ಬೆಂಗಳೂರು ಉತ್ತರ ವಿಶ್ವವಿದ್ಯಾಲಯ

ಟಮಕ, ಕೋಲಾರ – 563103

CHOICE BASED CREDIT SYSTEM

(Semester Scheme with Multiple Entry and Exit Options for Under Graduate Course)

SYLLABUS AS PER NEP GUIDELINES

SUBJECT: BACHELOR OF COMMERCE (FINANCE AND ACCOUNTING)

2021-22 onwards

BENGALURU NORTH UNIVERSITY

DEPARTMENT OF COMMERCE

Tamaka, Sri Devraj Urs Extension, Kolar, 563103.

Chairman, BoS

Dr. M Muniraju

Professor, Department of Commerce, Bengaluru City University

Syllabus Framed as per the National Educational Policy – 2020
Academic Year - 2021-21

12th , 16th and 22nd OCT 2021

PROCEEDINGS OF UG BOS MEETING OF B.COM (HONS), B.COM(A&F) HONS, B.COM (BUSINESS ANALYTICS) HONS, B.COM (LOGISTICS AND SUPPLY CHAIN MANAGEMENT) HONS, BBA (TRAVEL AND TOURISM MANAGEMENT) HONS, BBA (TRAVEL AND HOSPITALITY MANAGEMENT) BBA (HOSPITAL AND HEALTH CARE MANAGEMENT) COURSES

Proceedings of BOS of-UG - B.Com (Hons), B.Com (A&F) Hons, B.Com (Business Analytics) Hons, B.Com (Logistics and Supply Chain Management) Hons, BBA (Travel and Tourism Management) Hons, BBA(Travel and Hospitality Management) BBA (Hospital and Health Care Management) courses for the academic year 2021-2022 meeting held on 12th, 16th and 22nd October 2021 at the Chamber of the Principal ,Government First Grade College, Hoskote at 10:00 AM under the Chairmanship of Prof. M. Muniraju. The Board has agreed and approved the Course Matrix and the Syllabus of first year for the above mentioned courses. In case of any input requirements, it shall be initiated by the Chairman and necessary modifications shall be done as approved by the Board.

MEMBERS PRESENT

1.	**Prof. M.Muniraju** Ex- Chairman and Dean, Department of Commerce, Bengaluru City University	**Chairman**
2.	**Prof. R. Sarvamangala,** Professor**,** Department of Commerce**,** Bangalore University	**External Member**
3.	**Dr.G.H. Nagaraj**, Principal, Government First Grade College, Harohalli	**External Member**
4.	**Dr. Chandrakantha K,** Professor and Dean, Faculty of Commerce**,** Bengaluru North University**,** LBS Government First Grade College, R.T Nagar	**External Member**
5.	**Dr. S. Muralidhar,** Associate Professor and Head, Department of Commerce, Government First Grade College, Kolar	**MEMBER**
6.	**Dr. Muninarayanappa,** Principal**,** Government First Grade College, Hosakote	**MEMBER**
7.	**Dr. Milind Dete ,**FCMA Director- Learning ISDC	**External Member**
8.	**Sri Gaurav Kapur,** Head of Policy ACCA,	**External Member**
9.	**Sri B.V. Murali Krishna,** Additional Commissioner Commercial Tax Department , GOK	**External Member**
10.	**Dr. Shailaja K,** Associate Professor**,** Department of Commerce **,** Government First Grade College for Boys, Kolar	**MEMBER**
11.	**Dr. Sairam A,** Assistant Professor**,** Department of Commerce **,** Government First Grade College,Vemagal	**MEMBER**

Co-Opted Members

1.	**Dr Gurumurthy**, Department of Commerce, Government First Grade College,Magadi	Co-Opted Member
2.	**Girish .B.N**, Assistant Professor, Department of Commerce, Government First Grade College, Fazer Town, Bengaluru	Co-Opted Member
3.	**Dr. Swaminath. S**, Department of Commerce, Government First Grade College, Kengeri, Bengaluru	Co-Opted Member
4.	**Narendra R S**, Department of Commerce, Government First Grade College, Kolar	Co-Opted Member

Minutes of the Meeting

1. Prof.M. Muniraju, Department of Commerce, Bengaluru City University, welcomed all the BOS Members of the B.Com and BBA Board for BOS meeting which was scheduled on 12t.10.2021, 16.10.2021 and 22.10.2021.
2. The Chairman of BOS highlighted the importance in implementing the salient features of National Education Policy in the UG curriculum and urged all the BOS members to adopt the innovative and goal oriented curriculum structure that would enable the students to have a successful career and become responsible citizens.
3. The BOS members presented their views on the inclusion of relevant subjects , contents ,modifications required for the existing subjects and also presented a wide list of skill based and value based subjects that are required to be included in the curriculum. All these modifications were extensively discussed and the curriculum structure was finalised with the consensus of all the members and was duly accepted by the Chairman.
4. Based on the recommendations of the members of the BOS the Chairman resolved and accepted the New Scheme of Teaching, Evaluation and Curriculum from the Academic year 2021-22 based on National Education Policy 2020 for four year B.Com and BBA Under Graduate Program.

Chairman - BOS

BENGALURU NORTH UNIVERSITY

Scheme of Teaching, Evaluation & Curriculum
to be introduced from the

Academic Year 2021-22

Based on

National Education Policy – 2020

for

Four Year Under-Graduate Program

B.COM (Accounting & Finance) - HONORS DEGREE

(CBCS -SEMESTER SCHEME)

A. **Regulations**
B. **Course Matrix**
C. **Curriculum of Courses**

Chairman, BoS

Dr. M Muniraju

Professor, Department of Commerce, Bengaluru City University

DEPARTMENT OF COMMERCE

Tamaka, Sri Devraj Urs Extension,
Kolar, 563103.

REGULATIONS PERTAINING TO B.COM – F&A DEGREE
ACCORDING TO NEP – 2020

I INTRODUCTION

The curriculum framework for B.Com. (Accounting & Finance) Degree is structured to offer a broad outline that helps in understanding the creative potential of new career growth opportunities based on changing industrial and societal needs. The course is upgraded keeping in mind the aspirations of students, with opportunities to major in specializations such as accounting, financial markets, marketing, human resources and banking to focus the students towards a career in those domains. The core concepts within subject have been updated to incorporate the recent advancements, techniques to upgrade the skills of learners to create a focus on various functional areas of business. Problem Based learning has been integrated into the curriculum for a better understanding of various concepts in business and commerce. The syllabus under NEP-2020 is expected to enhance the level of understanding among students and maintain the high standards of graduate program offered in the country. Effort has been made to integrate the use of recent technology and MOOCs to assist teaching learning process among students. The major objective of the graduate program is to elevate the subject knowledge among students, and making them as critical thinkers thereby students can address the issues related to industry and other business sectors.

II OBJECTIVES

1. To give an insight into the areas of Accounting and Finance and the new developments in business management.
2. To prepare students for professions in the field of Accounting and Finance and the latest developments relating to the Accounting & Finance
3. To incentivize the development of personal and executive skills in the students with the aim of enhancing the efficiency of decision making and strengthening the problem detection, analysis and solving skills
4. To enable students to understand and apply the latest developments in Information Technology to Accounting & Finance areas in order to develop core competencies for generate added value
5. To develop leaders who can head operations or logistics departments in the future in line with the latest developments in the field of Accounting & Finance
6. To develop global middle level managers to address and solve real time operational issues in the areas Accounting & Finance
7. To enable students to gain command over the new e-commerce business models
8. To develop committed managers with ethical standards and values
9. To develop business philosophers with a focus on social responsibility and ecological sustainability

III. GRADUATE ATTRIBUTES

The graduate attributes in B. Com. are the outline of the expected course learning outcomes mentioned in the beginning of each course. The characteristic attributes that a B. Com. graduate will be able to demonstrate through learning various courses which are listed below:

- **Disciplinary Knowledge**
  Capability of executing comprehensive knowledge and understanding of one or more disciplines that form part of commerce.

- **Communication Skills**
  Ability to communicate long standing, unsolved problems in commerce; Ability to show the

importance of commerce as precursor to various market developments since the beginning of civilization.

- **Critical Thinking**
  - Ability to engage in reflective and independent thinking by understanding the concepts in every area of Commerce and Business;
  - Ability to examine the results and apply them to various problems appearing in different branches of Commerce and Business.

- **Problem solving**

  Capability to reduce a business problem and apply the classroom learning into practice to offer a solution for the same; Capabilities to analyse and synthesize data and derive inferences for valid conclusion; Able to comprehend solutions to sustain problems originating in the diverse management areas such as Finance, Marketing, Human Resource, Taxation and so on.

- **Research Related Skills**
  - Ability to search for, locate, extract, organize, evaluate, and use or present information that is relevant to a particular topic;
  - Ability to identify the developments in various branches of Commerce and Business.

- **Information and Communication Technology (ICT) digital literacy**

  Capability to use various ICT tools (like spreadsheet) for exploring, analysis, and utilizing the information for business purposes.

- **Self-directed Learning**

  Capability to work independently in diverse projects and ensure detailed study of various facets of Commerce and Business.

- **Moral and Ethical Awareness/Reasoning**

  Ability to ascertain unethical behavior, falsification, and manipulation of information; Ability to manage self and various social systems

- **Life-long learning**

  Capability of self-paced and self-directed learning aimed at personal development and for improving knowledge/skill development and reskilling in all areas of Commerce.

IV. ELIGIBILITY FOR ADMISSION

Candidates who have completed two years Pre – University course of Karnataka State or its equivalent as notified by the university from time to time are eligible to seek admission for this course

V. DURATION OF THE PROGRAMME

The Duration of the Programme is Four (04) years of Eight Semesters. Progressive Certificate, Diploma, Bachelor Degree or Bachelor Degree with Honors provided at the end of each year of Exit of the Four years Undergraduate Programme respectively

Exit with	Credits Requirement*
Certificate at the Successful Completion of First Year (Two Semesters) of the Four Years Bachelor of Commerce Undergraduate Degree Programme	50
A Diploma at the Successful Completion of the Second Year (Four Semesters) of the Four Years Bachelor of Commerce Undergraduate Degree Programme	(50 + 50) 100
Basic Bachelor Degree at the Successful Completion of the Third Year (Six Semesters) of the Four Years Bachelor of Commerce Undergraduate Degree Programme	(50 + 50 + 44) 144
Bachelor Degree with Honours in a Discipline at the Successful Completion of the Four Years (Eight Semesters) of the Four Years Bachelor of Commerce Undergraduate Degree Programme	(50 + 50 + 44 + 41) 185

V. MEDIUM OF INSTRUCTION

The medium of instruction shall be English. However, a candidate is permitted to write the examination either in English or in Kannada (Kannada version Only for Theory Papers).

VI. ATTENDANCE

- For the purpose of calculating attendance, each semester shall be taken as a Unit.
- A student shall be considered to have satisfied the requirement of attendance for the semester, if he/she has attended not less than 75% in aggregate of the number of working periods in each of the courses compulsorily.
- A student who fails to satisfy the above condition shall not be permitted to take the University examination.

VII. TEACHING AND EVALUATION

M.Com graduates with B. Com, B.B.M, BBA & BBS as basic degrees from a recognized university are only eligible to teach and to evaluate the Courses (except languages, compulsory additional subjects and core Information Technology related subjects) mentioned in this regulation. Languages and additional courses shall be taught by the graduates as recognized by the respective Board of Studies.

VIII. RECORD MAINTENANCE AND SUBMISSION

- Every college is required to establish an Innovative business lab / computer lab to enable students to get practical knowledge of business activities and online learning.
- In every semester, the student should keep a record of the Business Lab/Field Study Activity and submit it to the concerned faculty.
- The BOE is authorized to make random surprise visits to the colleges and verify record-books and the internal marks awarded.

IX. Guidelines for Continuous Internal Evaluation (CIE) and Semester End Examination (SEE)

The CIE and SEE will carry 40% and 60% weightage each, to enable the course to be evaluated for a total of 100

marks, irrespective of its credits. The evaluation system of the course is comprehensive & continuous during the entire period of the Semester. For a course, the CIE and SEE evaluation will be on the following parameters:

SL No.	Parameters for the Evaluation	Marks
	Continuous Internal Evaluation (CIE)	
A	Continuous & Comprehensive Evaluation (CCE)	20 Marks
B	Internal Assessment Tests (IAT)	20 Marks
	Total of CIE (A+B)	**40 Marks**
C	Semester End Examination (SEE)	**60 Marks**
	Total of CIE and SEE (A + B + C)	**100 Marks**

A. Continuous & Comprehensive Evaluation (CCE): The CCE will carry a maximum of 20% weightage (20 marks) of total marks of a course. The faculty member can select any four of the following assessment methods, Minimum of four of the following assessment methods of (5) marks each:

- Individual Assignments
- Seminars/Classroom Presentations/ Quizzes
- Group Discussions /Class Discussion/ Group Assignments
- Case studies/Case lets
- Participatory & Industry-Integrated Learning/ Field visits
- Practical activities / Problem Solving Exercises
- Participation in Seminars/ Academic Events/Symposia, etc.
- Mini Projects/Capstone Projects
- Any other academic activity.

B. Internal Assessment Tests (IAT): The IAT will carry a maximum of 20% weightage (20 marks) of total marks of a course, under this component, two tests will have to be conducted in a semester for 20 marks each and the same is to be scaled down to 10 marks each.

C. In the case of 50 percent of CIE weightage courses, faculty members can choose assessment methods accordingly for the required marks as mentioned above.

Template for IAT

Internal Assessment Test Bachelor of Commerce – A&F (B.Com.)

Name of the Course: **Course Code:**

Duration: 1 Hours **Total Marks: 20**

SECTION-A

I. Answer any two of the following questions.
(Questions related to Concepts) (2X 2 = 4)

1.
2.
3.

SECTION-B

II. Answer any two of the following questions.
(Questions are related to Understanding and Application) (2X 4 = 8)

4.
5.
6.

SECTION- C

III. Answer any one of the following questions.
(Questions are related to analysis and evaluation) (1 X 8 = 8)

7.
8.

XXXXXXXX

X. APPEARANCE FOR THE EXAMINATION

A candidate shall be considered to have appeared for the examination only if he/she has submitted the prescribed application for the examination along with the required fees to the university.

XI. PATTERN OF QUESTION PAPER

SECTION-A 1. a,b,c,d,e,f,g	(Conceptual questions) Answer any FIVE out of seven sub questions	(05 X 02 = 10 Marks)
SECTION -B: 2,3,4,5.6	(Application questions) Answer any THREE out of five questions	(03 X 05 = 15 Marks)
SECTION-C: 7,8,9.10, 11	(Analysis and understanding questions) Answer any THREE out of five questions	(03 X 8 = 24 Marks)
SECTION-D 12, 13	Question completely based on the skill Development part (lab activities) Answer any ONE out of two questions	(01 X 11 = 11 Marks)
TOTAL		**60 Marks**

Notes:

- One Hour of Lecture is equal to 1 Credit.
- One Hour of Tutorial is equal to 1 Credit (Except Languages).
- Two Hours of Practical is equal to 1 Credit

Acronyms Expanded	
AECC	- Ability Enhancement Compulsory Course
DSC ©	- Discipline Specific Core (Course)
SEC-SB/VB	- Skill Enhancement Course-Skill Based/Value Based
OEC	- Open Elective Course
DSE	- Discipline Specific Elective
SEE	- Semester End Examination
CIE	- Continuous Internal Evaluation
L+T+P	- Lecture + Tutorial + Practical(s)

BENGALURU NORTH UNIVERSITY
DEPARTMENT OF COMMERCE B.COM – A & F DEGREE
(CBCS -SEMESTER SCHEME) – 2021-22
COURSE MATRIX

ANNEXURE – 1

FIRST SEMESTER

Semester I								
Sl. No.	**Course Code**	**Title of the Course**	**Category of Courses**	**Teaching Hrs per Week (L + T + P)**	**SEE**	**CIE**	**Total Marks**	**Credit**
1	Lang.1.1	Language-I	AECC	3+1+0	60	40	100	3
2	Lang.1.2	Language–II	AECC	3+1+0	60	40	100	3
3	B.Com.1.1	Financial Accounting	DSC	3+1+0	60	40	100	4
4	B.Com.1.2	Economic Environment& Business Strategies	DSC	3+1+0	60	40	100	4
5	B.Com.1.3	Mathematics and Logical Reasoning	DSC	3+1+0	60	40	100	4
6	B.Com.1.4	Excel Analytics for Business	SEC-SB	1+0+2	50	50	100	2
7	B.Com.1.5	Health & Wellness	SEC-VB	0 + 0 + 2	-	50	50	1
8	B.Com.1.6	Physical Education - Yoga	SEC-VB	0 + 0 + 2	-	50	50	1
7	B.Com.1.7	***Any one of the following*** **(Within the faculty)** a. Managerial Ethics **(Across the faculty)** b. Entrepreneurship & Start-ups c. Accounting for everyone d. Corporate Environment (Refer Annexure)	OEC	3+0+0	50	50	100	3
Sub–Total(A)					**400**	**400**	**800**	**25**

Note:
*** Within the Faculty:** The Course 1 is meant for Commerce Students and shall be taught by Commerce Teachers (Both B. Com & BBA Teachers)
*** Across the Faculty:** The Courses (2 & 3) are meant for Other Department / Discipline Students and shall be taught by Commerce Teachers (Both B. Com & BBA Teachers)

Note: Practical Classes may be conducted in the Business Lab or in Computer Lab or in Class room depending on the requirement. One batch of students should not exceed half (i.e., 50 or less than 50 students) of the number of students in each class/section. 2 Hours of Practical Class is equal to 1 Hour of

Teaching, however, whenever it is conducted for the entire class (i.e., more than 50 students) 2 Hours of Practical Class is equal to 2 Hours of Teaching

SECOND SEMESTER

Semester II								
Sl. No.	**Course Code**	**Title of the Course**	**Category of Courses**	**Teaching Hrs per Week (L+T+ P)**	**SEE**	**CIE**	**Total Marks**	**Credits**
1	Lang.2.1	Language-I	AECC	3+1+0	60	40	100	3
2	Lang.2.2	Language–II	AECC	3+1+0	60	40	100	3
3	B.Com.2.1	Advanced Financial Accounting	DSC	3+1+0	60	40	100	4
4	B.Com.2.2	Statistical Applications in Business-I	DSC	3+1+0	60	40	100	4
5	B.Com.2.3	Indian Financial System	DSC	3+1+0	60	40	100	4
6	B.Com.2.4	Environmental Studies	AECC	1+0+2	50	50	100	2
8	B.Com.2.5	Physical Education - Yoga	SEC – VB	0+0+2		50	50	1
9	B.Com.2.6	NCC/NSS/R&R(S&G)	SEC-VB	0+0+2		50	50	1
7	B. Com 2.7	***Any one of the following*** **(Within the Faculty)** a. Retail Management **(Across the Faculty)** b. Banking Innovation c. Event Management d. Financial Literacy (Refer Annexure)	OEC	3+0+0	50	50	100	3
Sub–Total(B)					**400**	**400**	**800**	**25**

Note:

*** Within the Faculty:** The Course 1 is meant for Commerce Students and shall be taught by Commerce Teachers (Both B. Com & BBA Teachers)

*** Across the Faculty:** The Courses (2 & 3) are meant for Other Department / Discipline Students and shall be taught by Commerce Teachers (Both B. Com & BBA Teachers)

Note: Students will be formed in to batches of 30 each to provide a practical exposure of either Excel or Digital visualizations skills in the Business Labs. Lab record is required to be maintained for CIE

Name of the Program: Bachelor of Commerce (B.Com.)

EXIT OPTION WITH CERTIFICATION–with ability to solve well defined problems

Name of the Program: B. Com (Accounting & Finance)

Course Code: B.Com. (A & F) 1.1

Name of the Course: Financial Accounting

Course Credits	**No. of Hours per Week**	**Total No. of Teaching Hours**

4 Credits	4 Hrs	56 Hrs

Pedagogy:

Classroom lecture, tutorials, Group discussion, Seminar, Case studies & field work

Course Outcome:

On successful completion of the course, the student will be able to Understand the Basic Concepts of accounting, the ability to pass journal entries and prepare ledger accounts, the ability to prepare subsidiaries book, the ability to prepare trial balance and final accounts of proprietary concern, ability to use accounting concepts in Spreadsheet.

Syllabus

Module:1 - THEORETICAL FRAMEWORK OF FINANCIAL ACCOUNTING 10 Hrs

Introduction, Meaning and Definition, Significance of Accounting; Functions of Accounting; Users of Accounting Information; Accounting Principles - Accounting Concepts and Conventions; Accounting equations - Problems on Accounting Equations; Accounting Standards; List of Indian Accounting Standards

Module:2 - ACCOUNTING FOR SALE OF PARTNERSHIP FIRM 16 Hrs

Sale to a limited company - need for conversion; meaning of purchase consideration; methods of calculating purchase consideration - net payment method, net asset method; passing of journal entries and preparation of ledger accounts in the books of vendor; treatment of certain items - dissolution expenses, unrecorded assets and liabilities, assets and liabilities not taken over by the purchasing company, contingent liabilities, non-assumption of trade liabilities; in the books of purchasing company - passing of incorporation entries; treatment of security premium

Module: 3 - DEPARTMENTAL ACCOUNTS 16 hrs

Meaning and Features of Departmental Undertaking; Examples of Department SpecificExpenses and Common Expenses; Need and Bases of Apportionment of Common Expenses; Preparation of Trading and Profit and Loss Account in Columnar Form; General Profit and Loss Account and Balance Sheet - Simple problems involving adjustment on Closing Stock, Depreciation and Inter Departmental Transfers at Cost Price.
(Problems may contain information for a maximum of three departments).

