and nature of management; evolution of management thoughts – traditional, behavioural, system and contingency viewpoints

Unit -II

Planning, decision making and organizing: nature and elements of planning, planning types and models; strategic planning – an overview; basic issues in organizing – work specialization, chain of command, delegation, decentralization, span of management, bases for departmentation

Unit -III

Leading: recognition of human factor, motivation models/approaches; leadership styles/behaviours, personal characteristics of effective leaders, leadership development

Unit -IV

Management control– concept and process, overview of control techniques, effective control system; evaluating corporate social performance; managing company ethics and social responsibility

Suggested Readings:

1. Robbins, S.P. and Decenzo, D.A. Fundamentals of Management , Pearson Education Asia, New Delhi
2. Hellreigel, Management, Thomson Learning, Bombay
3. Koontz, H and Wehrich, H; Management, Tata McGraw Hill
4. Stoner, J et. al, Management, New Delhi, PHI, New Delhi
5. Robbins & Coulter, Management, PHI, New Delhi
6. Satya Raju, Management – Text & Cases , PHI, New Delhi
1. Richard L. Daft, Management, Thomson South-Western

Instructions for External Examiner: The question paper shall be divided in two sections. **Section ‘A’** shall comprise of eight short answer type questions from whole of the syllabus carrying two marks each, which shall be compulsory. Answer to each question should not exceed 50 words normally. **Section ‘B’** shall comprise 8 questions (2 questions from each unit). The students will be required to attempt four questions selecting one question from each unit. All questions will carry equal marks.

Journalism and Mass Communication

(Open Elective) [for students of other Dept.]

16JRM01

MEDIA & SOCIETY

2ndSemester

Marks: 100

Credits: 3:0:0

Time Allowed: 3 Hours

Theory Marks: 80

Internal Assessment Marks: 20

Unit I

1. Media Definition
2. Relationship of Media in Society
3. Impact of Media on society- recent trends
4. Media and Social Development

Unit II

1. Media Literacy
2. Impact of Media on children and youth
3. Media and gender issues
4. Media and Rural Society

Unit III

1. Media and Violence
2. Media and Rising Crime
3. Media and Democracy
4. Media and development of Scientific temperament
5. Media and environmental issues

Unit IV

1. Media accountability

2. Media and Economic development
3. Media and Nation building
4. Popular culture and media

LL.M. THIRD SEMESTER EXAMINATION w.e.f. Session 2017-18

Open Elective (Family Law)

PAPER CODE: 16LAWO1

MM: Th 80+IA 20

Time: 3 hours

NOTE FOR EXAMINER/PAPER SETTER

The question paper of each course will be divided into Five sections, each of the First Four Sections of the Question Paper will contain 2 questions respectively from Unit-1 to Unit-4 of the syllabus. The students will be required to attempt one question from each section. Section 5 of the question paper shall contain 8 short answer type questions of 3 marks each (without any choice) covering the entire syllabus. As such Section 5 will be compulsory. The examiner will be free to set the questions in problem forms based on case law.

NOTE FOR STUDENTS (ON QUESTION PAPER)

Attempt four questions from sections 1 to 4, selecting at least one question from each section. These questions shall carry 14 marks each. Section 5 is compulsory and each question in this section shall carry 3 marks.

UNIT-I

Application of Hindu Law, Sources of Hindu, Schools of Hindu Law, Hindu Joint Family, Features of Mitakshra and Dayabhaga Joint Families, Coparcenary, Classification of Property, Karta of Joint Family, Position, Liabilities and Powers of Karta. Karta's powers of Alienation, Coparcener's Power of Alienation, Coparcener's Right to Challenge Improper Alienation, Alienee's Rights and Remedies

Leading Case: Harihar Prasad V Balmika Prasad AIR 1975 SC 733

K.S. Subhiah Pillai V Commissioner of IT AIR 1999 SC 1220

UNIT-II

The nature and concept of Hindu Marriage, Evolution of the Institution of Marriage, The Hindu Marriage Act, 1955, Essential Conditions for Valid Hindu Marriage, Ceremonies of Marriage, Registration of Hindu Marriages, Remedy of Restitution of Conjugal Rights, Void and Voidable Marriages, Judicial Separation and Divorce, Various Types of Grounds for Divorce and Judicial Separation, Fair Trial Rule, Legitimacy of Children, Jurisdiction, Bars to Matrimonial Remedies, Ancillary Reliefs, Permanent Alimony and Maintenance, Custody etc.

Leading Case: Kailishwati V Ayudhia Parkash AIR 1977 PLR 216

Naveen Kohli V Neelu Kohli, (2006) 4 SCC 558

UNIT-III

The Hindu Succession Act, 1956, Effects of the Hindu (Succession) Amendment, 2005, Rules of Succession to the Property of Hindu Male, Succession to the Property of Hindu Female, Succession to the Mitakshara Coparcener's Interest, General Rules of Succession, Partition, Subject Matter of Partition, Persons who have a Right to Partition & Right to Share, Persons who are entitled to Share, if, Partition takes place, Modes of Partition, How Partition is effected, Partial Partition, Reopening of Partition, Re-Union.

Leading Case: Raghuvamma V Chenchamma AIR 1964 SC 136

Commissioner of Income Tax V Chandersen, AIR 1986 SC 1753

UNIT-IV

The Hindu Minority and Guardianship Act, 1956, Concept of Minority and Guardianship, Natural Guardians and their Powers, Testamentary Guardian: Appointment and Powers, Certified Guardian, Defecto Guardian, Guardian By Affinity, The Hindu Adoption & Maintenance Act, 1956, Nature of Adoption, Essential Conditions for Valid Adoption, Effects of Adoption, Registration of Adoption, Maintenance As Personal Obligation, Maintenance of Dependents, Quantum of Maintenance, Maintenance As a Charge on Property

Leading Cases: G. Appaswami Chettiar V R.Sarangapani AIR 1978 SC 1051

Githa Hariharan V Reserve Bank of India(1999)2 SCC 228

BOOKS RECOMMENDED

Mulla	-	<u>Principles of Hindu Law</u>
Dr. Paras Diwan	-	<u>Modern Hindu Law</u>
Mayne's	-	<u>Hindu Law and Usage</u>
Dr. U.P.D.Kesari	-	<u>Modern Hindu Law</u>
Basant Kumar Sharma	-	<u>Modern Hindu Law</u>

16LISO1: Academic Integrity and Plagiarism

MM: Th 80+IA 20

Time: 3Hrs.

