MODIFIED CURRICULUM B.Sc.
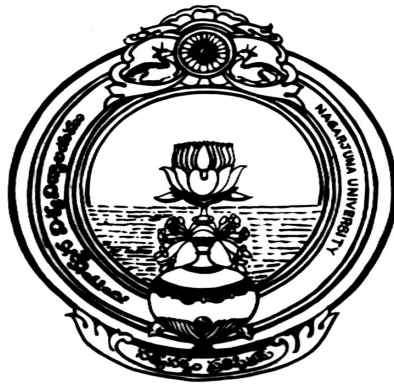
From the batch of Students admitted in the Academic Year 2008-09

ACHARYA NAGARJUNA UNIVERSITY
NAGARJUNA NAGAR – 522 510

B.Sc. COURSE STRUCTURE

Second Year w.e.f. the Academic Year 2009-10
(From the batch of Students admitted in the year 2008-09)

Part – I:

S.No.	Subject	Hrs per week	No of Marks
1	English Language including communication skills	6	100
2	Second language	4	100
3	Environmental Studies	4	100
4	Office Automation Tools (Computer Skills)*	2	100
	Total	16	**400**

Part – II :

S.No.	Subject	Hrs per week	No of Marks
5	Core – 1 – II	4	100
6	Core – 2 – II	4	100
7	Core – 3 – II	4	100
8	Core1- Lab II	3	50
9	Core2- Lab II	3	50
10	Core32- Lab II	3	50
	Total ::	21	**450**
	Grand Total ::	37	**850**

* For all B.A & B.Sc. programmes with no Computer Course as core subject

NOTE :
1. **All are credit Subjects for award of Pass / Class**
2. **For those subjects modified curriculum is not given, the old syllabus holds good.**
3. **Model question papers that are not available with this booklet will be sent to the colleges in due course.**

Second Year ENGLISH Syllabus
PAPER – II (Part – II)

Max. Marks : 100

Part – A (50 Marks)

POETRY

Title of the Poem	Name of the Poet
1. The Sunne Rising	John Donne
2. The Solitary Reaper	William Wordsworth
3. Road Not Taken	Robert Frost
4. Refugee Mother and Child	Chinua Achebe
5. Good Bye Party for Mrs. Pushpa T. S.	Nissim Ezekiel
6. I will embrace only the sun	Tripuraneni Srinivas (*Down to Earth*, Post-Modern Telugu Poetry, OUP)

PROSE

Title of the Prose Lesson	Name of the Author
1. Mr. Know-All	Somerset Maugham
2. Film-Making	Satyajit Ray
3. Not Just Oranges	Premchand
4. Talk on Advertising	Herman Wouk
5. On Shaking Hands	A. G. Gardiner
6. Decolonizing the Mind	Ngugi wa Thiong'o

COMMUNICATION AND COMPOSITION
1. Resume Writing
2. e-Correspondence
3. Note-Making
4. Report Writing
5. Expansion of Proverbs and Ideas
6. Description of Pictures

FURTHER READING FOR SECOND YEAR

Short Stories:

1. Gajar Halwa	Gita Hariharan
2. My Brother, My Brother	Norah Burke

 (from *Indian Literature,* 166 Mar-Apr 1995, Vol XXXVIII, No: 2, Sahitya Academy)

One-Act Plays

1. Refund	Ritz Karinthi
2. *Julius Caesar* (Caesar's Murder Scene only)	William Shakespeare

INFORMATION TRANSFER, COMMUNICATION AND COMPOSITION
1. Jumbled Passages (from one-act plays)
2. Paragraph-Writing (with hints from short stories)

COMMUNICATION CURRICULUM

YEAR – II COMMUNICATION CURRICULUM				
Year – II / Level – 2 Modules	Topics	Skills / Activities	Time Frame 40 Hours	Additional Infrastructure Requirement
II-B-1 Spoken English	1. Neutralization of Accent-Pronunciation	• Word stress, tone, pitch, speed, weak forms, pauses • Reading aloud texts • Sentence stress (Recording voice) • Intonation • Word ending pronunciation • Problem sounds • Accents – regional, standard • Reducing MTI	10	*Sound System * Recording facility
	2. Art of Conversation	• Initiating, sustaining, closing, turn-taking, interrupting, apologizing, clarifying, confirming, etc.	10	Nil
	3. Giving a Formal Talk/Speech	• Speech type: Describing/Narrating-people, place, things, events • 1-3 minute talks (e.g. welcoming a gathering)	4	*Sound System
	4. Telephoning Skills	• Types of Calls-Formal/Informal • Making/changing appointments • Practice with Mock Calls • Telephone etiquette	10	*Speaker Phone recommended
II-B-2 Listening Comprehension	1. *Barriers to listening *Types of listening- ▪ Academic (lectures) ▪ Information (facts and inferences)	• Role play • Listening to and understanding live or recorded text • Taking dictation-paragraphs, dialogues (written/spoken)	3	*Audio, CD / Tapes
	2. Real life listening- ▪ railway/airport ▪announcements, radio/TV news ▪ casual conversations	• Identifying context • Listening for the main idea • Listening for specific information • Information transfer-filling in a form/table while listening	3	*Audio, CD / Tapes

The Pattern of the Question Paper for the Second Year

1. Prose: 10 (Section - A)
2. Poetry: 10 (Section - B)
3. Additional Reading (Non-Detailed Text): 10 (Section - C)
4. Composition & Vocabulary : 20 (Section - D)

The Question Paper Model for the Second Year

Section – A

I.   Answer any FIVE out of EIGHT following in about 25 words: 5x2=10

(One of the questions is on identifying and commenting on the given passage from Prose)

Section – B

II.   Answer any FIVE out of EIGHT following in about 25 words: 5x2=10

(*One of the questions is on identifying and commenting on the given passage from Poetry*)

Section – C

III.   Answer any FIVE out of EIGHT following in about 25 words: 5x2=10

(*One of the questions is on a Jumbled Passage from one-act plays*)

(One of questions is on paragraph writing –with hints given from the short stories)

Section – D

IV.   Answer all the questions and all questions carry equal marks: 4x5=20

1. Respond to the advertisement below writing a Resume using the information given: (OR) Respond to the given e-mail (Official/Business)

2. Note Making (OR) Mind-mapping:

3. Expansion of a proverb / ideas in about 100 words (OR) Information Transfer:

4. Description of a given picture(or) Report writing of a dialogue(from one-act plays)

Second Year SANSKRIT Syllabus
Paper - II(Part – II)

(1)   Drama   (2)   Drama (Modern)
(3)   Upanishad   (4)   Prose
(5)   Bhoja Prabandha story   (6)   History of Literature
(7)   Alankaras ,   (8)   Grammar

Drama

1).Pratima Gruham

   Pratima of Bhasa III act only

2) Modern Drama
   Bharata Samskruteh mulam
   P. Sreeramachandrudu from (Susamhata Bharatam VI act)

3) Upanisadadesah
   Bruhadaranayaka   Dakara katha
   Sikshanusasanam   Sikshavalli of Taittiriya

Prose

4) Sukanasopadesah
    From Kadambari Sangraha

5) Bhojasya Saraswati Sushama
   From Bhojaprabandha Page No. 74 (Abridged form)

6) Poets and Books from History of literature

   1) Panini   (2) Kautilya
   3) Bharatamuni   (4) Bharavi
   5) Magha   (6) Sri Harsha
   7) Bhavabhuti   (8) Sankaracharya
   9) Dandin   (10) Jagannadha

7) Alankaras from Kuvalayananda

(1)   Upama   (2)   Ananvayaa
(3)   Utpreksha   (4)   Deepakam
(5)   Aprastutaprasamsa   (6)   Drstantam
(7)   Arthantaranyasa   (8)   Virodha Bhasa
(9)   Ullekha   (10)   Vyajasthuti

8) Grammar

Declensions :

Halanta Nouns

(1)	Jalamuc	(2)	Vac
(3)	Marut	(4)	Bhagavat
(5)	Pachat	(6)	Rajan
(7)	Gunin	(8)	Naman
(9)	Vidwas	(10)	Manas

Pronouns :

Asmad, Yushmad, Idam, Tat, Etat, Yat, Kim

Participles :

Ktva, Lyap, tumun, Kta. Ktavat, Shatr, Shanac, Tavya

Suggested Model paper
Sanskrit

<u>IInd year</u>   100 Marks

1) Essays two out of four   12 x 2 = 24
2) Short answers from lessons four out of eight   4 x 4 = 16
3) Annotations (Contexts) three out of six   5 x 3   = 15
4) Translation (Upanishads)   = 05
5) Poets, and Works two out of four   5 x 2   = 10
6) Alankaras two out of four   5 x 2   = 10
7) a) Sabdas two out of four   5 x 2   = 10
     b) Krtparticiples   2 x 5   = 10

Second Year HINDI (Second Language) Syllabus

Paper- II (Part – II)

A.   Poetry Text – Kavya Deep

      Editor : Sri B. Radha Krishna Murthy

      Maruthi Publications, Guntur

B.   History of Hindi Literature : Main tendencies of all the four ages with special references to the following authors and poets :-

      (1) Chand Vardai (2) Kabir das (3) Surdas (4) Tulasidas (5) Mirabai (6) Raheem (7) Biharilal (8) Bharatendu Harishchandra (9) Mahaveer Prasad Dwivedi (10) Maithilisharan Gupt (11) Premchand (12) Jayashankar Prasad (13) Pant (14) Nirala (15) Maha Devi Verma (16) Agyeya (17) Dinkar.

C.   General Essay

      (1) Sahitya Aur Samaj (2)Vidyarthi Aur Rajniti (3) Vidyarthi Aur Anushasan (4) Aaj Ki Shiksha Niti (5) Vigyan : Abhishap Ya Vardan (6) Nari Shiksha (7) Samaj Main Nari Ka Sthan (8) Adhunik Shiksha Aur Nari (9) Bharat Main Berojgari Ki Samasya (10) Bharat par Bhoomandalikaran Ka Prabhav (11) H.I.V./Aids (12) Paryavaran Aur Pradooshan (13) Bharat Main Badhati Hui Janasankhya Ki Samasya.

D.   Translation from English or Telugu to Hindi

E.   Prayojan moolak Hindi : (1) Prayojanmoolak Hindi : Arth Evam Swaroop (2) Raj Bhasha, Rastra Bhasha aur Sampark Bhasha.

Reference Books:

1. Hindi Sahitya Ka Itihas – Prof. T. Mohan Singh,
2. Hindi Sahitya Ka Sanskhipt Itihas – Dr. Vidya Sagar Dayal
3. Hindi Sahitya Ka Sanskhipt Itihas – Dr. Tej Narayan Jaiswal.
4. Hindi Sahitya Ka Subodh Itihas – Gulab Rai
5. Prayojanmoolak Hindi – Dr. Ram Prakash, Dr. Dinesh Gupt

B.A., B.Sc., B.Com – Second Year - Second Language Hindi
Model Question Paper Pattern
Paper – II

Maximum Marks : 100

1.	2 out of 4 Annotations from the prescribed poetry text	10 x 2 = 20
2.	1out of 3 long answer questions from prescribed poetry text	10
3.	1 out of 2 long answer questions from the prescribed History of Hindi Literature	15
4.	2 out of 4 short answer questions from the prescribed authors and poets from History of Hindi Literature	10 x 2 = 20
5.	1 out of 3 long answer questions from the prescribed general essays	10
6.	Translation of five English or Telugu sentences into Hindi	2 x 5 = 10
7.	1 out of 3 short answer questions from the prescribed Prayojan moolak Hindi	5
8.	1 comprehensive passage along with 5 questions	2 x 5 = 10

ENVIRONMENTAL STUDIES

COURSE METERIAL

This course material is designed to introduce students to the way non-engineering students analyse problems of managing the environment and natural resources. It is not meant to make students experts in Environmental studies, but should give a distinctive economic perspective on how to analyse environmental issues and to appreciate some of the economic arguments that can be used in these. The lectures look at environmental problems that are of current concern, and develop the economic principles needed to analysis them. The main objective of the lectures is to introduce students to various aspects of the environmental problems, viz., natural resource degradation, depletion of oil reserves environmental pollution, the over-exploitation of forests, global warming; conservation of resources, environmental acts, impacts of human population, etc. Environmental Systems and Society minor is designed for students who wish to augment their major program of study with courses addressing the relationships between environmental science and associated social and political issues. This will enable the student to impart a deeper understanding of environmental systems related to air, land, and water resources and provide a basis for sound professional decision making. Through this, the student can develop the following skills

►Specific knowledge and skills associated with the topics covered;
►Written and oral communication; and
►Capacity to evaluate critically the roles of various stakeholders in managing environmental goods.

