

(Abstract)

Modified Scheme, Syllabus of M.Sc Applied Zoology Programme (CBCSS) - Mark rearrangement for the Courses in fourth semester - implemented in the University Department - w.e.f. 2020 Admission - Orders issued

ACADEMIC C SECTION

Acad/C4/3864/2020

Dated: 28.11.2022

- Read:-1. U.O. No. Acad/C4/3864/2020 dated 17.01.2021
2. Letter No. Acad/C4/12617/2020 Dated 17.08.2022
3. Minutes of the meeting of the Department Council, Dept. of Zoology dated 07.11.2022
4. Letter from HoD, Dept. of Zoology Dtd. 08.11.2022 forwarding the Scheme, Syllabus of MSc Applied Zoology programme CBCSS

ORDER

1. As per paper read (1) above, the revised Scheme, Syllabus MSc Applied Zoology Programme (CBCSS) was implemented in the University Department - w.e.f 2020 admission.
2. The meeting of the Department council, Dept. of Zoology held on 07.11.2022, as per paper read(3) above, resolved to change the mark distributed for the Course - Project (MSZ004C11) from 200 to 100 with CE 40 & ESE 60 to comply with the Regulation for PG programmes (CBCSS)in University Departments w.e.f 2020, and as requested as per paper (read 2) above.
3. The HoD, Dept. of Zoology submitted the modified Scheme, Syllabus with the aforementioned changes made in the mark distribution for the Courses in the fourth semester of M.Sc. Applied Zoology Programme (CBCSS) as paper read (4) above, for implementation with effect from 2020 admission.
4. The Vice Chancellor after considering the matter in detail and in exercise of the powers of the Academic Council conferred under section 11 (1) Chapter III of Kannur University Act 1996 accorded sanction to modify the Mark rearrangement for the course in fourth semester of M.Sc. Applied Zoology Programme under CBCSS, in the Department of Zoology, Mananthavady Campus with effect from 2020 admission as detailed in para (2) above, and to report to the Academic Council.
6. The modified Scheme and Syllabus of M.Sc Applied Zoology Programme (CBCSS) implemented with effect from 2020 admission are appended and uploaded in the University Website.(www.kannuruniversity.ac.in).
- 7.The UO read (1) above stands modified to this effect
Orders are issued accordingly.

Sd/-

BALACHANDRAN V K
DEPUTY REGISTRAR (ACAD)
For REGISTRAR

To: 1. The Head, Dept of Zoology
Mananthavady Campus

Copy To: 1. The Examination Branch (through PA to CE).
2. PS to VC / PA to PVC / PA to R
3. DR / AR I/ AR II (Acad), EX-CI, EP IV
4. The Web Manager (for uploading in the Website),
5. The Computer programmer
6. SF / DF /FC

Forwarded / By Order

SECTION OFFICER



KANNURUNIVERSITY

DEPARTMENT OF ZOOLOGY

CURRICULUM AND SYLLABI FOR
M. Sc. APPLIED ZOOLOGY PROGRAMME

Choice Based Credit and Semester System (CCSS)

(w. e. f. 2020 Admission)

**REGULATIONS, SCHEME AND SYLLABUS FOR M.Sc. APPLIED ZOOLOGY
(BIODIVERSITY: CONSERVATION AND MANAGEMENT)
Effective from 2020 Admission**

1. ELIGIBILITY FOR ADMISSION:

Candidates who have passed and secured at least 55% marks in B.Sc. Zoology (Main) Degree examination of this University or an equivalent examination of any other University is eligible to apply for the M.Sc. Applied Zoology (Biodiversity: Conservation and Management) programme.

Regulations regarding the reservation of the seats are as per the rules of Government of Kerala/Kannur University. Those who have appeared for the final year examination can also apply; however, they should produce the mark-sheet before the preparation of rank list.

2. ADMISSION PROCEDURE:

Admission to the MSc Applied Zoology programmes of the University department shall be made purely on the basis of Entrance Examination.