Note

The paper is divided into 4 units. The candidates are required to attempt 5 questions in all selecting 1 question from each unit (out of two internal choices). Question 1 is compulsory consisting of 8 short answer type questions spread over the whole syllabus. All questions carry equal marks.

Objectives

- to know about academic integrity;
- to identify instances and types of plagiarism;
- to get awareness about plagiarism;
- to identify "fair use" applications to the use of someone else's materials;
- to find information about the correct way to cite a reference;
- to begin to develop your personal philosophy on academic integrity;
- to be cautious enough to have deterrence strategies of plagiarism.

Outcomes

The course enables the students to get awareness about the nature and practice of academic integrity and its advantages. Further the completion of the course will guide the students and others to have deterrence policies and strategies to get away from plagiarism activities. After completion of the course, the learners will come to know, how citations are made properly. Over all awareness will be developed to maintain academic honesty with practical examples by the trainers.

Unit 1: Academic Integrity

Academic Integrity: meaning, definition and concept

Reasons: Individual reputation, personal integrity, professional competence, status or standing of the institution

Original writings and contribution to society

Writings and Impact: good and original writings bring credibility; good impact factors; writings meant for the readers and society

Unit 2:Plagiarism

Plagiarism basics: meaning, definition and concept

Plagiarism: concept, need and importance, definitions; types

Copyright and fair use

Hoes does it occur: intentional and unintentional; innocence vs. deception

Unit 3:Plagiarism Deterrence

Deterrence: avoidance, awareness

Guidelines: summarizing, paraphrasing, direct quotations, language and vocabulary

Citations: citation basics; citation styles: parenthetical and superscription

Style manuals : Chicago, APA, MLA, Harvard

Unit 4: Measures, initiative and university agencies

Research and Citation policies: formulation of research polices

Regular trainings & awareness; role of librarians; handling online resources

Anti-plagiarized software; Turnitin; I-authenticate; usefulness and limitations

Suggested Readings

Cvetkovic, Vibiana Bowman & Anderson, Katie Elson (Eds.) (2010). *Stop plagiarism: a guide to understanding and prevention*. New York: Neel-Schuman.

Lampert, Lynn D. (2008). *Combating student plagiarism: an academic librarian's guide*. Oxford: Chandos.

Posner, Richard (2007). *The little book of plagiarism*. New York: Pantheon Books.

Roth, Lorie (1999). Educating the cut-paste generation. *Library Journal*, 124(18), pp.42-44.

Scalon, Patrick (2003). Student online plagiarism: how do we respond? *College Teaching*, 51(4): pp. 161-65.

Swain, N.K. Publish or perish: What the Indian policy makers think about it? *University News*, 52.15 (April 14-20, 2014): pp. 23-28.

***Open Electives to be offered
by
Department of Mathematics***

Course Code	Title of the Course	Theory Marks	Internal marks	Practical Marks	Credits (L:T:P)
To be offered in 2nd Semester					
16MATO1	Mathematical Techniques and Applications	80	20	--	3:0:0
16MATO2	Parametric and Non-Parametric Tests	80	20	--	3:0:0

16MATO1: Mathematical Techniques and Applications
(To be offered in Even Semester)

Time: 03 Hours
MM. Th 80+IA 20
Time: 2 h
Credits : 3:0:0

Section - I

Idea of Real Number System, Sets, Relations and functions.
Solutions of linear and quadratic equations; Logarithms and Exponents. Trigonometric functions.

Section - II

Concepts of limit, Continuity and Differentiation. Slope of a straight line.
Increasing and Decreasing functions, Maxima and Minima.

Section - III

Integration - Simple techniques including integration by substitution and by parts for algebraic, exponential and logarithmic functions, Definite integrals. Differential Equation- Solution of first order linear differential equation.

Section - IV

Measures of Central Tendency and Dispersion. Linear Correlation and Regression.

Note : The question paper will consist of **five** units. Each of the first four units will contain **two** questions from unit **I , II , III , IV** respectively and the students shall be asked to attempt **one** question from each unit. Unit five will contain **eight to ten** short answer type questions without any internal choice covering the entire syllabus and shall be **compulsory**.

Books Recommended:

1. Maurice, Weir D., Hass J., Frank, Giordano R., Thomas' Calculus, Pearson.
2. Strang, G., Calculus, Wellesley-Cambridge Press.
3. Heinbockel, J.H., Introduction to Calculus, Vol - 1.,
<http://www.math.odu.edu/~jhh/Volume-1.PDF>
4. Goon, A.M, Gupta, M.K and Dasgupta, B, Basic Statistics, World Press.
5. Gupta, S.P, Statistical Methods, Sultan Chand & Sons, New Delhi.

16MATO2: Parametric and Non-Parametric Tests
(To be offered in Even Semester)

Time: 03 Hours
MM. Th 80+IA 20
Time: 2 h
Credits : 3:0:0

Section - I

Parameter and Statistic: Sampling distribution of a statistic, standard error and its utility.
Tests of significance: Null and alternative hypotheses, Two types of error, Critical region and level of significance, One-tailed and two-tailed tests, Critical values, Procedure for testing of hypothesis.

Unit -II

Large Sample Tests: Tests of significance for single proportion and single mean, for difference of two proportions, two means and two standard deviations, related confidence intervals for population parameters. Chi-square tests for goodness of fit, Test of independence of attributes.

Unit -III

t-test for single mean, difference of means, F-test for equality of two population variances, related confidence intervals. Applications of ANOVA for one-way and two-way classified data.

Unit -IV

Non-parametric tests: Advantages and drawbacks of non-parametric tests over parametric tests, One sample and two sample sign tests, Median test, Wilcoxon-Mann-Whitney test, One sample runs test, Spearman rank correlation test.

Note : The question paper will consist of **five** units. Each of the first four units will contain **two** questions from unit **I , II , III , IV** respectively and the students shall be asked to attempt **one** question from each unit. Unit five will contain **eight to ten** short answer type questions without any internal choice covering the entire syllabus and shall be **compulsory**.

Books Recommended:

1. Mood, A. M., Graybill, F. A. and Boss, D. C., Introduction to Theory of Statistics, McGraw-Hill.
2. Goon, A. M., Gupta, M. K. and Das Gupta, B., Basic Statistics, World Press.
3. Gupta, S.C. and Kapoor, V. K., Fundamentals of Mathematical Statistics, S. Chand Pub., New Delhi.
4. C. R. Kothari, Research methodology, New Age International Publishers.