Environmental Systems and Society

Each course consists of units and each unit consists of modules. The student is expected to:

►Review course material and follow up reference on each topic;
►Work through course material and other notes regularly to check the understanding of the concepts and methods discussed; and
►Write the examination, which should draw on course material, and the references provided but also on a range of sources related to environment.

ENVIRONMENTAL STUDIES SYLLABUS
(Non-Engineering Students)

Module 1: Environmental Studies – Introduction

►*Definition, Scope and Importance*
►Measuring and defining environmental development: indicators   (3 lectures)

Module 2: Basic Principles of ecosystem functioning

►Concept of an ecosystem
►Structure and function of an ecosystem
►Producers, consumers and decomposers
►Energy flow in the ecosystem
►Food chains, food webs and ecological pyramids
►Introduction, types, characteristic features, structure and functions

- Forest ecosystem
- Grassland ecosystem
- Desert ecosystem
- Aquatic ecosystems (ponds, streams, lakes, rivers oceans, estuaries)
                                                                (8 lectures)

Module 3: Environment and Natural Resources

►**Forest Resources**

- Use and over-exploitation
- Deforestation
- Timber extraction
- Mining and dams-their effects on forests and tribal people.
- Case studies

►**Water Resources**

- Use and over-utilization of surface and ground water
- Floods, droughts
- Conflicts over water
- Dams-benefits and costs
- Mineral resources
- Use and exploitation
- Effects of extracting and using mineral resources
- Case studies

►**Food resources**

- World food problems
- Changes caused by agricultural and overgrazing
- Effects of modern agriculture, fertilizer-pesticide problems, water logging, and salinity
- Case studies**.**

►**Energy resources**

- Growing energy needs
- Renewable and non renewable energy sources
- Use of alternate energy sources
- Case studies

►**Land resources**

- Land as a resource
- Common property resources
- Land degradation
- Soil erosion and desertification   (10 lectures)

Module 4: Biodiversity and its Conservation

- ►Introduction-Genetic, species and ecosystem diversity
- ►Bio-geographical classification of India
- ►Value of biodiversity- consumptive and productive use, social, ethical, aesthetic and option values.
- ►Biodiversity-global, national and local levels
- ►Hot-spots of biodiversity
- ►Threats to biodiversity – habitat loss, poaching of wildlife, man-wildlife conflicts
- ►India as a mega-diversity nation
- ►Endangered and endemic species of India
- ►Conservation of biodiversity-In-situ and Ex-situ conservation   (6 lectures)

Module 5: Environmental Pollution

- ►Welfare Measures and Environmental Values
- ►Definition and Classification of Environmental Values
- ►Valuation Methods   (4 lectures)

Module 6: Environmental Economics

- ►Economic approach to environmental preservation and conservation
- ►Property rights and externalities
- ►Management of Natural Resources
- ►Economics of natural resources

    - Forestry
    - Water resources

- Fisheries
- Biodiversity   (8 lectures)

Module 7: Environmental Pollution

► Causes, effects and control measures of

- Air pollution
- Water pollution
- Soil pollution
- Marine pollution
- Noise pollution
- Nuclear hazards
- Solid Waste Management
- Urban and industrial wastes

► Pollution case studies
► Pollution control methods
► Disaster management-floods, earthquake, cyclone and landslides.   (8 lectures)

Module 8: Regional and sectoral Issues

► Urbanisation
► Agroforestry
► Drylands
► Goods and services
► Mountain development
► River basin water resource management
► Sustainable tourism
► Coastal zone management   (8 lectures)

Module 9: Environment and Development

► The economy and environment interaction
► State of the environment
► Economics of development, preservation and conservation
► Sustainability: theory and practice
► Equitable use of resources for sustainable lifestyles
► Role of an individual in prevention of pollution   (6 lectures)

Module 10: Environmental Problems in India

► Effects of human activities on the quality of life
► Water and River, Ground water
► Wasteland reclamation
► Energy-Firewood, Animal energy, thermal and Nuclear energy
► Access to Common Property Resources (CPR)
► Pollution: domestic
► Solid waste, Health and Sanitation and Unsafe Drinking water   (6 lectures)

Module 11: Human Population and the Environment

- ► Population growth and environment
- ► Human Rights
- ► Value Education
- ► Women and Child Welfare
- ► Role of Information Technology
- ► Case Studies   (6 lectures)

Module 12: Social Issues and the Environment

- ► From Unsustainable to Sustainable development
- ► Water conservation, rain water harvesting, watershed management
- ► Resettlement and rehabilitation of people; its problems and concerns
- ► Case studies
- ► Environmental ethics : Issues and possible solutions
- ► Consumerism and waste products
- ► Public awareness
- ► Role of an individual in conservation of natural resources   (8 lectures)

Module 13: Sustainable Resource Management

- ► Benefits and costs of environmental management
  - ► Market and non-market benefits
  - ► Health benefits
  - ► Recreation benefits
  - ► Aesthetic benefits
  - ► Environmental costs

- ► Environmental impact assessment
- ► Evaluation of project and programmes   (6 lectures)

Module 14: Design of Environmental Policy

- ► Direct Regulation by Government
- ► Common and Control Instruments
  - ▪ Economic Instruments
  - ▪ Pollution Taxes
  - ▪ Marketable Permits
  - ▪ Mixed Instruments
  - ▪ Informal Regulation by Local Communities
- ► Monitoring and Enforcement of Environmental Regulation   (6 lectures)

Module 15: Institutions and Governance

- ► Evolution of laws, institutions, and policies relation to India
- ► Popular participation in environmental movement
- ► Environmental activities and ethics that sustain the world   (4 lectures)

Module 16: Environment and Sustainable Development

- ► Concepts and indicators

► Linkages and trade-offs
► Indicators of sustainability
► Approaches to sustainable development   (4 lectures)

Module 17: Field Work

► Visit to a local area to document environmental assets-river/forests/grassland/hill/mountain
► Study of local environment-common plants, insects, birds
► Study of simple ecosystems-pond, river, hill slopes, etc
► Prepare a term paper based on the observations during the field work.

(Field work Equal to 6 lecture hours).

For all B.A./B.Sc./B.Com. Programs with no computer course as core subject
II Year

Theory Paper-2

Office Automation Tools

Unit-1: MS EXCEL BASICS   **12 hrs**

Excel basics : The usual spread sheet features, Overview of excel features, Getting Started, Creating a new work sheet, Selecting cells, Navigating with the mouse and keyboard, Entering and editing text, text boxes, text notes, checking spelling, undoing and repeating actions, entering and formatting numbers, entering and editing formulas, referencing cells, order of evaluation in formulas, look up tables, copying entries and equations to minimize typing, more auto fill examples, creating custom fill lists, protecting and un protecting documents and cells.

Rearranging worksheets : Moving cells, copying cells, sorting cell data, inserting rows, inserting columns, inserting cells, inserting as you paste, deleting parts of a worksheet, clearing parts of a worksheet, how formulas react to worksheet design changes, Auditing tools help spot potential problems.

Excel formatting tips and techniques : Excel page setup, Changing column widths and row heights, auto format, manual formatting, using styles, format codes alter a number's appearance, format painter speeds up format copying, changing font sizes and attributes, adjusting alignments, centering text across columns, using border buttons and commands, changing colors and shading, inserting and removing page breaks, hiding rows and columns.

Organizing large projects : Using names, splitting windows and fixing titles, outlining your worksheets, working with multiple worksheets, using multiple worksheets in a workbook, viewing multiple windows, summarizing information from multiple worksheets.

An introduction to functions : Parts of a function, functions requiring add-ins, online functions help, the function wizard, examples of functions by category, error messages from functions.

Unit-2: EXCEL CHARTS, GRAPHICS AND FUNCTIONS   **12 hrs**

Excel's chart features : chart parts and terminology, instant charts with the chart wizard, creating charts on separate worksheets, resizing and moving charts, adding chart notes and arrows, editing charts, rotating 3-D charts, Changing worksheet values by dragging chart parts, printing charts, deleting charts, setting the default chart type, controlling which series on which axis, adding overlay charts, creating trend lines, data map.

Working with graphics in Excel : Creating and placing graphic objects, resizing graphics, positioning graphics on worksheets, drawing lines and shapes, examples of graphics in Excel, possible sources of excel graphics, Excel slide shows.

Introduction to Excel's command macros : Recording your own macros, running macros, assigning macros to buttons.

Using worksheets as databases : Database concepts and terms, Creating an excel database, Working with data forms, filtering—a better way to find, sorting excel databases, cross-tabulating databases, adding subtotals to databases.

Automating what-if projects : General organizational tips, scenario manager, finding the right number with solver.

Auditing and trouble shooting worksheets : Using error values to locate problems, using iteration to solve circular references, using the info window to find errors, using the auditing command to trouble shoot.

Unit-3: MS ACCESS BASICS   12 hrs

Introduction to Access : Access concepts and terms, starting and quitting access, the access workspace and tools, the views.

Creating a simple database and tables : The access table wizard, creating databases without the wizard, field names, data types and properties, adding or deleting fields in tables, renaming fields and their captions, moving fields, deleting fields in tables, resizing fields, changing the appearance of text in tables, freezing columns, primary key fields, indexing fields, viewing a list of database properties.

Forms : The form wizard, saving forms, modifying forms.

Entering and editing data : Typing, adding records, duplicate previous entries without retyping, switching out of data entry mode, when do entries get saved?, undo, correcting entries, global replacements, moving from record to record in a table, entry and navigational shortcuts.

Finding, sorting and displaying data : Queries and dynasets, creating and using select queries, returning to the query design, multiple search criteria, finding incomplete matches, using wildcards in queries, requesting range of records, hiding columns, reformatting dynasets, multilevel sorts, showing all records after a query, saving queries for latter use, cross tab queries, find and replace.

Unit-4:   ACCESS REPORTS, FORMS AND GRAPHICS   12 hrs

<u>**Printing reports, forms, letters and labels**</u>: simple table, form, and database printing, defining advanced reports, manual reporting and modifying, modifying section contents, properties in reports, saving report formats for reuse, printing mailing labels, changing label designs.

Relational databases : Flat versus relational, how relationships work, Exercise: creating a simple relationship, types of relationships, defining and redefining relationships, deleting relationships, creating relationships.

Expressions, macros and other automation : Expressions, using expressions in reports, using expressions in queries, using expressions in forms, expression builders.

Graphics in databases : Objects: linked, embedded, bound and unbound, unbound graphics as form and report embellishments, bound graphics in records, adding graphics to buttons, chart wizard: charting your data.

Linking, importing and exporting records : Importing versus linking, linking other databases as tables, importing data from spread sheet files, importing data from word files, exporting access data.

Unit-5:   FUNDAMENTALS OF INTERNET   12 hrs

The Internet and the World Wide Web : Overview: what is Internet, The Internet's history, The Internet's major services, Understanding the world wide web, Using your browser and the world wide web, navigating the web, closing your browser, getting help with your browser, searching the web, search results and web sites.

E-mail and other Internet Services : Overview: communicating through the Internet, Using E-mail, Using an E-mail program, Stomping out spam, Using web-based e-mail services, More features of the Internet.

Connecting to the Internet: Overview: Joining the Internet phenomenon, Connecting to the Internet through wires, How PC applications access the Internet, Connecting to the Internet wirelessly.

Doing business in the online world : Overview: commerce on the world wide web, E-commerce at the consumer level, E-commerce at the business level, Business, the Internet and every thing, Telecommuters.

Prescribed books:

1. **Ron Mansfield, Working in Microsoft office, Tata McGraw Hill (2008) (chapters 13 to 23 and 29 to 38)**

2. **Peter Norton, Introduction to computers, Sixth Edition Tata McGraw Hill (2007)(Chapters 8A, 8B, 9A, 9B).**

Reference Books :

1. Michael Miller, Absolute Beginner's guide to computer Basics, Fourth Edition, Pearson Education (2007).

2. Deborah Morley, Charles S.Parker, understanding computers today and tomorrow, 11th edition, Thomson (2007).

3. Ed Bott, woody Leonhard, using Microsoft Office 2007, Pearson Education (2007).

4. Rajkamal, Internet and web Technologies, Tata McGraw Hill(2007).

Model Question Paper

General Stream B.A./B.Com./B.Sc.: II Year: Theory Paper-2

Office Automation Tools

Time: 3Hrs   Max.Marks:100

Section-A

Answer all the following questions.   **10*2=20 Marks**

1.
 a) How can we add 'n' number of worksheets with a single click?
 b) How are browsers and the WWW associated with each other?
 c) List out the different ways of viewing a query.
 d) What is a modem?
 e) What is the difference between E-commerce and Web commerce?
 f) Distinguish between front end and back end tools with examples.
 g) What are the different possible extensions for an Excel worksheet?
 h) How can we use the format painter?
 i) List out some of the operators used in Excel.
 j) What is bandwidth?