Module: 4 - BRANCH ACCOUNTS 14 Hrs

Introduction, Meaning, Objectives & Types of Branches; Dependent Branches - Features; Supply of Goods at Cost Price; Invoice Price; Branch Account in the books of Head Office (Debtors System Only)

Skill Development:

- Drafting of Debit Notes, Credit Notes, Purchase Orders, Sales Invoice, Bills of Exchange,Form of Journal, Trading A/c, Profit & Loss A/c, Balance Sheet with imaginary figures
- Develop E-content based partnership deed and limited liability partnership deed
- List out 2 Departmental Undertakings with the following details: Name & Address of theDepartmental Undertaking. List of departments.
- Download insurance claim form and fill the necessary details to claim fire insurance
- Produce documentary evidence for creating accounting ledgers and groups

Reference Books:

1. Hanif and Mukherjee - Financial Accounting - Mc Graw Hill Publishers
2. Dr. S Muralidhar, Prof. S A Jagadeesha, Dr. K S Sailaja & Prof. P R Narasappa – Financial Accounting - Kalyani Publishers
3. Arulanandam & Raman - Advanced Accountancy - Himalaya Publishing House
4. S. Anil Kumar, V. Rajesh Kumar and B Mariyappa – Fundamentals of Accounting - HPH
5. Dr. S.N. Maheswari - Financial Accounting - Vikas Publication
6. S P Jain and K. L. Narang - Financial Accounting - Kalyani Publication
7. Radhaswamy and R.L. Gupta - Advanced Accounting - Sultan Chand
8. M.C. Shukla and Goyel - Advanced Accounting - S Chand.

Name of the Program: B. Com (Accounting & Finance)
Course Code: B.Com. (A & F) 1.2
Name of the Course: ECONOMIC ENVIRONMENT & BUSINESS STRATEGIES

Course Credits	No. of Hours per Week	Total No. of Teaching Hours
4 Credits	**4 Hrs**	**56 Hrs**

Pedagogy:

Classroom lecture, tutorials, Group discussion, Seminar, case studies &field work

Course Outcomes:

On successful completion of the course, the student will be able to understand the basic knowledge of economic concepts and to apply the same in the business decisions.

Syllabus

Module: 1 - BUSINESS GOALS AND DECISIONS 8 Hrs

Meaning of a Firm, Goals, Profit Maximization v/s Wealth Maximization. Decision making - decisions under market uncertainties, tactical versus strategic decisions and game theory.

Module: 2 - BUSINESS CYCLES & ECONOMIC DECISIONS 10 Hrs

Business cycles; Phases of Business cycle; effects of business cycle; measures to control the business cycle
Meaning and salient features of Monetary Policy, Fiscal Policy, Industrial Policy

Module:3 - MARKET FORCES 16 hrs

Demand – meaning law of demand, nature of elasticity of demand, determinants of elasticity of demand, cost of advertisement and derived demand relations, measurement of elasticity under graphic method (concepts only).
Demand forecasting- meaning and methods (problems on trend projection by least squaremethod).
Supply - Law of supply, determinants of supply

Module:4 - MARKET STRUCTURE & CONSUMER BEHAVIOUR 22 Hrs

Perfect competition – features, price and output determination, influence of time element on price and output.
Monopoly – features, price and output determination, price discrimination
Monopolistic competition – features, price and output determination in short run and long-run in industry
Consumer sovereignty – limitations; approaches to the study of consumer behavior; cardinal approach; Law of Equi–Marginal Utility; Ordinal Approach
Indifference Curve Analysis - Properties.
Consumer surplus – meaning, analysis, limitations

Skill Development

1. Develop a E content on decision making approaches under market uncertainties,
2. Draft the diagrammatic representation of different business cycles
3. Student to choose a product and apply Indifference Curve Analysis in real situation
4. Select and discuss the case studies that will have impact on price and output determination underdifferent market structures
5. A survey report on the demand forecasting for a product.

Reference Books:

1. P.L Mehta - Managerial Economics - Sultan Chand & Sons
2. R.L Varshney and K.L Maheshwari - Managerial Economics - Sultan Chand & Sons
3. H.L Ahuja; Business Economics, S. Chand & Company Ltd., New Delhi.
4. Venugopal & Monica - Economics for Business - I.K. International Publications
5. Sanchethi & Kapoor - Business Mathematics - Sultan Chand & Sons
6. K.P.M Sundaram - Micro Economics - Sultan Chand & Sons.
7. M.L. Agarwal - Business Mathematics - Sultan Chand & Sons

8. D.M. Mithani - Managerial Economics - Himalaya Publishing House
9. M.L. Jhingani &J.K. Stephen - Managerial Economics - Vrinda Publishing (P) Ltd
10. Manoj Kumar Mishra - Managerial Economics - Voyu Education of India
11. Khan and Jain - Financial Management - Tata McGraw Hill Education Private Ltd
12. R.K. Sharma and S.K. Gupta - Financial Management - Kalyani Publications
13. Reddy and Appannaiah - Economics for Business
14. Karma Pal - Managerial Economics - Excel Books

Name of the Program: B. Com (Accounting & Finance)
Course Code: B.Com. (A & F) 1.3
Name of the Course: MATHEMATICS AND LOGICAL REASONING

Course Credits	No. of Hours per week	Total No. of Teaching Hours
4 Credits	4 Hrs	56 Hrs

Pedagogy:

Classroom lecture, Case studies, Group discussion, Seminar & field work etc.

Course Outcomes:

On successful completion of the course, enable to expose the students for the application of mathematical tools and techniques in managerial/business decision making and application of mathematic in day to day business functions)

Syllabus:

Module: 1 - NUMBER SYSTEM **10 Hrs**

Introduction – Natural Numbers, Even Numbers, Odd Numbers, Integers, Prime Numbers, Rational and Irrational numbers, Real Numbers, HCF and LCM (Simple problems)

Module:2 - TYPES OF EQUATIONS AND MATRICES **18 Hrs**

Linear equations - Simultaneous equations (only two variables); Eliminations and substitution method only- Quadratic equations – Factorization and formula method ($ax^2 + bx + c = 0$ form only); Application of equations in business and management; Matrices - Algebra of Matrices, Inverse of a Matrix and determinants; Problems on linear equations in two variables using Cramer's rule.

Module:3 - PROGRESSIONS **12 Hrs**

Arithmetic Progression - Finding the 'nth 'term of AP and Sum to nth term of AP; Insertion of Arithmetic Mean; Geometric Progression – Finding the 'nth 'term of GP and sum to 'nth 'term of GP and insertion of Geometric Mean

Module: 4 - COMMERCIAL ARITHMETIC AND LOGICAL REASONING **16 hrs**

Simple Interest; Compound Interest including yearly and half yearly calculations; Annuities; Percentages; Bills Discounting; Ratios and proportions; duplicate-triplicate and sub-duplicate of a ratio
Proportions: third, fourth and inverse proportion - problems
Number Series; Coding and Decoding and Odd man out; Direction Tests; Seating Arrangements; Blood Relations, Syllogism

SKILL DEVELOPMENT ACTIVITIES:

1. Draft a chart on number system and its application
2. Show a chart for different kinds of equations
3. Application of Matrix in Business Problems
4. Develop an e-contentment on application of progression in real life situation
5. Draft the procedure of discounting of bills by commercial banks
6. Take the previous of UPSC, KPSC, Banks, Insurance company, Railway board question papers and solve numerical aptitude and reasoning segments
7. Learning Mathematical applications and decision-making using MS Excel Functions.

BOOKS FOR REFERENCE

1. Albright - Business Analytics - Cengage
2. R.G. Saha – Methods and Techniques for Business Decisions - VBH
3. Dr. Sancheti and Kapoor - Business Mathematics and Statistics - Sultan Chand
4. Zamarudeen - Business Mathematics - Vikas
5. R.S Bhardwaj - Mathematics for Economics and Business
6. Anderson, Sweeny - Essentials of Business Analytics - Cengage
7. Madappa, Mahadi Hassan, M. Iqbal Taiyab – Business Mathematics - Subhash
8. G.R. Veena and Seema - Business Mathematics and Statistics - I.K. Intl Publishers

Name of the Program: B.Com (Accounting & Finance)
Course Code: B.Com (A & F) 1.4
Name of the Course: Excel Analytics for Business -I

Course Credits	No. of Hours per week	Total No. of Teaching Hours
2 Credits	3 Hrs	28 Hrs

Pedagogy:

Classroom lecture, tutorials, Group discussion, Seminar, Case studies & field work

Course Outcomes:

On successful completion of the course, the students will be able to Understand the basic concepts of Spreadsheet, Summarize data using Functions, Apply Conditions using formulas and Functions, Implement financial Accounting Concepts in Spreadsheet, Outline the Basic Activity in Spreadsheet.

Syllabus

Module: 1 – Introduction (08 Hrs)

Introduction to spreadsheets; Office Suite overview; Basic text and cell formatting; Basic arithmetic calculation; Paste special ; Freeze pane; Auto completion of series; Sort and filter - Charts

Module: 2 - Summarize data using functions (10 Hrs)

Perform calculations by using the SUM, MIN and MAX, COUNT, AVERAGE, logical operations by using the IF function, SUMIF, AVERAGEIF, COUNTIF

Module:3 - Text Functions (10 Hrs)

Data validation - Text Functions: LEN, TRIM, PROPER, UPPER, LOWER, CONCATENATE.

Skill Developments Activities:

- Enter class data into rows and columns
- Create Draft Marks Card in Spreadsheet
- Create Draft profit and Loss and Balance Sheet in Spreadsheet
- Create GST Invoice in Spreadsheet with Tax Rate
- Any other activities, which are relevant to the course.

Reference Books:

- Rohit Khurana - Learning MS-Word and MS-Excel
- Dr. R S Narendra et. al - Excel made easy – Kalyani Publishers
- Adam Ramirez - Excel Formulas and Functions 2020: The Step-by-Step Excel Guide with Examples on How to Create Powerful Formula
- Kogent Learning Solutions Inc. - Excel 2013 in Simple Steps
- Harjit Suman - Excel Formulas and Functions: The Step-by-Step Excel Guide on how to Create Powerful Formulas

Note: Latest edition of textbooks and reference Books may be used

Name of the Program: Bachelor of Commerce (B.Com.) (Accounting & Finance)
Course Code: B.Com. (A & F) 2.1
Name of the Course: ADVANCED FINANCIAL ACCOUNTING

Course Credits	No. of Hours per week	Total No. of Teaching Hours
4 Credits	4 Hrs	56 Hrs

Pedagogy:

Classroom lecture, Case studies, Group discussion, Seminar & field work etc.,

Course Outcomes:

On successful completion of the course, the students will be able to familiar with the accounting procedures for different types of businesses and to impart skills for recording various kinds of business transactions

Syllabus:

Module: 1 - CONSIGNMENT ACCOUNTS **14 Hrs**

Consignment - Introduction & Meaning; Consignor & Consignee; Goods Invoiced at Cost Price; Goods Invoiced at Selling Price; Normal Loss & Abnormal Loss; Valuation of Stock; Stock Reserve; Journal Entries & Ledger Accounts in the books of Consignor and Consignee

Module: 2 - ACCOUNTING FOR JOINT VENTURES **14 Hrs**

Joint Venture – Introduction, Meaning & Objectives; Distinction between Joint Venture and Consignment; Distinction between Joint Venture and Partnership; Maintenance of Accounts in the books of co-ventures; Maintaining Separate Books for Joint Venture; Preparation of Memorandum Joint Venture – Problems

Module: 3 - ROYALTY ACCOUNTS **14 Hrs**

Royalty - Meaning and definition; Technical Terms – Royalty, Royalty Agreement, Landlord, Minimum Rent, Short Workings, Recoupment of Short Working under restrictive (Fixed Period) and non-restrictive (Floating Period), Recoupment within the Life of the Lease; Accounting Treatment for Strike and Stoppage of work; Accounting Treatment in the books of Lessee and lessor – Journal entries and Ledger Accounts with minimum rent account

Module: 4 - CONVERSION OF PARTNERSHIP FIRM INTO A LIMITED COMPANY **14 Hrs**

Meaning & Objectives of Conversion; Purchase Consideration - Methods of Calculation of Purchase Consideration - Lump Sum Method- Net Assets Method - Net Payment Method; Mode of Discharge of Purchase Consideration; Ledger Accounts in the Books of Vendor; Incorporation Entries in the Books of Purchasing Company; Preparation of Balance Sheet in Vertical form.

Skill Development Activities:

1. Preparation of Consignment account with imaginary figures
2. List the types of business which comes under consignment
3. Preparation of Joint Venture Agreement
4. Collection & recording of Royalty agreement with regard to any suitable situation
5. Preparation of list of items which comes under Royalty accounts

BOOKS FOR REFERENCE

1. Arulanandam & Raman - Advanced Accountancy - HPH
2. Dr.S.Muralidhar, Prof. S A Jagadeesha, Dr. K S Sailaja & Prof. P R Narasappa– Advanced Financial Accounting- Kalyani Publishers
3. Anil Kumar, Rajesh Kumar and Mariyappa - Advanced Financial Accounting - HPH
4. Dr. Alice Mani - Advanced Financial Accenting - SBH
5. Dr. S.N. Maheswari - Financial Accounting - Vikas Publication
6. S P Jain and K. L. Narang - Financial Accounting - Kalyani Publication
7. Souandrajan & K. Venkataramana - Financial Accounting - SHBP
8. Dr.Janardhanan - Advanced Financial Accounting - Kalyani Publishers
9. Radhaswamy and R.L. Gupta - Advanced Accounting - Sultan Chand
10. M.C. Shukla and Grewel - Advanced Accounting

Name of the Program: B.Com (Accounting & Finance)
Course Code: B.Com. 2.2
Name of the Course: Statistical Applications in Business-I

Course Credits	No. of Hours per week	Total No. of Teaching Hours
4 Credits	4+0+0 Hrs.	56 Hrs.

Pedagogy: Classrooms lectures, tutorials, Group discussions, Seminars, Case studies, Lab & field work etc.,

Course Outcomes:
On successful completion of the course, the Students will be able to develop a basic knowledge of fundamentals of Statistics for interpreting business data and their commercial application for decision making in business

Syllabus

Module: 1 - STATISTICAL DESCRIPTION OF DATA [10 Hrs.]
Introduction – Definition of Statistics –- Functions – Scope – Limitations – Tabulation of Data - Diagrammatic representation of data - Bar diagram- subdivided bar diagram- percentage bar diagram and pie diagram (simple problems)- Frequency distribution, Graphical representation of Frequency Distribution – Graphical presentation -Histogram- Frequency polygon- Ogives (simple problems).

Module: 2 - MEASURES OF CENTRAL TENDENCY & DISPERSION [20 Hrs.]
Introduction – Definition of Statistics –- Functions – Scope – Limitations – Statistical Representation of Data. Measures of Central Tendency- Arithmetic Mean– Median – Mode (both grouped and ungrouped data including open- end class (Direct Methods only and problems on missing frequency) – Weighted Arithmetic Mean & Combined Mean -Empirical relationship between mean, median and mode. Dispersion - Range - Quartile deviation - Mean deviation about mean - Standard deviation and their Coefficients. (Direct method only)

Module: 3 - CORRELATION & REGRESSION [12Hrs]
Correlation- Types of Correlation- Karl Pearson's coefficient of correlation, Spearman's rank correlation coefficient- Problems
Regression - Regression lines -Regression coefficients - The two regression equations – Correlation coefficient through regression coefficient- Problems.

Module: 4 - INDEX NUMBERS AND TIME SERIES [14 Hrs]
Index Numbers- Uses of Index Numbers, Problems involved in construction of Index Numbers, Methods of construction of Index Numbers. Simple Aggregative Method – Simple Average of Price Relative Method – Weighted index method – Fisher's Ideal method (Excluding TRT & FRT) Consumer Price Index – Problems
Time Series - Components of time series; additive and multiplicative models; Trend analysis: Finding trend by moving average method and Fitting of linear trend line using principle of least squares. Lines of Regression - Derivation of Line of Regression of Y on X - Line of Regression of X on Y - Using Regression Lines for Prediction of time series data

Skill Developments Activities:

- Present Data in a tabular form no students studying in different course in your college for a particular period
- Analysis of data by computing standard deviation and coefficient of variation.
- Presentation of data in graphs and diagrams.
- Collect the age statistics of 10 married couples and compute correlation coefficient and regression equations.
- Analyze a particular company monthly share price movement traded in BSE & NSE by using moving average

BOOKS FOR REFERENCE :

1. Bhat B R, Sri Venkataramana and K S Madhava Rao, Statistics for Beginners Vol 1 – New Age (P) Ltd,.

2. Beri, G. C.. Business Statistics . New Delhi: Tata McGraw Hill Educations Pvt Ltd.

3. Chikodi & Satyaprasad – Quantitative Method for Business -II

4. Gupta, S. P. Statistical Methods. New Delhi: Sultan Chand and sons

5. Sharma, J. K. Business Statistics . New Delhi: Pearson Publishers.

6. Vohra, N.D. Quantitative Techniques in Management. Tata McGraw Hill Publishing Company

Name of the Program: Bachelor of Commerce (B.Com.) (Accounting & Finance)
Course Code: B.Com (A & F) 2.3
Name of the Course: INDIAN FINANCIAL SYSTEM

Course Credits	No. of Hours per week	Total No. of Teaching Hours
4 Credits	4 Hrs	56 Hrs

Pedagogy:

Classroom lecture, Case studies, Group discussion, Seminar & field work etc.,

Course Outcomes:

On successful completion of the course, enable the students with basic theory and recent practices of financial system both in Indian as well as global context

Syllabus

Module: 1 - INTRODUCTION TO FINANCIAL SYSTEM IN INDIA 10 Hrs

Overview of Financial System; Structure; Regulation & Functions Financial Instruments- Financial Markets – Capital Market – Money Market – Characteristics of Financial Market – Key elements of well-functioning of Financial system- Economic indicators of financial development.

Module: 2 - FINANCIAL MARKETS AND INSTRUMENTS 18 Hrs

Financial Markets - Meaning and Definition, Role and Functions of Financial Markets, Constituents of Financial Markets; Money Market Instruments; Capital Market Instruments; SEBI guidelines for Listing of Shares and Issue of Commercial Papers.

Methods of Capital Issue in New issue market – Initial Public Offering (IPO), Right Issue, Follow on Public Offer (FPO), Private Placement, Qualified Institutional Placement (QIP) , Offer for sale (OFS), Indian Depository Receipt (IDR), American Depository Receipt (ADR) & Global Depository Receipt (GDR) – Stock Exchange in India – Meaning & Functions

Module: 3 - OVERVIEW OF FINANCIAL INSTITUTIONS 16 Hrs

Commercial Banking; Types of Banks; Role of Commercial Banks; Recent Developments in Commercial Banking; RBI – Features, Powers & Role of RBI in credit creation & control; IRDA – Duties, Powers & Functions; LIC & GIC – Overview, Objectives & Functions; Mutual Funds – Concept, Types and Benefits of Mutual Funds; Role of SEBI in Mutual Funds; NBFC – Concept & Classification; Other important Financial Institutions – Merchant Banks, Investment Banks, Credit Unions, Savings and Loan Associations (meaning only); Brief about Financial Inclusion.

Module: 4 - FINANCIAL SERVICES 12 Hrs

Financial Services – Meaning, Objectives, Functions, Characteristics; Types of Financial Services - Merchant Banking – Functions and Operations, Leasing, Mutual Funds, Venture Capital & Credit Rating.

SKILL DEVELOPMENT ACTIVITIES:

- Chart showing the structure of Indian Financial System
- Structure of Commercial Banks in India
- Select any Mutual Fund and examine various closed and open – ended schemes offered
- Visit any financial institution and prepare a report regarding its structure, functions and performance.
- Analyze the ratings given by any credit rating agency, for at least 5 companies.
- Conduct a mock stock-trading session and record the outcome

BOOKS FOR REFERENCE

1. Meir Kohn - Financial Institutions and Markets - Tata Mc Graw Hill
2. R.M Srivastava & D. Nigam - Dynamics of Financial Markets & Institutions in India - Excel Books
3. L M Bhole - Financial Institutions and Markets - Tata Mc Graw Hill
4. Murthy E.N - International Finance & Risk Management
5. Howells, P and K. Bain - Financial Markets and Institutions - Prentice Hall
6. Mishkin, F. and S. Eakins - Financial Markets and Institutions - Pearson Education
7. Dr. K. Venkataramanappa - SHB Publications

ANNEXURE –

OPEN ELECTIVES

Name of the Program: Bachelor of commerce (B.Com.)
Course Code: B.Com. 1.5 (a)
Name of the Course: Managerial Ethics

Course Credits	No. of Hours per week	Total No. of Teaching Hours
3 Credits	3 Hrs	40 Hrs

Pedagogy:

Classroom lecture, tutorials, Group discussion, Seminar, Case studies & field work

Course Outcomes:

On successful completion of the course, the students will be able to understand the basic knowledge of managerial ethics and values and its relevance in modern context.

Syllabus

Module: 1 – Introduction to Ethical Concepts **10 Hrs**

Ethics: Introduction, Meaning, Scope; Types of Ethics; Characteristics; Factors influencing Managerial Ethics; Importance of Managerial Ethics; Arguments for and against Managerial ethics; Corporate Social Responsibility – Issues of Management – Crisis Management

Module: 2 – Personal Ethics **10 Hrs**

Introduction – Meaning – Emotional Honesty – Virtue of humility – Promote happiness – karma yoga – proactive – flexibility and purity of mind.

Module: 3 –Ethics in Management **10 Hrs**

Introduction – Ethics in HRM – Marketing Ethics – Ethical aspects of Financial Management – Technology Ethics and Professional ethics.

Module: 3 –Corporate Governance **10 Hrs**

Corporate Governance: Meaning, scope; composition of BODs, Cadbury Committee, various committees, reports on corporate governance, scope of Corporate Governance, Benefits and Limitations of Corporate Governance with living examples.