M.Sc. Medical Biotechnology Semester -II
Course Title: Principles of Medical Biotechnology-I

MM. Th 80 + IA 20

Course Code: 16MBTO1

Time: 3h

NOTE: The examiner is required to set seven questions in all. Question No. 1 will be compulsory and short answer type covering the entire syllabus. The remaining six questions will be set with two questions from each unit. The candidate will be required to attempt Question 1 and four more selecting at least one from each unit.

Theory

Unit -I

Innate and acquired immunity. Nature and Biology of antigens and super antigens. Antibody structure and function. Antigen - antibody interactions, ELISA, RIA, Western blot, Immunoprecipitation, Inflammation- Acute and chronic inflammation, Hypersensitivity. Blood group – ABO and Rh. Haemoglobin – Structure, biosynthesis and catabolism.

Unit -II

Different types of anaemia and their causes (Deficiency of iron, B12 and folic acid, hemolytic, aplastic and genetic disorders). Homeostasis – factors, mechanism, anticoagulants, procoagulants. Host microbe interactions, entry of pathogens, growth and multiplication of the pathogens, Endotoxins, Collection and transport of specimens for diagnosis

Unit -III

Methods of antimicrobial activity determination, types of epidemiology, tools of epidemiology, Recognition of an infectious disease in a population, types of epidemics, control of epidemics. General properties of viruses, viral multiplication, viral hemagglutination, Cultivation of viruses, Classification and nomenclature of viruses, host response to virus infection

Recommended Books

1. John E. Hall, Medical Physiology by Guyton, Saunders, 12th edition
2. Mims' Medical Microbiology By (author) Richard Goering, By (author) Hazel Dockrell, By (author) Mark Zuckerman, By (author) Ivan M. Roitt, By (author) Peter L. Chiodini Saunders (W.B.) Co Ltd.
3. Benjamin E. (1996), Immunology - A short course 3rd Edition, John Wiley, New York
4. Kuby J. (1997), Immunology, 3rd Edition, W.H. Freeman & Co., New York
5. Roitt, I.M. (1997), Essential Immunology, 9th Edition, Oxford Black Well Science, London
6. Tizard I.R. (1995), Immunology - An introduction, 4th Edition, Philadelphia Saunders College press.

(SEMESTER-II)

Open Elective: 16MCBO1: Microbial World: Diversity and applications *Time:*

03 Hours

MM. Th 80+IA 20

Time: 2 h

Credits : 3:0:0

Note: The question paper will consist of 9 questions. Students will have to attempt 5 questions in total - Question no. 1 will comprise of short answer questions covering the entire syllabus and will be compulsory. Two questions to be set from each Unit and students will have to attempt one from each Unit.

Unit – I

Systematics&Biodiversity:Classification and nomenclature of microorganism.Salient featuresof different groups: Acellularmicroorganisms (Viruses,Viroids, Prions) and Cellular microorganisms (Bacteria, Algae, Fungi andProtozoa) in reference to their distribution and occurrence, morphology, mode ofreproduction and economic importance.

Unit – II

Charactistics of extremophiles:Thermophiles, Methanophiles, Alkalophiles, Acidophiles, Halophiles and Barophiles: Classification, habitats, ecological aspects andapplications.

Unit – III

Microbiological techniques:Preparation of culture media, Pure culture isolation; cultivation,maintenance and preservation/stocking of pure cultures; cultivation of anaerobicbacteria, and accessing non-culturable bacteria. Physical and Chemical methods for the control of microorganisms

Unit – IV

Scope of Microbiology:Role of microorganisms in Food industry, Pharmaceutical industry, Production ofIndustrial enzymes, Agriculture: bio-fertilizers, bio-pesticides. Environment:bioremediation, bioleaching

Suggested readings:

1. Brock TD., Milestones in Microbiology, Infinity Books.
2. Pelczar M.J., Chan E.C.S. & Kreig N.R., Microbiology: Concepts and Application.,Tata McGraw Hill.
3. Stainier RY, Ingraham JL, Wheelis ML & Painter PR General Microbiology, Publisher: MacMillan.
4. Madigan M.T., Martinko J.M. and Parker J., Brock Biology of Microorganisms: Prentice-Hall , Inc USA.
5. Atlas R.M., Principles of Microbiology, Wm C. Brown Publishers.
6. Vandenmark P.V. and Batzing B.L., The Microbes – An Introduction to their nature and Importance: Benjamin Cummings. Microbiology

M.Sc. Physics Semester II
Open Elective – I Sources of
Energy – I

PAPER CODE: 16PHY01

Theory Marks: 80
Internal Assessment: 20
Time: 3 hours

Unit I

Introduction

Limitation of conventional energy sources, need and growth of alternative energy sources, basic scheme and application of direct energy conservation.

Solar Cells:

Solar energy: Introduction, The characteristics of the sun, Definitions related to solar radiations, solar radiation geometry, Estimation of daily solar radiation. Theory of solar cells. Solar cell materials, solar drying, solar furnaces, Solar cooking, solar green house technology, solar thermal power generation, solar cell array.

Unit II

Solar Thermal Energy:

Solar radiations, flat plate collectors and their materials, applications and performance, focusing of collectors and their materials, applications and performance; solar thermal power plants, thermal energy storage for solar heating and cooling, limitations.

Unit III

Geothermal Energy:

Resources of geothermal energy, thermodynamics of geo-thermal energy conversion-electrical conversion, non-electrical conversion, environmental consideration, estimates of geothermal power, nature of geothermal fields, advantages & disadvantages of geothermal energy forms, applications of geothermal energy. Geothermal power plant.

Fuel Cells:

Principle, working of various types of fuel cells, performance and limitations.

Unit IV

Wind Energy:

Wind power and its sources: Principle of working of Wind Energy, performance and limitations of energy conversion systems. Site selection, criteria, momentum theory, wind characteristics.

Text / References Books:

1. John Twideu and Tony Weir, "Renewal Energy Resources" BSP Publications, 2006
2. M.V.R. Koteswara Rao, "Energy Resources: Conventional & Non-Conventional" BSP Publications, 2006.
3. D.S. Chauhan, "Non-Conventional Energy Resources" New Age International.
4. C.S. Solanki, "Renewal Energy Technologies: A Practical Guide for Beginners" PHI Learning.
5. Peter Auer, "Advances in energy system and Technology" Vol I & II Edited by Academic Press.
6. G.D. Rai, "Non-conventional Energy sources" Khanna Publishers
7. Raja A.K., "Introduction to Non-Conventional Energy Resources" Scitech Publications.
Fahrenbruch and Bube, "Fundamentals of Solar cells. Photovoltaic Solar Energy"

SYLLABUS : M.A.(P) Sem-II Open Elective

Paper Code- 16PUBO1

Administrative Literacy

Total Credit: 4+0+0 =4

L+T+P

Total Marks = 100

Semester End Exam = 80

Internal Assessment = 20

Time = 3 hrs.