Section-B

Answer all the following questions.   **5 * 16 = 80 Marks**

2) **a)** Explain the engineering functions used in excel with examples.
     b) Explain the excel workspace with a neat diagram.

(or)

     c) Explain Auto filling dates, numbers and strings in Excel.
     d) Discuss some of the formatting features of excel.

3) **a)** How can we perform "What-if" analysis in Excel?
     b) Explain the different types of charts available in Excel.

(or)

     c) What is the use of macros in Excel?
     d) How can we detect and avoid circular references in excel?

4) **a)** Discuss the different ways of creating forms in Access.
     b) Explain the important features of M.S. Access.

(or)

     c) How can we retrieve the data stored in database?
     d) Write procedure to establish relationships in Access.

5) a) Describe the following terminology:
      (i) Database management system
      (ii) Primary key
      (iii)Dynasets
      (iv) OLE.

  b) Explain working with graphics in Access.

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(or)

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  c) Discuss in brief about linking between databases.
  d) How can we export our own data base.

6) a) How can we search for the content present in www?
  b) Explain different applications of Internet in brief.

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(or)

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  c) Describe the working of e-mail system.
  d) Discuss the pros and cons of E-commerce compared with traditional commerce.

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Second Year BOTANY Syllabus

Paper - II: Anatomy, Embryology, Taxonomy and Medicinal Botany
(Total Hours of Teaching: 120 @ 4 h / Week)

Unit - I: Anatomy   **(30 h)**

1. *Meristems:* Types, histological organisation of shoot and root apices and theories.   (4 h)

2. *Tissues* and *Tissue Systems:*   .   (6 h)

3. *Leaf:* Out Lines of Ontogeny, diversity of internal structure & types of stomata.   (6 h)

4. *Stem* and *root: Vascular cambium -* Formation and function. Out Lines of the concept

    Secondary growth Anamalous secondary growth-General account. Stem –

    Boerhavia, Bignonia, Dracaena; Root – *Beta*   (8 h)

5. *Wood structure:* General account. Study of local timbers (Botanical aspects and economic

    importance) – Teak (*Tectona grandis*), Rosewood, (*Albergia latefolia*), Red sanders,

    (*Pterocarpus santalinus*) Nallamaddi (*Terminalia tomentosa* (T. *alata*)), Yegisa

    (*Pterocarpus marsupiun*) and Neem (*Azadirachta indica*).   (6 h)

Unit - II: Embryology   **(24 h)**

6. Introduction: History and importance of Embryology.(out lines)

    Anther structure, Microsporogenesis and development of male gametophyte.   (5 h)

7. Ovule structure and types; Megasporogenesis; development of female

    Gametophyte/embryo sac – Sturcture of a typical (Polygonum type)

                                                   (6 h)

8. Pollination Embryo sac &Types of embryo sacs. Fertilization.(out lines)
                                         (4 h)

9. Endosperm - Development and types. Embryo - development and types; Polyembryony

    and Apomixis - an outline.   (5 h)

10. Palynology: Principles and applications.   (4 h)

Unit - III: Taxonomy   **(36 h)**

11. Introduction: Types of classification: Artificial, Natural and Phylogenetic.   **(4 h)**

12. Systems of classification: Salient features and comparative account of Bentham & Hooker and Engler & Prantle.   **(6 h)**

13. Current concepts in Angiosperm Taxonomy: Embryology in relation to taxonomy, Cytotaxonomy, Chemotaxonomy and Numerical Taxonomy.   **(4 h)**

14. Nomenclature and Taxonomic resources: An introduction to ICBN, Vienna code - a brief account.   **(6 h)**

15. Systematic study and economic importance of plants belong to the following families: Annonaceae, Capparaceae, Rutaceae, Fabaceae (Faboideae/papilionoideae, Caesalpinioideae, Mimosoideae), Cucurbitaceae, Apiaceae, Asteraceae, Asclepiadaceae, Lamiaceae, Amaranthaceae, Euphorbiaceae, Orchidaceae and Poaceae.   **(16h)**

Unit - IV: Medicinal Botany   **(30 h)**

16. Ethnomedicine: Scope, interdisciplinary nature, distinction of Ethnomedicine from Folklore medicine. Outlines of Ayurveda, Sidda, Unani and Homeopathic systems of traditional medicine. Role of AYUSH, NMPB, CIMAP and CDRI.   **(8 h)**

17. Plants in primary health care: Common medicinal plants – Identicfication – Plant parts to be used as remedies - Tippateega (*Tinospora cordifolia*), tulasi (*Oscimum sanctum*), pippallu (*Piper longum*), Karaka (*Terminalia chebula*), Kalabanda (*Aloe vera*), Turmeric (*Curcuma longa*).   **(4 h)**

18. Traditional medicine vs Modern medicine: Study of select plant examples used in traditional medicine as resource (active principles, structure, usage and pharmacological action)

of modern medicine: Aswagandha (*Withania somnifera*), Sarpagandha (*Rauvolfia serpentina*), Nela usiri *(Phyllanthus amarus),* Amla (*Phyllanthus emblica*) and Brahmi (*Bacopa monnieri*). (6 h)

19. Pharmacognosy: Introduction and scope. Adulteration of plant crude drugs and methods of identification - some examples. Indian Pharmacopoeia. (6 h)

20. Plant crude drugs: Types, methods of collection, processing and storage practices. Evaluation of crude drugs. (6 h)

Suggested Readings:

Bhattacharya et. al. 2007. A textbook of Palynology, Central, New Delhi.

Bhojwani, S. S. and S. P. Bhatnagar. 2000. The Embryology of Angiosperms (4th Ed.), Vikas Publishing House, Delhi.

Davis, P. H. and V. H. Heywood. 1963. Principles of Angiosperm Taxonomy. Oliver and Boyd, London.

Esau, K. 1971. Anatomy of Seed Plants. John Wiley and Son, USA.

Heywood, V. H. 1965 . Plant Taxonomy. ELBS , London.

Heywood, V. H. and D. M. Moore (Eds). 1984. Current Concepts in Plant Taxonomy. Academic Press, London.

Jain, S. K. and V. Mudgal. 1999. A Handbook of Ethnobotany. Bishen Singh Mahendra Pal Singh, Dehradun.

Jeffrey, C. 1982. An Introduction to Plant Taxonomy. Cambridge University Press, Cambridge. London.

Johri, B. M. 1984. Embryology of Angiosperms. Springer-Verleg, Berlin.

Joshi, S. G. 2000. Medicinal Plants. Oxford and IBH, New Delhi.

Kapil, R. P. 1986. Pollination Biology. Inter India Publishers, New Delhi.

Kokate, C. and Gokeale- Pharmocognacy- Nirali Prakashan, NewDelhi.

Lad, V. 1984. Ayurveda – The Science of Self-healing. Motilal Banarasidass, New Delhi.

Lewis, W. H. and M. P. F. Elwin Lewis. 1976. Medical Botany. Plants Affecting Man's Health. A Wiley Inter science Publication. John Wiley and Sons, New York.

Maheswari, P. 1971. An Introduction to Embryology of Angiosperms. McGraw Hill Book Co., London.

Pandey, B. P. 2007. Botany for Degree Students: Diversity of Seed Plants and their Systematics, Structure, Development and Reproduction in Flowering Plants. S. Chand & Company Ltd, New Delhi.

Rastogi, R. R. and B. N. Mehrotra. 1993. Compendium of Indian Medicinal Plants. Vol. I & Vol. II. CSIR, Publication and Information Directorate, New Delhi.

Sivarajan, V. V. and I. Balasubramaniyan. 1994. Ayurvedic Drugs and their Plant Sources. Oxford and IBH, New Delhi.

Stace, C. A. 1989. Plant Taxonomy and Biostatistics (2nd Ed.). Edward Arnold, London.

Singh, G. 1999. Plant Systematics: Theory and Practice. Oxford and IBH, New Delhi.

Practical - II: Anatomy, Embryology, Taxonomy and Medicinal Botany

(Total Hours of Laboratory Exercises: 90 @ 3 h / Week in 30 Sessions)

Suggested Laboratory Exercises:

1. Demonstration staining technique. (3 h)

2. Tissue organization in root and shoot apices using permanent slides (3 h)

3. Preparation & staining of

    Primary structure: Root - *Cicer*, *Canna*; Stem – *Tridax, Sorghum*

    (any dicot & Moncot roots and sterns) (6 h)

    Secondary structure: Root – *Tridax* sp.; Stem –*Pongamia*

    (any dicot secondary root and sternn) (3 h)

    Anomalous secondary structure: Examples as given in theory syllabus. (6 h)

4. Stomatal types using epidermal peels. (3 h)

5. Microscopic study of wood in T.S., T.L.S. and R.L.S. (6 h)

6. Structure of anther and microsporoganesis using permanent slides. (3 h)

7. Structure of pollen grains using whole mounts (*Catharanthus, Hibiscus,*

    Acassia, Grass). (3 h)

8. Pollen viability test using *in- vitro* germination (*Catharanthus*). (3 h)

9. (models or photographs or slide) (permanent slides) Study of ovule types and

    developmental stages of embryosac. (3 h)

10. Structure of endosperm (nuclear and cellular); Developmental stages of dicot and monocot

    Embryos using permanent slides. (3 h)

11. Isolation and mounting of embryo (using *Symopsis / Senna* / *Crotalaria*) (3 h)

12. Systematic study of locally available plants belonging to the families prescribed in

    theory syllabus (Minimum of one plant representative for each family) (18 h)

13. Demonstration of herbarium techniques. (3 h)

14. Local field visits to study the vegetation and flora. (6 h)

15. Detailed morphological and anatomical study of medicinally important part(s) of locally available plants (a minimum 10 plants) used in traditional medicine. (12 h)

16. Field visits to identify and collect ethno medicinal plants used by local tribes/folklore. (3 h)

17. Preparation and submission of 25 herbarium specimens for evaluation during the practical examination.

Second Year BIO-CHEMISTRY Syllabus

Theory – Paper-II: Metabolism and Biochemical Techniques

120 hrs (4hrs/week)

Unit- I : Bioenergetics and Biological Oxidations   **30 hours**

Energy transformations in the living system, Free energy concept. Exergonic and endergonic reactions. High energy compounds. Phosphate group transfer potential. Substrate level phosphorylation.

Biological oxidations: Definition, enzymes involved- oxidases, dehydrogenases and oxygenases. Redox reactions. Redox couplers. Reduction potential (ε, ε_0, ε'_0). Standard reduction potential (ε'_0) of some biochemically important half reactions.

Ultra structure of mitochondria. Electron transport chain and carriers involved. Oxidative phosphorylation, theories of oxidative phosphorylation- Mitchell's chemiosmotic theory. $F_o F_1$- ATPase. Inhibitors of respiratory chain and oxidative phosphorylation, uncouplers. Formation of reactive oxygen species and their disposal through enzymatic reactions.
Ultra structure of chloroplast, Cyclic and non-cyclic photophosphorylation.

Unit- II : Carbohydrate and Lipid Metabolism   **30 hours**

Concept of anabolism and catabolism. Glycolytic pathway, energy yield. Fate of pyruvate- formation of lactate and ethanol, Pasteur effect. Citric acid cycle, regulation, energy yield, amphipathic role. Anaplerotic reactions. Glycogenolysis and glycogenesis. Pentose phosphate pathway. Gluconeogenesis. Photosytnthesis- Light and Dark reactions, Calvin cycle, C_4 Pathway.

Catabolism of fatty acids (β- oxidation) with even and odd number of carbon atoms, Ketogenesis, *de novo* synthesis of fatty acids, elongation of fatty acids in mitochondria and microsomes, Biosynthesis and degradation of triacylglycerol and lecithin. Biosynthesis of cholesterol.

Unit-III : Metabolism of Nitrogen Compounds   **30 hours**

General reactions of amino acid metabolism- transamination, decarboxylation and deamination, Urea cycle and regulation, Catabolism of carbon skeleton of amino acids- glycogenic and ketogenic amino acids. Metabolism of glycine, serine, aspartic acid, methionine, phenylalanine and leucine. Biosynthesis of creatine. Inborn errors of aromatic and branched chain amino acid metabolism.