Skill Development:

- State the arguments for and against business ethics
- Make a list of unethical aspects of finance in any organization
- List out ethical problems faced by managers
- List out issues involved in Corporate Governance.
- List out unethical aspects of Advertising

Books for Reference:

1. Murthy CSV - Business Ethics and Corporate Governance - HPH
2. Dr. Muralidhar S & others – Managerial Ethics – Kalyani Publishers
3. Bholananth Dutta, S.K. Podder – Corporation Governance - VBH.
4. Dr. K. Nirmala, Karunakara Readdy - Business Ethics and Corporate Governance - HPH
5. H.R.Machiraju - Corporate Governance
6. K. Venkataramana - Corporate Governance - SHBP
7. N.M.Khandelwal - Indian Ethos and Values for Managers
8. S Prabhakaran - Business ethics and Corporate Governance
9. C.V. Baxi - Corporate Governance
10. R. R. Gaur, R. Sanghal, G. P. Bagaria - Human Values and Professional ethics
11. B O B Tricker - Corporate Governance - Principles , Policies and Practices
12. Michael, Blowfield - Corporate Responsibility
13. Andrew Crane - Business Ethics
14. Ghosh - Ethics in Management and Indian ethos

Name of the Program: Bachelor of commerce (B.Com.)
Course Code: B.Com. 1.5 (b)
Name of the Course: Entrepreneurship & Start-ups

Course Credits	No. of Hours per week	Total No. of Teaching Hours
3 Credits	3 Hrs	40 Hrs

Pedagogy:

Classroom lecture, tutorials, Group discussion, Seminar, Case studies & field work

Course Outcomes:

On successful completion of the course, the students develop the entrepreneurship abilities and opportunities and the course aims at imparting skills and techniques of exploring these opportunities through the formulation of a bankable project. It is also aimed to study the formalities of setting up of a company and its management

Syllabus

Module: 1 - INTRODUCTION TO ENTREPRENEURSHIP **10 Hrs**

Introduction – Meaning& Definition of Entrepreneurship, Entrepreneur & Enterprise –Functions of Entrepreneur - Factors influencing Entrepreneurship - Pros and Cons of being an entrepreneur – Qualities of an Entrepreneur – Types of Entrepreneurs

Module: 2 – BUSINESS PLAN **10 Hrs**

Business model: Meaning, designing, analyzing and improvising;
Business Plan – Meaning, Scope and Need;
Financial, Marketing, Human Resource and Production/Service Plan;
Business plan Formats; Project report preparation and presentation;
Why some Business Plan fails?

Module: 3 – FORMATION OF A BUSINESS ENTITY **08 Hrs**

Business opportunity, scanning the environment for opportunities, evaluation of alternatives and selection based on personal competencies. Steps involved in the formation of a small business venture: location, clearances and permits required, formalities, licensing and registration procedure. Assessment of the market for the proposed project – Financial, Technical, Market and Social feasibility study.

Module: 4 – GOVERNMENT SCHEMES & POLICIES **12 Hrs**

Government Schemes and Policies for Entrepreneurship Development: Start up India, Make in India, Atal Innovation Mission, STEP, JAM, STAND-UP India, TREAD, PMKVY, Schemes of DST, DIPP, MSME Single Point Registration Scheme, Ministry of Agriculture and Farmers Welfare-The Venture Capital Assistance Scheme, GoI-Pradhan Mantri Mudra Yojana, Small Industries Development Bank of India (SIDBI), Sustainable Finance Scheme, Department Of Science & Technology (DST)

Skill Developments Activities:

- A detailed Business plan is to be prepared, submitted and presented as process of CEE
- Preparation of a Project report to start a SSI Unit.
- Preparing a letter to the concerned authority-seeking license for the proposed SS Unit
- Format of a business plan.
- A Report on the survey of SSI units in the region where college is located.
- Chart showing financial assistance available to SSI along with rates of interest.
- Chart showing tax concessions to SSI both direct and indirect.
- Success stories of Entrepreneurs in the region

REFERENCE BOOKS

1. Vasanth Desai - Management of Small Scale Industry - HPH
2. Mark. J. Dollinger - Entrepreneurship – Strategies and Resources - Pearson Edition
3. Dr. Venkataramana - Entrepreneurial Development - SHB Publications
4. Udai Pareek and T.V. Rao, - Developing Entrepreneurship
5. Rekha & Vibha – Entrepreneurship Development - VBH
6. S.V.S. Sharma - Developing Entrepreneurship, Issues and Problems
7. B. Janakiraman , Rizwana M - Entrepreneurship Development - Excel Books
8. Srivastava - A Practical Guide to Industrial Entrepreneurs
9. Anil Kumar - Small Business and Entrepreneurship I.K. International Publishers
10. Government of India, Report of the committee on Development of small and medium entrepreneurs, 1975
11. Bharusali - Entrepreneur Development
12. Satish Taneja - Entrepreneur Development
13. Vidya Hattangadi - Entrepreneurship
14. N.V.R Naidu - Entrepreneurship Development, I.K. International Publishers

Name of the Program: Bachelor of commerce (B.Com.)
Course Code: B.Com. 1.5 (c)
Name of the Course: Accounting for Everyone

Course Credits	No. of Hours per week	Total No. of Teaching Hours
3 Credits	3 Hrs	40 Hrs

Pedagogy:

Classroom lecture, tutorials, Group discussion, Seminar, Case studies & field work

Course Outcomes:

On successful completion of the course, the students will be able to acquire basic knowledge on financial accounting and to impart preliminary skills for recording various kinds of financial transactions.

Syllabus

Module: 1 – Introduction to Accounting **12 Hrs**

Accounting – Meaning, Importance and Need, Its objectives and relevance to business establishments and other organizations and individuals; Accounting Concepts & Conventions
Some Basic Terms –Transaction, Account, Asset, Liability, Capital, Expenditure & Expense, Income, Revenue, Gain, Profit, Surplus, Loss, Deficit. Debit, Credit, Accounting Year, Financial Year.

Module: 2 – Recording of Transactions **12 Hrs**

Transactions and recording of transactions Features of recordable transactions and events, Recording of transactions: Personal account, Real Account and Nominal Account; Rules for Debit and Credit;
Double Entry System, journalizing transactions; Preparation of Ledger – Simple problems

Module: 3 – Final Accounts of Sole Proprietorship Concerns **12 Hrs**

Fundamental Accounting Equation; Preparation of Trial Balance; Concept of revenue and Capital; Preparation of Trading and Profit & Loss Account, Balance Sheet

Module: 4 – Computerized Accounting **4 Hrs**

Introduction to Computerized Accounting Systems: Introduction to popular accounting softwares

Skill Developments Activities:

- Prepare a set of Final Accounts with imaginary figures
- List out the popular Accounting Software in practice
- Visit an outlet near your place and understand the process of accounting followed

Reference Books:

1. Hatfield, L - Accounting Basics - Amazon Digital Services LLC.
2. Dr. Muralidhar S & others – Basics of Financial Accounting – Kalyani Publishers
3. Horngren, C. T., Sundem, G. L., Elliott, J. A., & Philbrick, D - Introduction to Financial Accounting - Pearson Education
4. Siddiqui, S. A - Book Keeping &Accountancy -Laxmi Publications Pvt. Ltd.
5. Sehgal, D - Financial Accounting -Vikas Publishing House Pvt. Ltd
6. Tulsian, P. C - Financial Accounting - Tata McGraw Hill Publishing Co. Ltd.
7. Mukharji, A., & Hanif, M - Financial Accounting - Tata McGraw Hill Publishing Co. Ltd.
8. Maheshwari, S. N., Maheshwari, S. K., & Maheshwari, S. K - Financial Accounting - Vikas Publishing House Pvt. Ltd
9. Mukherjee, S., & Mukherjee, A. K - Financial Accounting - Oxford University Press
10. Jain, S. P., & Narang, K. L – Financial Accounting – Kalyani Publishers

Name of the Program: Bachelor of commerce (B.Com.)
Course Code: B.Com. 1.5 (d)
Name of the Course: Corporate Environment

Course Credits	No. of Hours per week	Total No. of Teaching Hours
3 Credits	3 Hrs	40 Hrs

Pedagogy:

Classroom lecture, tutorials, Group discussion, Seminar, Case studies & field work

Course Outcomes:

On successful completion of the course, the students will be able to understand the corporate style of working and the laws governing the corporate administration

Syllabus

Module: 1 - INTRODUCTION TO COMPANY **10 Hrs**

Company: Meaning, Definition, Features; Steps in formation of Joint Stock Company; Kinds of Companies – One Person Company, Private Company, Public Company, Company limited by Guarantee, Company limited by Shares, Holding Company, Subsidiary Company, Government Company, Associate Company, Small Company, Foreign Company, Global Company, Body Corporate, Listed Company.

Module: 2 - FORMATION OF A COMPANY **12 Hrs**

Promotion Stage: Meaning of Promoter, Position of Promoter & Functions of Promoter,
Incorporation Stage – Meaning & contents of Memorandum of Association & Articles of Association, Distinction between Memorandum of Association and Articles of Association, Certificate of Incorporation Subscription Stage – Meaning & contents of Prospectus, Statement in lieu of Prospects and Book Building Commencement Stage – Document to be filed, e-filing, Register of Companies, Certificate of Commencement of Business.

Module: 3 – COMPANY ADMINISTRATION **10 Hrs**

Key Managerial Personnel – Managing Director, Whole time Directors, the Companies Secretary, Chief Financial Officer, Resident Director, Independent Director, Auditors – Appointment – Powers - Duties & Responsibilities. Managing Director – Appointment – Powers – Duties & Responsibilities. Audit Committee, CSR Committee. Company Secretary - Meaning, Types, Qualification, Appointment, Position, Rights, Duties, Liabilities & Removal or dismissal

Module: 4 - CORPORATE MEETINGS **08 Hrs**

Corporate Meetings - Types of Meetings – Annual General Meeting – Extraordinary General Meetings – Board Meetings and Resolutions - Requisites of a valid meeting

Skill Developments Activities:

- Drafting of Memorandum of Association, Drafting Articles of Association.
- Drafting Notice of Company Meetings – Annual, Special, Extraordinary and Board meetings.
- Drafting Resolutions of various meetings – different types.
- Chart showing Company's Organization Structure.
- Chart showing different types of Companies.

Reference Books:

1. S.N Maheshwari - Elements of Corporate Law - HPH.
2. Dr. Muralidhar & Others – Corporate Environment – Kalyani Publishers
3. Balchandran – Business Law for Management - HPH
4. Dr. B.G. Bhaskar, K.R. Mahesh Kumar – Corporate Administration - VBH
5. Dr. P.N. Reddy and H.R. Appanaiah - Essentials of Company Law and Secretarial Practice - HPH.
6. M.C. Shukla & Gulshan - Principles of Company Law.
7. K. Venkataramana - Corporate Administration – SHBP
8. N.D. Kapoor - Company Law and Secretarial Practice - Sultan Chand.

9. C.L Bansal - Business and Corporate Law
10. M.C. Bhandari - Guide to Company Law Procedures - Wadhwa Publication
11. S.C. Kuchal - Company Law and Secretarial Practice
12. S.C. Sharma - Business Law - I.K. International Publishers
13. S.N Maheshwari - Elements of Corporate Law - Vikas Publishers

Name of the Program: Bachelor of commerce (B.Com.)
Course Code: B.Com. 2.5 (a)
Name of the Course: Retail Management

Course Credits	No. of Hours per week	Total No. of Teaching Hours
3 Credits	3 Hrs	40 Hrs

Pedagogy:

Classroom lecture, tutorials, Group discussion, Seminar, Case studies & field work

Course Outcomes:

On successful completion of the course, the students will be able to acquire the skills required to be directly employed as a sales or marketing executive manager or to start a retail business of their own.

Syllabus

Module: 1 - INTRODUCTION TO RETAIL BUSINESS 10 Hrs

Introduction to retailing; Retail Business – Introduction, Definition and scope; functions of retailing; evolution of retailing, types of retail, trends in retailing industry, benefits of retailing, retailing environment.

Retail theories – Wheel of Retailing – Retail life cycle. Factors influencing retail business in India; Present Indian retail scenario

Module: 2 - RETAIL OPERATIONS 10 Hrs

Factors influencing location of Store - Market area analysis – Trade area analysis – Rating Plan method - Site evaluation. Retail Operations: Stores Layout and visual merchandising, Stores designing, Space planning, Inventory management, Merchandise Management, Category Management.

Module: 3 – RETAIL MARKETING & PROMOTION 12 Hrs

Retail marketing and promotion: Nature and scope; relationship marketing; market strategies; Understanding the retail customer; population analysis; demographic analysis; consumer behavior
Retail promotion Mix: - Retail promotion program, retail advertising media, promotional budget.

Module: 4 - INFORMATION SYSTEM IN RETAILING 08 Hrs

Non store retailing (e-retailing) - The impact of Information Technology in retailing - Integrated systems and networking – EDI – Bar coding – Electronic article surveillance – Electronic shelf labels – customer database management system

Skill Developments Activities:

- Draw a retail life cycle chart and list the stages
- Draw a chart showing a store operation
- List out the major functions of a store manager diagrammatically
- List out the current trends in e-retailing
- List out the Factors Influencing in the location of a New Retail outlet

REFERENCE BOOKS

1. Suja Nair - Retail Management - HPH
2. Dr. Muralidhar & Others – Retail Management – Kalyani Publishers
2. Karthic – Retail Management - HPH
3. S.K. Poddar& others – Retail Management - VBH.
4. R.S Tiwari - Retail Management - HPH
5. Barry Bermans and Joel Evans - Retail Management – A Strategic Approach - PHI
6. A.J.Lamba - The Art of Retailing - Tata Mc Graw Hill
7. Swapna Pradhan - Retailing Management - TMH
8. K. Venkataramana - Retail Management - SHBP

9. James R. Ogden & Denise T - Integrated Retail Management
10. A Sivakumar - Retail Marketing - Excel Books
11. Ogden - Biztantra
12. Levy & Weitz - Retail Management - TMH
13. Rosemary Varley, Mohammed Rafiq - Retail Management
14. Chetan Bajaj - Retail Management - Oxford Publication.
15. Uniyal &Sinha - Retail Management - Oxford Publications.
16. Araif Sakh - Retail Management

Name of the Program: Bachelor of commerce (B.Com.)
Course Code: B.Com. 2.5 (b)
Name of the Course: Banking Innovation

Course Credits	No. of Hours per week	Total No. of Teaching Hours
3 Credits	3 Hrs	40 Hrs

Pedagogy:

Classroom lecture, tutorials, Group discussion, Seminar, Case studies & field work

Course Outcomes:

On successful completion of the course, the students will be able to understand the banking technology and their recent developments and enhance their knowledge on banking concepts and techniques

Syllabus

Module: 1 – Introduction to Banking **10 Hrs**

Banking: Introduction, History and definition; banking operations, distinction between Retail and Corporate / Wholesale Banking, Role of Commercial Banks in credit creation, Concept of RTGS, NEFT

Module: 2 – Retail Banking Products **10 Hrs**

Retail Products: Retail Products Overview, Approval process for retail loans, credit scoring, Important Asset Products such as Home Loans, Auto / Vehicle Loans, Educational Loans, Credit / Debit Cards, Other Products / Remittances / Funds Transfer.

Module: 3 – Innovative Banking Products **10 Hrs**

Securitization, mortgage-based securities, Trends in banking: Innovative Insurance products, Demat services, online / Phone Banking, Property services, Investment advisory / Wealth management, Reverse Mortgage – Growth of e-banking, Cross- selling opportunities. Recovery of Retail Loans – Defaults, Rescheduling, recovery process. SARAFAESI Act, DRT Act, use of Lok Adalat forum

Module: 4 – Digital Banking **10 Hrs**

Digital Banking Products; Cards; EMV technology; ATMs; Cash Deposit machines; Cash Recyclers; Mobile Banking; Internet Banking; UPI payments; POS terminals; Branchless Banking; Payment Systems; Marketing of Digital Banking Products; New Developments and Innovations in Banking

Skill Development:

- Filling of application for opening a Bank Account
- Preparations of Bank Reconciliation Statement
- Identify and compare the banking delivery channels of nationalized banks and private banks
- List out the boons and the banes of computerization of banks operations.
- Current issues in banking technology to be discussed in class

Books for Reference:

1. Kaptan S S & Choubey N S, "E-Indian Banking in Electronic Era", Sarup & Sons, New Delhi 2003.
2. Vasudeva, "E-Banking", Common Wealth Publishers, New Delhi, 2005.
3. Chandramohan : Fundamental of Computer Network I.K. International Publishers
4. Effraim Turban, Rainer R. Kelly, Richard E. Potter, "Information Technology", John Wiley & Sons Inc, 2000.
5. Andrew S. Tanenbaum, "Computer Networks", Tata McGraw Hill, 3rd Edition, 2001
6. Padwal & Godse : Transformation of Indian Banks with Information Technology.

Name of the Program: Bachelor of commerce (B.Com.)
Course Code: B.Com. 2.5 (c)
Name of the Course: Event Management

Course Credits	No. of Hours per week	Total No. of Teaching Hours
3 Credits	3 Hrs	40 Hrs

Pedagogy:

Classroom lecture, tutorials, Group discussion, Seminar, Case studies & field work

Course Outcomes:

On successful completion of the course, the students will be able to understand the conceptual framework of Event Management, Event Services, Conducting Event and Managing Public Relations

Syllabus

Module: 1- INTRODUCTION TO EVENT MANAGEMENT **10 Hrs**

Event- Meaning- Why Event Management- Analysis of Event, Scope of Event, Decision Makers- Event Manager Technical Staff- Establishing of Policies & Procedure- Developing Record Keeping Systems.

Module: 2-EVENT MANAGEMENT PROCEDURE **10 Hrs**

Principles for holding an Event, General Details, Permissions- Policies, Government and Local Authorities, - Phonographic Performance License, Utilities- Five Bridge Ambulance Catering, Electricity, Water Taxes Applicable.

Module: 3-CONDUCT OF AN EVENT **10 Hrs**

Preparing a Planning Schedule, Organizing Tables, Assigning Responsibility, Communication and Budget of Event- Checklist, Computer aided Event Management– Roles & Responsibilities of Event Managers for Different Events.

Module: 4 CORPORATE EVENTS **10 Hrs**

Planning of Corporate Event, Job Responsibility of Corporate Events Organizer, Arrangements, Budgeting, Safety of Guests and Participants, Creating Blue Print, Need for Entertainment in Corporate Events And Reporting.

Skill Development:

1. Preparation of Event Plan for Wedding, Annual general body Meeting of an MNC.
2. Preparing Budget for conduct of National level intercollegiate sports events.
3. Preparation of Event Plan for College day Celebrations
4. Preparation of Budget for Conducting inter collegiate Commerce Fest.

Books for Reference:

1. Event Entertainment and Production – Author: Mark Sonderm CSEP Publisher: Wiley & Sons, Inc.
2. Dr. Muralidhar & others – Event Management – Kalyani Publishers
3. Ghouse Basha – Advertising & Media Mgt, VBH.
4. Anne Stephen – Event Management, HPH.
5. K. Venkataramana, Event Management, SHBP.
6. Special Event Production – Doug Matthews – ISBN 978-0-7506-8523-8
7. The Complete Guide to successful Event Planning – Shannon Kilkenny
8. Human Resource Management for Events – Lynn Van der Wagen (Author)
9. Successful Team Manageemnt (Paperback) – Nick Hayed (Author)
10. Event Management & Public Relations by Savita Mohan – Enkay Publishing House
11. Event Management & Public Relations By Swarup K. Goyal – Adhyayan Publisher - 2009

Name of the Program: Bachelor of commerce (B.Com.)
Course Code: B.Com. 2.5 (d)
Name of the Course: Financial Literacy

Course Credits	No. of Hours per week	Total No. of Teaching Hours
3 Credits	3 Hrs	40 Hrs

Pedagogy:

Classroom lecture, tutorials, Group discussion, Seminar, Case studies & field work

Course Outcomes:

On successful completion of the course, the students will be able to understand the basics of savings, investments, institutions, financial markets, insurance which enables the student to take sound financial decisions

Syllabus

Module: 1 – Basics of Savings and Investment **10 Hrs**

Concept of Savings & Investment; Savings Vs Investment, Power of Compounding; investment objectives; Risk and Return; Inflation effects on Investment; Various Assets Class

Module: 2 - Financial Markets **10 Hrs**

Capital Market; Money Market, Securities - Equity, Debentures or Bonds, IPOs and FPOs, Mutual Funds, Types of Mutual Funds, Brokers, sub-brokers, Process for becoming a capital market investor

Module: 3 – Insurance Products **10 Hrs**

Insurance Policies - Life Insurance, Term Life Insurance, Endowment Policies, Pension Policies, ULIP, Health Insurance and its Plans, Understanding of Ponzi Schemes

Module: 4 - Tax saving Schemes **10 Hrs**

Government Schemes; National Saving Certificates; Public Provident Fund; Post Office Schemes; Equity Linked Savings Schemes; Retirement Benefits Schemes - NPS (New Pension System)

Skill Development:

- Analyze the risk-return factors of any 4 asset classes
- List out the top 10 Mutual Funds based on their performance for the past 5 years
- List out at least 10 stock-brokers in Equity Markets
- List out the 10 IPOs that have been issued in the recent past
- Critically analyze the performance of PPF & ELSS

Books for Reference:

1. Meir Kohn - Financial Institutions and Markets - Tata Mc Graw Hill
2. R.M Srivastava & D. Nigam - Dynamics of Financial Markets & Institutions in India - Excel Books
3. L M Bhole - Financial Institutions and Markets - Tata Mc Graw Hill
4. Murthy E.N - International Finance & Risk Management
5. Howells, P and K. Bain - Financial Markets and Institutions - Prentice Hall
6. Valdez, S. & P. Molyneux - An Introduction to Global Financial Markets - Macmillan
7. Mishkin, F. and S. Eakins - Financial Markets and Institutions - Pearson Education
8. Dr. K. Venkataramanappa - SHB Publications

ಬೆಂಗಳೂರು ಉತ್ತರ ವಿಶ್ವವಿದ್ಯಾಲಯ

ಟಮಕ, ಕೋಲಾರ – 563103

CHOICE BASED CREDIT SYSTEM

(Semester Scheme with Multiple Entry and Exit Options for Under Graduate Course)

SYLLABUS AS PER NEP GUIDELINES

SUBJECT: BACHELOR OF BUSINESS ADMINISTRATION

2021-22 onwards

CURRICULUM AND REGULATIONS OF BBA DEGREE (REGULAR & HONOURS)

Under the National Education Policy – 2020

ಬೆಂಗಳೂರು ಉತ್ತರ ವಿಶ್ವವಿದ್ಯಾಲಯ
BENGALURU NORTH UNIVERSITY

SRI DEVARAJ URS, EXTENSION TAMAKA,
KOLAR – 563103.

