



RANI CHANNAMMA UNIVERSITY, BELAGAVI

WEL-COME

**TO THE COURSE STRUCTRE AND SYLLABUS OF UNDERGRADUATE
PROGRAMMES – B.Sc**

IV Semester

w.e.f.

Academic Year 2015-16 and onwards

Syllabi for Faculty of Science and Technology under

B.Sc

IV – Semester

Group – I

1. Basic – English:

RANI CHANNAMMA UNIVERSITY, BELAGAVI

GROUP -1 (LANGUAGES)

Detailed Syllabus for B. Sc. / B.Sc. Comp-Sc / BCA / B. Sc. in CCJ

(With effect from 2017-18 onwards)

Semester IV: Basic English

Teaching Hours: 5 Hours per Week

Text: **Eco English: Learning English through Environmental Issues an Integrated, Interactive Anthology**

Bloomsbury Publication

Edited By N. Krishnaswamy, Lalitha Krishnaswamy, Dr. B.S. Valke

(Units – 17, 18, 19, 20, 21, 22, 23, 24)

Grammar and Composition

- A) Correction of Sentences (focus on the use of articles, prepositions, numbers, subject verb agreement, question tags, Pronouns, adjectives, adverbs, homophones, homonyms)
- B) Speeches (Direct and Indirect)
- C) Voice (Active and Passive)
- D) Application Letters for Jobs without CV
- E) Paragraph Writing (my family, kinds of books, the green house effect, Importance of sports, euthanasia, solar energy, a decision that changed my life, advantages of vegetarianism, cherishing old people, human values are timeless etc)

Pattern of Question Paper

(80 Marks paper of three hours and 20 Marks for I.A)

1) Objective type questions	10X1=10
2) Comprehension Questions (Answer in a sentence or Two)	5X2=10
3) Essay type question (one out of two)	1X10 =10
4) Essay type question (one out of two)	1X10=10
5) Short Notes (two out of four)	2X5=10
6) Correction of errors	10X1=10

- | | |
|---|--------|
| 7) A) Direct and Indirect Speech | 5X1=05 |
| B) Active Voice and Passive Voice | 5X1=05 |
| 8) A) Application Letters for Jobs without CV | 1X5=05 |
| B) Paragraph Writing (about 150 words) | 1X5=05 |

80

Additional English

RANI CHANNAMMA UNIVERSITY, BELAGAVI MODERN INDIAN LANGUAGES (MIL) Detailed Syllabus for B. Sc. / B.Sc. Comp-Sc / BCA / B. Sc. in CCJ

(With effect from 2017-18 onwards)

Semester IV: Additional English

Teaching Hours: 5 per Week

Text Book: *Invisible Man* by H.G. Wells (Roopa Publications, New Delhi)

Grammar and Composition

- 1) Misspell words (Pair of words)
- 2) Organizing a written composition
- 3) Expansion of outlines into a story
- 4) A) Letters to News paper editors
B) Letters of complaint to the concerned authorities

Pattern of Question Paper

(80 Marks per paper of three hours and 20 Marks for I.A)

- | | |
|--|----------|
| 1) Objective type questions on the novel | 10X1= 10 |
| 2) Comprehension Questions on the novel
(Answer in a sentence or Two) | 5X2=10 |
| 3) Essay type question on the novel (one out of two) | 1X10 =10 |
| 4) Essay type question on the novel (one out of two) | 1X10=10 |
| 5) Short Notes on the novel (two out of four) | 2X5=10 |
| 6) A) Misspell words (Choosing a Correct Spelt word) | 5X1= 05 |
| B) Organising a written composition | 5X1= 05 |
| 7) Expansion of outlines into a story | 10 |
| 8) A) Letters to News paper editors | 1X5= 05 |
| B) Letters of complaint to the concerned authorities | 1X5=05 |

80

2. Basic –Kannada

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3. Basic – Marathi

B.Sc

Semester IV

Basic Marathi

Course: Literary Form: Lalit Gadya

Text: Suvarna Garud : Maruti Chittampali

Sanskriti Prakashan, Pune

4. Basic – Arabic

SYLLABUS OF ARABIC SUBJECT

BSc. Fourth Semester

Arabic Basic

Paper : Prose, Poetry and History of Arabic

Literature **Scheme of teaching :** 5 hours per week

Prescribed Text Books

1. Al Qiraatur Raashida part II (Prose)

By: Abul Hasan Ali Nadvi

Pub.By: Nadvatul Ulama Lucknow (u.p)

Following Lessons)

(1) Al Khaleefatu umar bin Abdul Azeez (i) (2) Al Khaleefah umar bin

Abdul Azeez (ii) (3) Fi baiti Abi Ayyub al Ansari. (4) Al Imam Malik bin Anasin. (5) Al Qatiratu (i) (6) Al Qatiratu (ii) (7) Jismun Nabati(i) (8) Jismun Nabati (ii)

2. Qaseeda-e-Burdah (Poetry)

By: Imam Boosari. Pub.By: Azeem Book Depo Deoband (u.p)

Chapter No.6.

3. Mukhtasar Tareekh-e- Adabiyat-e-

Arabi By: Dr.syed Abul Fazl

Pub.By:Deccan Traders Book Seller

& Publisher 23-2-378, Moghalpura, Hyderabad.

Chapter No.III 3rd & 4th period (daur)

4 The Holy Quraan. Pub.By:Taj Company Mumbai

Suratuz Zilzal

The question paper should be broadly based on the following pattern.

1) Multiple choice from first and second text	10x1	= 10
2) Summary from text with choice	2x7½	= 15
3) R.C. from first text with choice	3x5	= 15
4) Appreciation of verses from second text 2 out of 3	2x7½	= 15
5) Question from third text with choice	2x7½	= 15
6) Question on Sura	1x10	= 10

80

5. URDU BASIC (MIL)

B. Sc IV SEMESTER

URDU BASIC (MIL)

Paper III: Prose, Poetry & Science Essays

Scheme of Teaching: Duration 16 weeks, 5 hours/week

Prescribed Text books

- i. ***KARWAN-E-ADAB***
(Detailed Text book)

Ed by: Dr. Sayed Sanaulla
Published by: Nasheman Publishers
Near Ikhlas English School
2nd Stage RML Nagar
Shimoga.

PROSE: (Last 5 lessons only)

POEMS:

- | | |
|--------------------------|----------------|
| 1. Tazheek-e-rozgar- | Mirza Souda |
| 2. Khak-e-Hind- | Chakbast |
| 3. Talim-e-Niswan- | Akbar Ilahbadi |
| 4. Bol ari-o-dharti bol- | Majaz |

GAZALS:

- | | |
|---------------------------|-------------------|
| 1. Nagah chaman mein- | Mashafi |
| 2. Ye na thi hamari- | Ghalib |
| 3. Lagta nahin hai- | Zafar |
| 4. Hamne sun eke aap- | Mh. Hussain Azaad |
| 5. Hum hain Mata-e-kucha- | Majrooh |

II. JADEED-ILM-E-SCIENCE

By: Wazarat Hussain Pub
By: Educational Book
House, Aligarh 202002

(Following lessons only)

Lesson no. 10, 11, 12 & 13

(Page No- 198 –256)

SCHEME OF EXAMINATION (III & IV SEMESTER)

Total Marks – 100 marks (Theory- 80 + Internal Assessment- 20)

- a) Each paper of 100 marks shall carry 20 marks Internal Assessment, 4+10 shall for I.A Test and remaining 3+3 shall be for home assignment and attendance respectively**
- b) In each paper 2 tests shall be conducted for the award of I.A marks. First test of one hour duration for maximum 20 marks reduced to 4 marks shall be conducted in 8th week. Second test in 12th week of respective semester of 80 marks and of 3 hours duration then reduced to ten marks.**

The question paper shall be broadly based on the following pattern (III & IV semester)

Q. No. 1: Multiple choice questions from both the texts (10 out of 10)

10 x 1 = 10

Q. No. 2: (Detailed Text)

Essay type question, Summary/Critical

Appreciation of a story

(1 out of 3)

1 x 15 = 15

Q. No. 3: Reference to Context

(4 out of 6)

4 x 2.5 = 10

Q. No. 5: Appreciation of verses (Gazals)

(4 out of 6)

4 x 2.5 = 10

Non-Detailed Text

Q. No. 6: Essay type questions

(1 out of 2)

1 x 15 = 15

Q. No.7: Short notes

(2 out of 4)

2 x 5 = 10

6. Sanskrit (Basic)

Bsc Part -II Basic - Samskrit		
Fourth Semester		
Teaching Hours	_____	: 5 Hours per week _____
Exam Marks	_____	: 80+20=100 of 3 hours Duration
Text : सुमिहसंस्कृतसंस्कृत K. U. Dharwad Publication Pavate Nagar Dharwad - 3		
1.	सुमिहसंस्कृतसंस्कृत (संस्कृतसंस्कृतसंस्कृत)	: 70 Marks
2.		: 10 Marks
3.	Internal Assessment	: 20 Marks
	1. Internal Test - 14 2. Assignment, Class Records Skill -	
	Development - 06	Total 100 Marks

Bsc Part -II

Basic - Samskrit

Question Paper Pattern

Fourth Semester

1.	New type questions / select the correct answer (any ten out of twelve)	10 Marks
2.	Translate & explain (any three out of five)	18 Marks
3.	Explain with reference to context (any four out of six)	16 Marks
4.	Critical notes (any two out of four)	14 Marks
5.	Answer the following questions (with internal choice)	12 Marks
6.	Grammar (Recognize the pronouns forms)	10 Marks
	Total	80 Marks

7. Basic - Persian

B.Sc. 4th Semester

Basic Persian

Teaching Hours : 5 Hourse per Week

Modern Prose

1. Prescribed text book

Following portion only

Maruf-E-Iran

Textbook

Shukhan-E-Naw(Part-II) by Manzoor Ahmed Khan

Pub:-Educational book house Aligarh.

2. Prescribed textbook

Following portion only

Manzumat-Aqlaque

Textbook

Shukhan-E-Naw(Part-I) by Dr.Gulam Sarwar Muslim University.

Pub:-Educational book house Aligarh.

Scheme of Examination

1. Total marks-100 Theory -80 marks Internal test Assessment 17 and attendance 3 marks=20.

2. In each paper two tests shall be conducted for the award of Internal Assessment marks, and each of one hour duration for a maximum of 20 marks reduced to 17 later. First test shall be conducted in 8th week and 2nd test in 12th week of respective semester. The Average marks obtained in the two tests for 17 marks shall be taken as final Internal Assessment Marks test component.