Biosynthesis and regulation of purine and pyrimidine nucleotides, *de novo* and salvage pathways. Catabolism of purines and pyrimidines. Biosynthesis of deoxyribonucleotides- ribonucleotide reductase and thymidylate synthase and their significance. Disorders of nucleotide metabolism- Gout, Lesch-Nyhan syndrome.

Biosynthesis and degradation of heme.

Unit-IV : Biochemical Techniques   **30 hours**

Methods of tissue homogenization: (Potter-Elvejham, mechnical blender, sonicator and enzymatic).

Principle and applications of centrifugation techniques- differential, density gradient. Ultra-centrifugation- preparative and analytical..
Principle and applications of chromatographic techniques- paper, thin layer, gel filtration, ion- exchange and affinity chromatography. Elementary treatment of an enzyme purification.

Electrophoresis- principles and applications of paper, polyacrylamide (native and SDS) and agarose gel electrophoresis.

Colorimetry and Spectrophotometry- Laws of light absorption- Beer-Lambert law. UV and visible absorption spectra, molar extinction coefficient, biochemical applications of spectrophotometer. Principle of fluorimetry.

Tracer techniques: Radio isotopes, units of radio activity, half life, β and γ- emitters, use of radioactive isotopes in biology.

2nd Year Practical – Paper-II: Quantitative Analysis and Biochemical Techniques

90 Hrs (3hrs/week)

List of Experiments:

1. Estimation of amino acid by ninhydrin method.
2. Estimation of protein by Biuret method.
3. Estimation of protein by Lowry method.
4. Estimation of glucose by DNS method.
5. Estimation of glucose by Benedict's titrimetric method.
6. Estimation of total carbohydrates by anthrone method.
7. Isolation of egg albumin from egg white.
8. Isolation of cholesterol from egg yolk.
9. Isolation of starch from potatoes.
10. Isolation of casein from milk.
11. Separation of amino acids by paper chromatography.
12. Determination of exchange capacity of resin by titrimetry.
13. Separation of serum proteins by paper electrophoresis.
14. Separation of plant pigments by TLC.

Second Year BIOTECHNOLOGY

Paper II – Biological Chemistry and Microbiology
120 hrs (4hrs/week)

UNIT- I   Biomolecules   35 hours

1.1 **Carbohydrates :** Importance, classification and properties

1.2 Structure, configuration and biochemical importance of monosaccharides (glucose and fructose)

1.3 Dissacharides – Structures and biochemical importance of sucrose and trehalose Physiologically important glycosides (streptomycin, cardiac glycosides, ouabain)

1.4 Structure and function of homo polysaccharides – starch, inulin, cellulose and glycogen

Structure and function of heteropolysaccharides – Hyaluronic acid

1.5 **Proteins :** Classification, structure and properties amino acids

1.6 Peptide bond – Synthesis and characters

             1.7 Primary, secondary, tertiary and quaternary structures of proteins

1.8 Lipids : Fatty acids : Saturated and unsaturated

1.9 Triacylglycerols, Spingolipids, Sterols

Phospholipids (phosphatidic acid, phosphatidylcholine)

1.10   **Enzymes :** Classification and nomenclature of enzymes
            Kinetics of enzyme catalyzed reactions

1.11 Factors influencing enzymatic reactions
(a) pH (b) Temperature (c) Substrate concentration (d) Enzyme concentration

1.12 Enzyme Inhibition – Competitive and non-competitive

Unit II   **Intermediary Metabolism**   **30 hours**

2.1 Glycolysis

2.2 Citric acid cycle

2.3 Gluconeogenesis and its significance

2.4 Mitochondrial electron transport
Chemiosmotic theory of ATP synthesis

2.5 β-Oxidation of fatty acid

2.6 Deamination, decarboxylation and transamination reactions of amino acids

2.7 Catabolism of amino acids – phenyl alanine and tyrosine (Phenylketonuria and albinism)

2.8 Photosynthesis – Light reaction and photophosphorylation

2.9 Carbon Assimilation

Unit III   Fundamentals of Microbiology   25 hours

3.1 Outlines of classification of microorganisms

3.2 Structure and general characters of Viruses, Bacteria, Fungi and Micro Algae (one example from each group)

3.3   Disease causing pathogens and their symptoms (examples; Typhoid, HIV only)
3.4   Isolation, identification and preservation of microorganisms (Bacteria)
3.5   Identification methods of Fungi and useful Micro Algae
3.6   Methods of sterilization
3.7   Bacterial reproduction and growth kinetics (Batch and continuous cultures)
3.8   Pure cultures and cultural characteristics

UNIT – IV   Principles and Applications of Biophysical Techniques   30 hours

4.1   Microscopy – Light, Inverted, Fluorescent and Electron microscopy
4.2   Colorimetry – Beer – Lambert's Law
4.3   UV-VIS Spectrophotometry
4.4   Chromatography
        (a) Paper (b) Thin Layer (c) Ion-exchange (d) Gel-filtration
4.5   Electrophoresis – Native gels and SDS-PAGE, Agarose
4.6   Centrifugation and filtration – Basic Principles
4.7   Dialysis and lyopholization
4.8   Radio isotopes and their use in biology

Second Year BIOTECHNOLOGY

Practicals Paper – II

90 hrs
(3 hrs/week)

1. Preparation of Normal, Molar and Molal solutions
2. Preparation of Buffers (Acidic, Neutral and Alkaline Buffers)
3. Qualitative tests of sugars, amino acids and lipids
4. Estimations of protein by Biuret method
5. Estimation of total sugars by anthrone method
6. Separation of amino acids by paper chromatography
7. Electrophoretic separation of proteins (SDS-PAGE)
8. Technique of Micrometry (Stage and ocular)
9. Enzyme assay – Catalase or Invertase (or any other enzyme)
10. Preparation of routine microbiological media.
11. Isolation of common non-pathogenic bacteria
12. Staining and identification of bacteria – *E.coli*, *Pseudomonas*, *Bacillus* and *Staphylococcus*

Recommended Books

1. Biochemistry   - By Dr. U. Satyanarayana, U. Chakrapani
2. Biochemistry   - By J.L. Jain
3. Biochemistry   - By Conn and Stumpf
4. Biochemistry   - By Lehninger
5. Textbook of Medical Biochemistry- By S. Ramakrishnan, R. Rajan, and K.G. Prasannan (Orient Longman)
6. Biochemistry   - By Stryer
7. Biochemistry   - By Voet and Voet
8. Biochemistry (Jaypee)   - By Vasudevan
9. Biochemistry   - By David Rawn
10. General Biochemistry   - By J.H. Well
11. Biochemistry   - By K. Trehan
12. Biochemical Methods   - By S. Sadasivam and A. Manickam
12. An introduction to Practical Biochemistry   - By T. Plummer
13. Experimental Biochemistry - A Student Companion - By   V. Deshpande and B. Sasidhar
14. Practical Biochemistry – By Upadhayay, Wilson and Wilson, Wilson & Walker
15. Biochemistry   – Viva Series
16. Text Book of Microbiology - By Ananthanarayan and Paniker
17. Microbiology   - By Cappuccino (Pearson Education)
18. Microbiology   - By Tortora (Pearson Education)
19. Microbiology   - B.J. Pelczar, E.S.N. Cfan and N.R. Kreig, McGraw Hill Publ.
20. General Microbiology   – By Stanier, R.Y, J.L. Ingrahm, M.L. Wheel is & P.R. Painter
21. General Microbiology   – By Powar (Vol. I and Vol. II).
22. Practical Microbiology   - By Aneja.

Second Year CHEMISTRY SYLLABUS
Paper –II

UNIT – I (Inorganic Chemistry – II)

I. **Chemistry of d-block elements:** Stability of various oxidation states and e.m.f. Comparative treatment of second and third transition series with their 3d analogues. Study of Ti, Cr and Cu traids in respect of electronic configuration and reactivity of different oxidation states.

7 h

II. **Chemistry of f-lock elements:** Spectral properties and separation of lanthanides by ion exchange and solvent extraction methods. Chemistry of actinides – electronic configuration, oxidation states, actinide contraction, position of actinides in the periodic table, comparison with lanthanides in terms of magnetic properties, spectral properties and complex formation.

7 h

III. **Theories of bonding in metals:** Valence bond theory, Explanation of metallic properties and its limitations, Free electron theory, thermal and electrical conductivity of metals, limitations, Band theory, formation of bands, explanation of conductors, semiconductors and insulators.

6 h

IV. **Metal carbonyls and related compounds** – EAN rule, classification of metal carbonyls, structures and shapes of metal carbonyls of V, Cr, Mn, Fe, Co and Ni. Metal nitrosyls and metallocenes (only ferrocene).

7 h

UNIT-II (Organic Chemistry – II)

1. **Halogen compounds:**Nucleophilic aliphatic substitution reaction-classification into S_N1 and S_N2. Energy profile diagram of S_N1 and S_N2 reactions. Stereochemistry of S_N2 (Walden Inversion) S_N1

(Racemisation). Explanation of both by taking the example of optically active alkyl halide – 2bromobutane. Ease of hydrolysis – comparision of alkyl, benzyl, alkyl, vinyl and aryl halides. Nature of nucleophil, Nature of leaving group, Nature of solvent, SNi, Neighbouring group participataion. **4 h**

2. Hydroxy compounds   5 h

Alcohols: Preparation with hydroboration reaction, Grignard synthesis of alcohols.
Phenols: Preparation i) from diazonium salt, ii) from aryl sulphonates, iii) from cumene with mechanisom.

Chemical properties:
        a.   Acidic nature of phenols,
        b.   Formation of alkoxides/phenoxides and their reaction with RX,
        c.   Esterification by acids (mechanism),
        d.   Dehydration of alcohols.
        e.   Special reaction of phenols with mechanism;
      Bromination, Kolb-Schmidt reaction, Riemer-

Polyhydroxy compounds: Pinacol-Pinacolone rearrangement.

3. Carbonyl compounds   8 h
Synthesis of aldehydes from acid chlorides, synthesis of ketones from nitriles and from carboxylic acids.
Physical properties: absence of hydrogen bonding, keto-enol tautomerism, reactivity of carbonyl group in aldehydes and ketones.
Nucleophilic addition reaction with a) $NaHSO_3$, b) HCN, c) RMgX, d) 2, 4 DNP with mechanism.
Halogenation using PCl_5 with mechanism.

Base catalysed reactions with mechanism:
a) Aldol, b) Cannizzaro reaction, c) Perkin reaction, d) Benzoin condensation, e) Haloform reaction, f) Knoevenagel reaction.

Oxidation of aldehydes: Baeyer-Villiger oxidation of ketones with mechanism.

Reduction: Wolf - Kishner reduction, MPV reduction, reduction with $LiAlH_4$ and $NaBH_4$ (all mechanisms.)

Analysis of aldehydes and ketones with a) 2,4-DNT test, b) Tollen's test, c) Fehling text, d) Schiff test, e) Haloform test (with equation).

4. Carboxylic acids and derivatives: 5 h.

Methods of preparation by a) hydrolysis of nitriles, amides and esters. b) carbonation of Grignard reagents.

Special methods of preparation of aromatic acids by a) oxidation of side chain. b) hydrolysis by benzotrichlorides. c) Kolbe reaction.

Physical properties: Hydrogen bonding, dimeric association, acidity-strength of acids with examples of trimethyl acetic acid and trichloroacetic acid. Relative differences in the acidities of aromatic and aliphatic acids.

Chemical properties: Reactions involving H, OH and COOH groups-salt formation, anhydride formation, acid chloride formation, amide formation and esterification (mechanism).Degradation of carboxylic acids by Huns-Diecker reaction, decarboxylation by Schimdt reaction, Arndt-Eistert synthesis, halogenation by Hell-Volhard- Zelinsky reaction.

Derivatives of carboxylic acids: Reaction of acid chlorides, acid anhydrides, acid amides, esters (mechanism of the hydrolysis of esters by acids and bases).

5. Active methylene compounds   4 h

Acetoacetic esters: Preparation by Claisen condensation, keto-enol tautomerism. Acid hydrolysis and ketonic hydrolysis.
Preparation of a) monocarboxylic acids. b) dicarboxylic acids.
Reaction with urea
Malonic ester: Preparation from acetic acid.

Synthetic applications: Preparation of
   a) monocarboxylic acids (propionic acid and n-butyric acid).
   b) dicarboxylic acids (succinic acid and adipic acid).

   c) α,ß-unsaturated carboxylic acids (crotonic acid).
Reaction with urea.

6. Exercises in interconversion: Halogen derivatives to hydroxyl compounds, carboxylic acids and its derivatives**.**   **2 h**

Note: All reactions in the above chapters are to be explained withmechanisms.

