



હેમચંદ્રાચાર્ય ઉત્તર ગુજરાત યુનિવર્સિટી

NAAC A (3.02) State University

પો.બો.નં.—૨૧, યુનિવર્સિટી રોડ, પાટણ (ઉ.ગુ.) ૩૮૪૨૬૫

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પરિપત્ર ક્રમાંક — ૧૬૬ / ૨૦૨૦

વિષય :— એમ.એસસી. — ઈન્ટ્રીગેટેડ (લાઈફસાયન્સ) નો સેમેસ્ટર — ૧ અને ૨ ના અભ્યાસક્રમ અંગે..

આ યુનિવર્સિટીના લાઈફસાયન્સ વિષયના અનુસ્નાતક વિભાગના અધ્યક્ષશ્રીને જણાવવાનું કે, લાઈફસાયન્સ વિષયની અભ્યાસ સમિતિએ ભલામણ કર્યાનુસાર વિજ્ઞાન વિદ્યાશાખા અંતર્ગત એમ.એસસી.— ઈન્ટ્રીગેટેડનો સેમેસ્ટર — ૧ અને ૨ નો સામેલ પરિશિષ્ટ પ્રમાણનો અભ્યાસક્રમ **જૂન — ૨૦૨૦ થી ક્રમશઃ અમલમાં આવે તે રીતે** વિદ્યાશાખા / એકેડેમિક કાઉન્સિલવતી માન.કુલપતિશ્રીએ મંજૂર કરેલ છે. જે સંબંધિત સર્વેની જાણ તથા અમલ સારૂ આ સાથે મોકલવામાં આવે છે.

નોંધ: (૧) વિદ્યાર્થીઓના ઉપયોગ સારૂ પરિપત્રની એક નકલ ડિપાર્ટમેન્ટ ના ગ્રંથાલયમાં મૂકવાની રહેશે.

(૨) આ પરિપત્ર યુનિવર્સિટીની વેબ સાઈટ www.ngu.ac.in પર પણ ઉપલબ્ધ કરાવવામાં આવનાર છે.

સહી/—

અધ્યક્ષ

કુલસચિવવતી

બિડાણ : ઉપર મુજબ

નં.—એ કે / અ× સ / ૨૫૩૩ / ૨૦૨૦

તારીખ : ૧૧ / ૦૯ / ૨૦૨૦

પ્રતિ,

૧. અધ્યક્ષશ્રી , લાઈફસાયન્સ ડીપાર્ટમેન્ટ , હેમ. ઉ.ગુ. યુનિવર્સિટી, પાટણ.
૨. ડૉ. એમ. બી. પ્રજાપતિ (ડીનશ્રી — વિજ્ઞાન વિદ્યાશાખા), ગણિતશાસ્ત્ર ભવન, હેમ. ઉ.ગુ. યુનિવર્સિટી, પાટણ.
૩. પરીક્ષા નિયામકશ્રી, હેમચંદ્રાચાર્ય ઉત્તર ગુજરાત યુનિવર્સિટી, પાટણ. (પાંચ નકલ)
૪. ઓફિસરશ્રી ઈનચાર્જશ્રી, સબ સેન્ટર, ખેડબ્રહ્મા કેમ્પસ, મુ. —વડાલી, જિ. — સાબરકાંઠા. (હેમ.ઉત્તર ગુજરાત યુનિવર્સિટી, પાટણ.)
૫. ગ્રંથપાલશ્રી, હેમ.ઉત્તર ગુજરાત યુનિવર્સિટી, પાટણ. (વિદ્યાર્થીઓના ઉપયોગ સારૂ રેકર્ડ ફાઈલ માટે)
૬. સીસ્ટમ એનાલીસ્ટ, રીઝલ્ટ સેન્ટર, હેમ.ઉ.ગુ. યુનિવર્સિટી, પાટણ તરફ પરિણામ માટે તથા વેબસાઈટ પર મૂકવા સારૂ.
૭. પ્રવેશ પ્રશાખા (એકેડેમિક શાખા) હેમચંદ્રાચાર્ય ઉત્તર ગુજરાત યુનિવર્સિટી, પાટણ.
૮. અનુસ્નાતક પ્રશાખા (એકેડેમિક શાખા) હેમચંદ્રાચાર્ય ઉત્તર ગુજરાત યુનિવર્સિટી, પાટણ.
૯. મુખ્ય હિસાબી અધિકારીશ્રી (મહેકમ), હેમચંદ્રાચાર્ય ઉત્તર ગુજરાત યુનિવર્સિટી, પાટણ તરફ—પરિપત્રની ફાઈલ અર્થે
૧૦. સિલેક્ટ ફાઈલે— (૨ નકલ)