Scheme of Examination

Q1.Multiple choice questions	1*10=10
Q2.Essay type questions from the text	3*05=15
Q3.Questions on R.C from the text	3*05=15
Q4.Translation & Explanation from the text	3*05=15
Q5.Summary of the Passage/Poem from the text with choice	1*15=15
Q6.Short notes with choice (On the history of Persian Literature)	2*05=10

8. Basic – Hindi

B.Sc. IVth Semester

Basic Hindi

1) Examination : a) One Paper carrying 80 Marks and 3 hours of Duration.

b) Internal Assessment Marks 20

2) Teaching : 5 hours per week

3) Course :1) Collection of Prose

2) General Essay

4) Distribution of Marks

I	Objective type of Questions 10/14	10 Marks
II	Annotations from Prose 2/4	10 Marks
III	General Question based on Prose 2/4	30 Marks
IV	Short Notes on Prose 3/5	15 Marks
V	General Essay with Options 1/3	15 Marks
	Total	80 Marks
	Internal Assessment	20 Marks
	Total	100 Marks

Text Books- Prose

- 1) ग यअमृत पठन के लए (संपूणपु तक) Marks 65
संपा क
जोग संहबसेन,डॉ. यंकटपाट ल
वाणी काशन६५४६९५, २१-ए, द रयागंज, नयी द -ल११०००२
- 2) **General Essay** (नबंधरचना) Marks 15

Reference Books

1. सा हि यक नबंध: गणप तचंगु त
2. च तनक न: महादेवीवमा
3. नबंधका खजाना : आरती अि नहो ी
4. ह दका ग यसा ह :य रामचं तवार
5. सा ह सुमनय: बालकृ णभ
मम हो
6. आधु नक ह दसा ह य व वधआयाम : रि ा
7. भारतीय नार : अि मताक पहचान : उमा शु ला
8. ेठल लत नबंध: कृ ण बहार म
9. ह दग यलेखनम यं औरय वचार: सुरेशका त

Group – II

OPTIONAL / COMPULSORY SUBJECT FOR THE DEGREE IN SCIENCE SUBJECTS

RANI CHANNAMMA UNIVERSITY, BELAGAVI.

B.Sc. IV Semester (w.e.f: 2018 – 19) and onwards.

Subject: BOTANY (optional)

Paper: Diversity of Angiosperms and their systematics, Economic botany and Medicinal botany 52 hrs.

Unit I: Morphology of Angiosperms: 07 hrs.

Study of stems and its modifications, Leaf- types, stipules, Phyllotaxy and their modifications. Study of Inflorescences, flowers (Floral formula and Floral diagram to be included) and fruits.

Unit II: Angiosperm systematics: 10 hrs.

Botanical nomenclature- principles and rules, taxonomic ranks, type concept and principle of priority. Botanical survey of India. Classification of Angiosperms: Systems proposed by Bentham and Hooker, Engler Prantl. Their salient features, merits and demerits.

Brief account of APG classification.

Contributions of Cytology (Cytotaxonomy), Phytochemistry (Chemotaxonomy) and Taxometrics (Numerical taxonomy) to taxonomy.

Unit III: Diversity of flowering plants as illustrated by members of the following families: 20hrs

Annonaceae, Brassicaceae, Malvaceae, Rutaceae, Rhamnaceae, Fabaceae, Myrtaceae, Combretaceae, Cucurbitaceae, Apiceae, Rubiaceae, Asteraceae, Apocyanaceae, Asclepiadaceae, Convolvulaceae, Solanaceae, Acanthaceae, Verbenaceae, Lamiaceae, Amaranthaceae, Euphorbiaceae, Orchidaceae, Liliaceae, Arecaceae and Poaceae.

Unit IV: Economic Botany: 10 hrs

Origin & Distribution, Family, Botanical name and utility of following plants-

Food plants: Rice, Wheat, Maize, Pulses (Bengal gram, Pigeon pea) and Sugarcane

Fibres: Cotton, Jute.

Oil yielding plants: Ground nut, Sunflower, Palm oil, Sandalwood and Citronella oils

Paper & pulp: Bamboo & Eucalyptus

Spices: Ginger, Clove, Cinnamon, Asafoetida and Cardamom

Beverages: Tea & Coffee

Rubber: Hevea sp.

Unit V: Medicinal botany: 05hrs

Common medicinal plants in primary health care: -

Tippateega (*Tinospora cordifolia*), Tulsi (*Ocimum sanctum*) Kalabanda (*Aloe-vera*)

Turmeric (*Curcuma longa*) Ashwagandha (*Withania somnifera*) and Sarpagandha

(*Rauwolfia serpentina*)

Practicals:-

1. Morphology of Root, Stem, Leaf and their modifications.
2. Study of Inflorescence and its types.
3. Study of Flower-I- Descriptive terms, Thalamus, Calyx, Corolla and Aestivation.
4. Study of Flower-II –Androecium and Gynoecium. Floral formula and Floral diagram.
5. Study of Fruit types.
6. Study of any 18 families representing from polypetalae, gamopetalae, apatalae and monocots available in the locality.
8. Economic botany and Study of Medicinal Plants (as per syllabus) available in the locality.
9. Study Tour for minimum Two days to study the Flora (Taxonomy).

Suggested readings:

1. Davis, P.H. and Heywood, V.H. 1963. Principles of angiosperm taxonomy. Oliver and boyd, London.
2. Heywood, V.H. and Moore, D.M. (eds) 1984. Current concepts in plant taxonomy academic press, London
3. Jeffery, C. 1982. An introduction to plant taxonomy. Cambridge university press, Cambridge, London.
4. Jones, S.B. Jr and Luchsinger, A.E. 1986. Plant systematics (2nd edition). McGraw Hill book co, New York.
5. Radford, A.E. 1986. Fundamentals of plant systematics. Harper and Row, New York.
6. Singh, G. 1999. Plant systematics; theory and practice. Oxford and IBH, New Delhi.
7. Atace, C.A. 1989. Plant taxonomy and bio systematics (2nd edition). Edward Arnold, London.
8. Dutta, S.C. 1988. Systematic botany. Walleyeastern, New Delhi.
9. Jaques, H.E. 1999. Plant families- how to know them. IBS, New Delhi.
10. Lawrence, G.H.M. 1951. Taxonomy of vascular plants. Macmillan, New Delhi.
11. Stewart, W.M. 1983. Paleobotany and the evolution of plants, Cambridge university press, Cambridge.
12. Joshi S.G. Medicinal plants Oxford and IBH New Delhi.
13. Kokate and Gokale _pharmacognacy. Nerali publication, New Delhi.
14. Lad v Ayurveda- the science of self-healing- Motilal Banarasi Das, New Delhi.
15. Lewis W.H. and M.P. F Elwin Lewis 1976, Medical Botany plants affecting human health. A Wiley interscience publication, John Wiley and sons New York.
16. College botany vol 1 by Gangulee, Das and Datta. New central book agency, Calcutta.
17. Systematic botany by R.N Sutaria.
18. Taxonomy of Angiosperms by B.P. Pandey.
19. Kocchar, S.L. 1998. Economic Botany in Tropics. 2nd edition, Macmillan Ltd, New Delhi.
20. Sambamurthy, A.V.S.S and Subramanyam, N.S. 1989. A Text Book of Economic Botany, Wiley Eastern Ltd. New Delhi.
21. Sharma, O.P. 1996. Hill's Economic Botany. Tata McGraw Hill Co., Ltd., New Delhi.
22. Simpson, B.B. and Conner-Ogorzaly, M. 1986. Economic Botany-plants in our world. McGraw Hill, New York.
23. Hill. A.F. 1989. Economic Botany. Tata McGraw-Hill, New York.
24. Herbs Cultivation and Medicinal Uses- H. Panda – NIIR Publication, New Delhi.
25. Chopra R.N., Badhwar R.L. & Ghosh G. (1965) - Poisons Plant of India.

26. Jain S.K. – Medicinal Plants.

27. Judd, W.S., Campbell, C.S., Kellogg, E.A., Stevens, P.F. (2002). Plant Systematics-A Phylogenetic Approach. Sinauer Associates Inc., U.S.A. 2nd edition.

**B.SC. IV SEMESTER
PRACTICAL EXAMINATION**

Time: 4 Hours

Max Marks: 40 Marks

- | | |
|--|------------------|
| Q1. Assign the specimens A, B, C&D to the respective families giving diagnostic features and their classifications. | 12 Marks |
| Q2. Draw the floral diagram and write the floral formula of specimen “ E ” | 03 Marks |
| Q3. Explain the morphological peculiarities observed in the specimens F, G, H & I. | 08 Marks |
| Q4. Identify giving botanical name and family of specimens J, K, L & M.
Mention the parts used & their uses. | 08 Marks |
| Journal | 05 Marks. |
| Study tour report | 04 Marks |

B.Sc IV Semester Practical Examination, Subject: Botany

Instructions to Examiners.

Time: 4Hours Max Marks: 40

- | | |
|--|------------------|
| Q.1. Specimens A, B, C and D
One from apetalae or monocots, One or two from polypetalae,
One or two from gamopetalae,
(Classification-1mark, Identification & salient features- 2 marks) | 10 marks. |
| Q.2. Specimens E- A twig with floral buds.
(Floral formula-1mark, floral diagram-2marks). | 3marks. |
| Q.3. Specimens F, G, H and I
(One specimen each from Root/Stem, Leaf,
Inflorescence, Flower / Fruits). | 10 marks. |
| Q.4. Specimens- J, K, L and M
03 specimens from Economic Botany, 01 specimen from
Medicinal Botany.
(1 mark –Family & Botanical name, 1-Mark for uses) | 8 marks. |
| Journal | 5 marks. |
| Study tour report | 4marks |

B.Sc.IV Semester Theory Examination, Sub: BOTANY

Pattern of Question Paper

Time: 03 hours

Max. Marks: 80

All questions are compulsory

Q. I Answer any ten out of twelve (01 to 12 sub questions)

10 X 2 = 20

From UnitI: 02 Sub questions, From UnitII: 03 Sub questions,
From UnitIII: 03 Sub questions, From UnitIV: 02Sub questions,
From UnitV: 02Sub questions,

Q. II Answer any six out of eight (13 to 20 sub questions)

6X 5 = 30

From UnitI: 01 Sub questions, From UnitII: 02 Sub questions,
From UnitIII: 03 Sub questions, From UnitIV: 01 Sub questions,
From UnitV: 01 Sub questions,

Q. III Descriptive Answers.

21. a) From Unit I :Morphology of Angiosperms

1 X 10 = 10

OR

b) From Unit II: Angiosperm systematics

22. a) From Unit III :Diversity of flowering plants.....