Unit - III (Physical chemistry – II)

1.   Phase rule: **5 h**

Concept of phase, components, degree of freedom. Derivation of Gibbs phase rule. Phase equilibrium of one component – water system. Phase equilibrium of two-component system, solid-liquid equilibrium. Simple eutectic diagram of   Pb-Ag system, desilverisation of lead. Solid solutions- compound with congruent melting point- (Mg-Zn) system, compound with incongruent melting point – NaCl- water system. Freezing mixtures.

2. Catalysis: **12h**

Homogeneous and Heterogeneous catalysis, comparision with examples. Kinetics of specific acid catalyzed reactions, inversion of cane sugar. Kinetics of specific base catalyzed rreactions, base catalyzed conversion of acetone to diacetone alcohol. Acid and base catalyzed reactions-

hydrolysis of esters, mutarotation of glucose. Catalytic activity at surfaces. Mechanisms of heterogeneous catalysis. Langmuir-Hinshelwood mechanism.

Enzyme catalysis: Classification, characteristics of enzyme catalysis. Kinetics of enzyme catalyzed reactions-Michaelis Menton law, significance of Michaelis constant (Km) and maximum velocity (Vmax). Factors effecting enzyme catalysis-effect of tempetature, pH, concentration and inhibitor. Catalytic efficiency. Mechanism of oxidation of ethanol by alcohol dehydrogenase.

3.   Electrochemistry   14 h

Debye-Huckel-Onsagar's equation for strong electrolytes (elementary treatment only). Definition of transport number, determination by Hittorf's method. Application of conductivity measurements-determination of dissociation constant (K_a) of an acid, determination of solubility product of sparingly soluble salt, conductometric titrations. Types of reversible electrodes- the gas electrode, metal-metal ion, metal-insoluble salt and redox electrodes. Electrode reactions. Calculations of thermodynamic quantities of cell reactions (G, H and K). Determination of pH using quinhydrone electrode, Solubility product of AgCl. Potentiometric titrations.

Unit IV (General chemistry-II)

1. Molecular symmetry   5h

Concept of symmetry in chemistry-symmetry operations, symmetry elements. Rotational axis of symmetry and types of rotational axes. Planes of symmetry and types of planes. Improper rotational axis of symmetry. Inversion centre. Identity element. The symmetry operations of a molecule form a group. Flow chart for the identification of molecular point group.

2. Theory of quantitative analysis   8 hrs

a) **Principles of volumetric analysis:** Theories of acid-base, redox, complexometric, iodometric and precipitation titrations, choice of indicators for these titrations.

b) **Principles of gravimetric analysis:** Precipitation, coagulation, peptization, coprecipitation, post precipitation, digestion, filtration and washing of precipitate, drying and ignition, precipitation from homogenous solutions, requirements of gravimetric analysis.

3. Evaluation of analytical data   4 h

Theory of errors, idea of significant figures and its importance, accuracy – methods of expressing accuracy, error analysis and minimization of errors, precision – methods of expressing precision, standard deviation and confidence limit.

4. Introductory treatment to:
a) Pericyclic Reactions   5 h

Concerted reactions, Molecular orbitals, Symmetry properties HOMO, LUMO, Thermal and photochemical pericyclic reactions. Types of pericyclic reactions – electrocyclic, cycloaddition and sigmatropic reactions – one example each.

b) Synthetic strategies   4 h

Terminology – Disconnection (dix), Symbol (   ), synthon, synthetic equivalent (SE), Functional group interconversion (FGI), Linear, Convergent and Combinatorial syntheses, Target molecule (TM). Retrosynthesis of the following molecules

1) Acetophenone
2) Cyclohexene
3) Phenylethylbromide

Second Year CHEMISTRY SYLLABUS

LABORATORY COURSE – II

Practical Paper – II (Inorganic Chemistry)

I. Titrimetric analysis:

1) Determination of carbonate and bicarbonate in a mixture
2) Determination of Fe(II) using $K_2Cr_2O_7$
3) Determination of Fe(II) using $KMnO_4$ with oxalic acid as primary standard.
4) Determination of Cu(II) using $Na_2S_2O_3$ with $K_2Cr_2O_7$ as primary standard
5) Determination of Zinc using EDTA
6) Determination of Magnesium using EDTA
7) Determination of hardness of water
8) Determination of Zinc by ferrocy amide

II. Gravimetric analysis (any three of the following)

1) Determination of barium as barium sulphate
2) Determination of sulphate as barium sulphate
3) Determination of lead as lead chromate
4) Determination of nickel as Ni-DMG complex
5) Determination of magnesium as magnesium pyrophosphate.

B.Sc.(Computer Science): II Year: Theory Paper-2

Object Oriented Programming with Java and Data Structures.

120 hrs (4hrs/week)

Detailed Syllabus :

Unit – 1: Java Fundamentals   24h

Fundamentals of Object Oriented programming : *Object Oriented paradigm – Basic concepts of Object Oriented Programming – Benefits of OOP – Applications of OOP.*
Java Evolution : Java Features – How Java differs from C and C++ - Java and Internet – Java and World Wide Web – Web Browsers – Hardware and Software Requirements – Java Environment.
Overview of Java Language: Simple Java Program – Java Program Structure – Java Tokens- Java Statements – Implementing a Java Program – Java Virtual Machine – Command Line Arguments.

Constants, Variables and Data types: Constants – Variables – Data types – Declaration of Variables- Giving Values to variables- Scope of Variables-Symbolic Constants-Type Casting.

(Chapters : 1,2,3,4)

Unit – 2:   Oops Concepts in Java   24h

Operators and Expressions: Arithmetic Operators – Relational Operators- Logical Operators – Assignment Operators – Increment and Decrement Operators – Conditional Operators – Bitwise Operators – Special Operators – Arithmetic Expressions – Evaluation of Expressions – Precedence of Arithmetic Operators – Operator Precedence and Associativity.

Decision Making and Branching: Decision Making with If statement – Simple If Statement-If else Statement-Nesting If Else Statement- the ElseIf Ladder-The switch Statement – The ?: operator.

Decision Making and Looping: The while statement – The do statement – The for statement – Jumps in Loops.

Class , Objects and Methods: Defining a Class – Fields Declaration – Methods Declaration – Creating Objects – Accessing class members – Constructors – Methods Overloading – Static Members – Nesting of Methods – Inheritance – Overriding Methods – Final Variables and Methods – Final Classes – Abstract Methods and Classes – Visibility Control.

(Chapters : 5,6,7,8)

Unit – 3: Packages and Interfaces in Java   24h

Arrays, Strings and Vectors: One-dimensional Arrays-creating an Array – Two dimensional Arrays – Strings – Vectors – Wrapper Classes – Enumerated Types.

Interfaces: Multiple Inheritance : Defining Interfaces – Extending Interfaces – Implementing Interfaces – Accessing Interface Variables.

Packages: Java API Packages – Using system Packages – Naming Conventions – Creating Packages – Accessing a Package – Using a Package – Adding a Class to a Package – Hiding Classes – Static Import.

(CHAPTERS : 9,10,11)

UNIT – 4

Multithreaded Programming: Creating Threads – Extending the Thread Class – Stopping and Blocking a Thread – Life Cycle of a Thread – Using Thread Methods – Thread Exceptions – Thread Priority – Synchronization.
Managing Errors and Exceptions: Types of Errors – Exceptions – Syntax of Exception Handling Code – Multiple Catch Statements – Using Finally Statement – Throwing our own Exceptions – Using Exceptions for debugging.

Applet Programming: How Applets differ from Applications – Preparing to write Applets – Building Applet Code – Applet Life Cycle – Creating an executable Applet – Designing a WebPage – Applet Tag – Adding Applet to HTML file – Running the Applet – More about Applet Tag – Passing parameters to Applets – Aligning the display – More about HTML tags – Displaying Numerical Values – Getting Input from the user.
(Chapters : 12, 13, 14)

Unit – 5 Data Structures   24h

Sorting: **Bubble Sort – Selection Sort – Insertion Sort – Quick Sort-Stacks and Queues: Stacks - Queues – Circular Queue - Deques - Priority Queue –**

Parsing Arithmetic Expressions – Linked List: Simple Linked List – Finding and Deleting Specified Links – Double Ended Lists – Abstract Data types – Sorted Lists – Doubly Linked Lists – Advanced Sorting : Quick Sort - Binary Trees : Tree Terminology – Finding a Node – Inserting a Node – Traversing the Tree – Finding Maximum and Minimum values – Deleting a Node – Efficiency of Binary Trees – Trees Represented as Arrays – Graphs: Introduction to Graphs – Searches – Minimum Spanning Tree – Topological Sorting with Directed Graphs – Connectivity in Directed Graphs.

(Chapters : 3,4,5,7 (Only Quick Sort), 8,13)

Prescribed books   :

1. E.Balaguruswamy, Programming with Java, A primer, 3e, TATA McGraw-Hill Company (2008).(Chapters : 1 to 14)

2. Robert Lafore, Data Structures & Algorithms in Java, Second Edition, Pearson Education(2008)

   (Chapters: 3,4,5,7 (Only Quick Sort),8,13)

Reference Books   :

1. John R. Hubbard, Programming with Java, Second Edition, Schaum's outline Series, Tata McGrawhill (2007).

2. Timothy Budd, Understanding Object Oriented Programming with Java, Pearson Education (2007).

3. Adam Drozdek, Data Structures and Algorithms in Java, Second Edition, Cengage Learning(2008).

4. John R. Hubbard, Anita Hurry, Data Structures with Java, Pearson Education (2008).

5. Jana, Java and Object Oriented Programming Paradigm, PHI (2007).

6. Deitel & Deitel. Java TM: How to Program, 7th Edition, PHI (2008).

7. Samatha, Classic Data Structures, PHI (2005).

B.Sc(Computer Science): II Year: Lab-2

Java and Data structures Lab

90hrs (3hrs/week)

Java Lab Cycle

1. Write a java program to determine the sum of the following harmonic series for a given value of 'n'.
   1+1/2+1/3+. . . _1/n

2. Write a program to perform the following operations on strings through interactive input.
   a) Sort given strings in alphabetical order.
   b) Check whether one string is sub string of another string or not.
   c) Convert the strings to uppercase.

3. Write a program to simulate on-line shopping.

4. Write a program to identify a duplicate value in a vector.

5. Create two threads such that one of the thread print even no's and another prints odd no's up to a given range.

6. Define an exception called "Marks Out Of Bound" Exception, that is thrown if the entered marks are greater than 100.

7. Write a JAVA program to shuffle the list elements using all the possible permutations.

8. Create a package called "Arithmetic" that contains methods to deal with all arithmetic operations. Also, write a program to use the package.

9. Write an Applet program to design a simple calculator.

10. Write a program to read a text and count all the occurrences of a given word. Also, display their positions.

11. Write an applet illustrating sequence of events in an applet.

12. Illustrate the method overriding in JAVA.

13. Write a program to fill elements into a list. Also, copy them in reverse order into another list.

14. Write an interactive program to accept name of a person and validate it. If the name contains any numeric value throw an exception "InvalidName".

15. Write an applet program to insert the text at the specified position.

16. Prompt for the cost price and selling price of an article and display the profit (or) loss percentage.

17. Create an anonymous array in JAVA.

18. Create a font animation application that changes the colors of text as and when prompted.

19. Write an interactive program to wish the user at different hours of the day.

20. Simulate the library information system i.e. maintain the list of books and borrower's details.

Data Structures Lab Cycle

21. Program to create , insert, delete and display operations on single linked list ?
22. Program to create , insert, delete and display operations on double linked list ?
23. Program to create , insert, delete and display operations on circular single linked list ?
24. Program to split a single linked list
25. Program to reverse a single linked list
26. Program to implement Insertion Sort.
27. Program to implement PUSH and POP operations on Stack using array method.
28. Program to implement PUSH and POP operations on Stack using Linked list method.
29. Program to implement insert and delete operations on Queue using array method.
30. Program to implement insert and delete operations on Queue using linked list method.
31. Program to implement insert and delete operations on Priority Queue?
32. Program to implement insert and delete operations on Double Ended Queue?
33. Program to evaluate postfix expression by using Stack?
34. Program to construct Binary Search Tree and implement tree traversing Techniques.
35. Program to delete a leaf node from binary search tree.
36. Program to implement Selection Sort.
37. Program to implement Bubble Sort.
38. Program to implement Operations on Circular Queue.
39. Program to implement Quick Sort.
40. Program to Find number of Leaf nodes and Non-Leaf nodes in a Binary Search Tree.
41. Program for Insertion Sort.