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MR. A. MUTHU ANANDA

THE NATIONAL EDUCATIONAL POLICY 2020

The approval of the National Education Policy (NEP) by the Ministry of Human Resource Development, Government of India has been well deliberated as discussed from the last 4 years and more. The advent of industry 4.0 scenario has led our current system of education outdated. Hence, the NEP is designed to contemplate the current skill requirements. The Indian education system with its earlier policies on education has greatly led to creation of fragmented system of education. However, bringing the whole system into one large umbrella remains a key issue. The current NEP has attempted to cure the same by getting rid of standalone institutions and institutions of affiliated nature and proposed formation and upgradation of institutions to offer multidisciplinary education. Multidisciplinary education system with inbuilt flexibility for both undergraduate as well as post graduate and research level is a key highlight of the NEP. It focuses on promoting and building vocational skills/skill enhancement courses, right from the school level, which can ease the burden on the employment opportunities and supply of proficient/talented workforce. As the experts rightly put it as the syllabi which academia develops should be student centric rather than teacher centric, which used to be so far. As already the Union Cabinet has approved the NEP 2020, it aims to pave way for transformational reforms in school and higher education systems in the country. This policy will replace the 34- year-old National Policy on Education (NPE), 1986.

VISION OF THE NATIONAL EDUCATION POLICY 2020

- An education system that contributes to an equitable and vibrant knowledge society, by providing high-quality education to all.

- Develops a deep sense of respect towards the fundamental rights, duties and Constitutional values, bonding with one's country, and a conscious awareness of one's role and responsibilities in a changing world.

- Instils skills, values, and dispositions that support responsible commitment to human rights, sustainable development and living, and global well-being, thereby reflecting a truly global citizen.

This National Education Policy 2020 is the first education policy of the 21st century and aims to address the many growing developmental aspirations of our country. This Policy proposes the revision and revamping of all aspects of the education structure, including its regulation and governance, to create a new system that is aligned with the aspirations & goals of 21st century education, including SDG4, while building upon India's traditions and value systems. NEP aims for India to have an education system by 2040 that is second to none, with equitable access to the highest-quality education for all learners regardless of social or economic background and seeks to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all" by 2040." The whole of the NEP policy is a medication to cure the shortcomings in the education system for the last 35 to 36 years. The failure or success of the NEP will rely completely on the implementation and its acceptance by the stakeholders. For which we need to join hands in strengthening the system.

The BBA Programme provides a best career opportunist for students to develop managerial and entrepreneurial skills in order to pursue employment opportunities in the corporate sector or venture into their own business. The course takes a student over the functional areas of management including manufacturing, marketing, finance, HRM, sales, strategy management etc. ... Plus, soft skill development such as communication, attitude, leadership and other skills.

I. OBJECTIVES OF THE BBA DEGREE

- To develop entrepreneurism by equipping them with all the skills and knowledge required to start a business.
- To develop ethical managers with inter disciplinary knowledge
- To enable students to apply knowledge of management theories and practices to solve business problems.
- To promote ethical and value-based leadership ability.
- To equip students for the world of work, particularly the work of the future.
- To enable students to demonstrate use of appropriate techniques to effectively manage business challenges.
- To encourage analytical and critical thinking abilities for business decision making.
- To empower students to take up competitive examinations like UPSC, KPSC, and other examinations.

II. GRADUATE ATTRIBUTES

The graduate attributes are the outline of the expected course learning outcomes mentioned in the beginning of each course. The characteristic attributes that a graduate will be able to demonstrate through learning various courses which are listed below:

DISCIPLINARY KNOWLEDGE

Capability of executing comprehensive knowledge and understanding of one or more disciplines that form part of commerce.

COMMUNICATION SKILLS

- Ability to communicate long standing, unsolved problems in commerce.
- Ability to show the importance of commerce as precursor to various market developments since the beginning of civilization.

CRITICAL THINKING

- Ability to engage in reflective and independent thinking by understanding the concepts in every area of Commerce and Business.
- ii.Ability to examine the results and apply them to various problems appearing in different branches of Commerce and Business.

PROBLEM SOLVING

- Capability to reduce a business problem and apply the classroom learning into practice to offer a solution for the same.
- ii. Capabilities to analyse and synthesize data and derive inferences for valid conclusions.
- iii. Able to comprehend solutions to sustain problems originating in the diverse management areas such as Finance, Marketing, Human Resource, Taxation and so on

RESEARCH RELATED SKILLS

- Ability to search for, locate, extract, organise, evaluate, and use or present information that is relevant to a particular topic.
- Ability to identify the developments in various branches of Commerce and Business.

INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) DIGITAL LITERACY

- Capability to use various ICT tools (like spreadsheet) for exploring, analysis, and utilizing the information for business purposes.

SELF-DIRECTED LEARNING

- Capability to work independently in diverse projects and ensure detailed study of various facets of Commerce and Business.

MORAL AND ETHICAL AWARENESS/REASONING

- Ability to ascertain unethical behaviour, falsification, and manipulation of information. ii. Ability to manage self and various social systems.

LIFE-LONG LEARNING

- Capability of self-paced and self-directed learning aimed at personal development and for improving knowledge/skill development and reskilling in all areas of Commerce.

III. ELIGIBILITY FOR ADMISSION

Candidates who have completed two years Pre – University course in any discipline of Karnataka State or its equivalent as notified by the university from time to time are eligible to seek admission for this course.

IV. DURATION OF THE PROGRAMME

The Duration of the Programme is Four (04) years of Eight Semesters. Progressive Certificate, Diploma, Bachelor Degree or Bachelor Degree with Honors provided at the end of each year of Exit of the four years Undergraduate Programme as the case maybe as follows:

YEAR	EXIT OPTION WITH	CREDITS REQUIREMENT*
CBA	On successful completion of Two Semesters of BBA at the end of First year, the student will be eligible for the award of CERTIFICATE IN BUSINESS ADMINISTRATION	48
DBA	On successful completion of four Semesters of BBA at the end of Second year, the student will be eligible for the award of DIPLOMA IN BUSINESS ADMINISTRATION	96 (48+48)
BBA	On successful completion of Six Semesters of BBA at the end of Third year, the student will be eligible for the award of BACHELOR'S DEGREE IN BUSINESS ADMINISTRATION	138 (48+48+42)
BBA (H)	On successful completion of Eight Semesters of BBA at the end of fourth year, the student will be eligible for the award of HONOURS DEGREE IN BUSINESS ADMINISTRATION	180 (48+48+42+42)

V. MEDIUM OF INSTRUCTION

The medium of instruction shall be English only.

VI. ATTENDANCE

- For the purpose of calculating attendance, each semester shall be taken as a Unit.
- A student shall be considered to have satisfied the requirement of attendance for the semester, if he/she has attended not less than 75% in aggregate of the number of working periods in each of the courses compulsorily.
- A student who fails to satisfy the above condition shall not be permitted to take the University examination.

VII. TEACHING AND EVALUATION

M.Com/MBA/MBS graduates with B.Com, B.B.M, and BBA & BBS as basic degrees from a recognized university are only eligible to teach and to evaluate the Courses (except languages, compulsory additional subjects and core Information Technology related subjects) mentioned in this regulation. Languages and additional courses shall be taught by the graduates as recognized by the respective Board of Studies.

VIII. RECORD MAINTENANCE AND SUBMISSION

- Every college is required to establish an Innovative business lab / computer lab to enable students to get practical knowledge of business activities and online learning.
- In every semester, the student should keep a record of the Business Lab/Field Study Activity and submit it to the concerned faculty.
- The BOE is authorized to make random surprise visits to the colleges and verify record-books and the internal marks awarded.

IX. GUIDELINES FOR CONTINUOUS INTERNAL EVALUATION (CIE) AND SEMESTER END EXAMINATION (SEE)

The CIE and SEE will carry 40% and 60% weightage each, to enable the course to be evaluated for a total of 100 marks, irrespective of its credits. The evaluation system of the course is comprehensive & continuous during the entire period of the Semester. For a course, the CIE and SEE evaluation will be on the following parameters:

SL No.	Parameters for the Evaluation	Marks
CONTINUOUS INTERNAL EVALUATION (CIE) – (A + B)		
A	Continuous & Comprehensive Evaluation (CCE)	20 Marks
B	Internal Assessment Tests (IAT)	20 Marks
C	Semester End Examination (SEE)	60 Marks
	TOTAL OF CIE AND SEE (A + B + C)	100 MARKS

A. CONTINUOUS & COMPREHENSIVE EVALUATION (CCE):

The CCE will carry a maximum of 20% weightage (20 marks) of total marks of a course. The faculty member can select any four of the following assessment methods, Minimum of four of the following assessment methods of 5 marks each:

- Individual Assignments
- Seminars/Classroom Presentations/ Quizzes
- Group Discussions /Class Discussion/ Group Assignments
- Case studies/Caselets
- Participatory & Industry-Integrated Learning/ Field visits
- Practical activities / Problem Solving Exercises
- Participation in Seminars/ Academic Events/Symposia, etc.
- Mini Projects/Capstone Projects
- Any other academic activity.

B. INTERNAL ASSESSMENT TESTS (IAT):

The IAT will carry a maximum of 20% weightage (20 marks) of total marks of a course, under this component, two tests will have to be conducted in a semester for 25 marks each and the same is to be scaled down to 10 marks each. Standard format is given below.

C. 50 PERCENT OF CIE

In the case of 50 percent of CIE weightage courses, faculty members can choose assessment methods accordingly for the required marks as mentioned above.

TEMPLATE FOR IAT QUESTION PAPER

INTERNAL ASSESSMENT TEST					
Name of the Course					
Name of the Subject:					
Subject Code:	BBA--	Duration:	1 HOURS	Total Marks	25
SECTION-A	Answer any two of the following three questions. (Questions related to Concepts)				2 X 2 = 4
SECTION-B	Answer any two of the following three questions. (Questions related to Understanding and Application)				2 X 5 = 10
SECTION- C	Answer any one of the following questions. (Questions related to analysis and evaluation)				1 X 11 = 11

X. APPEARANCE FOR THE EXAMINATION

A candidate shall be considered to have appeared for the examination only if he/she has submitted the prescribed application for the examination along with the required fees to the university.

XI. PATTERN OF QUESTION PAPER

SEMESTER END UNVERSITY QUESTION PAPER TEMPLATE					
Name of the Course					
Name of the Subject:					
Subject Code:		Duration:	3 HOURS	Total Marks	60
SECTION-A	Answer any FIVE out of SEVEN sub questions (CONCEPTUAL QUESTIONS)			05 X 02 = 10 Marks	
SECTION-B	Answer any THREE out of FIVE questions (APPLICATION QUESTIONS)			03 X 05 = 15 Marks	
SECTION- C	Answer any THREE out of FIVE questions (ANALYSIS AND UNDERSTANDING QUESTIONS)			03 X 08 = 24 Marks	
SECTION- D	Answer any ONE out of TWO questions Question completely based on the SKILL BASED (LAB ACTIVITIES) OR A CASE STUDY.			01 X 11 = 11 Marks	

COURSE MATRIX

I SEMESTER								
SL. NO	COURSE CODE	TITLE OF THE COURSE	CATEGORY OF COURSES	TEACHING HOURS PERWEEK (L + T + P)	SEE	CIE	TOTAL MARKS	CREDITS
1	LANG.1.1	Language - I	AECC	3+1+0	60	40	100	3
2	LANG.1.2	Language – II	AECC	3+1+0	60	40	100	3
3	BBA.1.1	Corporate Management & Behaviour	DSC	4+0+0	60	40	100	4
4	BBA.1.2	Accounting for Business	DSC	3+0+2	60	40	100	4
5	BBA.1.3	Marketing Management	DSC	4+0+0	60	40	100	4
6	BBA.1.4	Digital Proficiency for Business	SEC-SB	1+0+2	50	50	100	2
7	BBA.1.5	Office Management / Retailing Management / Business Management	OEC	3+0+0	50	50	100	3
				SUB TOTAL - I	400	300	700	23

II SEMESTER								
SL. NO	COURSE CODE	TITLE OF THE COURSE	CATEGORY OF COURSES	TEACHING HOURS PERWEEK (L + T + P)	SEE	CIE	TOTAL MARKS	CREDITS
8	Lang.2.1	Language – I	AECC	3+1+0	60	40	100	3
9	Lang.2.2	Language – II	AECC	3+1+0	60	40	100	3
10	BBA.2.1	Financial Accounting and Reporting	DSC	3+0+2	60	40	100	4
11	BBA.2.2	Human Resource Management	DSC	4+0+0	60	40	100	4
12	BBA.2.3	Bumastics	DSC	3+0+2	60	40	100	4
13	BBA.2.4	Health Wellness / Social & Emotional Learning	SEC-VB	1+0+2	-	100	100	2
14	BBA.2.5	Environmental Studies	AECC	2+0+0	50	50	100	2
15	BBA.2.6	Talent Management / Digital Marketing / Entrepreneurship	OEC	3+0+0	50	50	100	3
				SUB TOTAL - II	400	400	800	25

III SEMESTER								
SL. NO	COURSE CODE	TITLE OF THE COURSE	CATEGORY OF COURSES	TEACHING HOURS PER WEEK (L + T + P)	SEE	CIE	TOTAL MARKS	CREDITS
16	Lang.3.1	Language - I	AECC	3+1+0	60	40	100	3
17	Lang.3.2	Language – II	AECC	3+1+0	60	40	100	3
18	BBA.3.1	Cost Accounting	DSC	3+0+2	60	40	100	4
19	BBA.3.2	Global Business Ecosystem	DSC	4+0+0	60	40	100	4
20	BBA.3.3	Disaster Management	DSC	3+0+2	60	40	100	4
21	BBA.3.4	Artificial Intelligence	SEC	1+0+2	50	50	100	2
22	BBA.3.5	Advertising / Financial Literacy / Services Marketing	OEC	3+0+0	50	50	100	3
				SUB TOTAL - III	400	300	700	23

IV SEMESTER								
SL. NO	COURSE CODE	TITLE OF THE COURSE	CATEGORY OF COURSES	TEACHING HOURS PER WEEK (L + T + P)	SEE	CIE	TOTAL MARKS	CREDITS
23	Lang.4.1	Language - I	AECC	3+1+0	60	40	100	3
24	Lang.4.2	Language – II	AECC	3+1+0	60	40	100	3
25	BBA.4.1	Accounting for Decision Making	DSC	3+0+2	60	40	100	4
26	BBA.4.2	Business Analytics	DSC	3+0+2	60	40	100	4
27	BBA.4.3	Financial Management	DSC	3+0+2	60	40	100	4
28	BBA.4.4	Constitution of India	AECC	2+0+0	50	50	100	2
29	BBA.4.5	Sports/NCC/NSS/others (if any)	SEC-VB	1+0+2	-	100	100	2
40	BBA.4.6	Insurance / Banking Operations / Travel & Tourism	OEC	3+0+0	50	50	100	3
				SUB TOTAL - IV	400	400	800	25

V SEMESTER								
SL. NO	COURSE CODE	TITLE OF THE COURSE	CATEGORY OF COURSES	TEACHING HOURS PER WEEK (L + T + P)	SEE	CIE	TOTAL MARKS	CREDITS
31	BBA.5.1	Manufacturing and Operations Management	DSC	4+0+0	60	40	100	4
32	BBA.5.2	Income Tax	DSC	3+0+2	60	40	100	4
33	BBA.5.3	Elective-1	DSE	4+0+0	60	40	100	4
34	BBA.5.4	Elective-2	DSE	4+0+0	60	40	100	4
35	BBA.5.5	Information Technology for Managers	Vocational - 1	1+0+2	60	40	100	3
36	BBA.5.6	Cyber Security	SEC - VB	1+0+2	50	50	100	2
				SUB TOTAL - V	350	250	600	21

VI SEMESTER								
SL. NO	COURSE CODE	TITLE OF THE COURSE	CATEGORY OF COURSES	TEACHING HOURS PER WEEK (L + T + P)	SEE	CIE	TOTAL MARKS	CREDITS
37	BBA.6.1	Business Regulation	DSC	4+0+0	60	40	100	4
38	BBA.6.2	Entrepreneurship & Startup Management	DSC	3+0+2	60	40	100	4
39	BBA.6.3	Elective – 3	DSE	4+0+0	60	40	100	4
40	BBA.6.4	Elective – 4	DSE	4+0+0	60	40	100	4
41	BBA.6.5	Goods & Services Tax (GST)	Vocational-2	1+0+2	60	40	100	3
42	BBA.6.6	Content and Technical Writing	SEC - SB	1+0+2	50	50	100	2
				SUB TOTAL - VI	350	250	600	21

VII SEMESTER								
SL. NO	COURSE CODE	TITLE OF THE COURSE	CATEGORY OF COURSES	TEACHING HOURS PER WEEK (L + T + P)	SEE	CIE	TOTAL MARKS	CREDITS
44	BBA.7.1	Corporate Ethics & Governance	DSC	4+0+0	60	40	100	4
45	BBA.7.2	E – Business	DSC	4+0+0	60	40	100	4
46	BBA.7.3	Advance Statistics for Business Research	DSC	2+0+2	60	40	100	3
47	BBA.7.4	Elective – 5	DSE	4+0+0	60	40	100	4
48	BBA.7.5	Selected Statistical Software Application	Vocational-3	1+0+2	60	40	100	3
49	BBA.7.6	Research Methodology	DSC	3+1+0	60	40	100	3
				SUB TOTAL - VII	350	250	600	21

VIII SEMESTER								
SL. NO	COURSE CODE	TITLE OF THE COURSE	CATEGORY OF COURSES	TEACHING HOURS PER WEEK (L + T + P)	SEE	CIE	TOTAL MARKS	CREDITS
50	BBA.8.1	Strategic Management	DSC	4+0+0	60	40	100	4
51	BBA.8.2	Operations Research and Quantitative Techniques	DSC	3+0+2	60	40	100	4
52	BBA.8.3	Project Management	DSC	4+0+0	60	40	100	4
53	BBA.8.5	Digital Marketing	Vocational-4	1+0+2	60	40	100	3
54	BBA.8.5	Research Projects / Internship with Viva-voce OR Elective Paper 6 & 7 (Two Courses from the Selected Elective Group)	PR	2+4+0	140	60	200	6
			DSE	4+0+0	60	40	100	3
			DSE	4+0+0	60	40	100	3
				SUB TOTAL - VIII	500	300	800	21
				TOTAL OF I TO VIII	3510	2350	5600	180

SELECTION OF ELECTIVES

Students have to select dual electives out of the list of electives given in Fifth and Sixth Semester. Electives selected in the fifth semester should be continued in the sixth semester. However they can change the electives in the seventh semester. The electives selected in the seventh semester will continue in the eighth semester.

EXIT OPTION WITH BACHELOR DEGREE

Ability to solve complex problems that are ill-structured requiring multi-disciplinary skills to solve them.

BACHELOR DEGREE WITH HONORS

Experience of workplace problem solving in the form of internship or research experience preparing for higher education or entrepreneurship experience.

NOTES

One Hour of Lecture	1 Credit.
One Hour of Tutorial	1 Credit. (Except Languages).
Two Hours of Practical	1 Credit.

ACRONYMS EXPANDED

AECC	Ability Enhancement Compulsory Course
DSC ©	Discipline Specific Core (Course)
SEC-SB/VB	Skill Enhancement Course-Skill Based/Value Based
OEC	Open Elective Course
DSE	Discipline Specific Elective
SEE	Semester End Examination
CIE	Continuous Internal Evaluation
L+T+P	Lecture + Tutorial + Practical(s)

Note: *Practical Classes may be conducted in the Business Lab or in Computer Lab or in Class room depending on the requirement. One batch of students should not exceed half (i.e., 40 or less than 40 students) of the number of students in each class/section. 2 Hours of Practical Class is equal to 1 Hour of Teaching, however, whenever it is conducted for the entire class (i.e., more than 40 students) 2 Hours of Practical Class is equal to 2 Hours of Teaching.*

ELECTIVE GROUPS AND COURSES

V SEMESTER	FINANCE	Advanced Corporate Financial Management
	MARKETING	Consumer Behavior
	HUMAN RESOURCE MANAGEMENT	Compensation and Performance Management
	DATA ANALYTICS	Financial Analytics
	RETAILING	Retail Operations Management
	LOGISTICS AND SUPPLY CHAIN MANAGEMENT	Freight Transport Management

VI SEMESTER	FINANCE	Security Analysis and Portfolio Management
	MARKETING	Advertising Management & Sales promotion
	HUMAN RESOURCE MANAGEMENT	Employee Welfare & Social Security
	DATA ANALYTICS	Marketing Analytics
	RETAILING	Strategic Brand Management
	LOGISTICS AND SUPPLY CHAIN MANAGEMENT	Sourcing for Logistics and SCM

VII SEMESTER	FINANCE	Strategic Financial Management
	MARKETING	Brand Management / Rural Marketing
	HUMAN RESOURCE MANAGEMENT	Labor Laws & IR
	DATA ANALYTICS	HR Analytics
	RETAILING	Merchandising Planning and Buying
	LOGISTICS AND SUPPLY CHAIN MANAGEMENT	Managing Procurement contract and relationship

VIII SEMESTER	FINANCE	Derivatives and Risk Management
		International Financial Management
	MARKETING	B to B Marketing (Industrial Marketing)
		Sales & Distribution Management
	HUMAN RESOURCE MANAGEMENT	HRD
		International HRM
	DATA ANALYTICS	Web and Social Intelligence
		Machine Learning in Business
	RETAILING	IT applications in Retail Business

		Visual Merchandising
	LOGISTICS AND SUPPLY CHAIN MANAGEMENT	Global Environment for Supply chain Management
		International Supply Chain

NOTE: Student shall continue with the same elective group in V and VI semesters, however, he/she may change the elective group in VII semester, but shall continue in the same group in VIII semester.