Note:

The question paper will consist of 5 units containing 9 questions. The students are required to attempt one question from each unit. Question no 9 consisting of eight short answer questions covering entire syllabus, is compulsory.

Unit-I

Administrative Structure at Central Level – Office of President, Prime Minister's Office, Cabinet Secretariat & Central Secretariat

Unit-II

Administrative Structure at State Level – Office of Governor, Chief Minister's Office, State Secretariat & Chief Secretary

Unit-III

Administrative Structure at Division & District Level: Divisional Commissioner, Deputy Commissioner, Superintendent of Police, District Rural Development Agency, Haryana Urban Development Authority, District Development & Panchayat Officer

Unit-IV

Flagship Programmes of Central Government: Mahatma Gandhi National Rural Employment Guarantee Scheme, Rashtriya Swasthya Bima Yojana, Pradhan Mantri Kaushal Vikas Yojana, Mid-day Meal, Integrated Community Development Scheme, Targeted Public Distribution System.

Suggested Readings:

1. Maheshwari, S.R., Evolution of Indian Administration, New Delhi: Orient Longman, 1974.
2. Maheshwari, S.R., Indian Administration, New Delhi: Orient Longman.
3. Arora, R.K. and Rajni Goyal, Indian Public Administration, New Delhi: Wishwa, 1997..

4. Misra, B.B., The Central Administration of East India Company, London: Manchester Press, 1959..
5. Sarkar, J.N., Mughal Administration, Calcutta: M.C. Sarkar, 1935.
6. Ray, Anirudh , Some Aspects of Mughal Administration, New Delhi: Kalyani 1984.
7. Khosla, R.P., Administrative Structure of the Great Mughals, Delhi: Kanti Publications, 1991.
8. Prasad K. Nayak, S. Sen and G.S. Mansukhani (Eds.), Indian Administration, New Delhi: Unique Publishers, 2007
9. Fadia, B.L., Indian Administration, Agra: Sahitya Bhawan, 2007.
10. Chand Ashok, Indian Administration, London: Allen and Unwin, 1967.
11. Singh Hoshiar, Indian Administration Allahabad: Kitab Mahal, 1998.
12. Kataria, Surender , Indian Administration, Jaipur: RSBA
13. Maheshwari, S.R., State Governments in India, New Delhi: Macmillan, 2000.
14. Padhi, A .P. State Administration in India, Delhi: Uppal, 1998.
15. Sharma, Ashok, Bharat Mein Prashashnik Sansthan, Jaipur: RSBA, 2003.
16. Arora, Ramesh and Geeta Chaturvedi, Bharat Mein Rajya Prashashan, Jaipur, RSBA, 2001
17. Sharma, Harish Chander, State Administration in India (Hindi) Haipur: College Book Depot, 2002.

M.A. Political Science
Semester II
(16POLO1)

Paper: Disaster Management-I (Open Elective A)

Max. Marks	: 100
Theory Paper	: 80
Internal Assessment	: 20
Time	: 3 Hrs

Note:

The question paper will be divided into five units carrying equal marks i.e. 16 marks. Students shall be asked to attempt one out of two questions from each unit. Unit five shall contain eight short answer type questions without any internal choice and it shall be covering the entire syllabus. As such, all questions in unit five shall be compulsory.

UNIT I

Disaster Management: Meaning, Concepts, Principles, Scope, Objectives and Approaches
Elements of Disaster Management

UNIT II

Disaster Mitigation: Hazard Assessment, Vulnerability Assessment, Risk Assessment, Protective

Measures and

Public Information

Disaster Preparedness: Disaster Plan, Damage Inspection, repair and Recovery procedures, Communication and Control Centers, Disaster Forecasting, Warning and Prediction

UNIT III

Disaster Relief: Rapid Damage Assessment operations, Evacuation and Shelter, Media Coverage, Relief Aid, Maintain

UNIT IV

Reconstruction Planning: Meaning and Economic and Social Rehabilitation

Essential Readings:

1. Beatley, Timothy (1998). *The Vision Burby, Raymond (ed.), Cooperating with Hazards with Land-Use Planning* Washington, D.C., Joseph Henry Press.
2. David Godschalk, Timothy Beatley, Phil J. Kaiser (1998). *Natural Hazard Mitigation: Recasting* Island Press.
3. FEMA (2000). *Planning for a Sustainable Hazard Mitigation and Livability*. Washin
4. *Godschalk, David R., Timothy Beatley, P Edward J. Kaiser*

SYLLABUS FOR OPEN ELECTIVE (SANSKRIT)

Ancient Indian Culture and Philosophy

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laalaaLd` `f` fr ,oaaaa
n”kZZZu½

Maximum Marks: 100

16SKTO1

2nd Semester

Credits: 3:0:0

Time Allowed: 3 Hours

Theory Marks: 80

Internal Assessment Marks: 20

Unit I : General Study of Ramayana and Mahabharata - 20

?kVd ,d ¼jkek;.k o egkHkkjr dk lkekU; v/;;u½

- (i) General Introduction ¼lkekU; ifjp;½
- (ii) Recensions ¼laLdj.k½
- (iii) Society ¼lekt½
- (iv) Family Relations ¼ikfjokfjd lEcu/k½
- (v) Education ¼f”k{k½
- (vi) Politics ¼jktuhfr½
- (vii) Economy ¼vFkZO;oLFk½
- (viii) Situation of Women ¼fL=;ksa dh n”kk½

Unit II : Vidurniti - 20

?kVd nks % ¼fonqjuhfr½

Unit III : Śrīmadbhagavad Gītā – Chapters I to III - 20

?kVd rhu Jhen~Hkxon~xhrc % v/;k; & ,d ls rhu

Unit IV : Yoga Philosophy - 20

?kVd pkj ;ksx n”kZu

- (i) General Introduction to Yoga – Citta, Vrtti, Ívara
;ksx n”kZu dk lkekU; ifjp; & fpÙk] o`fÙk] bZ”oj
- (ii) Yoga for Social Health – Maitri, Karunā, Muditā, Upekshā, Yama
;ksx ,oa lkekftd LokLFk; & eS=h] d#.kk] eqfnrk] mis{kk] ;e

- (iii) Yoga for physical health – Niyama, Āsana, Prānāyāma
;ksx ,oa “kkjhfd LokLF; & fu;e] vkluj izk.kk;ke
- (iv) Yoga for mental health – Pratyāhāra, dhāranā, dhyāna, samādhi.
;ksx ,oa ekufld LokLF; & izR;kgkj] /kkj.kk] /;ku] lekf/k

Guidelines : Students will be required to attempt five questions of 16 marks each.