1 X 10 = 10

OR

b) From Unit III: Diversity of flowering plants.....

23. a) From Unit IV : Economic Botany

1 X 10 = 10

OR

b) From Unit IV:Economic Botany

Note: - Minor changes in the Question Paper Pattern is permitted, with respect to the teaching hours allotted for each topic.

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2. BIOTECHNOLOGY (Optional)

RANI CHENNAMMA UNIVERSITY, BELGAVI
 COURSE STRUCTURE AND SCHEME OF EXAMINATION FOR BIOTECHNOLOGY (Optional)
 (WITH EFFECT FROM 2018-19)

semester	Paper Title	Instruction Hrs per week		Examination Marks		Internal Assessment Marks		Duration of Examination Hrs		Total Marks
		Theory	Practical	Theory	Practical	Theory	Practical	Theory	Practical	
IV	Paper 4.1 Molecular Biology	4		80		20		3		150
	Practical 4.2 Molecular Biology		4		40		10		4	

Syllabus

SEMESTER – IV

PAPER 4.1 – MOLECULAR BIOLOGY AND BIOINFORMATICS

Total hours allotted: 50 hrs

Part: A Molecular biology

1. Molecular basis of life:

An introduction, nucleic acids: Structure and types of DNA and RNA and their

Functions (04 Hrs)

2. DNA replication: (03Hrs)

Prokaryotic and Eukaryotic – enzymes and proteins involved in replication

3. DNA damage and repair: (03Hrs)

Causes and mechanism- Photo reactivation, Mismatch Repair

4. Recombination in Prokaryotes: (04Hrs)

Transformation, Conjugation and Transduction

5. Structure of gene: Prokaryotic and Eukaryotic gene (03Hrs)

6. Genetic code: properties and deciphering (02hrs)

7. Transcription: (06Hrs)

Process of transcription, Transcription factors

8. Translation: (06Hrs)

Initiation, elongation and termination of protein synthesis, translation

Factors.

9. Regulation of gene expression: (06Hrs)

Regulation of gene expression in Prokaryotes – Operon concept

Regulation of gene expression in Eukaryotes – Galactose metabolism in yeast.

10. Insertional elements and transposons: (03Hrs)

Transposable elements in Maize and Drosophila

PART: B Bioinformatics (10 Hrs)

Introduction to bioinformatics, Concept and structure of databases, Introduction to the human genome project and components of the genome. Introduction to the gateway sites (NCBI, EMBL and DDBJ) Types of nucleic acid sequences–Genebank: Protein Data Bank (PDB) –in the context of protein structural biology, Introduction to sequence analysis, significance, motif analysis and phylogenic comparisons Concept and methods of sequence comparisons in general: FASTA, BLAST 9 and CLUSTALW, pairwise sequence comparison, Global Alignment, Local Alignment

PRACTICALS 4.2 MOLECULAR BIOLOGY

1. Preparation of DNA model.
2. Estimation of RNA by Orcinol method.
3. Estimation of DNA by DPA method and determination of T_m value and purity of DNA.
4. Detergent lysis of RBC
5. Osmotic lysis of RBC
6. Extraction of protein from Animal (goat) liver / muscle source by salt precipitation and Organic solvent method and estimation of protein by Lowry's method.
7. Extraction of protein from plant source (Green gram / Pea) by salt precipitation and organic solvent method and estimation of protein by Lowry's method.
8. Protein separation by polyacrylamide gel electrophoresis.
9. Demonstration of Conjugation, transformation and transduction by charts.
10. Sequence alignment (FASTA, BLAST)
11. ROS MOL

References:

MOLECULAR BIOLOGY AND BIOINFORMATICS

1. Darnell J., Lodish H., and Baltimore D.1990: molecular cell biology, Scientific American books inc.,New York.
2. De Roberties, E.P.D. and De Roberties, E.M.S. 1988: cell and molecular biology. Lea and Jeliger.Philadelphians K.M.Varghese company.
3. Freifelder D and Malacinski G.M 1993, Essentials of molecular biology, Jones and Barklett PublishersInc.
4. Geroge M.Malacinski 1998: Essentials of molecular biology, Jones and Barklett Publishers Inc.Glick B.R. and Pasternak, J.J.1994: Molecular biotechnology , principles and applications of recombinant DNA, American Society for microbiology, Washington DC
5. Griffith A.J.F, Miller, J.H.Suzuki, 2000: An introduction to genetic analysis, 7th Ed. W.H.Freeman, NewYork
6. Howe C 1995,: Gene cloning and manipulation, Cambridge university press, USA
7. Karp G 1996: Cell and Molecular biology concept and experiment, John Wiley ans sons Inc. New York 22
8. Roger L.P.Adams, John T and David P.Leader Biochemistry of Nucleic acid, Chapman and Holl publications
9. Sandhya Mitra 1988: Elements of Molecular Biology, MacMilan Publications.
10. Smith, Molecular Biology, Faber and Faber publications.
11. Walker J.M anf Gingold E.B.1983 Molecular Biology and Biotechnology, Indian edition Royal society of chemistry UK
12. Watson J.D., Hopkins, N.H.Robert and Weiner A.M.1987, Molecular Biology of Gene 4th Ed.,Benjamin Publ Co. New York.
13. Biotechnology & Genomics : P.K.Gupta
14. Molecular biology: Avinash & Kakoli Upadhyay
15. Cell & Molecular biology: S.C.Rastogy
16. Molecular Biology-Turner et. al.
17. Molecular Biotechnology, Glick & Pasternak.

18. Molecular Biology of Cells, (2002), 4th Edition; Albert's *et al.*
19. Molecular Cell Biology (2004), Lodish *et al.*
20. Cell and Molecular Biology; Concepts & Experiments (2004). Karp, G.
21. The Cell: A molecular Approach (2004), Cooper, G.M
22. Cell & Molecular biology, de Robertis & DeRobertis.
23. Gene VIII (2005) - Benjamin Lewin
24. Molecular Biology- Turner *et al*
25. The Biochemistry of Nucleic Acid 11th Ed. (1992) – Adams *et al*
26. Molecular Biology of Gene (2004) – Watson *et al.*
27. Microbial Genetics – Friedfelder
28. Molecular Cell Biology 5th Ed. (2004) – Lodish *et al.*
29. Human Molecular biology (2004) – Stefan, S.
30. Biochemistry & Molecular Biology of Plants (2000) – Buchanan *et al*
31. Plant Biochemistry & Molecular Biology – Lea & Leegood.
32. Cell & Molecular Biology- Karp G.
33. Glick, B.T and Pasternak J.J (1998) Molecular biotechnology, Principles and application of Recombinant DNA, Washington D.C. ASM press.
34. Howe.C. (1995) Gene Cloning and manipulation, Cambridge University Press, USA
35. . Lewin, B., Gene VI New York, Oxford University Press.
36. Rigby, P.W.J. (1987) Genetic Engineering Academic Press Inc. Florida, USA.
37. Sambrook et al (2000) Molecular cloning Volumes I,II, & III Cold spring Harbor Laboratory Press, New York, USA
38. Walker J.M. and Gingold, E.B. (1983) Molecular Biology & Biotechnology (Indian Edition) Royal Society of Chemistry U.K
39. Karp.G (2002) Cell & Molecular Biology, 3rd Edition, John Wiley & Sons; INC

B.Sc Degree Examinations

Biotechnology

B.Sc. Biotechnology Theory Question Paper Pattern

Time: 3 Hrs

Max. Marks: 80

Q.No.I. Answer any **TEN** of the following

2X10= 20

- 1)
- 2)
- 3)
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)
- 10)
- 11)
- 12)

Q.NO.II Answer any **FOUR** of the following

4X5= 20

- 13)
- 14)
- 15)
- 16)
- 17)
- 18)

Q.No.III. Answer any **FOUR** of the following

4X10= 40

19)

20)

21)

22)

23)

RANI CHANNAMA UNIVERSITY, BELAGAVI.
B.Sc Biotechnology Practical Examination
IV Semester– MOLECULAR BIOLOGY AND BIOINFORMATICS

Time:4hrs

Max. Marks - 40

- | | |
|--|--------|
| Q.1. Estimate the amount ofin the given sample
DNA by DPA method/ RNA by orcinol method | 15mark |
| Q.2. Estimate the amount ofin the given sample
Protein from animal source/ plant source | 10mark |
| Q.3. Write the principle /Application of.....
Conjugation/ transformation/ transduction | 5marks |
| Q.4. Journal | 5marks |
| Q.5. Viva-voce | 5marks |

3. CHEMISTRY (Optional)

B.Sc. IV SEMESTER W.E.F. 2018-19

CHEMISTRY

TEACHING HOURS : 50 HOURS

INORGANIC CHEMISTRY

Chemistry of d and f block elements

06 hours

General characteristics of d block elements- Electronic configuration, oxidation states, metallic property, colour, reactivity, reducing property, magnetic, catalytic and complex formation properties.

General characteristics of f block elements - Electronic configuration, cause and consequences of lanthanide contraction.

General features of actinides- electronic configuration, oxidation state, extraction of uranium from pitchblende.

Bioinorganic Chemistry

04 hours

Essential and trace elements in biological process, metalloporphyrins with respect to haemoglobin and chlorophyll(structure and function), biological role of Na, K, Fe and Zn.

Environmental Chemistry

07 hours

Air pollution: Types of pollutants, sources and control measures- CO, CO₂, SO_x, NO_x, H₂S, hydrocarbons, CFC's and particulates, pesticides, and their adverse effects.