Subject Name	CORPORATE MANAGEMENT & BEHAVIOUR			Subject Code	BBA 1.1
Course Credits	4	No. of Hours per Week	4	Total No. of Teaching Hours	56

PEDAGOGY

Classrooms lecture, tutorials, Group discussion, Seminar, Case studies & field work etc.,

COURSE OUTCOMES:

On successful completion of the course, the Students will demonstrate

- The ability to understand concepts of business management, principles and function of management.
- The ability to explain the process of planning and decision making.
- The ability to create organization structures based on authority, task and responsibilities and understand organizational Behavior, avoid conflicts, accept change and work in groups.
- The ability to explain the principles of direction, importance of communication, barrier of communication, motivation theories and leadership styles.
- The ability to understand the requirement of good control system and control techniques.

MODULE NO 1	INTRODUCTION TO BUSINESS & MANAGEMENT	10 HRS

Introduction to Business, Forms of Business Organization, their merits, limitations and formation-Meaning Nature and Characteristics of Management Scope and Functional areas of Management; Management as a Science, Art or Profession; Management and Administration; Principles of Management.

MODULE NO. 2	PLANNING AND DECISION MAKING	08 HRS

Nature, Importance and Purpose of Planning - Planning Process; Objectives; Types of plans (Meaning only); Decision making- Importance and steps; MBO and MBE (Meaning only)

MODULE NO. 3	ORGANIZING AND STAFFING	18

Nature and purpose of Organization; Principles of Organizing; Delegation of Authority; Types of Organization - Departmentation, Committees; Centralization vs Decentralization of Authority and Responsibility, Span of Control; Nature and importance of Staffing Organizational Behavior: Individual Behavior and Differences - Personality – Attitudes and Beliefs – Values - Perception – Perceptual Selectivity –Management of Stress Group Dynamics: Group Behavior–Formation - Understanding Work Groups– Conflict, Negotiation, and Intergroup Behavior - Management of Change – Resistance to Change – Organizational Development

MODULE NO. 4	DIRECTING AND COMMUNICATING	12

Meaning and Nature of Direction, Principles of Direction; Communication - Meaning and Importance, Communication Process, Barriers to Communication, Steps to overcome Communication Barriers, Types of Communication; Motivation theories – Maslow's Need Hierarchy Theory, Herzberg's Two Factor Theory, Mc.Gregor's X and Y theory. Leadership – Meaning, Formal and Informal Leadership, Characteristics of Leadership; Leadership Styles – Autocratic Style, Democratic Style, Participative Style, Laissez Faire Leadership Styles, Transition Leadership, Charismatic Leadership Style.

MODULE NO. 5	COORDINATING AND CONTROLLING	08
Coordination–Meaning, Importance and Principles. Controlling-Meaning and steps in controlling, Essentials of Effective Control system, Techniques of Control (in brief).		

SKILL DEVELOPMENTS ACTIVITIES

- Two cases on the above syllabus should be analyzed by the teacher in the classroomand the same needs to be recorded by the student in the Skill Development Book.
- Draft different types of Organization structure.
- Draft Control charts.

TEXT & REFERENCE BOOKS

- Stephen P. Robbins, Management, Pearson
- Koontz and O"Donnell, Management, McGraw Hill.
- L M Prasad, Principles of management, Sultan Chand and Sons
- V.S.P Rao/Bajaj, Management process and organization, Excel Books.GH25
- Appanniah and Reddy, Management, HPH.
- T. Ramaswamy : Principles of Management, HPH.
- Aswathappa :Organisation Behaviour

NOTE: LATEST EDITION OF TEXT BOOKS MAY BE USED.

Subject Name	Accounting for Business			Subject Code	BBA 1.2
Course Credits	4	No. of Hours per Week	4	Total No. of Teaching Hours	56

PEDAGOGY
Classrooms lecture, tutorials, and problem solving.

COURSE OUTCOMES:
On successful completion of the course, the Students will demonstrate

- Understand the framework of accounting as well accounting standards.
- The Ability to pass journal entries and prepare ledger accounts
- The Ability to prepare subsidiaries books
- The Ability to prepare trial balance and final accounts of proprietary concern.
- Construct final accounts through application of tally.

MODULE NO. 1	INTRODUCTION TO FINANCIAL ACCOUNTING	08

Introduction – Meaning and Definition – Objectives of Accounting – Functions of Accounting – Users of Accounting Information – Limitations of Accounting – Accounting Cycle - Accounting Principles – Accounting Concepts and Accounting Conventions. Accounting Standards – objectives-significance of accounting standards. List of Indian Accounting Standards.

Module No. 2	ACCOUNTING PROCESS	12

Meaning of Double entry system – Process of Accounting – Kinds of Accounts – Rules - Transaction Analysis – Journal – Ledger – Balancing of Accounts – Trial Balance – Problems on Journal, Ledger Posting and Preparation of Trial Balance.

Module No. 3	SUBSIDIARY BOOKS	14

Meaning – Significance – Types of Subsidiary Books –Preparation of Purchases Book, Sales Book, Purchase Returns Book, Sales Return Book, Bills Receivable Book, Bills Payable Book. Types of Cash Book- Simple Cash Book , Double Column Cash Book , Three Column Cash Book and Petty Cash Book(Problems only on Three Column Cash Book and Petty Cash Book), Bank Reconciliation Statement – Preparation of Bank Reconciliation Statement (Problems on BRS)

Module No. 4	FINAL ACCOUNTS OF PROPRIETARY CONCERN	10

Preparation of Statement of Profit and Loss and Balance Sheet of a proprietary concern with special adjustments like depreciation, outstanding and prepaid expenses, outstanding and received in advance of incomes, provision for doubtful debts, drawings and interest on capital.

Module No. 5	ACCOUNTING SOFTWARE	12

Introduction-meaning of accounting software, types accounting software-accounting software Tally-Meaning of Tally software – Features – Advantages, Creating a New Company, Basic Currency information, other information, Company features and Inventory features. Configuring Tally - General Configuration, Numerical symbols, accounts/inventory info – master configuration - voucher entry configuration. Working in Tally: Groups, Ledgers, writing voucher, different types of voucher, voucher entry Problem on Voucher entry - Generating Basic Reports in Tally-Trail Balance, Accounts books, Cash Book, Bank Books, Ledger Accounts, Group Summary, Sales Register and Purchase Register, Journal Register, Statement of Accounts, and Balance Sheet.

SKILL DEVELOPMENTS ACTIVITIES
▪ List out the accounting concepts and conventions. ▪ Prepare a Bank Reconciliation Statement with imaginary figures ▪ Collect the financial statement of a proprietary concern and record it. ▪ Prepare a financial statement of an imaginary company using tally software.
TEXT BOOKS
• Hanif and Mukherjee, Financial Accounting, Mc Graw Hill Publishers • Arulanandam & Raman; Advanced Accountancy, Himalaya Publishing House • S.Anil Kumar,V.Rajesh Kumar and B.Mariyappa–Fundamentals of Accounting, • Himalaya Publishing House. • Dr. S.N. Maheswari, Financial Accounting, Vikas Publication • S P Jain and K. L. Narang, Financial Accounting, Kalyani Publication • Radhaswamy and R.L. Gupta, Advanced Accounting , Sultan Chand • M.C. Shukla and Goyel, Advaced Accounting, S Chand. NOTE: LATEST EDITION OF TEXT BOOKS MAY BE USED.

Subject Name	MARKETING MANAGEMENT			Subject Code	BBA 1.3
Course Credits	4	No. of Hours per Week	4	Total No. of Teaching Hours	56

PEDAGOGY:

Classrooms lecture, tutorials, Group discussion, Seminar, Case studies & field work etc.,

COURSE OUTCOMES:

On successful completion of the course, the Students will demonstrate

- Understand the concepts and functions of marketing.
- Analyse marketing environment impacting the business.
- Segment the market and understand the consumer behaviour
- Describe the 4 p's of marketing and also strategize marketing mix
- Describe p's of service marketing mix.

MODULE NO. 1	INTRODUCTION TO MARKETING	10

Meaning and Definition, Concepts of Marketing, Approaches to Marketing, Functions of Marketing. Recent trends in Marketing-E- business, Tele-marketing, M-Business, Green Marketing, Relationship Marketing, Concept Marketing, Digital Marketing, social media marketing and E-tailing (Meaning only).

MODULE NO. 2	MARKETING ENVIRONMENT	10

Micro Environment – The company, suppliers, marketing intermediaries competitors, public and customers; Macro Environment- Demographic, Economic, Natural, Technological, Political, Legal, Socio-Cultural Environment.

MODULE NO. 3	MARKET SEGMENTATION AND CONSUMER BEHAVIOUR	10

Meaning and Definition, Bases of Market Segmentation, Requisites of Sound Market Segmentation; Consumer Behavior-Factors influencing Consumer Behavior; Buying Decision Process.

MODULE NO. 4	MARKETING MIX	20

Meaning, Elements of Marketing Mix (Four P's) – Product, Price, Place, Promotion. Product-Product Mix, Product Line, Product Lifecycle, New Product Development, Reasons for Failure of New Product, Branding, Packing and Packaging, Labeling, Pricing – Objectives, Factors influencing Pricing Policy, Methods of Pricing; Physical Distribution– Meaning, Factors affecting Channel Selection, Types of Marketing Channels. Promotion – Meaning and Significance of Promotion, Personal Selling and Advertising (Meaning Only)

MODULE NO. 5	SERVICES MARKETING	06

Meaning and definition of services, difference between goods and services, features of services, seven P's of services marketing (concepts only).

SKILL DEVELOPMENTS ACTIVITIES

- Two cases on the above syllabus should be analyzed and recorded in the skill development
- Design a logo and tagline for a product of your choice

- Develop an advertisement copy for a product.
- Prepare a chart for distribution network for different products.

TEXT & REFERENCE BOOKS

- Philip Kotler, Marketing Management, Prentice Hall.
- Lovelock Christopher, Services Marketing: People, Technology, Strategy, PHI
- William J. Stanton, Michael J.Etzel, Bruce J Walker, Fundamentals of Marketing, McGraw Hill Education.
- Bose Biplab, Marketing Management, Himalaya Publishers.
- J.C. Gandhi, Marketing Management, Tata McGraw Hill.
- Ramesh and Jayanti Prasad: Marketing Management, I.K. International
- Sontakki, Marketing Management, Kalyani Publishers.
- P N Reddy and Appanniah, Marketing Management

NOTE: LATEST EDITION OF TEXT BOOKS MAY BE USED.

Subject Name	DIGITAL MARKETING			Subject Code	BBA 1.4 (OEC)
Course Credits	3	No. of Hours per Week	3	Total No. of Teaching Hours	45

PEDAGOGY

Classroom's lecture, tutorials, Group discussion, Seminar, Case studies.

COURSE OUTCOMES

On successful completion of the course, the Students will be able to

- Understand the basic Work in Word effectively.
- Effectively communicate through Email
- Concepts of Spreadsheet
- Summarize data using Functions
- Apply Conditions using formulas and Functions
- Implement Basic financial Concepts in Spreadsheet

MODULE NO. 1	WORD DOCUMENT	16 HRS

Introduction – Objective -Word Document Basic - Opening Word Document Package - Title Bar, Menu Bar, - Toolbars & Sidebar - Creating a New Document - Opening and Closing Documents Opening Documents - Save and Save As - Closing Document - Using The Help - Page Setup - Print Preview - Printing of Documents - PDF file and Saving a Document as PDF file - Document manipulation & Formatting - Text Selection - Cut, Copy and Paste - Font, Color, Style and Size selection - Alignment of Text - Undo & Redo - Spelling & Grammar - Shortcut Keys

MODULE NO. 2	INTERNET & EMAIL	04 HRS

Introduction – Objectives – Internet - protocols: HTTP, HTTPS, FTP - Concept of Internet & WWW - Website Address and URL - Applications of Internet - Modes of Connecting Internet (Hotspot, Wi-Fi, LAN Cable, Broadband, USB Tethering) - Popular Web Browsers (Internet Explorer/Edge, Chrome, Mozilla Firefox,) - Exploring the Internet - Surfing the web - Popular Search Engines - Searching on Internet - Introduction -Objectives - Structure - protocols: SMTP, IMAP, POP3 - Opening Email account - Mailbox: Inbox and Outbox - Creating and Sending a new E-mail - CC – BCC- Replying -Mail MergeForwarding - attachments – Scheduling – Password Protect – Delete.

MODULE NO. 3	INTRODUCTION TO SPREADSHEETS	04 HRS

Introduction to spreadsheets - Office Suite overview - Basic text and cell formatting - Basic arithmetic calculation - Special paste - Freeze pane - Auto completion of series - Sort and filter - Charts.

MODULE NO. 4	SUMMARIZING DATA USING FUNCTIONS	12 HRS

Perform calculations by using the SUM function- Perform calculations by using MIN and MAX functions - Perform calculations by using the COUNT function - Perform calculations by using the AVERAGE function - Perform logical operations by using the IF function - Perform logical operations by using the SUMIF function - Perform logical operations by using the AVERAGEIF function - Perform statistical operations by using the COUNTIF function.

MODULE NO. 5	DATA VALIDATION	09 HRS

Text Functions: LEN, TRIM, PROPER, UPPER, LOWER, CONCATENATE. Skill Developments Activities: ● Enter class data into rows and columns ● Create Draft Marks Card in Spreadsheet ● Create Draft profit and Loss and Balance Sheet in Spreadsheet ● Create GST Invoice in Spreadsheet with Tax Rate Any other activities, which are relevant to the course.

SKILL DEVELOPMENTS ACTIVITIES

- Use word processor to prepare Resume
- Draft a covering letter using Word Processor
- Systematically draft different emails
- Prepare a Letter of Internship requisition and send email.
- Enter class data into rows and columns
- Create Draft Marks Card in Spreadsheet
- Create Draft profit and Loss and Balance Sheet in Spreadsheet
- Create GST Invoice in Spreadsheet with Tax Rate
- Any other activities, which are relevant to the course.

TEXT & REFERENCE BOOKS

- Learning MS-Word and MS-Excel, by Rohit Khurana
- Excel Formulas and Functions 2020: The Step by Step Excel Guide with Examples on How to Create Powerful Formulas: 1 by Adam Ramirez
- Excel 2013 in Simple Steps by Kogent Learning Solutions Inc.
- Excel Formulas and Functions: The Step by Step Excel Guide on how to Create Powerful Formulas by Harjit Suman

Subject Name	Business Management			Subject Code	BBA 1.5 (OEC)
Course Credits	3	No. of Hours per Week	3	Total No. of Teaching Hours	42

PEDAGOGY

Classroom's lecture, tutorials, Group discussion, Seminar, Case studies.

COURSE OUTCOMES

On successful completion of the course, the Students will be able to

- An understanding of the nature, objectives and social responsibilities of business
- An ability to describe the different forms of organisations
- An understanding of the basic concepts of management
- An understanding of functions of management.
- An understanding of different types of business combinations

MODULE NO. 1	INTRODUCTION TO BUSINESS	08

Business: Meaning, Nature, Scope and Social responsibility of Business, Objectives, Essentials of successful business; Functional areas of business. Concept of Business Organisation.

MODULE NO. 2	FORMS OF BUSINESS ORGANIZATION	12

Sole proprietorship: Definitions, Features, Merits and Demerits. Partnership: Definitions, partnership deed, Features, Merits and Demerits. Joint Stock Company: Definitions, Features, Merits and Demerits. Co-operatives: Definitions, Features, Merits and Demerits.

MODULE NO. 3	PUBLIC ENTERPRISES	08 HRS

Departmental Undertaking: Definitions, Features, Merits and Demerits. Public Corporations: Definitions, Features, Merits and Demerits. Government Companies: Definitions, Features, Merits and Demerits

MODULE NO. 4	BUSINESS FUNCTIONS	08 HRS

Functional Areas of Management Marketing Management: Marketing Concept; Marketing Mix; Product Life Cycle; Pricing Policies and Practices Financial Management: Concept and Objectives; Sources of Funds – Equity Shares, Debentures, Venture Capital and Lease Finance. Securities Market, Role of SEBI. Human Resource Management: Concept and Functions; Basic Dynamics of Employer - Employee Relations.

MODULE NO. 5	MANAGEMENT OF ORGANIZATIONS	06 HRS

Management- Meaning, Definitions, Difference between Management and Administration, Levels of Management, Objectives of Management, Functions of management- planning, organizing, staffing, directing, coordinating, controlling, Principles of Management.

SKILL DEVELOPMENTS ACTIVITIES

- Preparation of partnership deed
- Draw a business tree
- Make a list of 10 PSUs
- Prepare a list of different types of business combinations
- Prepare an Organization chart

TEXT & REFERENCE BOOKS

- C B. Guptha - Business Organisation and Management, Sultan Chand & Sons.
- Dr. S. C. Saxena - Business Administration & Management, Sahitya Bhawan.
- M. C. Shukla - Business Organisation and Management. S Chand & Company Pvt. Ltd.
- S.A Sherlekar - Business Organization, Himalaya Publishing House.
- Y.K. Bhushan. Fundamentals of Business Organisation and Management, Sultan Chand & Sons.
- R.K. Sharma, Business Organisation & Management Kalyani Publishers
- Dr. I.M. Sahai, Dr. Padmakar Asthana,' Business Organisation & Administration', Sahitya Bhawan Publications Agra.

NOTE: LATEST EDITION OF TEXT BOOKS MAY BE USED.

Subject Name	OFFICE MANAGEMENT (OEC)			Subject Code	BBA 1.5
Course Credits	3	No. of Hours per Week	3	Total No. of Teaching Hours	42

PEDAGOGY

Classroom's lecture, tutorials, Group discussion, Seminar, Case studies.

COURSE OUTCOMES

On successful completion of the course, the Students will be able to

- An understanding of basic knowledge of office organisation and management
- Demonstrate skills in effective office organization
- Ability to maintain office records
- Ability to maintain digital record.
- Understanding of different types of organisation structures and responsibilities as future office managers.

MODULE NO. 1	FUNDAMENTALS OF OFFICE MANAGEMENT	06

Introduction: Meaning, importance and functions of modern office, Modern Office Organisation: Meaning; Steps in office organisation; Principles of Office organisation, Organisation structure types, Nature of office services: Types of services in a modern office, decentralization and centralization of office services, Departmentation of Office Office management: Meaning, Elements and major processes of Office management Office Manager: Functions and qualifications of Office manager.

MODULE NO. 2	ADMINISTRATIVE ARRANGEMENT AND FACILITIES	06

Office Accommodation and its Importance: Location of Office, Choice of Location: Urban vs Suburban, Factors to be Considered in Selecting the Site, Securing Office Space, Office Lay-out: Objectives of Office Lay-out, Principles of Office Lay-out, Steps in Lay-out Planning, Advantages of a Good Lay-out. Types of offices: Open Office and Private Office-advantages and disadvantages.

MODULE NO. 3	OFFICE ENVIRONMENT	10 HRS

Meaning and Components of Office Environment, Interior Decoration: Colour conditioning, Floor Coverings, Furnishings, Furniture and Fixtures: Types of Furniture, Choice between Wooden and Steel Furniture, Principles Governing Selection of Furniture Lighting and Ventilation, Noise: Internal Noise, External Noise, Cleanliness, Sanitation and Health, Safety and Security

MODULE NO. 4	RECORDS MANAGEMENT	10 HRS

Module No. 4: Introduction to records: Importance of Records, types of office records, Records Management: Meaning, Principles of Record Keeping, Functions of 'Records Management Filing: Elements of Filing and Filing Functions, Objectives and Importance of Filing, Advantages of Filing, Essentials of a Good Filing System, Classification of Files, Filing Procedure or Routine. Filing Methods: Horizontal Filing - meaning, types and advantages, Vertical Filing- meaning, equipment used, advantage and disadvantages. Centralisation and Decentralisation of Filing- Centralised filing and Decentralised Filing Office manual: contents, Importance, types of office manuals. Indexing: Meaning, importance, advantages and essentials of good indexing, type of index Retention and disposal of files: Meaning and benefits of record retention, need for disposal of files, life-cycle stages of files.

MODULE NO. 5	OFFICE MECHANISATION AND DATA PROCESSING	10 HRS

Meaning, Importance and Objectives of Office Mechanisation, Advantages and disadvantages of Office Mechanisation, Factors Determining Office Mechanisation Kinds of Office Machines: Duplicating Machines and Photocopying Machines, Accounting, tabulating and computing machines, communication machines, Introduction to Data and Information: Distinction between Data and Information, Importance of Data and Information, Classification of Data, Classification of Information, Data Lifecycle (chart), Data Collection Methods- Primary and secondary data collection methods, Data presentation Methods of Presentation of Data, Data processing using computers: Components of Computers, Input and Output Devices, Software used in Computers (names and uses only), Computer Applications in Office Management, Advantages and Limitations of Computerisation

SKILL DEVELOPMENTS ACTIVITIES

- Visit an office and enlist the different types of machines used in the office
- Identify the different types of stationery used in offices today
- Draw a data life cycle chart
- Draw charts indicating different types of office layouts.