Question no. 1 will comprise eight short answer type questions from all Units.
Guidelines for other Four questions are as under.

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Unit I :	One critical question out of two Or two short notes out of four.	16
Unit II :	One critical question out of two Or two short notes out of four.	16
Unit III :	One critical question out of two Or two short notes out of four.	16
Unit IV :	One critical question out of two Or two short notes out of four.	16

Recommended Books (vuq”kaflr xzUFk) :

1. jkek;.k & xhrk izsl xksj[kiqj
2. egkHkkjr & xhrk izsl] xksj[kiqj

3. Srimad Valmikiya Ramayana with Commentaries in 6 Vols. Hkkjrh; fo|k izdk"ku] tokgj uxj]
fnYyh & 7
4. Srimad Mahabharatam Ed. by T.R. Krishnacharya – Indian Book Centre, Sri Satguru Publications, 24/4, Shakti Nagar, Delhi.
5. Valmiki Ramayana me Varnit Arthik Jeevan – Kaveri Book Service
6. Valmiki Ka Rajdharma – Kaveri Book Service
7. Jhjde ds ;qx dk frfFk fu/kkZj.k % iq'dj hyky cukjlh nkl] fnYyh HkVukxj] ek
8. Politics and Ethics in Ancient India (As depicted in Mahabharta) : M. Jauhari – Hkkjrh; fo|k izdk"ku] tokgj uxj] fnYyh
9. Religion and Society in Ancient India : Om Parkash - Hkkjrh; fo|k izdk"ku] tokgj uxj] fnYyh
10. jkek;.kdkyhu lekt ,oa laLd`fr % txnh"k pUnz HkV~V & Hkkjrh; fo|k izdk"ku] tokgj uxj]
fnYyh
11. Vidurniti by Swami Jagdishwaranand – Kaveri Book Service
12. Jhen~Hkxon~xhrc & xhrc izsl] xksj]kiqj
13. A Bhagavad Gita : Kappuswami – pkS[kEck vkfj;.Vkfj;k] fnYyh
14. lw=e~ ¼O;klHkk';e~½ & O;kOE czäyhueqfu ikrxty;kx
15. lw=e~ & O;kOE lqjs"kpUnz JhokLrO; ikrxty;kx
16. lw=e~ & O;kOE gfjgjkUn vkj.; ikrxty;kx
17. dh n`f'V esa n"kJZu & foeyk d.kkZVd O;k[;kdkjkas ikrxty;kx
18. The Yoga System of Patanjali – J.H. Woods.
19. Essence of Yoga – Reflections on the Yoga Sutras of Patanjali by Bernard Bauan Chand – Indian Book Centre, Sri Satguru Publications, Delhi.
20. Meditative Yoga : Integrating Body, Breath and Mind by Are Holen and Terbojrn Hobbel : Motilal Banarsidass, Delhi.

21. The Art and Science of Raja Yoga by J. Donald Walters : Motilal Banarsidass, Delhi.

MA 2nd Semester (Open Elective Paper) to be chosen from the common pool of the University.

Sem	Paper No	Code	Nomenclature of Paper	Contact hours/L+T+P	Marks			Credit
					Theory	I.A	Total	
II	Paper	16SOCO1	Understanding Sociology	4:0:0	80	20	100	3

Scheme of Examination:

It is decided to adopt the new scheme of Choice Based Credit System of examination whereby all the papers have four units comprising of 80 marks and the Internal Assessment component will be of 20 marks in all the Semesters. In the theory paper students will be asked to attempt four questions from the four units selecting at least one question from each unit and the 5th question shall be compulsory which will cover all units in the format of short answer type questions comprising of about 50 to 60 words. Thus, the total marks for all the five questions i.e. four from the units (16x4=64) and the 5th compulsory question of short answer numbering eight of 2 marks each i.e (8x2=16) thus making the total weight age to 80 marks. The detail of Internal Assessment of 20 marks has been prescribed by the University is given below:-

(a) One Class Test	:	10 Marks
(b) One Assignment	:	5 Marks
(c) Attendance	:	5 Marks
Less than 65%	:	0 Marks
Up to 70%	:	2 Marks
Up to 75%	:	3 Marks
Up to 80%	:	4 Marks
Above 80%	:	5 Marks

M.A.(Sociology)
Semester-II
Open Elective Paper- -16SOC01
Understanding Sociology

Maximum Marks: 100
Theory: 80
Internal Assessment: 20
Time : 3 Hours

Note:

3. Nine question would be set in all.
4. Question No. fifth shall be based on the entire syllabus and would be compulsory. It would contain eight short answer questions of two marks each.
5. There would be two questions (16 marks each) from each of the four units.
6. The candidate would be required to attempt four questions (one compulsory and other four questions selecting one from each unit).

Unit-I

Sociology: Meaning and Definition, Beginning and Growth of Sociology; The Scope of Sociology; Relationship with History, Anthropology, Economics.

Unit-II

Society: Types of society; Community and its characteristics; Social Groups and their types; Social Control: Functions and forms.

Unit-III

Social Stratification: Its characteristics and Bases; Social Mobility: Meaning and its types, Socialization: Stages and agencies of socialization; Social Change: Meaning and factors.

Unit-IV

Family: concept, forms and changing pattern of families; Marriage: concept and forms; Kinship: terminology, usages and incest.

References:

- Maclver, R.M. and C.H.Page (1985), *Society*, New Delhi: Macmillan.
- Giddens, Anthony, (1993), *Sociology*. Cambridge: Polity Press.
- Spencer, Metta (1976), *Foundations of Modern Sociology*, New Jersey: Prentice-Hall
- Johnson, H.M. (1983), *Sociology: A Systematic Introduction*, New Delhi: Allied Publishers.
- Haralambos, M. (1989), *Sociology: Themes and Perspectives*, New Delhi: Oxford University Press.
- Fichter, Joseph H. (1957), *Sociology*, Chicago: The University of Chicago Press.
- Bottomore, T.B. (1972), *Sociology*, New York: Vintage Books.
- Davis, K. (1949), *Human Society*, New York: Macmillan.
- Moore, Wilbert E. (1974), *Social Change*, Englewood Cliffs: Prentice –Hall.
- Rawat, H.K. (2013), *Contemporary Sociology*, Jaipur: Rawat Publications.
- Singh, J.P. (1999), *Sociology: Concepts and Theories*, New Delhi: Prentice-Hall.