3. REGISTRATION

- a. The Department has Permanent/ Contract faculty members as Student Advisors. Each student at the time of admission will be assigned to an advisor by the Department Council. He/she will advise the student about the academic Programme and counsel on the choice of courses depending on the student's academic background and objective. The student will then register for the courses she/he plans to take for the semester before the classes begin.
- b. The Department of Zoology offering MSc Applied Zoology programme shall have the maximum of 20 students that can be admitted taking into consideration the facilities available. The Department Council will be the authority to fix the optionals that can be offered for a Programme while ensuring that sufficient choice is given to each student in all semesters other than Semester 1. Elective courses for the next semester will be announced within 10 days of the end of the previous semester.
- c. The student has to complete the prescribed prerequisites for the course before registration. The student within a maximum of 10 working days after the commencement of the classes can change the Optional Course with the consent of HoD in consultation with the Advisor.
- d. The Department shall make available to all students a bulletin listing all the courses offered in every Semester specifying the Credits, list of topics the course intends to cover, the name of the instructor, the timetable and examination schedule. This will be made available in the last week of each semester after it is approved by the Department Council, the Dean and the VC.

4. COURSE DETAILS:

- a. Credit and Semester system will be followed for the programme. Credit is the measure to assess the value or relative importance of a course, computed on the basis of the time to be devoted for teaching theory and/or practical. Credit defines the quantum of contents/ syllabus prescribed for a course and determines the number of hours of instruction required per week. Thus credits will be assigned on the basis of the number of lectures/tutorials/ laboratory works and other forms of learning required completing the course contents in a sixteen week schedule per semester.
- b. Each student at the time of admission will be assigned to an advisor by the department council. He/she will advise the student about the academic programme and counsel on the choice of

course.

- c. Three kinds of Courses are offered - Core, Elective and Open Elective Courses (including MOOC courses). Core and Elective Courses are offered by the Department conducting the Programme. Open Elective Courses are offered either by the Department conducting the Programme or by any other Department of the University or via MOOC.
- d. Elective Courses are offered bythe Department concerned. Open Elective Courses will be offered by other Departments/Centres/Institutions as options. Open Elective Courses can be opted in any of the Semesters during the entire Programme other than the first semester. The maximum students that can be admitted to an Open Elective Course is limited to forty (40) except for MOOC courses. If the student intake in a department is more than 40, then the maximum number of students that can be admitted to an Open Elective course is equal to the student intake.
- e. The minimum duration for completion of a two year PG Programme in any subject is four (4)semesters and the maximum period for completion is eight (8) Semesters from the date of registration.
- f. Zero Semester : A Semester in which a student is permitted to opt out due to unforeseen genuine reasons.
- g. No regular student shall register for more than 24 credits and less than 16 credits per semester.
- h. The total credits required for the successful completion of a four semester Programme will be between 72 to 80.
- i. Maximum credits assigned to Core Courses for science subjects are 70 % of the total required credits.
- j. The Department Council shall design Core, Elective and Open Elective Courses including the detailed syllabus for each Programme offered by the Department. The Department Council shall have the freedom to introduce new courses and/or to modify/redesign existing Courses and replace any existing Course with a new Course to facilitate better exposure and training for the students, with the approval of the Faculty Council and the Academic Council.
- k. There shall be a one hour lecture excluding tutorials/seminars and two to three hours of practical work per week for one credit.