Model Question Paper

B.Sc.(Computer Science): II Year: Theory Paper-2

OBJECT ORIENTED PROGRAMMING WITH JAVA AND DATA STRUCTURES

Time: 3Hrs   **Max. Marks: 100**
_____

Section – A

Answer ALL Questions   10 * 2 = 20

  1. a) Difference between applet and Standalone applications?
     b) Is a Java Program compiled or Interpreted? Justify?

     c) Difference between String and StringBuffer.

     d) What are the components of Java Development kit?

     e) Write rules of thumb?

     g) How can you compile a package?

     h) Write attributes of applet tag.

     i) Define Stack.

     j) Define Completed Graph.

Section – B

Answer ALL Questions   5 * 16 = 80

  2. a) Explain the merits and demerits of Object Oriented
        Programming.
     b) How is java associated with World Wide Web.

                         (or)

     c) Explain about the Structure of Java Program.

     d) What are different data types in Java.

  3. a) Discuss Type Conversion in Expressions.
     b) Explain Control Structures in Java.

                   (or)

     c) What is the difference between Overloading and Overriding?

     d) Explain Visibility Access in Java.

4. a) Write steps to create and access a package ?

   b) Explain difference between vectors and arrays.

                    (or)

   c) How multiple inheritance achieved in Java?

   d) What are wrapper classes?

5. a) Write a Life Cycle of a thread with a neat diagram ?
    b) Write syntax for handling exceptions in Java ?

                              (or)

    c) How can you create an executable Applet?

    d) How can you give priorities to Threads ?

6. a) Define linked list. What are the advantages of linked
       lists.
    b) Explain about preorder traversal of a tree with example.

                              (or)

    c) Explain priority queue.

    d) Explain Quick Sort with example.

                    * * * * *

B.Sc II Year- Electronics Syllabus

PAPER–II   Analog Circuits and Communications (120 hours)

UNIT- I (30 hours)

Power Supplies: Rectifiers– Halfwave, fullwave and bridge rectifiers- Efficiency- Ripple factor- Regulation – Harmonic components in rectified output – Types of filters- Choke input (inductor) filter- Shunt capacitor filter- L section and π section filters – Block diagram of regulated power supply - Series and shunt regulated power supplies – Three terminal regulators (78XX and 79XX) LM317 and LM337 – Principle and working of switch mode power supply (SMPS).

UNIT-II (30 hours)

RC Coupled Amplifier: Analysis and frequency response of single stage RC coupled CE amplifier.

Feedback: Positive and negative feedback- Effect of feedback on gain, band width, noise, input and output impedances –Positive feed back – Criteria for oscillations.

Operational Amplifiers: Differential amplifier- Block diagram of Op-Amp- Ideal characteristics of Op-Amp- Op-Amp parameters- Input resistance- Output resistance- Common mode rejection ratio (CMMR)- Slew rate- Offset voltages – Input bias current- Basic Op-Amp circuits- Inverting Op-Amp- Virtual ground- Non-inverting Op-Amp- Frequency response of Op-Amp. Interpretation of Op-Amp data sheets.

UNIT-III (30 hours)

Applications of Op-Amps: Summing amplifier- subtractor- Voltage follower- Integrator- Differentiator - Comparator- Logarithmic amplifier- Sine wave [Wein Bridge] and square wave [Astable] generators- Triangular wave generator- Monostable multivibrator- Solving simple second order differential equation. Basic Op-Amp series regulator and shunt regulator.

UNIT-IV (30 hours)

Communications: Need for modulation-Types of modulation- Amplitude, Frequency and Phase modulation.
Amplitude modulation-side bands- modulation index- square law diode modulator- Demodulation- diode detector.
Frequency modulation working of simple frequency modulator- Ratio detection of FM waves- Advantages of frequency modulation.
AM and FM radio receivers [block diagram approach].

(**NOTE:** *Solving related problems in all the Units*)

Reference Books:

1. Electronic Devices and Circuits-Millman and Halkias- Tata Mc Graw Hill (TMH)
2. Microelectronics- J. Millman and A. Grabel - TMH
3. Operational Amplifiers and Linear Integrated Circuits- Ramakant A. Gayakwad- Prentice Hall of India (PHI).
4. Operational Amplifiers and Linear Integrated Circuits- K. Lalkishore - Pearson Education
5. Analog Electronics- L.K. Maheswari and M.M.S. Anand- PHI
6. Applied Electronics- R.S.Sedha- S Chand &Co
7. Principles of Electronics- V.K. Mehta and Rohit Mehta - S Chand &Co
8. A first Course in Electronics – A.A.Khan & K.K. Dey - PHI
9. Electronic Communication Systems - George Kennedy & Bernard Davis - TMH.
10. Electronic Communication -D. Roddy & J. Coolen- PHI
11. Principles of Electronic Communication Systems –Louis E. Frenzel -TMH

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B.Sc II Year - Electronics
PRACTICALS PAPER-II (90 hours - 30 Sessions)
Analog Circuits and Communications Lab

1. D.C Power supply and filters.

2. Three terminal regulators – 7805, 7905, 317, 337.

3. Single stage RC – coupled amplifier – frequency response.

4. OP-Amp (IC 741) as

> a) Inverting amplifier.
> b) Non- inverting amplifier.
> c) Comparator.

5. OP-Amp (IC 741) as

> a) Integrator.
>
> b) Differentiator.

6. OP-Amp as Wien bridge oscillator.

7. Astable multivibrator – Determination of frequency (using IC741 Op-Amp).

8. Monostable multivibrator–Determination of pulse width (using IC 741Op Amp).

9. Voltage regulator using IC- 7805and IC-7905.

10. AM modulator and Demodulator.

11. FM modulator.

12. Simulation experiments using appropriate electronic circuit simulation software.

> a) RC coupled amplifier.
> b) Wien bridge oscillator.
> c) Astable multivibrator.
> d) Amplitude Modulation.
> e) Frequency Modulation.

Note: Student has to perform the following experiments
> *(1) Any 7 experiments among the experiment numbers1to10.*
> *(2) Experiment Number 12 (a,b,c,d and e) is compulsory*

STUDENTS ARE ENCOURAGED TO DO A SMALL PROJECT WORK DURING SECOND YEAR

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Second Year MATHEMATICS Syllabus

MODEL CURRICULUM - B.A/B.Sc

Mathematics: Paper - II

Abstract Algebra & Real Analysis

120 hrs (4hrs/week)

UNIT - I: (30 hours)

GROUPS :

Binary operations- Definitions and properties, Groups--Definition and elementary properties, Finite groups and group composition tables, Subgroups and cyclic subgroups. Permutations--Functions and permutations ,groups of permutations, cycles and cyclic notation, even and odd permutations, The alternating groups. Cyclic groups - Elementary properties ,The classification of cyclic groups , sub groups of finite cyclic groups. Isomorphism - Definition and elementary properties, Cayley's theorem, Groups of cosets, Applications, Normal subgroups - Factor groups , Criteria for the existence of a coset group, Inner automorphisms and normal subgroups, factor groups and simple groups, Homomorphism-Definition and elementary properties, The fundamental theorem of homomorphisms, applications.

UNIT - II: (30 hours)

RINGS:

 Definition and basic properties, Fields, Integral domains, divisors of zero and Cancellation laws, Integral domains, The characteristic of a ring, some non – commutative rings, Examples, Matrices over a field, The real quaternions ,Homomorphism of Rings - Definition and elementary properties, Maximal and Prime ideals, Prime fields. Rings of Polynomials – Polynomials in an indeterminate form, The evaluation of homomorphism.

Prescribed text book:
Scope and treatment as in The first course in Abstract Algebra by John B Fraleigh , Narosa Publishing house , chapter 1 to 7,11 to 13,23,24.1 to 24.3 , 25.1,25.4 and chapter 29 to 31.

Reference Books:
1.Topics in Algebra , I.N.Herstein,Wiley Eastern.
2.Contemporary Abstract algebra by Joseph A Gallian , Narosa Publishing House

UNIT – III: (35 hours)

REAL NUMBERS:

 The Completeness Properties of R, Applications of the Supremum Property.
                   (No question is to be set from this portion)
Sequences and Series - Sequences and their limits, limit theorems, Monotonic Sequences, Sub-sequences   and   the   Bolzano-Weirstras**s**   theorem,The   Cauchy's   Criterion

,Properly divergent sequences, Introduction to series, Absolute convergence, test for absolute convergence, test for non-absolute convergence.

Continuous Functions--continuous functions, combinations of continuous functions, continuous functions on intervals, Uniform continuity.

UNIT – IV :   (25 hours)

DIFFERENTIATION AND INTEGRATION:

The derivative, The mean value theorems, L'Hospital Rule, Taylor's Theorem.

Riemann integration - Riemann integral , Riemann integrable functions, Fundamental theorem.

Prescribed text Book:

Scope as in "**Introduction to Real analysis",** by Robert G. Bartle and Donald R. Sherbert , John Wiley ,3rd edition. Chapter 3, (3.1 to 3.7), Chapter 5 (5.1 to 5.4), Chapter 6 (6.1 to 6.4), Chapter 7 (7.1 to 7.3), Chapter 9 (9.1,9.2 and 9.3).

Reference Books:

1. A course of Mathematical Analysis, Shanthi Narayan and P.K.Mittal, S.Chand & Company

2. Mathematical analysis by S.C.Malik and Savita Arora, Wiley Eastern Ltd.

Second Year MICROBIOLOGY Syllabus

Paper II: MICROBIAL PHYSIOLOGY AND GENETICS

UNIT – I   Nutrition, Growth and Enzymes   30 Hrs

Microbial nutrition - nutritional requirements and uptake of nutrients by cells. Nutritional groups of microorganisms - autotrophs, heterotrophs, mixotrophs, methylotrophs.

Growth media - synthetic, nonsynthetic, selective, enrichment and differential media. Microbial growth - different phases of growth in batch cultures.

Factors influencing microbial growth.

Synchronous, continuous, biphasic growth.

Methods for measuring microbial growth – Direct microscopy, viable count estimates, turbiodometry, biomass.

Enzymes - properties and classification, enzyme unit.

Biocatalysis - induced fit, and lock and key model, coenzymes, cofactors,   factors affecting catalytic activity of enzymes.

Inhibition of enzyme activity - competitive, noncompetitive, uncompetitive   and allosteric.

UNIT – II   Intermediary Metabolism   30 Hrs

Aerobic respiration - Glycolysis, HMP pathway, ED pathway, TCA cycle,   electron transport, oxidative and substrate-level phosphorylation. Anaplerotic reactions. β-Oxidation of fatty acids.

Glyoxylate cycle. Anaerobic respiration (nitrate, sulphate respiration).

Fermentation - Common microbial fermentations with special reference to   alcohol and lactic acid fermentations.

Photosynthetic apparatus in prokaryotes. Outlines of oxygenic and   anoxygenic photosynthesis in bacteria.

UNIT – III   Microbial Genetics   30 Hrs

Fundamentals of genetics - Mendelian laws, alleles, crossing over, and   linkage. DNA and RNA as genetic materials.

Structure of DNA – Watson and Crick model.

Extrachromosomal genetic elements – Plasmids and transposons.

Replication of DNA – Semiconservative mechanism.

Outlines of DNA damage and repair mechanisms.

Mutations – spontaneous and induced, base pair changes, frame shifts,   deletions, inversions, tandem duplications, insertions.

Various physical and chemical mutagens.

Brief account on horizontal gene transfer among bacteria – transformation, transduction and conjugation.

UNIT – IV   Gene Expression and Recombinant DNA Technology   30 Hrs

Concept of gene – Muton, recon and cistron. One gene-one enzyme,   one gene-one polypeptide, one gene-one product hypotheses.

Types of RNA and their functions.

Outlines of RNA biosynthesis in prokaryotes.

Genetic code. Structure of ribosomes and a brief account of protein synthesis.

Types of genes – structural, constitutive, regulatory.

Operon concept. Regulation of gene expression in bacteria – *lac* operon.

Basic principles of genetic engineering - restriction endonucleases,   DNA polymerases and ligases, vectors.

Outlines of gene cloning methods.

Genomic and cDNA libraries.

General account on application of genetic engineering in industry,   agriculture and medicine.

TEXT AND REFERENCE BOOKS:

Gottschalk, G. (1986). **Bacterial Metabolism**, Springer-Verlag, New-York.

Caldwell, D.R. (1995). **Microbial Physiology and Metabolism**, W.C. Brown Publications, Iowa, USA.

Moat, A.G. and Foster, J.W. (1995). **Microbial Physiology**, John-Wiley, New York.