Water pollution: Types of pollutants, sources and adverse effects (sewage, infectious agents, organic chemicals and inorganic mineral, oils and sediments)

Parameters of water pollution - Dissolved oxygen(DO), biological oxygen demand(BOD) and chemical oxygen demand(COD), definitions and their determinations. Treatment of sewage and industrial effluents - Preliminary, primary and secondary treatment(Aerated lagoons, trickling filters and activated sludge)

ORGANIC CHEMISTRY

Aldehydes and Ketones

05 hours

Nomenclature, structure and Bonding, mechanism of nucleophilic addition reactions-Hydrogen cyanide, hydroxyl amine, acetal formation-with ethanol and ethylene glycol.

Mechanism of the following reactions

- Aldol condensation
- Cannizzarro's reaction
- Claisen-Schmidt reaction

- d) Perkin's reaction
- e) Benzoin condensation
- f) Baeyer-Villiger oxidation of ketones
- g) Mannich reaction, Synthesis of Coumarin and Vanillin.

Carboxylic Acids

05 hours

Nomenclature, structure and bonding, acid strengths of mono, di and tri-chloroacetic acids and nitro, chloro and hydroxy substituted benzoic acids, mechanism of esterification and hydrolysis of ester (Aac2 and Bac2).

Reactions of carboxylic acids - i) Conversion into acid derivatives (acid chlorides, amides, esters and anhydrides), ii) Curtius rearrangement, iii) Reaction with organometallic compounds and iv) Hell-Volhard-Zelinsky reaction.

Aromatic Amines

04 hours

Classification, distinction between primary, secondary and tertiary amines by nitrous acid test, comparison of basic character of methyl amine, aniline and cyclohexylamine, amine salts as phase transfer catalysts, mechanism of Hoffmann rearrangement, Gabriel phthalimide reaction, diazotisation, synthetic applications of diazonium salts-reduction, Sandmeyer's reaction, coupling reactions.

Ethers and Epoxides

03 hours

Ethers: Nomenclature of ethers and their methods of preparation, chemical reactions - Reaction with HI, hot and cold taking symmetric and unsymmetrical ethers.

Crown ethers: Definition, examples, use of crown ethers as phase transfer catalysts.

Epoxides: Synthesis of 1,2-epoxy ethane and 1,2-epoxycyclopentane, acid catalysed ring opening of 1,2-epoxycyclopentane in aqueous solution.

PHYSICAL CHEMISTRY

Electrochemistry

08 hours

Debye-Huckel's theory, Debye-Huckel equation for strong electrolytes (no derivation).

Applications of conductance measurements-

- a) Determination of solubility product of sparingly soluble salts
 - b) Conductometric titrations - types of acid-base titrations and precipitation titrations
 - c) Determination of degree of dissociation of weak electrolytes
- Ionic mobility, transport number and its determination by Hittorff's method

Chemical Kinetics

08 hours

Second order reaction with examples, derivation of rate constant equation of second order reaction when concentration of the reactions are equal ($a=b$), half life period, determination of order of reaction by

- a) Differential equation method
- b) Half life method

Simple collision theory of reaction rates: Derivation of rate constants of unimolecular(Lindemann hypothesis) and bimolecular reaction rates, limitations of collision theory.

Transition state theory: Theory

Comparison of transition state theory and collision theory, steric factor.

Chemical kinetics of complex reactions-first order reaction, opposing, consecutive and parallel reactions.

REFERENCE BOOKS

Inorganic chemistry

- | | |
|---------------------------------|----------------------------|
| 1. Advanced Inorganic Chemistry | Gurdeep Raj |
| 2. Basic Inorganic Chemistry | Alber Cotton and Wilkinson |
| 3. Inorganic Chemistry | James Huheey |
| 4. Modern Inorganic Chemistry | R.D. Madan |
| 5. Inorganic Chemistry | J.D. Lee |
| 6. Environmental Chemistry | A.K. Dey |
| 7. Environmental Chemistry | H. Kour |

Organic chemistry:

- | | |
|----------------------|--------------------|
| 1. Organic Chemistry | Wade |
| 2. Organic Chemistry | I.L. Finar Vol-I |
| 3. Organic Chemistry | Morrison and Boyd |
| 4. Organic Chemistry | Bahl and Tuli |
| 5. Organic Chemistry | Bahl and Arun Bahl |

Physical chemistry

- | | |
|--------------------------|-----------|
| 1. Electrochemistry | Glasstone |
| 2. Physical Chemistry | Atkins |
| 3. Engineering Chemistry | Jain |

B.Sc. IV SEMESTER CHEMISTRY PRACTICALS

Total number of hours per week: 04

Internal Assessment=10 Marks

Total No. of hours per Semester: 52

Practicals: 40 Marks

1. Semi-micro Qualitative analysis of two simple inorganic Salts
 ANIONS : CO_3^{-2} , S^{-2} , Cl^- , Br^- , I^- , NO_3^- , SO_4^- ,
 CATIONS : Pb^{+2} , Cu^{+2} , Al^{+3} , Fe^{+2} , Fe^{+3} , Mn^{+2} , Co^{+2} , Ni^{+2} , Zn^{+2} , Ca^{+2} , Ba^{+2} ,
 Mg^{+2} , Na^+ , K^+ and NH_4^+ .
2. Determination of dissolved oxygen present in water by Winkler's method.
3. Determination of C.O.D in polluted water.

4 . COMPUTER SCIENCE (Optional)

Syllabus for B.Sc. Semester – IV W.E.F 2018-19

17BScCST41: Operating System Principles

Teaching Hours: 4 Hrs/week Marks: Main Exam: 80

IA: 20

Objective: To introduce the basic concepts and functions of Operating System.

Expected Learning Outcomes:

- $\frac{35}{17}$ Understand the structure and functions of operating system
- $\frac{35}{17}$ Understand the various Operating system management strategies
- $\frac{35}{17}$ Understand the basics of Linux operating system

UNIT I 10Hrs Introduction: Basics of Operating Systems: Definition, types of Operating Systems, OS Service, System Calls, OS structure: Layered, Monolithic, Microkernel Operating Systems – Concept of Virtual Machine.

UNIT II 10Hrs Process Management Process Definition , Process Relationship , Process states , Process State transitions , Process Control Block , Context switching , Threads, Concept of multithreads , Benefits of threads, Types of threads.

Process Scheduling: Definition, Scheduling objectives, Types of Schedulers, CPU scheduling algorithms, performance evaluation of the scheduling.

UNIT III 10Hrs
 Inter-process Communication Race Conditions, Critical Section, Mutual Exclusion, Hardware Solution, Strict Alternation, Peterson's Solution, The Producer Consumer Problem, Semaphores, Event Counters, Monitors, Message Passing, and Classical IPC Problems.
 Deadlocks: Definition, Deadlock characteristics, Deadlock Prevention, Deadlock Avoidance (concepts only).

UNIT IV 10Hrs Memory Management: Logical and Physical address map, Memory allocation, Internal and External fragmentation and Compaction, Paging. Virtual Memory: Demand paging, Page Replacement policies.

UNIT V 10Hrs I/O Management Principles of I/O Hardware: Disk structure, Disk scheduling algorithm

File Management: Access methods, File types, File operation, Directory structure, File System structure, Allocation methods, Free-space management, and directory implementation.



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Structure of Linux Operating System, Exploring the Directory Structure, Naming Files and Directories, Concept of shell, Types of shell, Editors for shell programming (e.g. vi), basics of Shell programming.

References:

1. Silberschatz, Peter B. Galvin and Greg Gagne, Operating System Concepts, 9th Edition, WileyIndian Edition .
2. Andrew S Tanenbaum, Modern Operating Systems, Third Edition, Prentice Hall India.
3. Sumitabha Das, UNIX Concepts and Applications, 4th Edition, Tata McGraw Hill.

Additional Reading:

4. Milankovic, Operating Systems, Tata McGraw Hill.
5. Naresh Chauhan, Principles of Operating Systems, Oxford Press.
6. D.M. Dhamdhare, Operating Systems: A concept based approach, 2nd edition, Tata McGraw Hill.

17BScCST42: Programming Lab- Linux Lab.

Practical Hours: 4 Hrs/week

Marks: Main exam: 40

IA: 10

Revisit: Understands shell concept in UNIX/Linux environment and study of Basic commands of Linux/UNIX.

Study of Advance commands and filters of Linux/UNIX.

Study of UNIX Shell and Environment Variables.

Using vi editor for writing shell scripts.

1. Write a shell script to generate mark-sheet of a student by reading five subject marks, calculate and display total marks, percentage and Class obtained by the student.
2. Write a shell script which will accept a number b and display first n prime numbers as output.
3. Write a shell script which will generate first n Fibonacci numbers
4. Write a shell script to read n numbers as command arguments and sort them in descending order.
5. Write a shell script to display all executable files, directories and zero sized files from current directory.
6. Write a shell script to check entered string is palindrome or not.
7. Shell programming using filters (including grep, egrep, fgrep)
8. Write an awk program using function, which convert each word in a given text into capital.
9. Write a program for process creation using C (Use of gcc compiler).
10. Write a shell script to determine whether a given file exists or not, file name is supplied as command line argument
11. Write a shell script to search and replace string in a file.
12. Write a shell script that accepts a list of file names as its arguments, counts and reports the occurrence of each word that is present in the first argument file on other argument files.
13. Write an awk script to count the number of lines in a file that do not contain vowels

Following shall be executed in Linux environment using gcc/similar compiler.

14. Write a C program that implements a producer-consumer system with two processes.
15. Write a C program to allow cooperating processes to lock a resource for exclusive use, using Semaphores
16. Write a C program that illustrates two processes communicating using shared memory.
17. Simulate the following CPU scheduling algorithms a. Round Robin b) SJF c) FCFS d) Priority



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18. Simulate all file allocation strategies
 - a) Sequential b) Indexed c) Linked
19. Simulate all page replacement algorithms
 - a) FIFO b) LRU c) LFU
20. Simulate Paging Technique of memory management.

5. ELECTRONICS (Optional)

B.Sc SEMESTER –IV (W.E.F .2018-19)

Total Teaching hours: 50, Teaching hours per week : 4 hours

ELE -4 : DIGITAL ELECTRONICS

UNIT – I : NUMBER SYSTEM

Introduction to binary, decimal , octal and hexadecimal number systems and their interconversion. Binary addition and subtraction, subtraction using 1's and 2' s complements. BCD (8421 code), weighted codes, Gray codes, use of XOR gate for gray to binary conversions and vice versa, Excess-3 codes, ASCII and EBCDIC

8Hrs.+2Hrs.Problems =10hrs

UNIT -II : BOOLEAN ALGEBRA AND LOGIC GATES

Introduction, Basic theorems of Boolean algebra, De Morgan's theorems. Basic logic gates ; AND, OR and NOT, Truth Tables, timing diagram. Study of NAND and NOR gates. Boolean expressions and implementation , NAND and NOR as universal gates, XOR gate. Study of DTL logic family. Realisation of Basic gates using DTL.
Pin configuration of IC 74 XX(7400, 7402, 7404, 7408, 7432, 7476, 7486).