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY

NAAC A (3.02) State University

PATAN- 384265

Faculty of Science

**M. Sc. in Life Sciences
(5 years Integrated Programme)**

Syllabus/ scheme

Sem. – 1



Sem./CBCS/Grading pattern

w. e. f. June-2020

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY PATAN	
M. Sc. in Life Sciences (5 Years Integrated Programme) CBCS Syllabus 2020	
Document code	Syllabus IPLFSc- 2020
Name of faculty	Science
Faculty code	SCI
Programme name	M. Sc. in Life Sciences (5 Years Integrated Programme)
Programme code	IPLFSc
Effective from	June-2020

1. The proposed new structure for M. Sc. in Life Sciences (**5 Years Integrated Programme**) course is based on Choice Based Credit System (CBCS) which is in force June-2020.

CBCS Course Pattern

2. This programme is divided into **Ten Semesters** (Five Years). The duration of an academic year consists of two semester, each of 15 weeks for teaching. The academic session in each semester will provide 90 teaching days. Each semester has 24 credits and the programme is comprised of total 240 credits.
3. There will be five categories of courses/papers in this programme: CC- Core Course, PC- Practical Core, EG- Elective Generic, ES- Elective Subject and AEC- Ability Enhancement Course.
4. The theory courses with 4 credits shall have 60 hrs of direct classroom teaching workload (15 weeks \times 4). The theory courses with 3 credits shall have 45 hrs of teaching workload (15 weeks \times 3) and the theory courses with 2 credits shall have 30 hrs of teaching workload (15 weeks \times 2).

Attendance: The attendance rules will be as per the rules and regulation of Hemchandracharya North Gujarat University, Patan.

Medium of Instruction: The medium of instruction shall be English.

Structure of question paper :

1. For four credit course: each syllabus is of 4 units having equal weightage.
2. For two credit course: each syllabus is of 2 units having equal weightage.
3. For question paper of 70 marks (4 credits): each question paper shall have 6 questions:

	Total marks	
Q. 1	14	Must be drawn from Unit 1 and will have one long question of 14 marks OR two short questions of 7 marks each
Q. 2	14	Must be drawn from Unit 2 and will have one long question of 14 marks OR two short questions of 7 marks each
Q. 3	07	10 short questions must be drawn from Unit 1 & 2, out of which student has to answer any 7.
Q. 4	14	Must be drawn from Unit 3 and will have one long question of 14 marks OR two short questions of 7 marks each
Q. 5	14	Must be drawn from Unit 4 and will have one long question of 14 marks OR two short questions of 7 marks each
Q. 6	07	10 short questions must be drawn from Unit 3 & 4 out of which student has to answer any 7.
Total	70	

4. For question paper of 35 marks (2 credits): each question paper shall have 3 questions:

	Total marks	
Q. 1	14	Must be drawn from Unit 1 and will have one long question of 14 marks OR two questions of 7 marks each.
Q. 2	14	Must be drawn from Unit 2 and will have one long question of 14 marks OR two questions of 7 marks each.
Q. 3	7	8 short questions must be drawn from Unit 1 & 2, out of which student has to answer any 7.
Total	35	