Quantitative Techniques **Paper Code: 16STAO1**
(2nd Semester)

Maximum Marks-80
Internal Assessment Marks—20
Time:-03 Hours
Credit: 03

Section –I

Classification of Data, variable and measurement scales. Presentation of Data. Measures of Central Tendency and Dispersion, Skewness and Kurtosis. Measures of Association of Attributes. Correlation and Regression. Principle of Least Squares , Multiple and Partial correlation. Fitting of Polynomial and Exponential Curves.

Section –II

Random variables. Probability mass function, Probability density function and Commulative distribution function. Expectation and its properties. Moments, moment generating function and probability generating function. Discrete Probability distributions: Bernolli, Bionomial, Poisson, Negative Binomial, Geometric and Uniform. Continuous Probability distributions: Normal, Exponential, Log Normal and Uniform, Fitting of Bionomial, Poisson and normal distribution.

Section –III

Index numbers: Types, uses and their construction. Cost of living index numbers. Test of adequacy of Index numbers.

Time Series: Components and Models of time series. Measurements of trend and seasonal indices, Forecasting and Estimation.

Section –IV

Statistical Quality Control. Purposes and construction of control charts for variables and attributes using 3 sigma limits and 6 sigma limits. Single and double Sampling Inspection plans. Natural tolerance limit and modified control limits.

Vital statistics: Methods of obtaining Demographic data, Measurement of Mortality and Fertility. Complete Life and Abridged Life Tables.

Books Recommended

- | | | |
|--|---|---|
| 1. Goon, A.M., Gupta, M.K. and Dasgupta, B. | : | Outline of Statistics Volume-I & II |
| 2. Goon, A.M., Gupta, M.K. and Dasgupta, B. | : | Fundamental of Statistics Volume-I &II |
| 3. Rohtagi, V. K. and Md. Ehsanes Saleh, A. K. | : | An Introduction to Probability and Statistics |
| 4. Mood, A.M., Graybill, F.A. and Boes, D.C. | : | An Introduction to Theory of Statistics |
| 5. Croxton, F.E. and Cowden, D.J. | : | Applied General Statistics |
| 6. Kendall S.M. and Stuart A. | : | The Advanced Theory of Statistics |

Note: The examiner is to set the question paper into five units- A, B, C, D & E. In each unit A, B, C & D, he/she has to set two questions of 16 marks each from section I, II, III, & IV respectively and the candidate will attempt one question from each unit. In unit E, there will be 8 short answered questions of 2 marks each, covering the whole syllabus and the candidate has to attempt all the questions.

Sampling and Estimation Techniques

PAPER CODE: 16STAO2

Maximum Marks-80
Internal Assessment Marks—20
Time:-03 Hours
Credit: 03

Section –I

Population, sample, sampling distribution, standard error. Testing of Hypotheses: Simple and composite hypotheses, Null and alternative hypotheses, two types of errors, critical region and level of significance, one tailed test, two tailed test, Test of significance (Single and two samples problems) for normally distributed data. Goodness of fit test.

Section –II

Sample versus Complete Enumeration. Designing of Sample Surveys, Sources of Errors in Sample Surveys, Types of Non-Response Errors.

Probability and Non-probability Sampling: Simple Random Sampling with and without replacement for the estimation of Mean and Total, Determination of Sample Sizes of specified precision.

Section –III

Stratified Sampling: Proportional and Optimum Allocation, Estimation of gain due to stratification, Construction of strata, Determination of number of strata. Systematic, Cluster and Probability Proportional to Size Sampling. Comparison of stratified sampling with simple random sampling.

Section –IV

Analysis of Variance: one- way, two -way (with one and multiple but equal number of observations per cell). Completely Randomized Designs, Randomized Block Designs and Latin Square Designs.

Factorial Experiments: Definition, Estimation of factor's effect, Analysis of the factorial experiments, Confounding: complete and partial confounding.

Books Recommended

- | | | |
|---|---|--|
| 1. Mood A.M., Graybill, F.A. & Boes, D.C. | : | Introduction to the Theory of Statistics |
| 2. Goon, A.M., Gupta, M.K. and Dasgupta, B. | : | Fundamental of Statistics, Vol-II |
| 3. Singh D. & Chaudhary F.S. | : | Theory & Analysis of Sample Survey Designs |
| 4. Mukhopadhyay, Primal | : | Theory and Methods of Survey sampling |
| 5. Dass, M.N. and Giri, N.C | : | Design and Analysis of Experiments |

Note: The examiner is to set the question paper into five units- A, B, C, D & E. In each unit A, B, C & D, he/she has to set two questions of 16 marks each from section I, II, III, & IV respectively and the candidate will attempt one question from each unit. In unit E, there will be 8 short answered questions of 2 marks each, covering the whole syllabus and the candidate has to attempt all the questions.

M.D.UNIVERSITY, ROHTAK

16CSEO1

Computer Science Principles (Open Elective)

MM:T80+IA20

Credit 3

Time: 3 Hr

Instructions for setting of paper: Nine questions are to be set in total. First question will be short answer question covering whole syllabus and will be compulsory to attempt. Next eight questions will comprise of two questions each from the four sections. Student will be required to attempt four more questions selecting one from each section. Each question will be of 20 marks

UNIT I

Fundamental of computer science and computational thinking: logical reasoning, problem solving, data representation, processing of data, abstraction, managing complexity, operation of computers and networks, effective Web searching, ethical, legal and social aspects of information technology.

UNIT II

HTML and XHTML basics- LIST – unordered list – nested and ordered list – Basic HTML Tables – Intermediate HTML table and Formatting – basic HTML Forms and Formatting – More Complex HTML Forms – Frameset Element – Nested Frameset. Style Sheets and Graphics: Introduction to Style sheets – Formatting Text by Using Style Sheets – Formatting Paragraphs by Using Style Sheets, Java Script Basics.

UNIT III

Data Mining: Introduction: Motivation, Importance, Knowledge Discovery Process, KDD and Data Mining, Data Mining vs. Query Tools, Kind of Data mining, kind of data, Functionalities, interesting patterns, Classification of data mining systems, Major issues, from Data warehousing to data Mining.