8Hrs.+2Hrs.Problems

=10hrs

UNIT –III: SIMPLIFICATION OF BOOLEAN EXPRESSIONS AND ARITHMETIC LOGIC CIRCUITS.

Simplification of logical expressions using Boolean algebra,SOP & POS methods, standard SOP & POS, Minterm, Maxterm (2,3,4 variables). Karnaugh map (2, 3 and 4 variable map) Pair, quad and octets. Simplification of Boolean function using K-map (Overlapping groups, rolling the map, redundant group and Don't care conditions). Arithmetic logic circuits: Half adder, full adder, half subtractor and full subtractor.

8Hrs.+2Hrs.Problems =10hrs

UNIT –IV : COMBINATIONAL LOGIC CIRCUITS

Comparator, Two bit & four bit comparators, IC-7485, decimal to BCD priority encoder: IC-74147, BCD to decimal, decoder- IC 7445. BCD to 7-segment decoder-IC 7447-logic diagrams of each IC. Multiplexer – 4:1, 8:1 and 16:1 , applications of IC-74150. De-multiplexer -1:4, 1:8 and 1:16. IC-74154 and applications.

8Hrs.+2Hrs.Problems =10hrs

UNIT –V : SEQUENTIAL LOGIC CIRCUITS

Detailed analysis of RS, D, JK, T (Clocked) and Master Slave JK flip-flops, Edge triggered flip-flops , Characteristics truth table and excitation tables.

Counters; Asynchronous and synchronous counters (binary, decade and modulus counters), application of counters.

Shift registers ; Serial-in serial-out shift register (SISO), Serial-in parallel-out shift register (SIPO), Parallel-in parallel-out shift register (PIPO) and Parallel-in serial-out shift register (PISO) and application of shift register.

8Hrs.+2Hrs.Problems =10hrs

Reference Books:

1. Digital Fundamentals - Floyd
2. Digital Principles & Applications - Malvino and Leech
3. Digital logic and computer design - M. Morris Mano
4. Digital Electronics -Thomas Bartee
5. Digital Systems - Tocci
6. Pulse and digital circuits - Mithal & Vanavasi
7. Modern Digital Electronics - R.P.Jain
8. Digital Electronics - R.S. Alurkar
9. Digital computer electronics - Malvino and Brown.

LIST OF EXPERIMENTS

Lab – 4:

Each experiment is of four hours duration. Minimum EIGHT experiments are to be performed in the semester course

1. Realization of logic gates using IC-7400 (AND, OR, NOT, XOR, NOR, NAND)
2. Realization of logic gates using DTL.
3. Verification of Boolean Expressions and De Morgan's theorems using NAND gates
4. Half adder and full adder using logic gates.
5. Half subtractor and full subtractor using logic gates.
6. Gray to binary conversion and binary to gray conversion using XOR gates.
7. Multiplexer using logic gates
8. Demultiplexer using logic gates.
9. RS/ JK/ D / T flip-flop using logic gates.
10. Decade counter using JK flip-flop.
11. 4 bit up and down counters
12. Shift Registers using D-flip-Flop (Serial in – Serial out).
13. Shift Registers using D-flip-Flop (Parallel in – Parallel out).

6. Geography (Optional)

B. A. /B. Sc. SYLLABUS IN GEOGRAPHY

SEMESTER – IV

THEORY PAPER-IV

POPULATION GEOGRAPHY

Objectives: The objectives of this course are to understand the spatial and structural dimensions of population and emerging issues. The course is further aimed at familiarizing the students with global and regional level problems and equips them for comprehending the Indian situation.

Course structure : One Theory and One Practical

Teaching Theory : 05 hours per week

Practical : 04 hours per week.

Examination : One Theory paper of 80 Marks and 20 Marks for internal assessment (IA)

One Practical of 40 Marks and 10 Marks for internal assessment (IA) (out of 10 IA marks 7 marks for practical record and journal and 3 marks for attendance).

Units No.	Topic	Teaching Hours
I	Population Geography: Nature, Scope and Significance of Population Geography, Population Geography as Specialized Branch, Growth, distribution and density of population in India, Factors affecting the distribution of population.	12
II	Composition and Structure of Population: Age structure, Literacy, Sex ratio, Life expectancy, Working population and Occupational structure of population.	08
III	Human resources, optimum, over and under population, Population Pressure- causes and consequences Population Theories : Malthusian and Karl Mark's theory, Demographic Transitions and its stages.	20
IV	Population Change: Meaning and determents of Fertility, Mortality and their consequences. Migration; definition, types, causes and consequences of	06

	migration	
V	Population policy in India, Population problems and remedial measures.	04
	Total	60 hours

Reference:

- 1 Clarke John: Population Geography
- 2 Threwartha: A Geography of Population World Pattern
- 3 Hussain M: Human Geography
- 4 Chandna: Population Geography
- 5 Siddu and Sawant: Population Geography
- 6 Garnier B.J: Geography of population
- 7 Ghosh B.N: Fundamentals of population Geography

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B. A. /B. Sc. SYLLABUS IN GEOGRAPHY

SEMESTER – IV

PRACTICAL PAPER - IV

CARTOGRAPHIC REPRESENTATION OF GEOGRAPHICAL DATA

Units	Topic	Teaching Hours
I	Relevance of Representation of Population, Statistical & Geographical Data	03
II	Graphical representation of Data: Bar Graphs: Single, Double, Multiple, Compound, Band Graph and their Interpretation. Line Graphs: Single, Double, Multiple Line Graphs, Climograph, Hythergraph, Ergo Graph, Pyramid Graph and their Interpretation.	15
III	Diagrammatic representation of data: Pie Diagram, Block Pile, Sphere Diagram, Wind Rose and their Interpretation	06

IV	Maps: Dot Maps, Choropleth, Isopleth Maps and their Interpretation	06
V	Located Map Diagrams: Pie, Proportional Circles, Spheres & Block Diagrams (Note: By selecting suitable data at talukas in the district/districts in the state has to be represented by selecting these diagrams on the map.)	10
	Viva	
	Total	40 hours

(Note: for each practical exercises the staff in charge has to provide the suitable data, outline maps and graphs to the students in regular practical classes)

Reference:

1. R. L. Singh: Elements of Practical Geography
2. Gopal Singh: Practical Geography
3. Dr. Ranganat: Practical Geography (Kannada Version)
4. Singh and Kanoj: Practical Geography
5. R. P. Misra and Ramesh: Fundamental of Cartography
6. M. F. Karenavar & S. S. Nanjannavar: Practical Geography
7. M .F. Karenavar & S. S. Nanjannavar: Practical Geography (Kannada Version)
8. Pijushkanti Saha & Partha Basu: Advanced Practical Geography

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7. GEOLOGY (Optional)

SEMESTER IV

W.E.F 2018-19

PALEONTOLOGY, STRATIGRAPHY & INDIAN STRATIGRAPHY

Max. Marks: 80

Total teaching hours: 50 (4 hrs/week)

UNIT	TOPIC	Hrs
	PALEONTOLOGY	
I	Introduction: Fossil Definition, Mode of fossilisation- mummification, permineralisation, petrification, carbonisation, mould and cast, imprints, tracks and trails. Significance of fossil	10
	General morphological characters, description, and geological distribution of following phyla in brief: i. Phylum Protozoa - Foraminifera. ii. Phylum Ceolenterata - class Anthozoa, typical coral; class Graptolitoidea – Monograptus and Diplograptus.	
II	General morphological characters, description, and geological distribution of following phyla in brief: iii. Phylum Brachiopoda - Types of hinge line and distinguishing characters. iv. Phylum Echinoderma - Regularia and Irregularia	10
	General morphological characters, description, and geological distribution of following phylum in brief: v. Phylum Mollusca : class Lamellibranchs; class Gastropoda; class Cephalopoda- Nautiloidea and Ammonoidea- types of suture lines (simple, Goniatic, Ceratic and Ammonitic) vi. Phylum Arthropoda : class Crustacea- Trilobites	
	PRINCIPLES OF STRATIGRAPHY	
III	Introduction: Definition, Uniformitarianism, Catastrophism, Order of superposition.	10
	Correlation and correlation methods - Petrological and paleontological.	
	Geological Time Scale: Important Geological events (climate, life and mountain building) in brief during- Paleozoic, Mesozoic and Cenozoic era.	
	INDIAN STRATIGRAPHY	
IV	Brief account of physiographic divisions of India - Peninsular, extra peninsular and indo-Gangetic alluvial plains.	10
	Petrology, classification and economic importance of- Archaeans of Karnataka.	
	Cuddappah system of Andhra Pradesh and its equivalents in Karnataka- Kaladgi series	
V	Petrology, classification and economic importance of- Vindhyan system.	10
	Petrology, classification and economic importance of- Gondwana system with flora and fauna	
	Petrology, classification and economic importance of- Deccan traps- Inter trappeans, infra trappeans, bagh and lameta beds.	
	Jurassic of Kutch, Triassic of Kashmir and Cretaceous of Trichinopoly.	

**PRACTICAL
PALEONTOLOGY AND INDIAN STRATIGRAPHY**

Max. Marks: 40

Time: 4 hrs/week

Total 50 hrs

A. PALEONTOLOGY

1. Sketch, label and describe with range in time of the following fossils.
 - i) **Phylum Protozoa:** Nummulites, Textularia
 - ii) **Phylum Coelenterata-** Monograptus-Diplograptus; Corals- Calceola, Zaphrentis, Montlivaltia.
 - iii) **Phylum Echinoderma:** Cidaris and Micraster
 - iv) **Phylum Brachiopoda:** Productus, Spirifer, Rhynchonella, Terebratula.
 - v) **Phylum Mollusca:** Class Lamellibranchia- Arca, Pecten, Gryphea; Class Gastropoda- Natica, Turitella, Turbo, Cypraea, Murex, Conus, Voluta, Fusus, Physa. Class Cephalopoda- Nautilus, Goniatite, Ceratite, Ammonite, Belemnites.
 - vi) **Phylum Arthropoda:** Paradoxides, Calymene, Trinucleus.
 - vii) **Plant Fossils:** General descriptions of plant fossils- Glossopteris, Gangamopteris; Ptillophyllum, Calamites, Lepidodendron and Sigillaria.