White, D. (1995). **The Physiology and Biochemistry of Prokaryotes**, Oxford University Press, New York.

Reddy, S.R. and Reddy, S.M. (2004). **Microbial Physiology**, Scientific Publishers, Jodhpur, India.

Reddy, S.M. and Reddy, S.R. (2005). **A Text Book of Microbiology Vol-II. Microbial Metabolism and Molecular Biology**. Himalaya Publishing House, Mumbai.

Lehninger, A.L., Nelson, D.L. and Cox, M.M. (1993). **Principles of Biochemistry**, 2nd Edition, CBS Publishers and Distributors, New Delhi.

Elliot, W.H. and Elliot, D.C. (2001). **Biochemistry and Molecular Biology**, 2nd Edition, Oxford University Press, U.S.A.

Verma, P.S. and Agarwal, V.K. (2004). **Cell Biology, Genetics, Molecular Biology, Evolution and Ecology.** S. Chand & Co. Ltd., New Delhi.

Freifelder, D. (1997). **Essentials of Molecular Biology**. Narosa Publishing House, New Delhi.

Crueger, W. and Crueger, A. (2000). **Biotechnology: A Text Book of Industrial Microbiology,** Prentice-Hall of India Pvt. Ltd., New Delhi.

Glick, B.P. and Pasternack, J. (1998). **Molecular Biotechnology**, ASM Press, Washington D.C., USA.

Freifelder, D. (1990). **Microbial Genetics**. Narosa Publishing House, New Delhi.

Strickberger, M.W. (1967). **Genetics**. Oxford & IBH, New Delhi.

Sinnot E.W., L.C. Dunn and T. Dobzhansky. (1958). **Principles of Genetics**. 5th Edition. McGraw Hill, New York.

Glazer, A.N. and Nikaido, H. (1995). **Microbial Biotechnology – Fundamentals of Applied Microbiology**, W.H. Freeman and company, New York.

Old, R.W. and Primrose, S.B. (1994) **Principles of Gene Manipulation**, Blackwell Science Publication, New York.

Smith, J.E. (1996). **Biotechnology**, Cambridge University Press.

Snyder, L. and Champness, W. (1997). **Molecular Genetics of Bacteria**. ASM press, Washington, D.C., USA.

Maloy, S.R., Cronan, J.E. and Freifelder, D. (1994). **Microbial Genetics**, Jones and Bartlett Publishers, London.

Lewin, B. (2000). **Genes VIII.** Oxford University Press, England

Turner, P.C., Mclennan, A.G., Bates, A.D. and White, M.R.H. (1998). **Instant Notes in Molecular Biology**, Viva Books Pvt., Ltd., New Delhi.

Twynan, R.M. (2003). **Advanced Molecular Biology**. Viva books Pvt. Ltd. New Delhi.

Kannan, N. (2003). **Hand Book of Laboratory Culture Medias, Reagents, Stains and Buffers**. Panima Publishing Co., New Delhi.

Nicholl, D.S.T. (2004). **An Introduction to Genetic Engineering.** 2nd Edition. Cambridge University Press, London.

Ram Reddy, S., Venkateshwarlu, K. and Krishna Reddy, V. (2007) **A text Book of Molecular Biotechnology**. Himalaya Publishers, Hyderabad.

Second Year MICROBIOLOGY

LAB – II: MICROBIAL PHYSIOLOGY AND GENETICS   90 Hrs

1. Preparation of media for culturing autotrophic and heterotrophic microorganisms - Algal medium, mineral salts medium, nutrient agar medium, McConkey agar, and blood agar.
2. Enrichment culturing and isolation of phototrophs and chemoautotrophs.
3. Setting and observation of Winogradsky column.
4. Determination of viable count of bacteria.
5. Turbidometric measurement of bacterial growth.
6. Bacterial growth curve.
7. Factors affecting bacterial growth – pH, temperature, salts.
8. Qualitative analysis of sugars and amino acids.
9. Colorimetric estimation DNA by diphenylamine method.
10. Colorimetric estimation of proteins by Biuret/Lowry method
11. Paper chromatographic separation of sugars and amino acids
12. Starch hydrolysis, catalase test and sugar fermentation test.
13. Qualitative tests for sugars and amino acids.
14. Qualitative test and estimation of glucose.
15. Verification of Beer's law.
16. Problems related to DNA and RNA characteristics, Transcription and Translation.

REFERENCE BOOKS FOR LAB:

Wilson, K. and Walker, J. (1994). **Practical Biochemistry**. 4th Edition, Cambridge University Press, England.

Sawhney, S.K. and Singh, R. (2000). **Introductory Practical Biochemistry**, Narosa Publishing House, New Delhi.

Dubey, R.C. and Maheswari, D.K. (2002). **Practical Microbiology.** S. Chand & Co. Ltd., New Delhi.

Plummer, D.T. (1988). **An Introduction to Practical Biochemistry**. 3rd Edition, Tata Mc GrawHill, New Delhi.

Reddy, S.M. and Reddy, S.R. (1998). **Microbiology – Practical Manual**, 3rd Edition, Sri Padmavathi Publications, Hyderabad.

Jaya Babu (2006). **Practical Manual on Microbial Metabolisms and General Microbiology**. Kalyani Publishers, New Delhi.

Sashidhara Rao, B. and Deshpande, V. (2007). **Experimental Biochemistry: A student Companion**. I.K. International Pvt. Ltd.

Second Year PHYSICS Syllabus
Paper – II: Thermodynamics and Optics

120 hrs (4hrs/week)

Part A: Thermodynamics

Unit – I

1. **Kinetic theory of gases: (6)**

   Introduction – Deduction of Maxwell's law of distribution of molecular speeds, Experimental verification Toothed Wheel Experiment, Transport Phenomena – Viscosity of gases – thermal conductivity – diffusion of gases.

2. **Thermodynamics: (12)**

   Introduction – Reversible and irreversible processes – Carnot's engine and its efficiency – Carnot's theorem – Second law of thermodynamics, Kelvin's and Claussius statements – Thermodynamic scale of temperature – Entropy, physical significance – Change in entropy in reversible and irreversible processes – Entropy and disorder – Entropy of universe – Temperature- Entropy (T-S) diagram – Change of entropy of a perfect gas-change of entropy when ice changes into steam.

3. **Thermodynamic potentials and Maxwell's equations: (10)**

   Thermodynamic potentials – Derivation of Maxwell's thermodynamic relations – Clausius-Clayperon's equation – Derivation for ratio of specific heats – Derivation for difference of two specific heats for perfect gas. Joule Kelvin effect – expression for Joule Kelvin coefficient for perfect and Vanderwaal's gas.

Unit – II

4. **Low temperature Physics: (12)**

   Introduction – Joule Kelvin effect – liquefaction of gas using porous plug experiment. Joule expansion – Distinction between adiabatic and Joule Thomson expansion – Expression for Joule Thomson cooling – Liquefaction of helium, Kapitza's method – Adiabatic demagnetization – Production of low temperatures – Principle of refrigeration, vapour compression type. Working of refrigerator and Air conditioning machines. Effects of Chloro and Fluro Carbons on Ozone layer; applications of substances at low- temperature.

5. **Quantum theory of radiation: (12)**

   Black body-Ferry's black body – distribution of energy in the spectrum of Black body – Wein's displacement law, Wein's law, Rayleigh-Jean's law – Quantum

theory of radiation - Planck's law – deduction of Wein's law, Rayleigh-Jeans law, from Planck's law - Measurement of radiation – Types of pyrometers – Disappearing filament optical pyrometer – experimental determination – Angstrom pyroheliometer - determination of solar constant, effective temperature of sun.

6. Statistical Mechanics: (10)

Introduction to statistical mechanics, concept of ensembles, Phase space, Maxwell-Boltzmann's distribution law, Molecular energies in an ideal gas, Bose-Einstein Distribution law, Fermi-Dirac Distribution law, comparison of three distribution laws, Black Body Radiation, Rayleigh-Jean's formula, Planck's radiation law, Weins Displacement, Stefan's Boltzmann's law from Plancks formula. Application of Fermi-Dirac statistics to white dwarfs and Neutron stars.

PART – B

OPTICS

Unit III

7 The Matrix methods in paraxial optics: (8)

Introduction, the matrix method, effect of translation, effect of refraction, imaging by a spherical refracting surface. Imaging by a co-axial optical system. Unit planes. Nodal planes. A system of two thin lenses.

8 Aberrations: (6)

Introduction – Monochromatic aberrations, spherical aberration, methods of minimizing spherical aberration, coma, astigmatism and curvature of field, distortion. Chromatic aberration – the achromatic doublet – Removal of chromatic aberration of a separated doublet.

9 Interference: (15)

Principle of superposition – coherence – temporal coherence and spatial coherence – conditions for Interference of light

Interference by division of wave front: Fresnel's biprism – determination of wave length of light. Determination of thickness of a transparent material using Biprism – change of phase on reflection – Lloyd's mirror experiment.

Interference by division of amplitude: Oblique incidence of a plane wave on a thin film due to reflected and transmitted light (Cosine law) – Colours of thin films – Non reflecting films – interference by a plane parallel film illuminated by a point source – Interference by a film with two non-parallel reflecting surfaces (Wedge shaped film) – Determination of diameter of wire-Newton's rings in reflected light with and without contact between lens and glass plate, Newton's

rings in transmitted light (Haidinger Fringes) – Determination of wave length of monochromatic light – Michelson Interferometer – types of fringes – Determination of wavelength of monochromatic light, Difference in wavelength of sodium D_1, D_2 lines and thickness of a thin transparent plate.

Unit IV:

10 Diffraction: (10)

Introduction – Distinction between Fresnel and Fraunhoffer diffraction Fraunhoffer diffraction:- Diffraction due to single slit and circular aperture – Limit of resolution – Fraunhoffer diffraction due to double slit – Fraunhoffer diffraction pattern with N slits (diffraction grating)

Resolving Power of grating – Determination of wave length of light in normal and oblique incidence methods using diffraction grating.

Fresnel diffraction:-

Fresnel's half period zones – area of the half period zones –zone plate – Comparison of zone plate with convex lens – Phase reversal zone plate – diffraction at a straight edge – difference between interference and diffraction.

11 Polarization (10)

Polarized light : Methods of Polarization, Polarizatioin by reflection, refraction, Double refraction, selective absorption , scattering of light – Brewsters law – Malus law – Nicol prism polarizer and analyzer – Refraction of plane wave incident on negative and positive crystals (Huygen's explanation) – Quarter wave plate, Half wave plate – Babinet's compensator – Optical activity, analysis of light by Laurent's half shade polarimeter.

12 Laser, Fiber Optics and Holography: (9)

Lasers: Introduction – Spontaneous emission – Stimulated emission – Population inversion . Laser principle – Einstein coefficients – Types of Lasers – He-Ne laser – Ruby laser – Applications of lasers.

Fiber Optics : Introduction – Optical fibers – Types of optical fibers – Step and graded index fibers – Rays and modes in an optical fiber – Fiber material – Principles of fiber communication (qualitative treatment only) and advantages of fiber communication.

Holography: Basic Principle of Holography – Gabor hologram and its limitations, Holography applications.

NOTE: Problems should be solved at the end of every chapter of all units.

Textbooks

1. **Optics** by Ajoy Ghatak. *The McGraw-Hill companies*.
2. **Optics** by Subramaniyam and Brijlal. *S. Chand & Co.*
3. **Fundamentals of Physics**. Halliday/Resnick/Walker.*C. Wiley India Edition 2007*.
4. **Optics and Spectroscopy**. R. Murugeshan and Kiruthiga Siva Prasath. *S. Chand & Co.*
5. **Second Year Physics** – *Telugu Academy*.
6. **Modern Physics** by R. Murugeshan and Kiruthiga Siva Prasath (for statistical Mechanics) *S. Chand & Co.*

Reference Books

1. **Modern Physics** by G. Aruldhas and P. Rajagopal, *Eastern Economy Education*.
2. Berkeley Physics Course. Volume-5. **Statistical Physics** by F. Reif. *The McGraw-Hill Companies*.
3. **An Introduction to Thermal Physics** by Daniel V. Schroeder.*Pearson Education Low Price Edition*.
4. **Thermodynamics** by R.C. Srivastava, Subit K. Saha & Abhay K. *Jain Eastern Economy Edition*.
5. **Modern Engineering Physics** by A.S. Vasudeva. *S.Chand & Co. Publications*.
6. **Feyman's Lectures on Physics** Vol. 1,2,3 & 4. *Narosa Publications*.
7. **Fundamentals of Optics** by Jenkins A. Francis and White E. Harvey, *McGraw Hill Inc*.