UNIT IV

Computer Networks: Network fundamentals: Local Area Networks (LAN), Metropolitan Area Networks (MAN), Wide Area Networks (WAN), Wireless Networks, Inter Networks. Reference Models: The OSI model, TCP/IP model. Operating Systems: Main functions of operating systems. Multi Programming, multiprocessing, and multitasking. Deadlock and CPU scheduling algorithms

TEXT BOOKS

1. Blown To Bits: Your Life, Liberty and Happiness After The Digital Explosion
by Hal Abelson, Ken Leeden and Harry Lewis, 2010
2. Thomas A. Powell, McGraw-Hill “HTML & CSS: The Complete Reference”, Fifth Edition (Complete Reference Series) Osborne Media; 5 edition, 2010.
3. Krzysztof J. Cios, Witold Pedrycz, Roman W. Swiniarski, “Data mining: a knowledge discovery approach”, Springer, 2007

16CSEO2

**Software Engineering Practices
(Open Elective)**

MM:T80+IA20

Credit 3

Time: 3 Hr

Instructions for setting of paper: Nine questions are to be set in total. First question will be short answer question covering whole syllabus and will be compulsory to attempt. Next eight questions will comprise of two questions each from the four sections. Student will be required to attempt four more questions selecting one from each section. Each question will be of 20 marks

UNIT I

Software Engineering-Software Process- Generic process model-Prescriptive process model-specialized, unified process-Agile development-Agile Process- Extreme Programming- Other agile Process models-Software engineering Knowledge-core Principles-Principles that guide each framework Activity,

UNIT-II

Requirements Engineering-Establishing the Groundwork-Eliciting Requirements-Developing use cases- Building the requirements model- Negotiating, validating Requirements- Requirements Analysis- Requirements Modeling Strategies.

UNIT III

Design Process- Design concepts: Abstraction, Architecture, patterns, Separation of Concerns, Modularity, Information Hiding, Functional Independence, Refinement, Aspects, Refactoring, Object Oriented Design Concepts, Design Classes- Design Model: Data, Architectural, Interface, Component, Deployment Level Design Elements, Software Quality-Software Quality Dilemma- Achieving Software Quality .

UNIT IV

Testing: Strategic Approach to software Testing- Strategic Issues- Testing: Strategies for Conventional Software, Object oriented software, Web Apps-Validating Testing- System Testing- Art of Debugging, Software Maintenance-Software Supportability- Reengineering-Business Process Reengineering- Software Reengineering- Reverse Engineering- Restructuring- Forward Engineering- Economics of Reengineering

TEXT BOOKS

1. Roger S. Pressman, "Software Engineering – A Practitioner's Approach", seventh edition, 2010.
2. Ian Sommerville, "Software Engineering" Pearson Edu, 9th edition, 2010.
3. Hans Van Vliet "Software Engineering: Principles and Practices", 2008.

16MBTO1

**Business skills for Biotechnologists
(Open Elective)**

MM:T80+IA20

Credit 3

Time: 3 Hr

Instructions for setting of paper: Nine questions are to be set in total. First question will be short answer question covering whole syllabus and will be compulsory to attempt. Next eight questions will comprise of two questions each from the four sections. Student will be required to attempt four more questions selecting one from each section. Each question will be of 20 marks

Unit - I

Introduction: Creativity & Entrepreneurial personality and Entrepreneurship in Biotechnology, Concept and theories of Entrepreneurship, Entrepreneurial traits and motivation, Nature and importance of Entrepreneurs, Government schemes for commercialization of technology (e.g. Biotech Consortium)

Unit - II

Project management: Search for a business idea, concept of project and classification, project identification, project formulation, project design and network analysis, project report, project appraisal.

Unit - III

Financial analysis: Ratio analysis, Investment process, Break even analysis, Profitability analysis, Budget and planning process.

Sources of finance: Source of development finance, Project financing, Institutional financing to Entrepreneurs, Financial institutions, Role of consultancy organizations.

Unit - IV

Marketing channels: Methods of marketing, marketing channels, Marketing institutions and assistance.

Biotech enterprises: Setting up Small, Medium & Large scale industry, Quality control in Biotech industries, Location of an enterprise, steps for starting a small industry, incentives and subsidies, exploring export possibilities.

Text/References:

1. Innovation and entrepreneurship in biotechnology: Concepts, theories & cases by D. Hyne & John Kapeleris, 2006.
2. The Business of Biotechnology: From the Bench of the Street: By Richard Dana Ono Published Butterworth- Heinemann, 1991.
3. Entrepreneurship in Biotechnology: Managing for growth from start-up By Martin Grossmann, 2003.
4. Best Practices in Biotechnology Education: By Yali Friedman, Published by Logos Press, 2008.
5. Plant Development and Biotechnology: by Robert Nicholas Trigiano, Dennis John Gray; Published by CRC Press, 2004,
6. Dynamics of Entrepreneurial Development and Management, Vasant Desai, Himalaya Publishing House, 2005.
7. Projects: Planning Analysis, Selection, Implementation & Review, Prasanna
8. Chandra, Tata Mc Graw-Hill Publishing Co.

16MMEO1

OPERATIONS RESEARCH

MM:T80+IA20

Credit 3

Time: 3 Hr

Instructions for setting of paper: Nine questions are to be set in total. First question will be short answer question covering whole syllabus and will be compulsory to attempt. Next eight questions will comprise of two questions each from the four sections. Student will be required to attempt four more questions selecting one from each section. Each question will be of 20 marks

Unit I

Introduction : Definition, role of operations research in decisionmaking, applications in industry. Concept on O.R.model building - Types & methods. Linear Programming (LP) : Programming definition, formulation, solution - graphical simplex Gauss Jordan reduction process in simplex methods, BIG-M methods computational, problem.

Unit II

Deterministic Model : Transportation model-balanced & unbalanced; orth west rule, Vogel's Method, Least cost or matrix minimal, Stepperg stone method, MODI methods, degeneracy, assignment, travelling salesman, problem.

Advanced Topic of LP : Duality, PRIMAL-DUAL, reactions-its solution, shadow price, economic interpretation, dual simplex, post-optimality & sensitivity analysis, problems.

Unit III

Waiting Line Models : Introduction, queue parameters, M/M/1 queue, performance of queuing systems, applications in industries, problems. Unit VI Project Line Models : Network diagram, event activity, defects in network, PERT & CPM, float in network, variance and probability of completion time, project cost-direct, indirect, total optimal project cost by crashing of network, resources leveling in project problems. Coupling Principal Coordinates, Free Vibrations in Terms of Initial Conditions, Forced Harmonic Vibrations, Vibrations Absorber, Centrifugal Vibration Absorber, Vibration Damper.