B. INDIAN STRATIGRAPHY

Plotting of following important geological systems/formations in the given map of India:

- i. Physiographic divisions – Peninsula, Extra peninsula, Indo-gangetic alluvial plain.
- ii. Cuddappah
- iii. Deccan Volcanic Province
- iv. Kaladgi
- v. Vindhya
- vi. Gondwana
- vii. Cretaceous of Trichinopoly

TEXT BOOKS

1. Invertebrate paleontology - Henry woods
2. An introduction to Palaeobotany- Arnold, C.A.,
4. Principles of Paleontology, - Raup, D.M. and Stanley, M.S
5. Invertebrate Fossils -Moore , R.C., Laliker , C.G
6. Geology of India and Burma - Krishnan M.S
7. Geology of India - Wadia D.N
8. Stratigraphy of India- Ravindrakumar K.R.
9. Principles of Stratigraphy - Lemon R.Y
10. A manual of the Geology India and Burma - Pascoe, E.H.
11. General Stratigraphy - J.W. and Barret B.H
12. Historical Geology – Dunbar
13. Geology of India – M Ramakrishnan & R Vaidynadhan,

8. MICROBIOLOGY (Optional)

RANI CHENNAMMA UNIVERSITY, BELGAVI

COURSE STRUCTURE AND SCHEME OF EXAMINATION FOR (SEMESTER) IN MICROBIOLOGY

(WITH EFFECT FROM 2018-19)

semester	Paper Title	Instruction Hrs per week		Examination Marks		Internal Assessment Marks		Duration of Examination Hrs		Total Marks
		Theory	Practical	Theory	Practical	Theory	Practical	Theory	Practical	
IV	Paper 4.1 Molecular Biology and Genetic Engineering	4		80		20		3		150
	Practical 4.2 Molecular Biology and Genetic Engineering		4		40		10		4	

PAPER -4.1 MOLECULAR BIOLOGY AND GENETIC ENGINEERING

Total hours allotted-50

Total hours allotted-25

Part-A MOLECULAR BIOLOGY

1. **Molecular basis of life** **1-Hour**
2. **An introduction, Experiment proof of DNA and RNA as genetic material.** **2-Hours**
3. **DNA damage and Repair**
Causes of DNA damage, Repair mechanisms (Photoreactivation, Excision repair, Mismatch repair & SOS repair) . **5-Hours**
4. **Transcription :**
Process of transcription, transcription Factor, Post transcriptional modification in prokaryotes and Eukaryotes. **5-Hours**
5. **Translation :**
Initiation, elongation and termination of protein synthesis, translational factors in prokaryotes and eukaryotes. **5- Hours**
6. **Regulation of Gene expression.**
Regulation of Gene expression in prokaryotes (operon concept) and eukaryotes (Galactose metabolism in Yeast). **4- Hours**
7. **Gene organization and expression in mitochondria and chloroplasts.** **3- Hours**

Part-B GENETIC ENGINEERING

Total hours allotted-25

1. **Introduction and scope of genetic engineering.** **1-Hours**
2. **Tools of genetic engineering.**
 - a. Modifying enzymes: Restriction enzymes, ligases, Methylases
 - b. Cloning vehicles: Naturally occurring plasmids, cloning

plasmids(PBR322 and PUC18), Viruses as cloning vehicle(DNA, M13), Hybrid vectors(cosmids, YAC)

- c. Cloning hosts: E.coli.

7-Hours

3. Techniques in Genetic engineering:

- a. In vitro construction of r-DNA molecules: Isolation of DNA from bacteria(gene of interest) and isolation of vector DNA(Bacteria).
- b. Cutting of DNA molecules:Physical methods,enzymatic methods and joining of DNA molecules:Homopolymertails,Linkers,adapters.
- c. Transformation of r-DNA into target host organisms: Calcium chloride mediated gene transfer,Agro bacterium mediated DNA transfer, Electroporation and Micoinjection.
- d. Screening and selection of recombinant host cells: Insertional inactivation,In situ colony / DNA hybridization and immunological techniques.
- e. Gene libraries: Genomic DNA &c-DNA cloning techniques.
- f. DNA finger printing and its applications. **9 Hours**

4. Applications of Genetic Engineering

- a. Medicine-Gene therapy
- b. Agriculture-Nif gene

3 Hours

5. Potential hazards and safe guards of genetic engineering.

6. Biotechnology programmes and regulations: 2 Hours

Role of international organizations in Biotechnology,
Governmental regulations of recombinant DNA research for

disposal of Bio-hazardous material, Patenting of Biotechnological processes, products and patent laws.

3 hours

PRACTICAL-4.2 Molecular Biology and Genetic Engineering

1. Preparations of Buffer-Citrate and Phosphate.
2. Preparation of RNA by orcinol method.
3. Extraction and estimation of DNA by Diphenylamine method.
4. Extraction and estimation of protein from animal/ plant source by salt precipitation and organic solvent method.
5. Restriction Digestion of DNA.
6. In vitro DNA ligation.
7. Study of DNA finger printing (chart).
8. Study of gene cloning(chart)
 - a. PBR322
 - b. PUC18 and 19
 - c. SV40
 - d. Bacteriophages
 - e. Selection of recombinants by replica plate Techniques.

REFERENCES:

1. Brown, T.A. 1998 "Genetics- A molecular approach" 3rd edn. Stanley Thornes Ltd. U.K.
2. Colwell, D 1999 "Microbial Diversity" Academic Press.
3. Davis R.W.W Botstein, D and Rogeness, J.R. (1980): "A manual for Genetic Engineering" Cold Spring Harbor Laboratory. Cold Spring Harbor New York.
4. Dr Robertis, EDP and De Robertis E.M.S. 1988 "Cell and Molecular Biology" Lea and Febiger Philadelphia K.M. Vaghese

Co.

5. Gerald Karp “Cell Biology” McGraw Hill Book Co. New York.
6. Gillor.B.R.And Pasternak.J.J.1994 “Molecular Biotechnology Principles and Applications of Recombinant DNA American Society for Microbiology, Washington DC.
7. Nichol, D S F 1994 “An introduction to Genetic Engineering “Cambridge University Press.
8. Peters P 1993 “A Guide to Genetic Engineering” Dubuque Iowa WMC Brown.
9. Rigbu P.W.J 1987 “Genetic Engineering- VI Academic Press Inc, Florids,USA.
10. Salle. A.J. “Fundamentals Principles of Bacteriology” Tata McGraw Hill Publishing Company Ltd. New Delhi.
11. Smith “Molecular Biology “Faber and Faber Publications.
12. Stainer, R.Y. Ingraham J.L. “General Microbiology” Prentice Hall of India Pvt.Ltd.,New Delhi.
13. Watson James D “Recombinant DNA “ Scientific American Books, New York.

9. MATHEMATICS (Optional) – IV Sem

MATHEMATICS SYLLABUS FOR THE ACADEMIC YEAR 2015-2016 ONWARDS

B.SC IV SEMESTER

PAPER I :VECTOR CALCULUS AND INFINITE SERIES

TOTAL TEACHING HOURS: 50TEACHING HOURS PER WEEK: 05

UNIT-I

Dot and cross product of vectors, Ordinary derivatives of vectors. Continuity and differentiability of a vector function. Derivatives of sum. Dot product, Cross product and Triple product of vectors. Constant vector functions, Partial

differentiation of vector functions.

10 Hours

UNIT-II

The vector differential operator del . The gradient of a scalar point function, The directional derivative of function. Properties of gradient of vector function. Divergence and Curl of a vector point function. Properties of divergence and curl.

10 Hours

UNIT-III

Infinite series I: Infinite series and examples. Convergent, Divergent and Oscillatory series. Partial sum of series. Series of non-negative terms, Necessary and sufficient condition for convergence, Cauchy's general principle of convergence. Geometric series. The P-series (Harmonic), Comparison tests (different forms). **10 Hours**

UNIT-IV

Infinite series II: D'Alembert's ratio test, Raabe's test, Cauchy's integral test and Root test. **10 Hours**

Infinite series III: Absolute convergence and conditional convergence of series. Alternating series, Leibnitz theorem, Uniform convergence. **10 Hours**

References:

- (1) Murray R. Spiegel: VECTOR ANALYSIS.
- (2) Walter Rudin: Principles of Mathematical analysis.
- (3) N. P. Bali: Real Analysis.
- (4) Shanti Narayana: Mathematical Analysis.
- (5) G. K. Ranganath: Textbook of B.Sc. Mathematics.
- (6) N. Rudraiah and others: College Mathematics.

B.SC IV SEMESTER

PAPER II: GROUP THEORY, FOURIER SERIES AND DIFFERENTIAL EQUATIONS

TOTAL TEACHING HOURS: 50 TEACHING HOURS PER WEEK: 05

UNIT-I

Group Theory III: Normal sub-groups, Quotient groups. Homomorphism and

Isomorphism of groups. Kernel of Homomorphism. Fundamental theorem of Homomorphism. **10 Hours**

UNIT-II

Fourier series: Periodic functions, Fourier series of functions of period 2π and $2l$. Fourier series of odd and even functions, half range sine and cosine series.

10 Hours

UNIT-III

Fourier transforms: Finite sine and Cosine transforms. **10 Hours**

UNIT-IV

Differential Equations III: Linear differential equation of n^{th} order with constant co-efficients. Particular integral when RHS is of the form e^{ax} , $\sin ax$, $\cos ax$, x^n , $e^{ax}v$ and xv

where v is function of x .

10 Hours

UNIT-V

Differential Equations IV: Homogeneous linear differential equation of n^{th} order and Equation reducible to the homogeneous linear form, higher order exact differential equations.

References:

- (1) Herstein I. N: Topics in Algebra.
- (2) N. P. Bali: Differential equations.
- (3) Shanti Narayana: Mathematical Analysis.
- (4) G. K. Ranganath: Textbook of B.Sc. Mathematics.
- (5) N. Rudraiah and others: College Mathematics.