TEXT & REFERENCE BOOKS

- S.P Arora, Office Organisation and Management, Vikas Publishing House Pvt Ltd
- M.E Thakuram Rao, Office organisation and Management, Atlantic
- Judith Read, Mary Lea Ginn, Record Management, 10th Edition, Cengage Learning.

NOTE: LATEST EDITION OF TEXT BOOKS MAY BE USED.

Subject Name	RETAIL MANAGEMENT (OEC)			Subject Code	BBA 1.5
Course Credits	3	No. of Hours per Week	3	Total No. of Teaching Hours	42

PEDAGOGY

Classroom's lecture, tutorials, Group discussion, Seminar, Case studies.

COURSE OUTCOMES

On successful completion of the course, the Students will be able to

- An understanding of basic knowledge of Retail organisation and management
- Demonstrate skills in effective Retail organisation
- Ability to maintain office records
- Ability to understand digitalization of retailing.
- Understanding of different types of Retailing

MODULE NO. 1	RETAIL THEORY & PRACTICES RETAIL

Nature, Scope, History, Retail Institutions, Types, Retail Management Process, Indian Retailing Scenario, Retail Managers – Roles, Skills and Scope, Evolution of Management Theory, Organizational Environment in Retail Sector, Ethical Issues in Retailing Job Opportunities in Retail Industry- Personality Traits of Retailers, Retail Entrepreneur, Employment Opportunities, Internationalization and Globalization of Retailing.

MODULE NO. 2	RETAIL MARKETING STRATEGY

Introduction, Building Retail Brand, Sales Enhancement Strategies, Business Intelligence, Customer Service, Social Media Marketing, Pricing Strategy, Point of purchase communication, Role of Packaging, Pricing Strategy, Merchandise Management, Private Labels, Retail Promotion, Building Store Loyalty

MODULE NO. 3	RETAIL ORGANIZATION & FUNCTIONAL MANAGEMENT

Introduction, Classification of Retail Organization, Franchising, Human Resource Management in Retail, Building and Sustaining Relationship in Retailing, Customer relationship Management,

MODULE NO. 4	STORE PLANNING

Location, Layout, Store Operations: POS (Point of Sale) /Cash Process, Customer Service and Accommodation, Retail Floor and Shelf Management, Retail Accounting and Cash Management, Setting up Stores before Opening, Working with Floor Plans and Store Requirements

MODULE NO. 5	ELECTRONIC RETAILING

Introduction, Types of Technology in Retailing, Role of IT in Business; Influencing Parameters for use of IT in Retailing; Efficiency in Operations, Effective Management of Online catalogues; Direct Retailing Methods, Database Management; Data warehousing; Critical Analysis of E-Retailing Strategies; Customer Relationship Management

SKILL DEVELOPMENTS ACTIVITIES

- Draw a retail organization chart
- Classify different types of retailers
- Conduct a customer satisfaction survey

- Do a SWOC Analysis of a retail organisation

TEXT & REFERENCE BOOKS

- Levy Michael,Weitz Barton - Retailing Management, V Edition, Tata McGraw Hill, New York, 2. Berman Berry, Evans J.R.- Retail Management- A Strategic Management Approach, IX Edition , Pearson Education, New York,
- Lucas G.H., Bush Robert, Gresham Larry- Retailing, Houghton Mifflin Company, Boston
- Pradhan Swapna- Retailing Management-Text and Cases, II Edition, Tata Mc Graw Hill, India,
- Sinha, Uniyal- Managing Retailing, Oxford University Press, Delhi
- Agarwal, Bansal, Yadav, Kumar- Retail Management, Pragati Prakashan, Meerut
- Berman Berry, Evans J.R.- Retail Management- A Strategic Management Approach, IX Edition , Pearson Education, New York,
- Pradhan Swapna- Retailing Management-Text and Cases, II Edition, Tata Mc Graw Hill

Subject Name	FINANCIAL ACCOUNTING AND REPORTING			Subject Code	BBA 2.1
Course Credits	4	No. of Hours per Week	4	Total No. of Teaching Hours	56

PEDAGOGY

Classroom's lecture, tutorials, Group discussion, Seminar, Case studies.

COURSE OUTCOMES

On successful completion of the course, the Students will be able to

- The ability to prepare final accounts of partnership firms
- The ability to understand the process of public issue of shares and accounting for the same
- The ability to prepare final accounts of joint stock companies.
- The ability to prepare and evaluate vertical and horizontal analysis of financial statements
- The ability to understand company's annual reports.

MODULE NO. 1	FINAL ACCOUNTS OF PARTNERSHIP FIRM	10

Meaning of Partnership Firm, Partnership deed-clauses in partnership deed, Preparation of Final accounts of partnership firm-Trading and Profit and Loss Account, Profit and Loss Appropriation Account, Partners capital account and Balance sheet. Goodwill- Nature, Factors influencing goodwill and methods of valuation of goodwill (Average and super profit methods)

MODULE NO. 2	ISSUE OF SHARES	08

Meaning of Share, Types of Shares – Preference shares and Equity shares – Issue of Shares at par, at Premium, at Discount: Pro-Rata Allotment; Journal Entries relating to issue of shares; Preparation of respective ledger accounts; Preparation of Balance Sheet in the Vertical form (Practical Problems).

MODULE NO. 3	FINAL ACCOUNTS OF JOINT STOCK COMPANIES	12 HRS

Statutory Provisions regarding preparation of Company Final Accounts – Treatment of Special Items, Managerial Remuneration, Tax deducted at source, Advance payment of Tax, Provision for Tax, Depreciation, Interest on debentures, Dividends, Rules regarding payment of dividends, Transfer to Reserves, Preparation of Profit and Loss Account and Balance Sheet (Vertical Form Schedule -III) (Practical Problems).

MODULE NO. 4	FINANCIAL STATEMENTS ANALYSIS	12 HRS

Comparative Statements - Comparative Income Statement, Comparative Balance Sheet; Common size Statements – Common Size Income Statement, Common Size Balance Sheet – Trend Percentages. (Analysis and Interpretation)

MODULE NO. 5	CORPORATE FINANCIAL REPORTING	10 HRS

Corporate Financial Reporting - meaning, types, characteristics of Corporate financial report, users of corporate financial report; Components corporate financial report– general corporate information, financial highlights, letter to the shareholders from the CEO, management's discussion and analysis; Financial Statements-balance sheet, income statement, cash flow statement, and notes to the financial statements; Auditor's report;

Significant Accounting Policies; Corporate Governance Report; Corporate Social Responsibility Report (Discuss only), Role and Significance of above components of corporate financial report).

SKILL DEVELOPMENTS ACTIVITIES

- Collect financial statement of a company for five years and analyse the same using trend analysis.
- Refer annual reports of two companies and list out the components.
- Draft a partnership deed as per Partnership Act.
- List out the accounting policies in annual report of the company

TEXT & REFERENCE BOOKS

- Stephen P. Robbins, Management, Pearson
- Koontz and O"Donnell, Management, McGraw Hill.
- L M Prasad, Principles of management, Sultan Chand and Sons
- V.S.P Rao/Bajaj, Management process and organization, Excel Books.GH25
- Appanniah and Reddy, Management, HPH.
- T. Ramaswamy : Principles of Management, HPH.

NOTE: LATEST EDITION OF TEXT BOOKS MAY BE USED.

Subject Name	HUMAN RESOURCE MANAGEMENT			Subject Code	BBA 2.2
Course Credits	4	No. of Hours per Week	4	Total No. of Teaching Hours	56

PEDAGOGY

Classroom's lecture, tutorials, Group discussion, Seminar, Case studies.

COURSE OUTCOMES

On successful completion of the course, the Students will be able to

- Ability to describe the role and responsibility of Human resources management functions on business
- Ability to describe HRP, Recruitment and Selection process
- Ability to describe to induction, training, and compensation aspects.
- Ability to explain performance appraisal and its process.
- Ability to demonstrate Employee Engagement and Psychological Contract.

MODULE NO. 1	INTRODUCTION TO HUMAN RESOURCE MANAGEMENT	10 HRS

Meaning and Definition of HRM – Features Objectives, Differences between Human Resource Management and Personnel Management, Importance, Functions and Process of HRM, Role of HR Manager, Trends influencing HR practices

MODULE NO. 2	HUMAN RESOURCE PLANNING, RECRUITMENT & SELECTION	14 HRS

Human Resource Planning: Meaning and Importance of Human Resource Planning, Process of HRP, HR Demand Forecasting- Meaning and Techniques (Meanings Only) and HR supply forecasting, Succession Planning – Meaning and Features, Job Analysis: Meaning and Uses of Job Analysis, Process of Job Analysis – Job Description, Job Specification, Job Enlargement, Job Rotation, Job Enrichment (Meanings Only) Recruitment – Meaning, Methods of Recruitment, Factors affecting Recruitment, Sources of Recruitment, Selection – Meaning, Steps in Selection Process, Psychometric tests for Selection, Barriers to effective Selection, Making Selection effective; Placement, Gamification – Meaning and Features

MODULE NO. 3	INDUCTION, TRAINING AND COMPENSATION	10 HRS

Induction: Meaning, Objectives and Purpose of Induction, Problems faced during Induction, Induction Program Planning. Training: Need for training, Benefits of training, Assessment of Training Needs and Methods of Training and Development; Kirkpatrick Model; Career Development. Compensation: Direct and Indirect forms of Compensation (Meaning Only), Compensation Structure.

MODULE NO. 4	PERFORMANCE APPRAISAL, PROMOTION & TRANSFERS	14 HRS

Performance appraisal: Meaning and Definition, Objectives and Methods of Performance Appraisal – Uses and Limitations of Performance Appraisal, Process of Performance Appraisal Promotion: Meaning and Definition of Promotion, Purpose of Promotion, Basis of promotion Transfer: Meaning of Transfer, Reasons for Transfer, Types of Transfer, Right Sizing of Work Force, Need for Right Sizing

MODULE NO. 5	EMPLOYEE ENGAGEMENT AND PSYCHOLOGICAL CONTRACT	08 HRS

Employee Engagement (EE): Meaning and Types of EE, Drivers of Engagement - Measurement of EE, Benefits of EE. Psychological contract: Meaning and features

SKILL DEVELOPMENTS ACTIVITIES

- Preparation of Job Descriptions and Job specifications for a Job profile
- Choose any MNC and present your observations on training program
- Develop a format for performance appraisal of an employee.
- Discussion of any two Employee Engagement models.
- Analysis of components of pay structure based on the CTC sent by the Corporate to the institute for the various jobs of different sectors.

TEXT & REFERENCE BOOKS

- Aswathappa, Human Resource Management, McGraw Hill Edwin Flippo, Personnel Management, McGraw Hill C.B.Mamoria, Personnel Management, HPH
- Subba Rao, Personnel and Human Resources Management, HPH Reddy & Appanniah, Human Resource Management, HPH Madhurimalal, Human Resource Management, HPH
- S.Sadri & Others: Geometry of HR, HPH Rajkumar: Human Resource Management I.K. Intl
- Michael Porter, HRM and Human Relations, Juta & Co.Ltd.
- K. Venkataramana, Human Resource Management, SHBP Chartered Accountants of India, New Delhi.

NOTE: LATEST EDITION OF TEXTBOOKS MAY BE USED.

Subject Name	BUMASTICS			Subject Code	BBA 2.3
Course Credits	4	No. of Hours per Week	4	Total No. of Teaching Hours	56

PEDAGOGY

Classroom's lecture, tutorials, Group discussion, Seminar, Case studies.

COURSE OUTCOMES

On successful completion of the course, the Students will be able to

- The Understanding of the basic concepts of business maths and apply them to create solve and interpret application problems in business
- Ability to solve problems on various types of equation.
- Ability to solve problems on Matrices and execute the laws of indices, law of logarithm and evaluate them.
- Ability to apply the concept of simple interest and compound interest bills discounted, calculate Correlation and Regression for situations
- Ability to solve problems on Arithmetic progression, Geometric progression and
- construct logical application of these concepts.

MODULE NO. 1	THEORY OF EQUATIONS	10 HRS

Introduction business mathematics and its importance – Equations - Meaning - Types of Equations – Simple/ Linear Equations and Simultaneous Equations (only two variables), Elimination and Substitution Methods only. Quadratic Equation - Factorization and Formula Method ($ax^2 + bx + c = 0$ form only). Simple problems.

MODULE NO. 2	INDICIES, MATRICES AND LOGARITHMS	16 HRS

Meaning – types – operation on matrices – additions – subtractions and multiplication of two matrices – transpose – determinants – minor of an element – co-factor of an element – inverse – crammers rule in two variables – problems. Indices and Logarithms: Meaning- Basic Laws of Indices and their application for simplification. Laws of Logarithms – Common Logarithm, Application of Log Table for Simplification.

MODULE NO. 3	COMMERCIAL ARITHMETIC	16 HRS

Simple Interest, Compound Interest including yearly and half yearly calculations, Annuities, Percentages, Bills Discounting, Ratios and proportions, duplicate-triplicate and sub- duplicate of a ratio. Proportions: third, fourth and inverse proportion - problems.

MODULE NO. 4	BUSINESS STATISTICS	12 HRS

Meaning and importance Measures of central tendency – Mean, Median, Mode, G.M. and H.M. Dispersion – Range – Q.D. – M.D. – S.D. – C.V.

MODULE NO. 5	BUSINESS STATISTICS – 2	09 HRS

Simple Correlation and Regression

SKILL DEVELOPMENTS ACTIVITIES

- Develop an Amortization Table for Loan Amount – EMI Calculation.
- Secondary overhead distribution summary using Simultaneous Equations Method.

- Application of Matrix In Business Problems
- Application of Correlation and Regression

TEXT & REFERENCE BOOKS

- Saha: Mathematics for Cost Accountants, Central Publishers
- R.G. Saha and Others – Methods and Techniques for Business Decisions, VBH
- Dr. SanchetiandKapoor: Business Mathematics and Statistics, Sultan Chand
- Zamarudeen: Business Mathematics, Vikas
- R.S Bhardwaj :Mathematics for Economics and Business
- Madappa, mahadi Hassan, M. IqbalTaiyab – Business Mathematics, Subhash
- G.R. Veena and Seema : Business Mathematics and Statistics I.K. Intl Publishers
- Guptha Statistical methods

NOTE: LATEST EDITION OF TEXT BOOKS MAY BE USED.

Subject Name	PEOPLE MANAGEMENT			Subject Code	BBA.2.6 (OEC)
Course Credits	3	No. of Hours per Week	3	Total No. of Teaching Hours	45

PEDAGOGY

Classroom's lecture, tutorials, Group discussion, Seminar, Case studies.

COURSE OUTCOMES

On successful completion of the course, the Students will be able to

- Ability to examine the difference between People Management with Human resource Management
- Ability to explain the need for and importance of People Management.
- Ability to explain role of manager in different stages of performance management process
- Ability to list modern methods of performance and task assessment.
- Ability to analyse the factors influencing the work life balance of an working individual.

MODULE NO. 1	INTRODUCTION TO PEOPLE MANAGEMENT	06 HRS

Diversity in organisation: age, gender, ethnicity, race, and ability. People Management: Meaning, Features, Significance of people management, Difference between People Management and Human Resource Management, impact of individual and organizational factors on people management.

MODULE NO. 2	GETTING WORK DONE AND ASSESSMENT AND EVALUATION	12 HRS

Getting work done: Challenges of getting work done, significance of prioritization and assigning work to team members. Performance Management: meaning, role of a manager in the different stages of the performance management process, Types of Performance assessment, Assessment and Evaluation Process of evaluation of tasks in the organisation. Modern tools of assessment and evaluation of tasks and performance.

MODULE NO. 3	BUILDING PEER NETWORKS AND ESSENTIALS OF COMMUNICATION	12 HRS

Building Peer Networks: Understanding the importance of peer networks in an organization; being able to influence those on whom you have no authority; challenges Peer networking and different types of people networking in the workplace. Essentials of Communication: Concept of the communication process with reflection on various barriers to effective communication and ways to overcome, Types of Communication and Channels of Communication.

MODULE NO. 4	MOTIVATION	08 HRS

Meaning, Importance and need for motivation, team motivation- meaning, importance team motivation, types of Motivators and Modern methods of motivation

MODULE NO. 5	MANAGING SELF	07 HRS

Reflection on what does it mean to be a people manager; building a personal development plan for oneself, Self-Stress Management: Causes for stress, work life Balance, Importance of Work life balance, Factors influencing Work life Balance.

SKILL DEVELOPMENTS ACTIVITIES

- Analyse two cases on any of the above content indicated above.
- List out the modern tools to performance assessment and evaluation.
- Conduct a survey of work life balance of working individuals
- Draft a Career development of working individual in the middle level management.

TEXT & REFERENCE BOOKS

- McShane, Steven L. and Mary Ann Von Glinow, Organizational Behavior: Emerging Knowledge and Practice for the Real World. McGraw-Hill, latest edition, ISBN: 0-07-115113-3.
- Bernardin, H. John and Joyce E. A. Russell. Human Resource Management: An Experiential Approach. McGraw-Hill, 6/e. ISBN: 0078029163
- Argyris, C. (1974). Personality vs. Organization. Organizational Dynamics. Vol. 3. No. 2, Autumn.
- Blume, B. Baldwin, T. and Ryan, K. (2013). Communication Apprehension. A barrier to students leadership, adaptability and multicultural appreciation. Academy of Management Learning & Education, Jun, Vol. 12 Issue 2, p158-172.
- Colquitt, J.A., LePine, J.A., & Wesson, M.J. (2009) Organizational Behavior: Improving Performance and Commitment in the Workplace (International edition). New York: McGraw-Hill.
- Goleman, D. (1998). Working with Emotional Intelligence. Bantam Books

NOTE: LATEST EDITION OF TEXT BOOKS MAY BE USED.

Subject Name	DIGITAL MARKETING			Subject Code	BBA 2.6 (OEC)
Course Credits	3	No. of Hours per Week	3	Total No. of Teaching Hours	45

PEDAGOGY

Classroom's lecture, tutorials, Group discussion, Seminar, Case studies.

COURSE OUTCOMES

On successful completion of the course, the Students will be able to

Demonstrate the importance of the digital marketing for marketing success, manage customer relationships across all digital channels and build better customer relationships, create a digital marketing plan, starting from the SWOT analysis and defining a target group, then identifying digital channels, their advantages and limitations, perceiving ways of their integration taking into consideration the available budget

MODULE NO. 1	BASICS OF DIGITAL MARKETING	09 HRS

- Marketing, advertisement, history of the internet and digital advertisements, social media, digital marketing, algorithms, visibility, engagement, traffic, inbound - outbound marketing, digital marketing vs traditional marketing.

MODULE NO. 2	CONTENT CREATION FOR ONLINE PLATFORMS	09 HRS

Types of content: written, audio, picture, video; content and marketing, optimising content for web and for social media, influencers, connecting with influencers, headlines and data. Practical: audio-video production.

MODULE NO. 3	WEB MARKETING	09 HRS

web development with WordPress/Vix CMS, domain name, server, hosting, plugin, Google AdSense, Google trends, blogging - content writing, Adwords, keyword planner, Search Engine Optimization, off-page optimization, backlink, Google Analytics, competitor and website analysis, keyword analysis, cookies, page ranking, domain authority.

MODULE NO. 4	SOCIAL MEDIA MARKETING	09 HRS

Social media marketing, optimization, social media analytics, product marketing in Google Ads, Instagram, Facebook, YouTube video marketing, Twitter campaign, LinkedIn campaign, remarketing; App Store Optimization.

MODULE NO. 5	FREELANCING	09 HRS

Freelancing - guidance to Google, Microsoft Bing, email marketing, affiliate marketing, mobile marketing, digital marketing automation.

SKILL DEVELOPMENTS ACTIVITIES

- Define a target group (working in groups)
- Creating web sites, MS Expression (working in groups)
- Google AdWords (working in groups
- CRM strategy (working in groups)
- Social Media Marketing plan (working in groups)
- Making a Facebook page (working in groups)
- Business opportunities and Instagram options

- Optimization of Instagram profiles
- Integrating Instagram with a Web Site and other social networks
- Keeping up with posts

TEXT & REFERENCE BOOKS

- Ryan, D. (2014). Understanding Digital Marketing: Marketing Strategies for Engaging the Digital Generation, Kogan Page Limited.
- The Beginner's Guide to Digital Marketing
- Digital Marketer. Pulizzi,J.(2014) Epic Content Marketing, Mcgraw Hill Education.
- Chaffey, D., & Smith, P. R. (2017). Digital marketing excellence: planning, optimizing
- and integrating online marketing. Routledge.
- Chaffey, D., & Ellis-Chadwick, F. (2019). Digital marketing. Pearson.
- Charlesworth, A. (2018). Digital marketing: A practical approach. Routledge.
- Dodson, I. (2016). The art of digital marketing: the definitive guide to creating strategic, targeted, and measurable online campaigns. John Wiley & Sons.
- Gupta, S. (2018). Digital marketing. McGraw-Hill Education.
- Hanlon, A. (2018). Digital marketing: Strategic planning & integration. Sage.
- Parkin, G. (2016). Digital marketing: Strategies for online success. Fox Chapel Publishing.