Semester I

Course	Course code	Paper title	Exam duration (Hours)	External marks	Internal marks	Total marks	Teaching hours per week	Credit points
Paper-I	IPLFSc-101CC	Cell Biology	2.30	70	30	100	4	4
Paper-II	IPLFSc-102CC	Biochemistry	2.30	70	30	100	4	4
Paper-III	IPLFSc-103CC	Ecology	2.30	70	30	100	4	4
Practical Paper-I	IPLFSc-101PC	Cell Biology practical	More than 4 hours	50	00	50	4	2
Practical Paper-II	IPLFSc-102PC	Biochemistry practical	More than 4 hours	50	00	50	4	2
Practical Paper-II	IPLFSc-103PC	Ecology practical	More than 4 hours	50	00	50	4	2
Ability Enhancement course	IPLFSc-101AEC	English Communication	2.00	35	15	50	2	2
Generic elective	IPLFSc-101GE	Applications of Computer in Life Sciences	2.00	35	15	50	2	2
Elective subject course	IPLFSc-101ES	Human Disease and Control	2.00	35	15	50	2	2
	IPLFSc-102ES	OR Disaster Management						
Total				465	135	600	30	24

IPLFSC-101CC CELL BIOLOGY

UNIT – I

- Overview of Cell – Origin and evolution of cells and Cell theory.
- Classification of cells – Prokaryotic cells and Eukaryotic cells.
- Differences between Prokaryotic cells and Eukaryotic cells.

UNIT – II

- Cell membrane – Fluid mosaic model of membrane structure.
- Membrane proteins and their properties.
- Membrane carbohydrates and their role.
- Transport across membranes – active and passive transport
- Mitochondria – Structure, morphogenesis, chemical nature and functions.

UNIT – III

- Endoplasmic reticulum – Types, structure and function.
- Golgi apparatus – Structure and function.
- Lysosome – Structure and function.
- Peroxisomes and glyoxysome – morphology and function.
- Ribosome – Types, structure and function.

UNIT – IV

- Nucleus – structure and function.
- Chromosomes, chromatin structure.
- Cytoskeleton – Types of filaments and their functions.
- Microtubules – Chemistry and functions - Cilia and Flagella.

Reference Book

1. Verma PS and Agrawal Vk, 2010 Cell Biology, Genetics, Molecular Biology, Evolution and Ecology. S. Chand publications. New Delhi.
2. Powar CB 1983 Cell Biology, Himalaya Publishing House, Mumbai, India
3. David ES, Jones B Cell biology, Organelle structure and function

IPLFSC-102CC BIOCHEMISTRY

UNIT – I

- Introduction to Atoms, Elements and Molecules
- Major chemical bonds found in biological system – Ionic bond, Covalent bond, Hydrogen bond, Van der Waals interaction, hydrophobic interaction
- Introduction of pH and Buffer
- Water as universal solvent

UNIT – II

- Laws of Thermodynamics
- Gibbs Free energy, Entropy and Enthalpy
- Standard Free energy change and equilibrium constant
- Energy rich compounds – Phosphoenolpyruvate, Thioesters, ATP

UNIT – III

- Definition, function and classification of carbohydrate
- Structure and properties of Monosaccharides
- Overview of Disaccharides and Polysaccharides – Sucrose, Lactose, Starch, Cellulose, Glycogen, Heparin
- Definition, function and classification of Lipids
- Structure and Function of Lipids
- Introduction and significance of Phospholipids and Steroids

UNIT – IV

- Definition, function and classification of proteins
- Classification, Physical and chemical properties of Amino acids
- Structure of proteins – Primary, secondary, Tertiary and Quaternary levels
- Introduction of Nitrogen Base, Nucleosides and Nucleotides
- Structure of DNA – A-DNA, B-DNA and Z-DNA
- Introduction to RNA and its types

Reference Books

1. Harper H. A. 1993 Review of Physiological Chemistry (Lange Publications).
2. Lehninger A. I., Nelson D. L. and Cox M.M. 1993. Principles of Biochemistry (CBC Publishers).
3. Rastogi S. C. 2003 Biochemistry (Tata Mc Graw Hill Publishing Co. Ltd.).