5. EVALUATION:

- a. Evaluation of the students shall be done by the Faculty member who teaches the Course on the basis of Continuous Evaluation and an End Semester Examination. The proportion of the distribution of marks among End Semester Examination and Continuous Evaluation shall be 60:40.
- b. Continuous Evaluation includes Assignments, Seminars and periodic written examinations.
- c. The allocation of marks for each component under Continuous Evaluation shall be in the following proportions :

Theory		Practical	
Components	% of marks	Components	% of marks

Test paper	40% (16 marks)	Tests	75% (30 marks)
Viva, Seminar presentations, Discussion, Debate etc.	40% (16 marks)	Record	25%(10 marks)
Assignment	20% (8 marks)	--	--
Total Internal marks	40	Total internal marks	40

- d. Mode of assessment i.e. administering of Test or Tutorial etc. will be decided by the department.
- e. A copy of all records of Continuous Evaluation shall be maintained in electronic format in the Department and shall be made available for verification by the University.
- f. Performance of each student in an assessment shall be intimated to him/her within two weeks of the conduct of test/ submission of assignment/ report.
- g. For the end semester examinations, the duration of a four credit course shall be 3hours.
- h. The minimum attendance required for each Course shall be 60% of the total number of classes conducted for that semester. Those who secure the minimum attendance in a semester alone will be allowed to register for the End Semester Examination. Condonation of attendance to a maximum of 10 days in a Semester subject to a maximum of two spells within a Programme will be granted by the Vice-Chancellor. Benefit of Condonation of attendance will be granted to the students on health grounds, for participating in University Union activities, meetings of the University Bodies and participation in extra-curricular activities on production of genuine supporting documents with the recommendation of the Head of the Department concerned . A student who is not eligible for Condonation shall repeat the Course along with the subsequent batch.

6. GRADING:

6.1 An alphabetical Grading System shall be adopted for the assessment of a student's performance in a Course. The grade is based on a 6 point scale. The following table gives the range of marks %, grade points and alphabetical grade.

Range of Marks%	Grade Points	Alphabetical Grade
90-100	9	A+
80-89	8	A
70-79	7	B+
60-69	6	B
50-59	5	C
Below 50	0	F

A minimum of grade point 5 (Grade C) is needed for the successful completion of a Course. A student who has failed in a Course can reappear for the End Semester Examination of the same

Course along with the next batch without taking re-admission or choose another Course in the subsequent Semesters of the same programme to acquire the minimum credits needed for the completion of the Programme. There shall not be provision for improvement of CE and ESE. A student can sit the ESE again if she/he has successfully completed the CE requirements in a subsequent semester subject to the maximum durations permitted.

Performance of a student at the end of each Semester is indicated by the Semester Grade Point Average (SGPA) and is calculated by taking the weighted average of grade points of the Courses successfully completed. Following formula is used for the calculation. The average will be rounded off to two decimal places.

$$GPA = \frac{\text{Sum of (grade points in a course multiplied by its credit)}}{\text{Sum of Credits of Courses}}$$

6.4 At the end of the Programme, the overall performance of a student is indicated by the Cumulative Grade Point Average (CGPA) and is calculated using the same formula given above.

Empirical formula for calculating the percentage of marks will be

$$\% \text{ Marks} = (\text{CGPA} \times 10) + 5.$$

Based on the CGPA overall letter grade of the student and classification shall be in the following way.

CGPA	Overall Letter Grade	Classification
8.5 and above	A+	First Class with Distinction
7.5 and above but less than 8.5	A	
6.5 and above but less than 7.5	B+	First Class
5.5 and above but less than 6.5	B	
5 and above but less than 5.5	C	Second Class

Appearance for Continuous Evaluation (CE) and End Semester Evaluation (ESE) are compulsory and no Grade shall be awarded to a candidate if he/she is absent for CE/ESE or both.

A student who fails to complete the Programme/Semester can repeat the full Programme / Semester once, if the Department Council permits to do so. Absence in an examination will be marked zero.

No student shall be allowed to take more than eight consecutive Semesters for completing the four Semester Programme from the date of enrolment.

7. GRADE CARD

The Controller of Examinations shall issue the grade cards of all semesters and the consolidated grade card and certificates on completion of the programme, based on the details submitted by the Head of the Departments. This will be in digital form only.

The Grade Card shall contain the following

- (a) Title of the Courses taken as Core, Elective & Open Elective .
- b) The credits associated with and grades awarded for each Course.
- c) The number of credits (Core /Elective / Open Elective) separately earned by the student and the SGPA.
- d) The total credits (Core / Elective / Open Elective) separately earned by a student till that Semester.