MATHEMATICS SYLLABUS FOR THE ACADEMIC YEAR 2015-2016

ONWARDS Distribution of Marks

Unit	2 Marks	5 Marks	10 Marks	Total
I	3	1	1	21
II	3	1	1	21
III	2	2	1	24
IV	2	2	1	24
V	12 (24 Marks)	8 (40 Marks)	1	24

10. PHYSICS (Optional)

PHYSICS (Optional)

Physics 4.1: PHYSICAL OPTICS AND ELECTRICITY II. (Total Hours : 50)

17BSCPHYT41

UNIT – I

INTERFERENCE

Interference due to division of wave front: Fresnel's bi-prism- Determination of wavelength of monochromatic light.

Interference due to division of amplitude: Stokes' treatment of reflection and transmission at interface.

Thin Films, Conditions for maxima and minima in case of reflected light (derivation). Multiple reflections. Mention of conditions for maxima and minima in case of transmitted light. Theory of Newton's Rings (derivation).

Michelson's Interferometer: Construction and working ,Formation of circular and straight fringes (qualitative). Determination of wavelength of monochromatic light.

Problems.

(8 + 2 = 10 hours)

UNIT – II

DIFFRACTION

Fresnel's class:

Fresnel's theory of half-period zones considering plane waves. rectilinear propagation of light. Zone plate: Construction, theory, expression for focal length.

Problems.

(3 + 1 = 4 hours

)

Fraunhofer class:

Comparison of Fresnel and Fraunhofer class of defractions. Composition of 'n' number of SHMs of same amplitude and period having their phases increasing in arithmetic progression. Diffraction at Single Slit. Plane Transmission grating and its theory, Dispersive power of grating. Resolving power of prism and grating (derivation).

Problems.

(5 + 1 = 6 hours)

UNIT – III

POLARISATION:

Analytical treatment of circularly and elliptically polarized light. Huygens theory of double refraction, Positive and negative crystals. Retardation Plates.

Quarter wave plate, Half wave plate, Production and Analysis of plane, circularly and elliptically polarized light.

Optical activity:

Fresnel's theory of rotatory polarization (qualitative),
Laurent's half shade polarimeter, optical activity, specific rotation.

Problems.

(6 + 1 = 7 hours)

ALTERNATING CURRENT:

Operator 'j'. Argand diagram. LCR series circuit.-Expression for current, impedance and Phase (using 'j' operator method). Condition for resonance frequency, band width, quality factor and their relation (qualitative).

LCR parallel circuit- Expression for admittance and condition for Resonance (using 'j' operator method).

Problems.

(5 + 1 = 6 hours)

UNIT – IV

THERMO-ELECTRICITY:

Seebeck Effect and its explanation. Variation of emf with temperature, Neutral Temperature and Temperature of inversion. Thermo-electric Series. Laws of Thermo-Electric effects. Peltier Effect-explanation. Peltier's Coefficients and thermodynamics of Peltier's Effect. Thomson Effect - explanation. Thomson Coefficient.

Derivation of the relation $\pi = -T dE/dT$ and $\sigma_a - \sigma_b = T d^2e/dT^2$

Thermo-Electric (Tait) diagrams, its applications to determine,

- 1. Total emf,*
- 2. Peltier emf,*
- 3. Thomson emf*
- 4. Neutral temperature and*
- 5. Temperature of inversion.*

Problems.

(8 + 2 = 10 hours)

UNIT – V

ELECTROMAGNETIC THEORY:

Mathematical background: gradient of scalar, divergence and curl of vector and their physical significance. Gauss Law, Stokes' and Green's Theorem (without proof).

Maxwell's equations:

Derivation of Maxwell's equations in differential forms. Mention of integral forms and their physical significance. Derivation of general Plane Wave equations in free space. Transverse nature of radiation. Poynting theorem (derivation).

PHYSICS 4.2 LAB – IV

performed.

17BSCPHYP42

(7 hours)

LIST OF EXPERIMENTS

1. LCR Series Resonance Circuit.
2. LCR Parallel Resonance Circuit.
3. Comparison of Capacity by De Sauty's method.
4. Determination of L and C by equal voltage method.
5. Newton's Rings.
6. Fresnel's Bi-prism – Determination of Wavelength of monochromatic light.
7. Resolving Power of Telescope.
8. Resolving Power of Grating.
9. Resolving Power of Prism.
10. Thermo-Electric power of thermo-couple.
11. Determination of Wavelength of monochromatic light by Single Slit/
 - a. plane transmission grating
12. Polarimeter.

NOTE:

1. Experiments are of Four hours duration.
2. Minimum of Eight experiments to be

REFERENCE BOOKS:

1. Principles of Optics (I-Edition) – B.K.Mathur (New Gopal Printing Press, 1962).
2. Fundamentals of Optics (V-Edition) – Khanna and Bedi (R.Chand, New Delhi 1971).
3. A text book of Optics (I-Edition) – Brij lal and Subramanyam (S.Chand).
4. Optics (IV-Edition) – Ajoy Ghatak (Tata McGraw Hill, 2006).
5. Fundamentals of Optics (III Edition) – Jenkins White (Tata McGraw Hill,1957).
6. Fundamentals of Optics – Khanna & Gulati.
7. Geometrical Optics (I-Edition) – D.P.Acharya (Oxford & IBH Pub. Co., 1970).
8. Optics and Spectroscopy (VI Edition) – Murugesan, Kiruthiga and ShivaPrasad (S.Chand).
9. Geometrical Optics – A. Verstraetin.
10. Fundamentals of Electricity and Magnetism – Basudev Ghosh (Books & Allied New Central Book Agency, Calcutta, 2009).
11. Electricity and Magnetism – D.N.Vasudev (S.Chand).
12. Electricity and Magnetism – B.S.Agarwal (S.Chand).
13. Electricity and Magnetism – Brij lal and Subramanyam.
14. Electricity and Magnetism and Atomic Physics (Vol-I) – John Yarwood.
15. Electricity and Magnetism – A.N.Matveer (Mir Pub., 1986)
16. Introduction to Electrodynamics – D.J.Griffiths (III Edition), Prentice Hall India.
17. Vector Analysis – Hague.
18. Electricity and Magnetism – D.Chattopadhyay and Rakshit.
19. Electricity and Magnetism with Electronics – K.K.Tewari (S.Chand).
20. Fundamentals of Electricity and Magnetism – D.N.Vasudev.
21. Electricity and Magnetism – Sehgal and Chopra.
22. University Physics (XI Edition) – Yound & Freedom (Pearson Education, 2004).
23. Classical electrodynamics by A. D. Jackson.

11. STATISTICS (optional)

**B.A/ B.Sc. COURSE IN STATISTICS (OPTIONAL)
W.E.F 2018-19
FOURTH SEMESTER: THEORY PAPER**

Total: 50 Hours.

STTH-4: STATISTICAL INFERENCE.

Unit: 1. Point Estimation:

Concept of parameter, estimator, estimate and standard error of an estimator. Consistency - definition and criteria for consistency, Invariance property of consistency, Proof of Sufficient condition for consistency using Chebyshev's inequality. Unbiased ness, Mean squared error as a criterion for comparing estimators. Relative efficiency. Most efficient estimator, Minimum variance unbiased estimator (MVUE). Sufficient statistic. Neyman - Factorization theorem with proof.(discrete case) Measure of information - Fisher information function. Cramer - Rao inequality (without proof) and its applications in the construction of minimum variance unbiased estimators.

10 Hours

Unit: 2.Methods of estimation:

Maximum likelihood and Moment methods. Standard examples. Illustration for non uniqueness of MLE's. Properties of MLE and MME. Examples illustrating properties of MLE.

10 Hours

Unit: 3.Interval Estimation:

Meaning of confidence interval. Confidence coefficient. Confidence intervals for mean, difference between means for large and small samples,.Confidence intervals for a proportion and difference between two proportions for large samples.

10 Hours

Unit: 4.Testing of Statistical Hypothesis:

Simple and composite hypotheses, Size and power of a test. Most Powerful (MP) test. Uniformly Most Powerful (UMP) test, Statement and proof of Neyman -Pearson Lemma and its use in the construction of Most Powerful test. Standard examples for computation of size and power of a test. Standard examples on NP Lemma.

10 Hours

Unit: 5.UMP and Likelihood Ratio Tests:

Monotone likelihood ratio (MLR) Property. Uniform most powerful (UMP) test. Statement of the theorem of UMP tests for testing one sided hypothesis for distribution with MLR property. Likelihood ratio test (LRT). Large sample approximations to the distribution of the likelihood ratio statistics (without proof).LRT for single mean for normal case (large and small samples).

10 Hours

FOURTH SEMESTER:

STPR-4: PRACTICAL PAPER.

1. Comparison of Estimators by plotting Mean square error.
2. Estimation of Parameters: Maximum Likelihood Method-I
3. Estimation of Parameters: Maximum Likelihood Method-II
4. Estimation of Parameters: Method of Moments.
5. Evaluation of Type-I & Type-II errors and Power of tests (Based on Binomial, Poisson, Uniform & Normal Distributions).
6. Construction of M.P-tests and computations of power of tests based on Binomial, Poisson & Normal Distributions.
7. Construction of M.P-tests and computations of power of tests based on Binomial, Poisson & Normal Distributions.

Books for study:

1. Hogg .R.V.and Craig.A.T(1978):Introduction to Mathematical Statistics.-4/e Macmillan .
2. Goon AM, Gupta M.K., Das Gupta.B.(1991): Fundamentals of Statistics Vol-I World Press Kolkatta.
3. Gupta S.C and Kapoor V.K.: Fundamentals of Mathematical Statistics- Sultan Chand & Sons' publications.
4. Mood.A.M.,Graybill.F A. and Boes D.C.(1974): Introduction to the Theory of Statistics. McGrawHill.
5. Mukyopadhyay.P.(1996) .Mathematical Statistics.-Kolkotta Publishing House.

.Books for Reference:

1. Rohatgi.V.K. and A.K.Md.Ehsanes Saleh (2002):An introduction to probability theory and Mathematical Statistics. John Wiley.
2. Murry R.Speigel (1982): Theory & Problems of Statistics, Schaum's publishing Series.
3. P.G.Hoel (1971): Introduction to Mathematical Statistics, Asia publishing house.
4. Dudewicz EJ and Mishra S.N (1980): Modern Mathematical Statistics-John Wiley.
5. Kale B.K(1999):A First Course on Parametric Inference,Narosa.