IPLFSC-103CC ECOLOGY

UNIT – I

- Introduction to ecology, historical background, branches of ecology.
- Atmosphere: various zones of atmosphere, physiological –ecological interrelationship of gases and organisms, air as medium for living organism.
- Hydrosphere: physical and chemical properties of water, effect of aquatic environment on aquatic organism, water and ecological adaptations.
- Lithosphere: pedogenesis, physical and chemical properties of soil, soil as habitat for organisms, soil flora and fauna

UNIT – II

- Light and radiation: light variation in different environments, light receptors in organisms, effect of light on plants and animals
- Temperature: temperature fluctuations in different environments, effect of temperature on plant and animals, thermal adaptations of plants and animals.
- Interspecific interactions: positive interactions- mutualism, commensalism, proto cooperation; negative interaction- exploitation, amensalism, competition

UNIT – III

- Kinds of ecosystems, structure of ecosystem, abiotic and biotic components of ecosystem
- Functions of ecosystem- productivity of ecosystem, types of food chain, types of ecological pyramids, energy flow in ecosystem.
- Biogeochemical cycles: types of biogeochemical cycles, water cycle, oxygen cycle, carbon cycle, nitrogen cycle, sulphur and phosphorous cycle.

UNIT – IV

- Aquatic ecosystems: sub division of aquatic ecosystems, freshwater ecosystems, lentic and lotic ecosystems. Estuaries: types of estuaries, biotic communities of estuaries.
- Zonation of marine environment, stratification of marine environment, biotic communities of marine environment.
- Classification of terrestrial ecosystem: different types of biomes

Reference Book

1. Odum. E.P. 1996 Fundamentals of Ecology. Nataraj Publishers, Dehra Dun.
2. Verma PS and Agrawal Vk, 2010 Cell Biology, Genetics, Molecular Biology, Evolution and Ecology. S. Chand publications. New Delhi.
3. Smith, R.L.1986. Elements of Ecology. Harpet and Row Publishers, New York.

IPLFSc-101PC CELL BIOLOGY PRACTICAL

1. Preparation of temporary stained squash of onion root tip to study various stages of mitosis.
2. Preparation of permanent slide to show the presence of Barr body in human female blood cells/cheek cells.
3. Study of structure and function of different cell organelles using charts or models.
4. Isolation of chloroplast from given sample.
5. Perform staining of mitochondria in given sample.
6. Study of osmosis in grapes.
7. Gram staining in bacteria.
8. Special staining of bacteria:
 - (a) Capsule staining: Hiss's method
 - (b) Cell wall staining- Webb's method
 - (c) Spore staining- Schaeffer's method
 - (d) Metachromatic granule staining- Albert's method

IPLFSc-102PC BIOCHEMISTRY PRACTICAL

1. Preparation of reagents and solutions
2. Qualitative tests of functional groups in carbohydrates.
3. Qualitative tests of functional groups in proteins.
4. Qualitative tests of functional groups in lipids.
5. Quantification of carbohydrate from the given sample.
6. Quantification of protein content from the given sample.
7. Extraction of DNA from given sample: Spooling method.
8. Study of protein secondary and tertiary structures with the help of models.

IPLFSc-103PC ECOLOGY PRACTICAL

1. Principle and function of Sechi disc, Atmometer, Anemometer, Hygrometer, Hair hygrometer, Lux meter, Rain guage, Soil thermometer, Min-Max thermometer
2. To determine pH, EC, acidity, alkalinity, total hardness and dissolve oxygen content of given water sample
3. To determine soil texture, bulk density and particle density of given soil sample.
4. To determine water holding capacity and percolation rate of soil.
5. To determine pH, chloride, sulphate and total nitrogen, organic matter of given soil sample.
6. Study of positive and negative interaction of using suitable examples.
7. Study of different types of food chains and ecological pyramids using charts.
8. Study of different types biogeochemical cycles using charts.