The consolidated grade statement issued on completion of the Programme shall contain the name of the Programme, the Department/School offering the Programme, the title of the Courses taken, the credits associated with each Course, grades awarded, the total credits (Core /Elective/Open) separately earned by the student, the CGPA and the class in which the student is placed. Rank Certificates will be issued based on CGPA calculated at the end of the last semester of that Programme.

8 DEPARTMENT COUNCIL

All the Permanent and Contract teachers of the Department shall be the members of the Department Council.

The Department Council subject to the Regulation shall monitor every academic programme conducted in the Department.

Department Council shall prescribe the mode of conduct of courses, conduct of examinations and evaluation of the students.

An elected student representative also may attend the department council meeting where agenda related to academic matters / research activities of students are discussed.

SEMESTER WISE DISTRIBUTION OF PAPERS, MARKS, CONTACT HOURS AND CREDITS

First Semester

Paper No	Title of Paper	Contact Hrs/Week			Marks			Credits
		L	T/S	P	End Sem	Internal	Total	
	Course details/marks							
MSZOO01C01	Philosophy of Science and History of Biology	4	1	4	60	40	100	4
MSZOO01C02	Chemistry for Biologists	4	1	4	60	40	100	4
MSZOO01C03	Physics for Biologists and Statistics for Biologists	4	1	4	60	40	100	4
MSZOO01C04	Biosystematics, Taxonomy and Ethology	4	1	4	60	40	100	4
MSZOO01P01	Practical – I (Biochemistry)	6			60	40	100	3
MSZOO01P02	Practical – II (Biophysics & Biostatistics)	6			60	40	100	3
	Total				360	240	600	22

Second Semester

Paper No	Title of Paper	Contact Hrs/Week			Marks			Credits
		L	T/S	P	End Sem	Internal	Total	
	Course details/marks							
MSZOO02C05	Cytogenetics, Molecular Biology and Molecular evolution	4	1	4	60	40	100	4
MSZOO02C06	Biotechnology & Bioinformatics	4	1	4	60	40	100	4
MSZOO02C07	Comparative Animal Physiology	4	1	4	60	40	100	4
MSZOO02E01*	Immunology *	4	1	4	60	40	100	4
MSZOO02O01	Remote sensing and GIS for LifeSciences	4	1	4	60	40	100	4
MSZOO02P03	Practical – III (Cytogenetics, Molecular Biology and Biotechnology)	6			60	40	100	3
MSZOO02P04	Practical – IV (Animal Physiology and Parasitology)	6			60	40	100	3
	Total				360	240	600	22

Third Semester

Paper No	Title of Paper	Contact Hrs/Week			Marks			Credits
		L	T/S	P	End Sem	Internal	Total	
	Course details/marks							
MSZOO03C08	Developmental Biology	4	1	4	60	40	100	4
MSZOO03C09	Ecology	4	1	4	60	40	100	4
MSZOO03C10	Conservation Biology –I	4	1	4	60	40	100	4
MSZOO03E02	Conservation Biology –II	4	1	4	60	40	100	4
MSZOO03E03*	Wildlife Biology *	4	1	4	60	40	100	4
	Open Course				60	40	100	4
MSZOO03P05	Practical – V (Developmental Biology)	6			60	40	100	3
MSZOO03P06	Practical – VI (Ecology and Parasitology)	6			60	40	100	3
	Total				360	240	600	22

Fourth Semester

Paper No	Title of Paper	Contact Hrs/Week			Marks			Credits
		L	T/S	P	End Sem	Internal	Total	
	Course details/marks							
MSZOO04E04*	Research Methodology – Concepts & Methods*	4	1	4	60	40	100	4
MSZOO04E05*	Parasitology*	4	1	4	60	40	100	4
MSZOO04E06*	Fisheries Biology*	4	1	4	60	40	100	4
MSZOO04C11	Project Work	4	1	4	60	40	100	6
	Total				180	120	300	14

*Elective paper - choose any two (MSZOO04 E 01, MSZOO04E 02,MSZOO04E 03)

PROJECT WORK

The main objective of introducing a project work in the curriculum is that the student who completes this course should get hands on experience in independent research work in the field of biodiversity conservation and management. He/she should equip himself/herself to face challenges in Conservation Biology and should be able to provide trained manpower in the field. A topic in the optional subject – Biodiversity: Conservation and Management shall be assigned to each student.