SECOND YEAR PHYSICS PRACTICALS

90 hrs (3hrs/week)

(At least 12 Practicals are to be performed out of 16)

1. Co-efficient of thermal conductivity of a bad conductor by Lee's method.
2. Measurement of Stefan's constant.
3. Specific heat of a liquid by applying Newton's law of cooling correction.
4. Heating efficiency of electrical kettle with varying voltages.
5. Thickness of a wire-wedge method.
6. Determination of wavelength of light –Biprism.
7. Determination of Radius of curvature of a given convex lens- Newton's rings.
8. Resolving power of grating.
9. Study of optical rotation-polarimeter.
10. Dispersive power of a prism
11. Determination of wavelength of light using diffraction grating minimum deviation method.
12. Wavelength of light using diffraction grating – normal incidence method.
13. Resolving power of a telescope.
14. Refractive index of a liquid and glass (Boys Method).
15. Pulfrich refractometer – determination of refractive index of liquid.
16. Wavelength of Laser light using diffraction grating.

B .A/B.Sc. I I Year: Statistics Syllabus
(With Mathematics Combination)
(Examination at the end of II Year)
Paper - II: Statistical Methods and Inference

Max Marks. 100

120 Hrs (4 hrs per week)

1. Bivariate data, scattered diagram Correlation coefficient and it's properties. Computation of correlation coefficient for grouped data. Correlation ratio, Spearman's rank correlation coefficient and it's properties. Simple linear regression properties of regression coefficients, correlation verses regression. Principles of least squares, fitting of quadratic and power curves. Concepts of partial and multiple correlation coefficients (only for three variables). **20 L , 1Q.**

2. Analysis of categorical data, independence and association and partial association of attributes, various measures of association (Yule's)& coefficient of colligation for two way data and coefficient of continagency (pearsonss's &Tcheprow's)   **10L, 1Q**

3. Concept of population, parameter, random sample, statistic, sampling distribution and standard error. Standard error of sample mean (s) and sample proporations (s). Exact sampling distributions:-Statements and properties of X^2,t, &F distributions and their inter relationships.

10L, 1Q

4. Point estimation of a parameter. Concept of bias and mean square error of an estimate. Criteria of good estimator-consistency, unbiasedness, efficiency and sufficiency with examples. Statement of Neyman's Factorisation theorem, derivations of sufficient statistics in case of Binomial, Poisson, Noramal and Exponential (one parameter only) distributions. Estimation by the method of moments, Maximum likelihood (ML), statements of asymptotic properties of MLE. Concept of interval estimation. Confidence Intervals of parameters of normal population.   **20L, 1Q**

5. Concepts of statistical hypothesis, null and alternative, hypothesis, critical region, two Types of errors, level of significance and power of a test. One and two tailed tests, Neyman pearson''s fundamental lemma for Randomised tests. Examples in case of Binomial, poisson, Exponential and Normal distributions and their powers. Use of central limit theorem in testing large sample tests and confidence intervals for mean(s), proportion(s), standard deviation(s) and correlation coefficient(s).

30L, 2Q

6. Test of significance based on X^2, t, F. X^2-test for goodness of fit and test for independence of attributes. Definition of order statistics**.**   **10L, 1Q**

7. Non-Parametric tests their advantages and disadvantages, comparison with parametric tests. Measurement scale: nominal, ordinal, interval and ratio. One sample runs test, sign test and Wilcoxon-signed rank tests (single and paired samples). Two independent sample tests: Median test, Wilcoxon –Mann-Whitney U test, Wald Wolfowitz's runs test**.**

20L, 1Q

Note: Paper setter is requested to follow the questions allocated while setting the paper without fail.

List of Reference Books:

1. Fundamentals of mathematical statistics By sc gupta and vk kapoor.
2. Outlines of statistics v-II By Goon Gupta and Das Gupta
3. Introduction to Mathematical statistics by HOGG and CRAIG
4. Non_Parametric statistics for Behavioral science by Siegal and Sidney. Mc Graw Hill Publication.
5. Paramiteya mariyu aparamitiya prilshalu – by Telugu Academy. S
6. Statistics for Managers using Micro soft Excel. 4th edition Pearson Publication
7. Probability and statistical inference 7th edition Pearson Publication
8. Statistics made simple on your PG by prof. Skvs sarma
9. Introduction ot mathematical statistics by Hoel P.G
10. New mathematical statistics by Sanjay Arora and Bansilal.
11. Probability and Statistical   Inference by Hogg, Tanis. Rao.

(With Mathematics Combination)
(Examination at the end of II Year)
Paper –II: List of Practicals
90hrs (3hrs/week)

1.Generation of random samples from Uniform (0,1), Uniform (a,b) and exponential distributions.

2.Generation of random samples from Normal and Poisson distributions.

3.Simulation of random samples from Uniform (0,1), Uniform (a,b),Exponential, Normal and Poisson distributions using MS Excel.

4.Fitting of straight line and parabola by the method of least squares.

5. Fitting of straight line and parabola by the method of least squares using MS Excel.

6.Fitting of power curves of the type $y = a x^b$, $y = a b^x$ and $y = a e^{bx}$ by the method of least squares.

7. Fitting of power curves of the type $y = a x^b$, $y = a b^x$ and $y = a e^{bx}$ by the method of least squares using MS Excel.

8.Computation of Yule's coefficient of association.

9.Computation of Pearson's, Tcherprows coefficient of contingency.

10.Computation of correlation coefficient and regression lines for ungrouped data.

11.Computation of correlation coefficient, forming regression lines for ungrouped data.

12. Computation of correlation coefficient, forming regression lines for grouped data.

13. Computation of correlation coefficient, forming regression lines using MS Excel.

14.Computation of multiple and partial correlation coefficients.

15. Computation of multiple and partial correlation coefficients using MS Excel.

16.Computation of correlation ratio

17.Large sample tests for mean(s), proportion(s), Standard deviation(s) and correlation coefficient.

18.Small sample tests for single mean and difference of means and correlation coefficient.

19.Paired t-test.

20.Small sample tests for mean(s), paired t-test and correlation coefficient using MS Excel.

21.Small sample test for single and difference of variances.

22.Small sample test for single and difference of variances using MS Excel.

23. χ^2 – test for goodness of fit and independence of attributes.

24. χ^2 – test for goodness of fit and independence of attributes using MS Excel.

25.Nonparametric tests for single and related samples (sign test and Wilcoxon signed rank test) and one sample runs test.

26. Nonparametric tests for two independent samples (Median test,Wilcoxon Mann Whitney - U test, Wald - Wolfowitz's runs test)

Note: Training shall be on establishing formulae in Excel cells and deriving the results. The excel output shall be exported to MSWord for writing inferences.

Second Year ZOOLOGY Syllabus

THEORY PAPER – II

BIOLOGY OF CHORDATES, EMBRYOLOGY, ECOLOGY AND

120 hrs
(4 hrs/ week)

UNIT I

1.0. Protochordata to Amphibia

1.1. Protochordates: Salient features of Urochordata and Cephalochordata Structure and life-history of *Herdmania*, Significance of retrogressive Metamorphosis. **6 hours**

1.2. General characters of Chordates **1 hour**

1.3. General characters of Cyclostomes **1 hour**

1.4. General characters of fishes, classification up to sub-class level with examples **2 hours**

    1.4.1. Type study - *Scoliodon* : External Characters, Digetive system, respiratory system, Heart, excretory system, Brain **9 hours**

    1.4.2. Migration in fishes and types of scales

1.5. General characters and classification of Amphibia up to order level. **1 hour**

    1.5.1. Type study - *Rana* : External characters, digestive system, respiratory system, Heart, excretory system, Brain and reproductive system. **9 hours**

    1.5.2. Parental care in amphibians **1 hour**

UNIT II

2.0. Reptilia to Mammalia

2.1. General characters and classification of Reptilia up to order level. **3 hours**

    2.1.1. Type study – *Calotes* : External characters, digestive system, respiratory system, Heart, urinogenital system and Brain. **9 hours**

2.2. General characters and classification of Aves up to super order level with examples. **3 hours**

    2.2.1. Type study - Pigeon (*Columbia livia*) : Feathers, respiratory system, Heart and excretory system. **6 hours**

2.2.2. Migration in birds	**2 hours**
2.2.3. Flight adaptation in birds	**2 hours**
2.3. General characters and classification of Mammalia Sub Class level with examples.	**3 hours**
2.3.1. Dentition in Mammals.	**2 hours**

UNIT III

3.0. Embryology

3.1. Spermatogenesis, Oogenesis and Fertilization.	**3 hours**
3.2. Types of eggs	**3 hours**
3.3. Types of cleavages	**4 hours**
3.4. Foetal membranes and their significance	**3 hours**
3.5. Placenta : types and functions	**4 hours**
3.6. Regeneration with reference to Turbellarians and Lizards	**4 hours**

UNIT IV

4.0. Ecology

4.1. Biogeochemical cycles or nutrient cycles - Nitrogen Carbon; and- phosphorus.

6 hours

4.2. Definition of Community- Habitat and ecological niche   **12 hours**

    4.2.1. Community interactions : Brief account on Competition, predation,

        mutualism,commensalism and parasitism.

4.3. Population ecology : Density and dispersions of animal populations   **12 hours**

    4.3.1. Growth of human population and its control

    4.3.2.   Future of human population

Second Year ZOOLOGY

PRACTICAL PAPER – II   **90 hrs**
(3 hrs/ week)

CHORDATA, EMBRYOLOGY AND ECOLOGY

Observation of the following slides / specimens / models:

1. Protochordata : *Herdmania, Amphioxus, Amphioxus* T.S through pharynx.
2. Cyclostomata : *Petromyzon and Myxine.*
3. Pisces : *Pristis, Torpedo, Channa, Pleuronectes, Hippocoampus , Exocoetus, Echeneis, Labeo, Catla, Clarius, Anguilla.* Scales of fishes.
4. Amphibia : *Ichthyophis, Amblystoma, Siren, Axolotl larva, Rana, Hyla, Alytes.*
5. Reptilia: *Draco, Chamaeleon, Uromastix, Russels viper, Naja,* Krait, *Enhydrina, Testudo, Trionyx, Crocodile.*
6. Aves : *Picus, Psittacula, Eudynamis, Bubo, Alcedo.*
7. Mammalia: *Ornithorhynchus*, *Tachyglossus*, *Hedgehog, pteropus,Funambulus, Manis.*

DISSECTIONS:

1. V, VII, IX and X cranial nerves of *Scoliodon* or locally available fish.
2. Arterial system of *Scoliodon* or *Calotes*.

OSTEOLOGY*:*

1. Appendicular skeletons of *Varanus*, Pigeon and Rabbit.

EMBRYOLOGY:

1. Observations of following slides / models

   1.1. T.S. of testis and ovary (Rat / Rabbit / Human)

2. Different stages of cleavage (2-cell, 4- cell and 8- cell), Morula.

3. Blastula and gastrula of frog.

ECOLOGY:

1. Determination of $_p$H in a given sample of Water.
2. Estimation of dissolved oxygen in the given samples of Water.
3. Estimation of salinity (chloride) of water in the given samples.
4. Estimation of alkalinity water as Carbonates , bicarbonates in the given samples

REFERENCE BOOKS

1. 'Chordate Zoology' - E.L.Jordan and P.S. Verma. S. Chand Publications.
2. 'Cell biology, Genetics, Evolution and Ecology' . by P.S. Verma and V.K. Agarwal., S.Chand Publishers.
3. 'Chordata – I' by Mohan P.Arora., Himalaya Publishing House Pvt.Ltd.
4. 'Text book of Zoology – Vertebrates'., by Parker and Haswell.
5. 'Text book of Chordates' - Kavita Juneja and H.S.Bhamrah.
6. 'A text book of Embryology' - N. Arumugam.
7. 'Chordate Embryology' by P.S. Verma and V.K. Agarwal., S. Chand and Company.
8. 'Developmental Biology - Scott. F. Gilbert.
9. 'Developmental Genetics – G.S. Miglani.
10. 'Embryology' – Mohan P.Arora.
11. 'Elements of Ecology' – Odum.
12. ' Environmental Biology' by H.R.Singh., S.Chand Publications.
13. 'Ecology' - M.P.Arora
14. 'Environmental Biology' – P.D.Sharma.
15. 'Environmental Ecology' – P.R.Trivedi and Gurdeep Raj.
16. 'Ecology – Principles and Applications' – J.L Chapman and M.J.Reiss.
17. 'Biology' by Campbell & Reece.
18. 'Biology: The Science of Life' by R.A. Wallace, G.P. Sanders & R.J. Ferl.