11.ZOOLOGY (Optional)

**B.Sc IV Semester Scheme (CBSC - Pattern)
Zoology (Optional) Syllabus(Revised)
2018 -19 Onwards**

Semesters	Syllabus	Total Hours	Theory & Practical/ Week
IV	Cell Biology, Histology & Animal Behaviors	50hrs.	4 hrs.
	PRACTICAL	12	4 hrs.

NOTE:

THEORY MARKS			PRACTICAL MARKS		
Internal	Annual	Total Marks	Internal	Annual	Total Marks
20	80	100 marks	10	40	50 marks

Question paper pattern for THEORY examination

Que.No.	Marks	Solve	Total Marks
I	02	10	20
II	04	05	20
III	10	04	40
TOTAL --- 80 MARKS			

PRACTICAL pattern for examination

Que.No.	Solve	Total Marks
I	Make a temporary preparation of Histology slide.	10
II	Make a temporary squash preparation of Onion root tip/Grasshopper Testis/Onion flower bud	08
III	Identification (6X2)	12
IV	Field study report & viva	05
V	Journal	05
TOTAL --- 40 MARKS		

**B.Sc IV Semester Syllabus Revised (2018-19) Onwards
ZOOLOGY (Optional)**

Total Marks--80

Total Teaching--50hrs.

Cell Biology, Histology & Animal Behaviors

UNIT-I Cell Biology

Cell Biology: Ultra structure of animal cell, Cell theory & cell cycle.	1hr
Ultra Structure & function of cell organelles: Plasma membrane, Endoplasmic reticulum, Ribosome's, Golgi-complex, Lysosomes, Mitochondria and Nucleus.	8hrs

UNIT-II Cell Biology

Chromosomes: Structure & types of chromosomes. Ultra structure of chromosome.	2hrs
Cell division: Types- mitosis & meiosis.	2hrs
Cellular Aging & Cell Death: Concept of Aging theories, Effect of Aging on Cell organelles. Apoptosis, Necrosis-Definition & significance.	2hrs
Cancer Biology: Introduction, Characteristics of cancer cells. Carcinogens, cause & prevention.	3hrs

UNIT-III Histology

Histo chemical Techniques: Cytoplasmic & Nuclear stains. Preparation of histological slides.	3hrs
A). Study of histological structure and functions of the following Mammalian organs. a). Tongue b). Salivary glands c). Stomach d). Intestine e). Liver f). Kidney	8hrs

UNIT-IV Histology

B). Study of histological structure and Endocrine functions of the following Mammalian organs a) Pituitary b) Pancreas c) Adrenal d) Thyroid e) Parathyroid f) Thymus g) Testes h) Ovary	9hrs
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UNIT-V Ethology (Animal Behaviour)

Ethology: Introduction Definition, Scope of ethology. Brief Contributions of Konard Lorenz, Niko Tinbergen and Karl Von Frisch.	2hrs
Types of Animal Behaviour: 1). Innate Behaviour: Taxes, Reflexes, Instincts & Motivation. 2). Learned Behaviour: Habituation, Imprinting, Conditioned, Reflexes and Insight learning. 3). Social behaviour: Types of animal society & Colony in Honey Bees and Monkey troops. 4). Territoriality & Courtship Behaviour in Scorpion, Stickle Back Fish & Peacock. 5). Study of nesting behavior and mimicry in animal. 6). Biological clock, Circadian rhythm and Chronobiology.	7hrs
Animal Communication: Chemical, visual and Audio. Function of	

Signals odours, sounds and light.	2hrs
Parental care: Concepts, Fishes, Amphibians and Birds.	3hrs

PRACTICALS

	Total Practicals-12 hrs
1) Study of permanent cytology slides of Mitosis & Meiosis.	2hrs
2) Study of temporary preparation of Mitotic stages from onion Root tip cells.	2hrs
3) Study of temporary preparation of Meiotic stages from onion Flower bud/Grass Hooper testis.	2hrs
4) Preparation and observation of permanent histological slides Stomach, Intestine, Liver, Pancreas, Kidney, Adrenal Thyroid, Testis & Ovary.	4hrs
5) Study of mimicry in leaf insect, Chameleon, Butterflies, Stick Insect, Ants, Wasps and Spiders.	1hr
6) Study of Nest and nesting material.	1hr
7) Internal Practical Test	1hr

NOTE:

1. With the help of Charts/Models/Diagrams/Printouts & Xerox Sheets are used in practical demonstration
2. Compulsory field visit to study Mimicry, Habitats and Community.
3. Submission of field visit report carries 5 marks.

REFERENCE BOOKS

1. Introduction to Histology. Gauba R.K. Tata Mc Graw Hill New Delhi.
2. Cells and Tissues: Introduction to Histology ND Cells :Rogers:A.W. AcademicPress .
3. Basic medical Histology :Biology of cells & tissues & organs Kessel R.G. oupNew York.
4. Text Book of Histology :Bloom and Fawcett.Saunders Publ.Philadelphia.
5. Bailey's Text Book of Histology.Bailee Baltimore,Willims andWilkins.
6. Text Book of Ecology : Odum.
7. Introduction to animal behavior:Aubrey Manning and Marian.S.DawkinsCambridge Uni Press.
- 8.Essentials of organizational behavior:Stephan Robbins,Prentice Hall of IndiaNew Delhi.
9. Animal Behaviour :McFarland D ELBS with Longman.
10. Ethology " Barnett.
11. An introduction to Behavioural Ecology J.R. Krebs & N.B. Davies Black wellScientific Publ.
12. Text Book of Animal Behaviour: Fatik Baran mandal. PHI Learning Pvt Ltd newDelhi.
13. Animal Behaviour :Reena Mathur,Rastogi and Coimpani.
14. Cell Biology –Chennarayappa – Unniversity Press

15. Cell & Molecular Biology - P. K. Gupta , Rastogi Publishers,
NewDelhi
16. Cytology- Verma & Agrawal,S.Chand & Co.Publisher
17. Concepts of Cell Biology- Verma & Agrawal,S.Chand & Co Publisher
18. Cell & Molecular Biology- De Robertes & De Robertes
19. Cytology - C.B.Pawar,Himalaya Publisher House, Bombay.
20. Molecular Cell Biology: Harvey Lodish,David Baltimore et

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Revised syllabus of BA/BSW/BSc IV Semester Computer Applications
(Compulsory Paper) w.e.f 2018-19 and onwards

Name of the Subject: **COMPUTER APPLICATION (Compulsory Paper)** Contact Hrs: 52

Subject Code: Contact Weekly hours: 4

Marks: Main Exam: 80 IA: 20

UNIT-I 10Hrs

Introduction: Computer, data processing, characteristic features of computers, computer evolution to present form, computer generation. **Basic computer organization:** Basic operations performed by computers, basic organization of computer system, input units and its functions, output units and its functions, storage units and its functions, types of storage. **Number systems:** non-positional number system, positional number system, decimal, binary, octal, and hexadecimal number systems. Conversion from decimal to binary and vice-versa for integer numbers only

UNIT- II 10Hrs

Processor and memory: Internal structure of processor, memory structure, types of processors, main memory organization, random access memory, read only memory, cache memory. **Secondary storage:** secondary storage devices and their needs, commonly used secondary storage devices, sequential and direct access storage devices, basic principles of commonly used secondary storage devices (magnetic disk, optical disk, flash drives, memory card, disk array). **IO devices:** commonly used input output (IO) devices.

UNIT- III 10Hrs

Software: Software and its relationship with hardware, types of software, relationship among hardware, system software, application software and users of computer systems, steps involved in software development, firmware, middleware. **Overview of operating system:** Definition, functions of operating system, concept of multiprogramming, multitasking, multithreading, multiprocessing, time-sharing, real time, single-user & multi-user operating system.

UNIT- IV 12Hrs

Overview of Networking: An introduction to computer networking, Network types (LAN, WAN, MAN), Network topologies, Modes of data transmission, Forms of data transmission, Transmission channels (media). **Fundamentals of Electronic Mail:** Basic email facts, Email advantages and disadvantages, Email addresses, passwords, and userids, Mailer features, Email inner workings, Email management, Multipurpose Internet Mail Extensions (MIME). **Browsing and Publishing:** Browser Bare Bones, Coast-to-Coast Surfing, Hypertext Markup Language: Introduction, Web Page Installation, Web Page Setup HTML, HTML Formatting and Hyperlink Creation.

UNIT- V 10Hrs

The Internet: What is the Internet?, The Internet Defined, Internet History, The Way the Internet Works, Internet Congestion, Internet Culture, Business Culture and the Internet, Collaborative Computing and the Internet. **The World Wide Web:** The World Wide Web Defined, Web Browser Details, Web Writing Styles, Web Presentation Outline, Design, and Management, Registering Web Pages, Lynx: Text-Based Web Browser, Searching the World Wide Web: Directories, Search Engines,

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and Metasearch Engines, Search Fundamentals, Search Strategies. Telnet and FTP: Telnet and Remote Login, File Transfer, Computer Viruses.

References:

1. P. K. Sinha and Priti Sinha, Computer Fundamentals, Sixth Edition, BPB publications.
2. Rajaraman V., Introduction to Information Technology, 2nd Edition, PHI
3. S. K. Basandra, Computers Today , Galgotia Publications.
4. Xavier, C "Introduction to Computers and Basic Programming" New age International.
5. Rajaraman, V., Adabala, Neeharika, Fundamentals of Computers, PHI
6. Raymond Greenlaw, , Ellen Hepp, Inline/Online: Fundamentals of the Internet and the World Wide Web, 2/e, McGraw Hill Education;
7. Dietil and Dietil, Nieto, Internet and world wide web programming, Pearson Education
8. Sai Satish, Yash Patel, Srinivas Rao, Lokesh Reddy, Exploring Internet, Jai Sharma, Indian Servers
9. Gill, Nasib Singh: Essentials of Computer and Network Technology, Khanna Books Publishing Co., New Delhi
10. Norton, Peter, Introduction to Computer, McGraw-Hill.

Question Paper Pattern

Scheme of instruction and examination

Semester	Title of the Paper	Theory Hours	Theory Marks	I.A.Marks	Exam Hrs	Total Marks
IV	Computer Application (Compulsory Paper)	52	80	20	1.5	100

Note: The final examination is based on Multiple Choice Questions. Each unit shall carry equal weightage during the preparation of the question paper.