IPLFSC-101AEC ENGLISH COMMUNICATION

UNIT – I

- Theory of Communication, Types and modes of Communication
- Language of Communication: Verbal and Non-verbal (Spoken and Written) Personal, Social and Business Barriers and Strategies Intra-personal, Inter-personal and Group communication
- Speaking Skills: Monologue Dialogue Group Discussion Effective Communication/ Mis-Communication Interview Public Speech

UNIT – II

- Reading and understanding: close reading, comprehension summary, paraphrasing analysis and interpretation translation (from Indian language to english and vice-versa) literary/knowledge texts
- Writing Skills: documenting, report writing, making notes, letter writing

Reference books

1. Fluency in English - Part II, Oxford University Press, 2006.
2. Business English, Pearson, 2008.
3. Language, Literature and Creativity, Orient Blackswan, 2013.
4. Language through Literature (forthcoming) ed. Dr. Gauri Mishra, Dr Ranjana Kaul, Dr Brati Biswas.

IPLFSC-101GE APPLICATIONS OF COMPUTER IN LIFE SCIENCES

UNIT – I

- History and development of computers, generations of computers
- Classification of computers
- Structure of computer: arithmetic unit, central unit, memory unit, Input unit and output unit
- Introduction to binary number system

UNIT – II

- Introduction to MS-OFFICE and its use in database management
- Introduction to statistical softwares and their use in biological data analysis
- Introduction to bioinformatics

Reference books

1. Ghosh Z and Mallick B. (2008). Bioinformatics: Principles and Applications, Oxford University Press.
2. Zar, Jerrold H. (1999). Biostatistical Analysis, IV Edition, Pearson Education Inc and Dorling Kindersley Publishing Inc. USA
3. Antonisamy, B., Christopher S. and Samuel, P. P. (2010). Biostatistics: Principles and Practice. Tata McGraw Hill Education Private Limited, India.

IPLFSc-101ES HUMAN DISEASE AND CONTROL

Unit 1

15 hrs

1. Types of diseases: communicable and non communicable disease
2. Disease vector and their mode of transmission
3. Important disease vectors
4. Epidemic diseases

Unit 2

15 hrs

1. Human diseases caused by viruses and their preventions
2. Human diseases caused by bacteria and their preventions
3. Human diseases caused by protozoan and their preventions
4. Human diseases caused by parasites and their preventions

Reference books

1. Temparo C. D. and Lewis M. A. (2000) Diseases of the Human Body: Third Edition F.A. Davis Company, 450 pp
2. Cheng T.C. (1964) The Biology of animal parasites, Saunders International Student Edition
3. Panikar C.K.J (1988) 5. The Parasitology of Trematodes Oliver and Boyd Ltd. Edinburgh.
4. Sood Pamnik (1993) Parasitology (Protozoology and Helminthology) CBS Publication and Distrubution, Delhi

IPLFSC-102ES DISASTER MANAGEMENT

Unit 1

15 hrs

1. Introduction to disaster
2. Different types of disasters: Natural and Man made
3. Parameters of disaster risk
4. Levels of disaster as per national guideline

Unit 2

15 hrs

1. Disaster risk assessment
2. Components of disaster management
3. Role of government and NGO in disaster management
4. Case studies in disaster management

Reference books

1. Sharma, V.K. (Ed.). 1995. Disaster Management, IIPA, New Delhi.
2. Singh T. 2006 Disaster management Approaches and Strategies, Akansha Publishing House, New Delhi.
3. Sinha, D. K. 2006 Towards Basics of Natural Disaster Reduction, Research Book Centre, New Delhi.