Unit IV

Multi degrees of Freedom systems and Numerical Methods: Introduction Influence Coefficients, Stiffness Matrix, Flexibility Matrix, Natural frequencies and Normal Modes, Orthogonality of Normal Modes, Dunkerley's Equation, Method of Matrix Iteration, The Holzer Type Problem Geared and Branched Systems, Beams.

Normal Mode Vibrations of Continuous System : Vibrating String, Longitudinal Vibrations of Rod, Torsional Vibrations of Rod, Lateral Vibrations of Beam.

Text Books :- 1. Theory of Vibration with Applications W.T. Thomson, Prentice Hall of India.

2. Mechanical Vibration : G.K. Grover and S.P. Nigam, Nem Chand and Sons.

References Books : 1. Theory and Practice of Mechanical Vibrations J.S. Rao and K. Gupta , Wiley Eastern Ltd.

2. Mechanical Vibrations S.S. Raop, Addison - Wesley Publishing Company.

OPEN ELECTIVE COURSE

16ECE01 MULTIMEDIA COMMUNICATION

MM:T80+IA20

Credit 3

Time: 3 Hr

Instructions for setting of paper: Nine questions are to be set in total. First question will be short answer question covering whole syllabus and will be compulsory to attempt. Next eight questions will comprise of two questions each from the four sections. Student will be required to attempt four more questions selecting one from each section. Each question will be of 20 marks

UNIT I

Multimedia & Information Representation Multimedia Introduction: multimedia networks, Telephone networks, Data networks, Broadcast television networks, Integrated services digital networks, Broadband multiservice networks, types of Multimedia Applications: Movie on Demand, Near Movie on Demand, communication modes, multipoint conferencing, network QOS, Application QOS. Multimedia Information Representation: Digitization principles, Encoder Design, Decoder Design, Unformatted Text, Formatted Text, Hypertext, Images: Graphics, Digitized documents, Digitized pictures; Audio: PCM speech, CD-quality audio, Synthesized audio; Video: Broadcast television, Digital video, PC video, video content.

UNIT II

Text and Image Compression Compression Principles & Text Compression: Compression Principles: Source encoders and Destination decoders, Lossless and lossy compression, Entropy encoding, Source encoding; Text Compression: Static Huffman coding, Dynamic Huffman Coding, Arithmetic Coding. Image Compression: Graphics Interchange Format, Tagged image file format, digitized documents, digitized pictures.

UNIT III

Audio and Video compression: Audio Compression: Differential Pulse Code Modulation, Adaptive Differential PCM, Adaptive predictive coding, Linear Predictive coding, Code excited LPC, Perceptual Coding, MPEG Audio coders, Dolby audio coders Video compression: video compression principles, Motion Pictures Expert Group (MPEG), MPEG1, MPEG2.

UNIT IV

INTERNET AND DESIGNING FOR THE WORLD WIDE WEB The internet and multimedia: The internet, Internetworking: Internet addresses, connections, The Bandwidth Bottleneck, Internet services, MIME-Types, The world wide web and HTML, Dynamic web pages and XML, multimedia on the web, Tools for the World Wide Web: web browsers, web servers, web page makers and site builders, plug-ins and delivery vehicles. Designing For The World Wide Web: Developing for the web: HTML is a Markup Language, The Desktop Workspace, The Small Device Workspace, nibbling, Text for the web: making columns of text, flowing text around images; images for the web: GIF and PNG Images, JPEG Images, Using Photoshop, Backgrounds, clickable buttons, Client side image maps, sound for the web, animation for the web.

Text Books:

1. Fred Halsall, Multimedia Communications , Pearson
2. Tay Vaughan, Multimedia, making it work Eighth edition, Tata McGraw-Hill Edition

Reference Books

1. Rao, Bojkovic & Milovanovic, Multimedia Comm. System: Technology , Std. &Network , PHI
2. JohnF. Koegel Bufod, Multimedia Systems , Addison Wesley, Edition. 2000

**DEPARTMENT OF ZOOLOGY
M. Sc. ZOOLOGY**

Course no.: 16Z0001

Semester- II Course Title: Applied Zoology

MM:T80+IA20

Time: 3 Hr

Note: There shall be seven questions in total. One question will be compulsory (short answer type) covering the entire syllabus and remaining six questions will be set two from each unit. Students are required to attempt compulsory question and 04 more questions selecting at least selecting one from each unit.

Unit-I

Host – Definitive and intermediate, Parasitism, Symbiosis, Commensalism, Reservoir.
Transmission, prevention and control of diseases: Tuberculosis and Swine flu
Principles and applications of ECG, MRI, PET, and CAT.

Unit-II

Life history and pathogenesis of *Plasmodium* sp.
Life history, Medical importance and control of *Aedes* sp.
Life history, pathogenesis and control of *Taenia* sp.
Principles and applications of brain activity recording, and pharmacological testing.

Unit-III

Preservation of gametes in animal and artificial insemination.
Principles and management of Poultry.
Introduction and management of pisciculture
Genetic improvement in animals; Induced breeding in aquaculture.

***As per SOE Zoology**

**** Proposed maximum marks and subject to change in uniformity with other faculties of university**

List of Recommended Books

1. Dent, D. Insect Pest Management
2. Hill, D.S., Timber Press. Agricultural Entomology
3. David, B. V. & Ananthkrishnan. General and Applied Entomology . T. N., Tata McGraw-Hill Publishing.
5. Asa C. Chandler, Clark P. Read, Introduction to Parasitology, John Wiley and Sons., Inc., New York.
6. Thomas W.M. Cameron, Parasites and Parasitism, Billing and Sons Ltd. London,
7. Elmer R. Noble, Glenn A. Noble; Parasitology: The Biology of Animal Parasites, Lea and Febiger, Washington.
8. R.P. Hall, Protozoology, Prentice-Hall, Inc. Englewood Cliffs. N.J. Charles E. Tuttle Company, Tokyo
9. E.O. Wilson. The Diversity of Life (The College Edition), W.W. Northern & Co.
10. Molecular Biology of the Cell, B. Alberts, D. Bray, J. Lewis, M. Raff, K. Roberts and J.D. Watson. Garland Publishing Inc., New York.
11. Molecular Biology and Biotechnology. A comprehensive desk reference, R.A. Meyers (Ed.), VCH Publishers, Inc., New York.
12. Molecular Cloning: a Laboratory Manual, J. Sambrook, E.F. Fritsch and T. Maniatis, Cold Spring Harbor Laboratory Press, New York.
13. Gray's Clinical Neuroanatomy by Mancall **New Medical Pharmacology at a Glance (7th Ed.)**
14. Oxford Handbook of Neurology