The research work related to this topic will be carried out by each student under the supervision of a teacher. The report of the findings shall be submitted by each student in the form of a dissertation which shall be submitted for evaluation a day prior to the date of viva voce examination of the fourth semester. A declaration by the student to the effect that the dissertation submitted by him/her has not previously formed the basis for the award of any degree or diploma and a by the supervising teacher to the effect that the dissertation is an authentic record of work carried out by certificate the student under his supervision are to be furnished in the dissertation.

Assessment of different components of project may be taken as below:

Internal evaluation: 80 marks

Internal evaluation should be done by the Internal supervising teacher on the basis of the involvement of student at various stages of the project work including collection of data in a time bound manner, submission of dissertation as per the time schedule and on the sincerity and punctuality in carrying out the dissertation work

External evaluation: 120 marks

External evaluation of the dissertation and the conduct of Viva Voce examination should be done by two examiners of which one should be an expert from an Academic or research institute from a panel of experts submitted to University by the Head of the Department and the other should be a permanent faculty member nominated by the Head of the Department.

Out of the 120 marks 80 marks may be earmarked for the dissertation, 30 marks for the presentation and 10 marks for the interaction

Pass conditions. The students shall declare to pass the project report course if she/he secures a minimum of 40% marks (internal and external put together). In an instance of inability of obtaining a minimum of 40% marks, project work may be redone and the report may be resubmitted along with subsequent exams through parent department. There shall be no improvement chance for the marks obtained in the project report.

Students are required to undertake a compulsory study tour and a report of tour is to be submitted along with the Dissertation.

CURRICULUM AND SYLLABI FOR MSc APPLIED ZOOLOGY

I SEMESTER

MSZOO01C01 - Philosophy of Science and History of Biology
MSZOO01C02 - Chemistry for Biologists
MSZOO01C03 - Physics for Biologists & Statistics for Biologists
MSZOO01C04 - Biosystematics, Taxonomy and Ethology
MSZOO01P01 - Practical I(Biochemistry)
MSZOO01P02 - Practical II (Biophysics & Biostatistics)

II SEMESTER

MSZOO02C05 - Molecular Biology and Molecular Evolution
MSZOO02C06 - Biotechnology and Bioinformatics
MSZOO02C07 - Comparative Animal Physiology
MSZOO02E01* - Immunology
MSZOO02O01 -Open elective
MSZOO02P03 - Practical III (Molecular Biology and Biotechnology)
MSZOO02P04 - Practical IV (Animal Physiology)

III SEMESTER

MSZOO03C08 - Developmental Biology
MSZOO03C09 -Ecology
MSZOO03C10 - Conservation Biology – I
MSZOO03E02 - Conservation Biology – II
MSZOO03E03* -Wild Life Biology
MSZOO03O02– Open elective
MSZOO03P05 - Practical V (Developmental Biology)
MSZOO03P06 - Practical VI (Ecology and Conservation Biology)

IV SEMESTER

MSZOO04E04* - Research Methodology – concepts and methods
MSZOO04E05* - Parasitology
MSZOO04E06* - Fisheries Biology
MSZOO04C11 - Project Work
*elective paper

MSZOO01C01 - PHILOSOPHY OF SCIENCE AND HISTORY OF BIOLOGY90hrs

Course outcome: After the completion of this course, the students will be able to:

- Understand what science is and in what ways science differs from non science and pseudoscience subjects
- Get a clear picture about what philosophy science is.
- Understand the different methods of reasoning in Science.
- Get an idea about the modes of scientific explanations.