Detailed course matrix and scheme of evaluation for subject: Life Sciences (3-year B.Sc. course) effective from 2016-17

SEMESTER I

Course code	Course Title	Hrs/week	Total credits	Duration of examination (hrs)	Maximum marks	*Internal Assessment	Total marks
Theory							
LS101T	Biosystematics & Diversity of Plants	4	4	3	70	30	100
Practical							
LS101P	Biosystematics & Diversity of Plants	3	2	3	35	15	50

SEMESTER II

Course code	Course Title	Hrs/week	Total credits	Duration of examination (hrs)	Maximum marks	*Internal Assessment	Total marks
Theory							
LS201T	Biosystematics & Diversity of Animals	4	4	3	70	30	100
Practical							
LS201P	Biosystematics & Diversity of Animals	3	2	3	35	15	50

SEMESTER III

Course code	Course Title	Hrs/week	Total credits	Duration of examination (hrs)	Maximum marks	*Internal Assessment	Total marks
Theory							
LS301T	Plant anatomy & physiology	4	4	3	70	30	100
Practical							
LS301P	Plant anatomy & physiology	3	2	3	35	15	50

*Internal Assessment:
Theory (30 marks): Class test – 15 marks; Seminar Report – 05 marks; Seminar Presentation – 05 marks; Attendance – 05 marks
Practical (15 marks): Class test – 05 marks; Class Record – 05 marks; Attendance – 05 marks

SEMESTER IV

Course code	Course Title	Hrs/week	Total credits	Duration of examination (hrs)	Maximum marks	*Internal Assessment	Total marks
Theory							
LS401T	Animal anatomy & physiology	4	4	3	70	30	100
Practical							
LS401P	Animal anatomy & physiology	3	2	3	35	15	50

SEMESTER V

Course code	Course Title	Hrs/week	Total credits	Duration of examination (hrs)	Maximum marks	*Internal Assessment	Total marks
Theory							
LS501T	Cell & Molecular biology	3	3	3	70	30	100
LS502T	Developmental biology	3	3	3	70	30	100
Practical							
LS501P	Cell & Molecular biology	3	2	3	35	15	50
LS502P	Developmental biology	3	2	3	35	15	50

SEMESTER VI

Course code	Course Title	Hrs/week	Total credits	Duration of examination (hrs)	Maximum marks	*Internal Assessment	Total marks
Theory							
LS601T	Ecology & Environmental biology	3	3	3	70	30	100
LS602T	Genetics & Evolution	3	3	3	70	30	100
Practical							
LS601P	Ecology & Environmental biology	3	2	3	35	15	50
LS602P	Genetics & Evolution	3	2	3	35	15	50

Detailed Course Content
of B.Sc. with Life Sciences
(effective from 2016-17)

LS101T BIOSYSTEMATICS AND DIVERSITY OF PLANTS

52 hours | 4 hours / week | 4 credits

Unit 1: Introduction to Biosystematics of Plants **04 hours**

Botanical Nomenclature: Principles and a brief account of ICBN & ICNCP.

Botanical literature**:** Floras, Revisions, Monographs, Indices, Journals. Herbarium – Preparation, maintenance and Importance; Important herbaria of the world.

Botanical garden **–** a brief account and importance; Important botanical gardens of the world.

Unit 2: Viruses & Bacteria **06 hours**

Viruses- General characters, diversity (Morphological and Structural) and classification. Nomenclature of viruses. Morphology, Ultra structure and reproduction of TMV, Cauliflower Mosic Virus and T_4 Phage.

Bacteria - General characters, diversity and classification. Morphology, ultrastrcuture and reproduction of *Bacillus* and *E.coli*. Cyanobacteria & Mycoplasma : General characters, diversity and classification.

Unit 3: Non-vascular plants **16 hours**

Fungi: Occurrence, general characters, diversity and classification (Ainsworth 1972). Economic importance

Algae: Occurrence, general characters and classification (Fritsch 1945). Economic importance.

Bryophytes : General characters and classification, (Proskauer 1957) Fossil Bryophytes. Ecological and economic importance.

Unit 4: Vascular plants **26 hours**

Pteridophytes: Occurrence, general characters, diversity and classification (Reimers 1954). Brief account on stelar evolution, heterospory and seed habit. Fossil Pteridophytes - Types of fossils and fossilization.

Gymnosperms: Occurrence, general characters, diversity and classification (Pilger and Melchior (1954). A brief account of economic importance, origin and evolution of Gymnosperms. Fossil Gymnosperms

Angiosperms: Origin of Angiosperms. Occurrence, general characters, diversity and classification. Salient features and importance of the following families:

Dicots: Magnoliaceae, Nymphaeceae, Caryophyllaceae, Malvaceae, Euphorbiaceae, Rubiaceae, Scrophulariaceae, Asclepiadaceae, Asteraceae.

Monocots: Alismataceae, Arecaceae, Poaceae, Cyperaceae, Zingberaceae, Liliaceae and Orchidaceae.

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Recommended readings:

Non-vascular Plants

1. Alexopoulus C.J. & Mims C.W. 1990. Introductory mycology, 5th edn Wiley Eastern Limited, New Delhi.
2. Fritsch, F.E. 1961. Structure and reproduction in algae, Vol. I, II. Cambridge University Press, London.
3. Bhatia, K.N. 1984. A treatise on Algae. S. Chand and Company, New Delhi.
4. Bold, H.C. and Wyhne, M.J. 1978. Introduction to Algae: Structure and reproduction. Prentice Hall, Engle Wood Cliffs, New Jersey.
5. Chopra, R.N & Kumar, P.K. 1988. Biology of Bryophytes. New Age International Publisher, New Delhi.
6. Contract, F. H., Kimball, P.C. and Jay, L. 1998. Virology. Prentice Hall, Englewood Cliff, New Jersey.
7. Kumar, H.D. 1990. Introductory Phycology. Affiliated East West Pvt. Ltd. Bangalore.

8. Pandey, B.P. 1994. Fungi. S. Chand and Company Ltd, New Delhi.
9. Parihar N.S. 1970. An Introduction to Embryophyta, Vol. I Bryophyta. Central Book. Dept. Allahabad, India.
10. Pelezar, M.C. (Jr.) Cjan, E.C.S. and Kreig, N.R. 1998. Microbiology. 5th edition, McGraw Hill Book Company. Singapore.
11. Prescott G.W, 1978. The Fresh Water Algae, Pictured key Nature series, WM .G.Brown Company, IOWA.
12. Rashid, A. 1998. An introduction to Bryophyta, Vikas Publishing House Pvt. Ltd., New Delhi.
13. Schlegel, H.G. 1993. General Microbiology. 7th Edition, Cambridge University Press, Cambridge, U.K.

Smith, G.M. 1950. Cryptogamic Botany Vol. I. McGraw Hill Book Company, New York.

Vascular Plants

Pteridophytes and Gymnosperms :-

1. Parihar. N.S. 1977. The morphology of Pteridophytes, Central book Dept, Allahabad, India.
2. Bhatnagar and Moitra. A. 1996. Gymnosperms. Poplei. New Age International Ltd. New Delhi.
3. Chamberlain. C.J. 1986. Gymnosperms, structure and evolution. CBS Publications, New Delhi.
4. Chopra. G.L and Verma. V. 1988. Gymnosperm. Pradeep Publications, Jalandhar, India

Angiosperms -:

1. Cronquist. A. 1981. An integrated system of classification of flowering plants. Columbia University Press, New York.
2. Davis. P.H. and Heywood. V.H. 1973. Principles of Angiosperm taxonomy, Robert and E. Kriegen Publications, New York.
3. Heywood. V.H and Moore. D.M. 1984. Current concept in plant taxonomy, Academic Press, London.
4. Sambamurthy. A.V.S.S. 2005. Taxonomy of Angiosperm. IK International Publishers, New Delhi.
5. Lawrence. G.H.M. 1951. Taxonomy of vascular plants, Mac Milan, New York.

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LS101P BIOSYSTEMATICS AND DIVERSITY OF PLANTS
3 hours/ week | 2 credits

1. Measurement of dimension of microorganism by Micrometry.
2. Studying Bacteria - Gram staining
3. Identification of Saprolegnia, Pythium, Phytophthora, Albugo, Rhizo[pus, Aspergillus, Penicillium, Peziza, Puccinia, Tikka and Alternaria.
4. Study of representative species of Cyanophyceae – Microcystis, Oscillatoria, Nostoc, Scytonema.
   Chlorophyceae ; Scenedesmus, Hydrodictyon, Spirogyra, Desmids, Coleochaete, Ulva, Caulerpa.
   Charophyceae: Chara and Nitella.
   Xanthophyceae : Botrydium, Phaeophyceae : Ectocarpus and Sargassum.
   Rhodophyceae: Batrachospermum and Polysiphonia.
5. Study of morphology and anatomy of vegetative and reproductive structures of : Marchantia, Lunularia, Porella, Anthoceros, Sphagnum and Funaria.
6. Field visits to natural vegetations rich in non-vascular plants

7. Pteridophytes: Study of morphology, anatomy of vegetative and reproductive structures of Psilotum, Salaginella, Lycopodium, Equisetum, Ophioglossum, Marattia, Osmunda, Pteris, Marsilia.
   Fossil pteridophytes subjected to the availability of materials / slides.
8. Gymnosperms: Study of morphology,anatomy of vegetative and reproductive structures of Zamia, Cupressus, Cryptomeria, Araucaria, Ephedra, Gnetum. Fossil Gymnosperms subjected to the availability of materials/slides.
9. Angiosperms: Herbarium preparation, Description of a taxon using technical terms.
10. Derivation of a taxon to respective family using Floras.

11. Study of local flora and field visit to various Botanical gardens to study the vegetation.

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LS201T BIOSYSTEMATICS AND DIVERSITY OF ANIMALS

52 hours | 4 hours / week | 4 credits

Unit 1: Introduction to Biosystematics of Animals **04 hours**

Systematics of Animals: Meaning, Nomenclature, Principles of Classification, Major branches of invertebrates & vertebrates and their relationships. Minor phyla.

Unit 2: Invertebrates **22 hours**

Classification, general characters, diversity and economic importance of Phylum Protozoa, Porifera, Coelentarata, Ctenophora, Platyhelminthes, Aschelimenthes, Annelida, Arthropoda, Mollusca and Echinodermata.
Economic importance: Apiculture, Sericulture, Vermiculture, Lac culture.

Unit 3: Vertebrates **20 hours**

Origin, systematic position and characteristics of Vertebrates.
Diversity, Salient features and Classification of classes Pisces, Amphibia, Reptilia, Aves and Mammals (up to orders).
External features, Digestive, Respiratory, Circulatory, Excretory, Nervous and Reproductive systems: Shark, Frog, Rabbit.
Economic importance of Vertebrate phyla.

Unit 4: Adaptations & Animal Behaviour **06 hours**

Adaptations – Aquatic, Terrestrial, Aerial (Volant). Adaptive radiations in Reptiles & mammals.
Animal Behaviour - Ethogram, Learning, Instincts, Motivation, Cooperation and conflicts, Social organization in Primates.

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Recommended readings:

Invertebrates

1) Bames, R.D. 1968. Invertebrate Zoology, 2nd Edn. Saunders, Philadelphia.
2) Barrington, E.J.W. 1967. Invertebrate structure and function, Nelson, London.
3) Hyman, L.H. 1940-67. The invertebrates, Vol. I-VI. McGraw-Hill, New York.
4) Marshall, A.J. and Williams W.D. (Eds). 1995. Text book of Zoology–Invertebrates Ed., Vol. I, A.I.T.B.S. Publications.
5) Richard Brusca & Gary J. Brusca 2003. Invertebrates, Sinaver Associates. Inc., Publisher
6) A manual of Zoology part 1 non- chordates - Ekambaranatha Ayyar.

Vertebrates

1) Parker, J & W. Haswell, 1995. Textbook of Zoology – Vertebrates. The Macmillan Press Ltd., U.K.
2) Young J.Z. Life of Vertebrates, ELBS edition.
3) Eckert and Randall. Animal Physiology – Mechanisms and adaptations. CBS Publishers, 2000.

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LS201P BIOSYSTEMATICS AND DIVERSITY OF ANIMALS
3 hrs/week | 2 credits

Invertebrates:

Identification and classification of

1. Phylum Protozoa – Paramecium, Vorticella, Plasmodium, Euglena, Trypanosoma, Noctiluca, Entamoeba(Amoeba).
2. Porifera - Leucosolenia, Gemmule, Euspongia(Bath sponge), Euplectella(Venus flower basket), Hyalonema (glass rope sponge).
3. Coelentarata – Obelia, Aurelia, Sea anemone Physalia, Velella, Porpita, Corals – Fungia, Astrea, Gorgonia, Meandrina (Brain coral), Tubifora (Slag horn coral), Penantula (Sea pen).
4. Platyhelminthes-Liver fluke, tape worm, planaria.
5. Aschelminthes- Ascaris, Ancylostoma (Hook worm), Schistosoma (Blood worm) Filarial worm.
6. Annelida - Earth worm, Nereis, Aphrodite, leech, sabella, Tubifex, Arenicola.
7. Arthropoda- Lepas, Balanus, Centipede, Millipede, Scorpion, Peripatus, Limulus, Prawn, Crab, Lobster, Grass hopper, mouth parts of insects : butterfly, mosquito, honeybee, housefly and cockroach.
8. Mollusca - Sepia, Octopus, chiton, Patella, Dentalium, fresh water mussel, pila globosa (snail), Nautilus, Murex, Xanchus, Cyprea.
9. Echinodermata - Sea urchin, Starfish, Sea cucumber, Brittle star, sea lilly.
10. Demonstration of Dissections –
11. Reproductive, Digestive and Nervous system of male and female Cockroach, Silkmoth.
12. Earth worm – Nervous system (nerve ring) and setae mounting, Rat- Nervous system.

Vertebrates:

1. Identification and classification of vertebrates – Shark, Eel, Tetradon, Macropodus, Ophiocephalus, Narcine, Protopterus, Stegostoma, Salamander, Ichthyophis, Calotes, Mabuya, Phrynosoma, Draco, Varanus, Chamaeleon, Naja naja, Viper, Sphoenodon, Ostrich, Archaeopteryx, Owl, Vamphyrus, Loris, Pangolin, Porcupine.
2. Demonstration of Dissection: Rat nervous, Arterial and venous system, Reproductive system of male and female.
3. Life cycle of Frog.
4. Identification of skulls of chordates.
5. Dentition of chordates
6. Visit to National Parks, Zoos, Sanctuaries, Butterfly park.

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LS301T PLANT ANATOMY & PHYSIOLOGY
52 hours | 4 hrs / week | 4 credits

Unit 1: Primary vascular system **13 hours**

Organization of primary plant body, apical meristems and primary growth, Primary xylem - composition, Primary phloem - composition, the role of auxins in the development of the primary vascular system.

Cell wall:Structure and development of the cell wall - Structure (light microscopic and ultramicroscopic structure), composition of the cell wall, Cell wall development, role of cytoskeleton in wall development and genetic control of wall development.

Meristem:Definition, classification of meristem, Apical meristems of Shoot and Root apex, relevant theories pertaining to structure and organization of root apex and shoot apex: Shoot Apex: Apical Cell Theory, Tunica Corpus Theory, Zonation Theory.

Root Apex: Histogenic boundries; Quiscent center; Formation of leaf primordial, Transitional tissue regions, The primary peripheral thickening meristem of Monocotyledons.

Unit 2 : Secondary vascular system **13 hours**

Development of the secondary vascular system of the stem and root. Role of the vascular cambium, the effect of secondary growth on the primary body on leaf and branch traces.

Secondary Xylem: Structure and development of secondary xylem, Secondary xylem of gymnosperms and dicotyledons. Patterns of distribution of xylary elements and rays, Tyloses, Gentic control of differentiation of secondary xylem. Evolution in secondary xylem of dicotyledons.

Secondary phloem: Gross and Ultra structure, development of the phloem. Nature and development of the cell wall of sieve elements. Nature of protoplast of sieve elements, Nature and function of P-protein, Distinctive features of phloem of gymnosperms, The nature and function of companion cells and Strasburger cells.

Nodal anatomy: A general account

Anamalous secondary growth: *Aristolochia, Boerhaavia, Dracaena*.

Periderm: Structure and development, formation of rhytidome, Lenticels

Secretary tissues in plants : Internal secretory structures and External secretory structures.

Ecological adaptations: Xerophytes, Mesophytes, Hydrophytes, Epiphytes, Parasites and Mangroves.

Unit 3: Ascent of Sap **06 hours**

Water relation of a plant cell: Water potential, osmotic potential, pressure potential, membrane and their permeability mechanism of water absorption, SPAC concept.

Ascent of sap: Vital and physical forces.

Mineral nutrition: Importance of nutrients, major and minor elements, their deficiency disorders and treatments. Passive and active transport of solutes across the membranes, ion transport in roots, mechanism of translocation, sources and sink concept.

Unit 4: Photosynthesis & Respiration **07 hours**

Photosynthesis: General concepts and historical backgrounds, photosynthetic apparatus, mechanism of absorption of light, Absorption spectrum, Emersson's enhancement effect, two pigment system-PS-I and

PS–II. Non cyclic and cyclic electron transport system. Photophosphorylation, carbon assimilation-the Calvin cycle, C_4 cycle and the CAM pathway. Photorespiration and its significance.
Respiration:Types of respiration, mechanism of respiration, Glycolysis, Kreb's Cycle, Electron transport system. Oxidative phosphorylation, Energetics of biological oxidation, respiratory inhibitors.

Unit 5: Growth & Metabolism **07 hours**

Growth hormones: Defination, Kinetics, growth hormones, biosynthesis, transport and physiological effects of Auxins, Cytokinins, Gibberllins, Abscissic acid and ethylene, mechanism of hormone action.
Nitrogen metabolism: Introduction, nitrogen fixation, biochemistry of nitrogen fixation, role of *nif* genes and Leghaemoglobin.

Unit 6: Photobiology **06 hours**

Circadian rhythms, photoperiodism, vernalization, phytochromes, biochemical signalling involved in flowering, dormancy, seed germination and senescence.

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Recommended readings:

Plant Anatomy:

1. Katherine Easn, 1996. Anatomy of seed plants, First Wiley prints, New Delhi.
2. Cutter, D.G. 1971. Plant anatomy- Part-1. Cell and Tissues. Edward Arnold, London.
3. Cutter, D.G. 1971. Plant Anatomy, Part II, Cell and tissues, Edward Arnold, London.
4. Chand, S. 2005. Plant Anatomy, S, Chand and Company Ltd., New Delhi.
5. Metcalf C.R and L. Chalk, 1950, Anatomy of Dicotyledons. Leaves, Stems and wood in relation to taxonomy with Notes on Economic users II Vols. Clerodendron press, Oxford.
6. Pandey, Plant Anatomy, Chand and Company ltd, New Delhi.
7. Cutler Botha and Stevenson (2007) Plant anatomy an applied approach. Black well publishing, UK.
8. Fahn A.1990, Plant anatomy, 4th edition, Pergamon press, Oxford.

Plant Physiology:

9. Conn, E.E., Stumpf, Bruenning, G. and Doi, R.H. 1987. Outlines of Biochemistry, John Wiley and Sons, New York.
10. Wilkins, M.B. (eds). 1989. Advanced physiology, Pitman publishing Ltd, London.
11. Salisbury and Ross, 2005. Plant physiology, CBS publication, New Delhi.
12. Zeigger, 2006. Plant physiology, Sinaere publisher.
13. Trivedi and Verma, 2007. A text book of physiology, biochemistry and biotechnology, S. Chand and Co., New Delhi.
14. Tiaz & Zeiger, 2010. Plant Physiology, 5th edition, Dincoln Taiz & Eduardo Zugier, Parima Publishing, New Delhi.
15. W.G Hopkins and W.P.A Huner Introduction to plant physiology 4th edition, 2011.

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LS301P: PLANT ANATOMY & PHYSIOLOGY

3 hours / week | 2 credits

1. Free hand section of Stem: Helianthus (Normal), Cucurbita and Peperomia (Special features).
2. Study of anomalous secondary growth of stem: Boerrhavia, Aristolochia and Draceana.
3. Study of leaf anatomy of Isobilateral (Nerium) and Dorsiventral leaf (Ficus)
4. Study of stomata: Paracytic, anisocytic, anamocytic, Diacytic types.
5. Study of root anatomy : Aerial root (Ficus), Orchid root.
6. Study of Ecological adaptation – Xerophyte (Nerium), Mesophyte (Hydrophyte (Hydrilla)
7. Wood anatomy-TLS & RLS of
   Gymnospermous wood (Pinus/Araucaria) & Angiospermous wood(Michelia)
8. Plant Microtechnique - Microtomy, Maceration.
9. Determination of water potentials by following drops methods.
10. Hydroponics study of deficiency symptoms (chlorosis, necrosis)
11. Separation of chlorophylls and carotenoids by Ascending paper chromatography
12. Bioassay of Phyto hormones – Auxins, Cytokinins, Gibberllins, Abssisic acid, Ethylene
13. Determination of lipid activity
14. Estimation of Leghaemoglobin in the nodules.

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LS401T: ANIMAL ANATOMY & PHYSIOLOGY

52 hours | 4 hours / week | 4 credits

Unit 1 **05 hours**

Integument and derivatives: Structure and functions of skin (Mammals), scales, claws, nails, hairs. feathers and horns.

Unit 2 **14 hours**

Comparative account of heart (Fish, Frog, Reptile, Bird and Mammals), eyes –compound and camera eye, gills (fish) and lungs (Mammals), skull (rabbit), limbs - fore limbs & hind limbs (mammals).

Unit 3 **07 hours**

Histophysiology : Liver, Kidney, Spleen, Testis, Ovary, Pituitary, Pancreas.

Unit 4 **05 hours**

Respiration and Circulation: Types of respiration, Respiratory pigments, transport of O_2 and CO_2, Open and closed circulation, Blood composition and function.

Unit 5 **04 hours**

Excitable nature of the Nerve Impulse. Origin and propogation of action potential. Propagation of action potential across cell membrane and synaptic junction.

Unit 6 **03 hours**

Excretory patterns in vertebrates: ammonotelism, ureatelism and uricotelism.