- Understand the role of paradigm shifts in various branches of scientific research; also get an idea about the scientific revolutions in various branches of science
- Understand the value, its acceptance and the criticism to Science.
- Understand the historical milestones in the evolution of scientific thoughts and research.
- Distinguish between different centuries with respect to growth of science and scientific thoughts.
- Understand the ups and downs in the history of science, pace of scientific research during 17th to 20th Centuries and contributions made by scientists in the past centuries.

A. Philosophy of science 50 hrs

MODULE I :

- | | |
|--|---------------|
| 1. What is Science? | 5 hrs |
| Origins of modern science.
Philosophy of Science- definition, scope.
Science and pseudo-science. | |
| 2. Scientific Reasoning | 9 hrs |
| Deduction and induction
Hume's problem
Probability and induction | |
| 3. Explanation in science | 12 hrs |
| Hempel's covering law model of explanation
The problem of symmetry
Explanation and causality
Can science explain everything?
Explanation and reduction | |

MODULE II :

- | | |
|---|---------------|
| 4. Scientific Change and Scientific Revolutions | 11 hrs |
| Logical positivist philosophy of science
The structure of scientific revolutions
Incommensurability and theory ladenness of data
Kuhn and the rationality of science | |
| 5. Philosophical problems in Biology | 4 hrs |
| The problem of biological classification | |
| 6. Science and its Critics | 9 hrs |
| Scientism.
Science and religion
Is Science value free? | |

B. History of biology 40 hrs

MODULE III:

1. An account on history of science

3 hrs

Ancient Greek philosophers.

2. History of biology:

History of Biology during Seventeenth century: Anatomists, Microscopists

5 hrs

History of Biology during Eighteenth century: Great chain of being; Carl Linnaeus; Lamarck; Precursors to modern evolutionary theory.

8 hrs

MODULE IV:

History of Biology during Nineteenth century: Birth of associations and societies to promote science; Charles Darwin; Pre-Darwinian evolution; Origin of species; The emergence of biological disciplines; Experimental physiology; Cell theory, cell pathology and germ theory.

12 hrs

History of Biology during twentieth century:

12 hrs

- First half of 20th century: Growth of microbiology and Biochemistry; Genetics and heredity
- Second half of 20th century: The architects of life - proteins, DNA and RNA; The origins and borderlines of life; Growth of genetic engineering; Growth of Biotechnology; Growth of Genomics; Growth of Recombinant DNA.

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MSZOO01C02 - CHEMISTRY FOR BIOLOGISTS 90 hrs

Course outcome: After the completion of this course, the students will be able to:

- Understand the chemistry behind life forms, also connect biochemistry to their own lives on a variety of levels.
- Understand the fundamental biochemical principles thereby get to know how biochemistry works in the body and under different conditions.
- This course features the laws of thermodynamics, concept of enthalpy, entropy and free energy changes and their application to biological systems and reactions.
- Through this course the students learn about the classification, structure and function of biomolecules such as carbohydrates, proteins, lipids etc.

- The students will be able to acquire the basic concepts of bioenergetics and oxidative metabolism. Thus become aware with the metabolic pathways of biomolecules, their regulation, and the importance of high energy compounds.
- The students will become aware of the fundamental knowledge on Enzymes and biocatalysis. They may acquire basic principles to analyze the enzyme kinetics and learn to estimate the activity of enzymes. Studying the enzyme inhibition mechanism introduces the area of treatment strategies for various diseases such as cancer and AIDS.
- Students in the Biochemistry will learn the chemical nature and functions of vitamins.
- The students will develop skills to determine the structure and nature of amino acids.
- This course provides the structure, biosynthesis and degradation of nucleic acids. Students will learn about the structure of DNA and RNA.
- The practical biochemistry course acquires through getting knowledge in biochemical techniques and applying biochemical calculations.
- Students will learn the qualitative and quantitative analysis of constituents of biological fluids such as urine, blood and their estimation using standard methods.
- In this course students will undertake experiments and thus understanding the role of enzymes in clinical diagnosis and industrial applications as well.
- At the end of this course students are able to appreciate the importance of biochemistry in living systems.
- This course facilitates employability in diagnostic sector and R & D institutes.

MODULE I:	21 hrs
1. Introduction:	6hrs
Biochemistry and organization of cells Molecular logic of life Chemical unity and biological diversity Biopolymers The physical roots of the biochemical world Laws of thermodynamics in biological system: entropy, enthalpy and concept of free energy	
2. Carbohydrates:	6hrs
Structure of monosaccharides, disaccharides, oligosaccharides and polysaccharides (chitin, bacterial cell wall and glycogen) Physical and chemical properties of monosaccharides	
3. Lipids:	9hrs
Classification of lipids, classification of fatty acids Physical and chemical properties of lipids Structural lipids in membranes; Phospholipids, sphingolipids and cholesterol. Prostaglandins	

MODULE II: **12 hrs**

4. Amino acids and proteins:**12hrs**

Structure of different amino acids in proteins. Classification of amino acids. Peptide bonds; Zwitter ions.

Classification of proteins; glycoproteins and proteoglycans

Structure of proteins; Ramachandran plot

Nitrogen excretion and urea cycle

MODULE III:**30 hrs****5. Bioenergetics & oxidative metabolism:****30hrs**

Introduction to metabolism

Carbohydrate metabolism- Glycolysis; fate of pyruvate; gluconeogenesis; HMP pathway; glycogenolysis; glycogenesis, Regulation of glycogen metabolism. Citric acid cycle; electron transport chain; oxidative phosphorylation; redox potential; chemi-osmotic hypothesis; uncouplers; inhibitors of electron transport chain. High-energy compounds; role of ATP in the biological system

Lipid metabolism- Oxidation of fatty acids (saturated, unsaturated and odd carbon).

Ketone bodies; Biosynthesis of fatty acids; biosynthesis of cholesterol; Regulation of cholesterol biosynthesis.

Amino acid metabolism- transamination, decarboxylation and deamination reactions in the biological system; inborn errors in metabolism.

MODULE IV**27 hrs****6. Enzymes:****13hrs**

Introduction- Classification and nomenclature. Specificity, various factors influencing velocity of enzyme catalyzed reactions

Michaelis-Menten equation & Kinetics, Line weaver-Burk plot

Enzyme inhibition-reversible and irreversible (competitive and non-competitive) with examples.

Enzyme inhibition in the treatment of AIDS

6.4 Regulatory enzymes-Allosteric enzymes

Zymogens, isozymes

7. Nucleic acids:**8hrs**

Chemistry, biosynthesis and degradation of nucleic acids

Structure of DNA and RNA.

8. Vitamins:**6hrs**

Chemical nature and functions of vitamins

Role of B-complex vitamins as coenzymes.

Chemistry for biologists (References)

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2. Berg, J.M., Tymoczko, J. L. and Stryer, L. (2002) Biochemistry, W.H. Freeman and Co., New York.
3. Biology of the Cell (5th ed.)-Garland Science
4. Campbell, Farrel, 2007, Biochemistry (5th ed) Thomson, Brooks and Cole Publ.
5. Das, D. (2000) Biochemistry, Academic Publishers, Calcutta
6. David D. Plummer, 2008. an introduction to practical Biochemistry (3rd ed) TataMcGrawHill.
7. Deb, A C 2008. Comprehensive Viva and Practical Biochemistry. Central Publ.
8. Devlin, T.W. (2000). A Text Book of Biochemistry with Clinical Correlations, Wiley-Liss, NY.
9. Donald J Voet, Jubith J Voet, Charlotte, W. Pratt, 2007. Principles of Biochemistry (3rd ed). John Wiley.