Unit 7 **07 hours**

Contractile cytoplasmic streaming, Ameboid Movement, Ciliary, Flagellar and Muscular movements. Contraction of smooth, cardiac, skeletal muscle fibers. The sliding Filament Mechanism of Muscular Contraction. Mechanism of Contraction & involvement of muscle proteins.

Unit 7 **07 hours**

Feeding and digestion: Feeding patterns in vertebrates. Chemical and mechanical digestion, Stimulation of gastro-intestinal secretions, Digestion of carbohydrates, lipids and proteins. Nutritive types, vitamins, minerals, energy requirements, nutrition requirements of different ages. Nutritional disorders.

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Recommended readings:

1) Parker, J&W. Haswell, 1995. Textbook of Zoology – Vertebrates. The Macmillan Press Ltd., U.K.
2) Stephen A. Miller & John P. Harley 2001, Zoology. The Animal Kingdom. Wm. C Publishers.
3) Berme, R.N. and Levy MN Principles of Physiology, Mosby Year Book. Inc.1996.
4) Eckert and Randall. Animal Physiology – Mechanisms and adaptations. CBS Publishers, 2000.
5) Schmidt-Nielsen. Animal Physiology. Cambridge Univ. Press, 2000.
6) D. Jenson. The Principles of Physiology. Appleton-Century-Crofts, 1996.
7) Prosser CL. Comparative Animal Physiology. WB Saunders and Company, 1973.

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LS401P ANIMAL ANATOMY & PHYSIOLOGY
3 hrs / week |2 credits

1. Identification and functions of scales (fishes), claws, nails, hairs, horns, feathers, Hoofs and nests.
2. Felid visits to Research institutes, national parks and natural vegetations.
3. Vertebre – Procoelous (Frog), Amphicoelous (Bird), Amphiplateous (Rabbit).
4. Skulls in vertebrates : Frog, Bird, Mammal, rabbit, dog, man, turtle.
5. Histology sections of Testis, Ovary, Liver, Pancreas, Kidney, Spleen, intestine.
6. Microtomy – Organ fixing, Block making, Sectioning and staining of any one organ (rat)
7. Determination of oxygen consumption and metabolic rate in fish.
8. Rate of protein digestion by trypsin.
9. Acetylcholine activity in tissues
10. Determination of ATPase activity in tissues

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LS501T: Cell and Molecular Biology
39 hours | 3 hours/week | 3 credits

Unit 1: Techniques in Biology **04 hours**

Principles of microscopy; Light Microscopy; Phase contrast microscopy; Fluorescence microscopy; Confocal microscopy; Sample Preparation for light microscopy; Electron microscopy (EM)- Scanning EM and Scanning Transmission EM (STEM); Sample Preparation for electron microscopy; X-ray diffraction analysis.

Unit 2: Cell as a unit of Life **02 hours**

The Cell Theory; Prokaryotic and eukaryotic cells; Cell size and shape; Eukaryotic Cell components.

Unit 3: Cell Organelles **12 hours**

Mitochondria: Structure, marker enzymes, composition; Semiautonomous nature; Symbiont hypothesis; Proteins synthesized within mitochondria; mitochondrial DNA.

Chloroplast Structure, marker enzymes, composition; semiautonomous nature, chloroplast DNA.

ER, Golgi body & Lysosomes: Structures and roles.

Peroxisomes and Glyoxisomes: Structures, composition, functions in animals and plants and biogenesis.

Nucleus: Nuclear Envelope- structure of nuclear pore complex; chromatin; molecular organization, DNA packaging in eukaryotes, euchromatin and heterochromatin, nucleolus and ribosome structure (brief).

Unit 4: Cell Membrane and Cell Wall **04 hours**

The functions of membranes; Models of membrane structure; The fluidity of membranes; Membrane proteins and their functions; Carbohydrates in the membrane; Faces of the membranes; Selective permeability of the membranes; Cell wall.

Unit 5: Cell Cycle **04 hours**

Overview of Cell cycle, Mitosis and Meiosis; Molecular controls.

Unit 6: Genetic material **05 hours**

DNA: Miescher to Watson and Crick- historic perspective, Griffith's and Avery's transformation experiments, Hershey-Chase bacteriophage experiment, DNA structure, types of DNA, types of genetic material.

DNA replication (Prokaryotes and eukaryotes): bidirectional replication, semi–conservative, semi discontinuous RNA priming, Ǿ (theta) mode of replication, replication of linear, ds-DNA, replicating the 5´end of linear chromosome including replication enzymes.

Unit 7: Transcription (Prokaryotes and Eukaryotes) **04 hours**

Types of structures of RNA (mRNA, tRNA, rRNA), RNA polymerase- various types; Translation (Prokaryotes and eukaryotes), genetic code

Unit 8: Regulation of gene expression **04 hours**

Prokaryotes: Lac operon and Tryptophan operon; and in Eukaryotes.

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Recommended readings:

1. Cell and Molecular Biology. De Roberts and De Roberts., Saunders College, USA 6th edition.
2. Molecular Cell Biology. Lodish, Berk, Zipursky, Matsudaira, Baltimore & Darnell. Freeman Press, 6th edition.
3. Cell Biology. Karp G., McGraw Hill book comp. New York. 6th edition. 2010.
4. The Cell : A molecular approach. Cooper, G.M. ASM Press, USA. 5th edition. 2009.
5. Chromatin structure and function. Wolfe, A., Academic press, New York 1995.
6. Cell Biology. Pollard. J.P. and Earnshow, W.C. Saunders. 2002.
7. The Cell –A molecular approach. Cooper, G.M. Princeton Publishers. NY, 2000.
8. Molecular Cell Biology. Lodin, H., Berk, A., Zipursky, S.L., Matsudain, P., Baltimore, D. and Darneil, T. Will Freeman Company, NY, 6th edition.
9. Molecular biology of the cell. Albert, B., Johnson, A., Raff, M., Robert, K., Walter, P. Garland Sciences, NY, 5th edition.
10. Karp, G. Cell and Molecular Biology: Concepts and Experiments. 6th Edition. John Wiley & Sons. Inc. 2010.
11. De Robertis, E.D.P. and De Robertis, E.M.F. Cell and Molecular Biology. 8th edition. Lippincott Williams and Wilkins, Philadelphia. 2006.
12. Cooper, G.M. and Hausman, R.E. The Cell: A Molecular Approach. 5th edition. 2009.
13. ASM Press & Sunderland, Washington, D.C.; Sinauer Associates, MA.
14. Becker, W.M., Kleinsmith, L.J., Hardin. J. and Bertoni, G. P. The World of the Cell. 7th edition. Pearson Benjamin Cummings Publishing, San Francisco. 2009.

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LS501P: Cell and Molecular Biology

3 hours/week | 2 credits

Note: Wherever wet lab experiments are not possible, the principles and concepts can be demonstrated through any other material or medium including videos / virtual labs etc.

Cell Biology

1. To study prokaryotic cells (bacteria), viruses, eukaryotic cells with the help of light and electron micrographs.
2. Study of the photomicrographs of cell organelles
3. To study the structure of plant cell through temporary mounts.
4. To study the structure of animal cells by temporary mounts-squamous epithelial cell and nerve cell.
5. Preparation of temporary mounts of striated muscle fiber
6. To prepare temporary stained preparation of mitochondria from striated muscle cells/cheek epithelial cells using vital stain Janus green.
7. Study of mitosis and meiosis -temporary mounts and permanent slides (*Allium cepa*, Grass hopper/*Drosophila*)
8. Study the effect of temperature, organic solvent on semi permeable membrane.
9. Demonstration of dialysis of starch and simple sugar.
10. Study of plasmolysis and deplasmolysis on Rhoeo leaf.
11. Measure the cell size (either length or breadth/diameter) by micrometry.
12. Study the structure of nuclear pore complex by photograph (from Gerald Karp) Study of special chromosomes (polytene & lampbrush) either by slides or photographs.
13. Study DNA packaging by micrographs.
14. Preparation of the karyotype and ideogram from given photograph of somatic metaphase chromosome.

Molecular Biology

1. Isolation of nucleic acids from plant (young leaves, *Allium cepa*) and animal (butterfly or silkworm larva, adult Uzi fly, *Drosophila* larva) by CTAB and SDS-Proteinase K method
2. Isolation of plasmid DNA from bacterial culture using DNA extraction kit
3. Extraction of total RNA from bacterial culture using RNA isolation kit
4. Estimation of DNA content by Diphenylamine(DPA) method
5. Estimation of RNA by Orcinol method
6. Estimation of protein by Bradford method
7. Separation of nucleotide bases by paper chromatography
8. Agarose gel electrophoresis of DNA and RNA
9. Polyacrylamide gel electrophories of proteins

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LS502T: DEVELOPMENTAL BIOLOGY

39 hours | 3 hours / week | 3 credits

Unit 1: Introduction to developmental biology; Early development- Fertilization-types, Types & mechanisms of cleavage. Gastrulation: Cell movement and formation of germ layers in frog & chick and mouse, Concept of cell type determination, competence and differentiation, Creation of specific organs (organogenesis – chick) **5 hours**

Unit 2: Organizer concept: Primary organizer, embryonic stem cell, development of vertebrate nervous system (chick) Formation of neural tube, regions of brain. **3 hours**

Unit 3: Genetics of pattern formation: *Coenorhabditis* ,*Drosophila, Arabidopsis thaliana* , Maternal gene and formation of body axes, Homeotic gene function, Imaginal disc development, Axes formation in vertebrate, Hox genes. **6 hours**

Unit 4: Post embryonic development:

- Metamorphosis- endocrine control of metamorphosis in amphibian and insects.
- Regeneration – Cellular processes in regeneration, Sources, determination of polarity, regulation of regeneration. **6 hours**

Unit 5: Gametogenesis in plants:

Microsporogenesis & male gametophyte :- Anther wall Structure and development- Endothecium, Middle layers, Tapetum, Nuclear behaviour in tapetal cells and Sporogenous tissue; Formation of vegetative and generative cells, Formation of pollen wall – Structure and development and abnormal pollen grains.

Megasporogenesis & female gametophyte :- Structure and development of ovules, Types and parts of ovules. Structure and development of female gametophyte, Types of female gametophytes, Structure of Mature Embryo sac, Embryo sac haustoria. **9 hours**

Unit 6: Fertilization and embryogeny: Structure of style and stigma, Pollen germination and pollen tube growth. Path of pollen tube, pollen tube discharge, Double fertilization: triple fusion and syngamy. Central cell as the second gamete of the flowering plant. Structure and types of endosperm, Physiology and cytology of endosperm and functions of endosperm and endosperm haustoria. Classification of Embryogeny, early embryogenesis and mature embryo of Dicotyledons – *Capsella bursa pastoris* and mature embryo of monocotyledons- *Najus lacerata* and Grass. **10 hours**

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Recommended readings:

1. Alberts *et al,* Molecular Biology of The Cell. 6th edition, Garland, 2014.
2. Scott F. Gilbert, Developmental Biology, Sinauer, 2003.
3. Kalthoff, Analysis of Biological Development, McGraw Hill, 1996.
4. Lewin, Genes VIII, Pearson, 2004.
5. Monk, Mammalian Development – A Practical Approach, IRL, 1987.
6. O'Rahilly and Muller, Human Embryology and Teratology, Wiley, 1992.

7. Rana, Human Embryology Made Easy, Harwood, 1998.
8. Wolpert, Principles of Development, Oxford, 2002.
9. Singh, P. 2001. Essentials of Plant Breeding, Kalyani Publishers, Hyderabad.
10. Allard, R. W. 1999. Principles of Plant Breeding. John Willey & Sons. New York.
11. Dana, S. 2001. Plant Breeding. Naya Udyog. Calcatta.
12. Singh. B. D. 1995. Plant Breeding – Principles and Methods. Kalyani Publishers, New Delhi.

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LS502P: DEVELOPMENTAL BIOLOGY
3 hrs / week | 2 credits

Wherever wet lab experiments are not possible, the principles and concepts can be demonstrated through any other material or medium including videos / virtual labs etc.

1. Study of whole mounts of frog and chick- early developmental stages
2. Study of chick development from live eggs (window viewing) & permanent embryo mounting
3. Study of section of chick embryo through selective developmental stages
4. Dissection and mounting of imaginal discs of *Drosophila* / silk worm
4. Videos showing selective embryonic events like cleavage; gastrulation
5. Measurement of animal/plant cell size using ocular and stage micrometer.
6. Micro and mega sporogenesis in higher plants-slides only
7. Pollen germination in-vivo and in-vitro
8. Study of gamete/spores in algae, moss, liverwort, pteridophyte and gymnosperm
9. Embryo development in flowering plant- slides only; dissection of endosperm and embryo
10. Study of apical and lateral meristem, hypertrophy and hyperplasia
11. Mounting of endosperm – *Cucumis* sp.
12. Mounting of embryo – *Cyamopsis* / *Tridax* sp.

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LS601T: ECOLOGY & ENVIRONMENTAL BIOLOGY
39 hours | 3 hrs / week | 3 credits

Unit 1: Introduction: Definition of Ecology. Principles and Scope of Ecology, Laws of thermodynamics, Basic laws of energy flow: energy flow models, biogeochemical cycles. Ecosystem- concept and principles, structure and function of ecosystem, classification of ecosystem and composition, food chain, food webs, trophic levels, ecological pyramids. Ecological succession- Introduction, definition of succession and types. **10 hours**

Unit 2: Population & Behavioural Ecology; Population growth and structure, Regulation, Intra and Inter specific interactions. Community Ecology; Biotic community concept, community analysis, community stability, dynamics and equilibria, methods of studying ecosystem. Productivity-definition, types, measurements of Biomass and productivity in terrestrial and aquatic communities. Foraging behaviour, mating behaviour, mating systems, colouration and mimicry.

10 hours

Unit 3: Natural resources: Renewable and non-renewable resources, forest resources- use and over exploitation, deforestation, case studies. Timber extraction , mining, dams and their effects on forests and tribal people; Water resources- use and over utilization of surface and ground water, floods, drought, conflicts over water, dams, benefits and problems; Mineral resources- use and exploitation, environmental effects of extraction and use of mineral resources, case studies; Agricultural resources- World food problems, changes caused by agriculture and over grazing, effects of modern agriculture, fertilizer- Pesticide problems, water logging and salinity, case studies; Energy resources- growing energy needs, conventional and non-conventional energy resources, use of alternative energy sources, case studies; Land resources- Land as a resource, Land degradation, landslides, soil erosion and desertification. **10 hours**

Unit 4: Biodiversity and Conservation: Biogeographical classification of India, Biodiversity at Global, National and Local levels, India as a mega diversity nation, Threats to biodiversity, habitat loss, poaching of wildlife, man wildlife conflicts, endangered and endemic species of India, Ex-situ and In-situ conservation of Biodiversity. **5 hours**

Unit 5: Population & pollution: Pollution-Definition, Types, sources and effects of pollution. Solid waste management- types, effects and control measures, disaster management- floods, cyclone and landslides. Human population explosion, environment and human health, Human rights, Information technology and environmental health, case studies; Environmental Protection Act (EPA) - Air, Water, Wildlife, Forest conservation Acts, Public awareness. **4 hours**

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Recommended readings

1. Kormondy EJ, Concepts of Ecology, Prentice Hall, 1962.
2. Odum E P, Fundamentals of Ecology, 3rd Edition, Saunders, 1971.
3. Phillipson F H, Ecological energetics, Edward Arnold, 1980.
4. Eiseth G D et.al., Population Ecology, Van Nos, Stand Co., 1981.
5. Kumar H D, General Ecology, 1st Edition, Vikas Publishing House Pvt. Ltd., 1995

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LS601P: ECOLOGY & ENVIRONMENTAL BIOLOGY
3 hrs / week | 2 credits

Wherever wet lab experiments are not possible, the principles and concepts can be demonstrated through any other material or medium including videos / virtual labs etc.

1. Determination of dissolved oxygen in given water sample by Winkler's method
2. Estimation of Primary Productivity of Lake/ Pond System
3. Sampling techniques for plankton
4. Plotting of survivorship curves from hypothetical life table data
5. Productivity and Biomass estimation of plants
6. To determine minimal quadrat area for sampling in the given simulation sheet
7. To determine soil texture, soil density, bulk density, particle density and pore space
8. To determine water holding capacity and percolation rate of soil
9. To determine COD, BOD, Total solids
10. Determination of hardness of water.
11. Soil analysis: pH, Inorganic and organic contents
12. Study through specimens/photographs/slides of parasitic angiosperms, Saprophytic angiosperms, VAM fungi, Root nodules, Corolloid roots, Mycorrhizal roots, Velamen roots, Lichen as pollution indicators.
13. Principle and function of Sechi disc, Atmometer, Anemometer, Hygrometer, Hair hygrometer, Luxmeter, Rain guage, Soil thermometer, Min-Max thermometer.

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LS602T: Genetics and Evolution
39 hours | 3 hours/week | 3 credits

Unit 1: Introduction to Genetics **02 hours**
Mendel's work on transmission of traits, Genetic Variation, Molecular basis of Genetic Information

Unit 2: Mendelian Genetics and its Extension **05 hours**
Principles of Inheritance, Chromosome theory of inheritance, Incomplete dominance and codominance, Multiple alleles, lethal alleles, Epistasis, Pleiotropy, sex linked inheritance, extra-chromosomal inheritance

Unit 3: Linkage, Crossing Over and Chromosomal Mapping **05 hours**
Linkage and crossing over, Recombination frequency as a measure of linkage intensity, two factor and three factor crosses, Interference and coincidence, Somatic cell genetics – an alternative approach to gene mapping

Unit 4: Mutations **05 hours**
Chromosomal Mutations: Deletion, Duplication, Inversion, Translocation, Aneuploidy and Polyploidy; Gene mutations: Induced versus Spontaneous mutations, Back versus Suppressor Mutations.

Unit 5: Sex Determination **02 hours**
Chromosomal mechanisms, dosage compensation

Unit 6: History, theories and evidences of evolution **08 hours**
Major Events in History of Life, Lamarckism, Darwinism, Neo-Darwinism, Types of fossils, Incompleteness of fossil record, Dating of fossils, Phylogeny of horse.

Unit 7: Processes of Evolutionary Change **05 hours**
Organic variations; Isolating Mechanisms; Natural selection (Example: Industrial melanism); Types of natural selection (Directional, Stabilizing, Disruptive), Artificial selection

Unit 8: Species Concept, macroevolution and extinction **08 hours**
Biological species concept (Advantages and Limitations); Modes of speciation (Allopatric, Sympatric), Macroevolution and Macroevolutionary principles (example: Darwin's Finches), Mass extinction (Causes, Names of five major extinctions, K-T extinction in detail), Role of extinction in evolution

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Recommended readings:

1. Gardner, E.J., Simmons, M.J., Snustad, D.P. Principles of Genetics. VIII Edition. Wiley India. 2008
2. Snustad, D.P., Simmons, M.J.). Principles of Genetics. V Edition. John Wiley and Sons Inc. 2009
3. Klug, W.S., Cummings, M.R., Spencer, C.A. Concepts of Genetics. X Edition. Benjamin Cummings. 2012
4. Russell, P. J. Genetics- A Molecular Approach. III Edition. Benjamin Cummings. 2009
5. Griffiths, A.J.F., Wessler, S.R., Lewontin, R.C. and Carroll, S.B. Introduction to Genetic Analysis. IX Edition. W. H. Freeman and Co.
6. Ridley, M. (2004). Evolution. III Edition. Blackwell Publishing
7. Barton, N. H., Briggs, D. E. G., Eisen, J. A., Goldstein, D. B. and Patel, N. H. Evolution. Cold Spring, Harbour Laboratory Press. (2007).

8. Hall, B. K. and Hallgrimsson, B. Strickberger's Evolution. IV Edition. Jones and Bartlett Publishers 2008.
9. Campbell, N. A. and Reece J. B. Biology. IX Edition, Pearson, Benjamin, Cummings. 2011
Douglas, J. Futuyma. Evolutionary Biology. Sinauer Associates. 1997

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LS602P: GENETICS & EVOLUTION

3 hours / week | 2 credits

1. Study of Mendelian Inheritance and gene interactions (Non Mendelian Inheritance) using suitable examples. Verify the results using Chi-square test.
2. Study of Linkage, recombination, gene mapping using the data.
3. Study of Human Karyotypes (normal and abnormal).
4. Study of fossil evidences from plaster cast models and pictures
5. Study of homology and analogy from suitable specimens/ pictures
6. Charts:
   a) Phylogeny of horse with diagrams/ cut outs of limbs and teeth of horse ancestors
   b) Darwin's Finches with diagrams/ cut outs of beaks of different species
7. Visit to Natural History Museum and submission of report

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BANGALORE UNIVERSITY

REGULATIONS, SCHEME AND SYLLABUS

For the course

I to VI Semesters

BACHELOR OF COMPUTER APPLICATIONS

(BCA)

(Choice Based Credit System (Semester Scheme) –Y2K14 Scheme)

Revised w.e.f.

Academic Year 2014-2015 and onwards

Regulations, Scheme of study and Examination for BCA Degree Course
Under Choice Based Credit System - Semester System (Y2K14 SCHEME)
(Revised w.e.f. 2014 -2015)

R 1. a) Title of the course: **Bachelor of Computer Applications**

b) Duration of the Course: Durations of the undergraduate programmes shall extend over FOUR semesters (TWO academic years) for the Associate Degree(Advance Diploma), SIX semesters (Three academic years) for the regular Bachelor Degree.

c). Scheme of study:

i) There shall be five theory papers and two practical from first semester to fourth semester.

ii) There will be five theory, two practical and one project in fifth semester. There will be four theory, one practical and one project in sixth semester.

iii) The project work shall be carried out either independently or jointly (maximum of three students)

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

d) Scheme of Examination:

At the end of each semester there be University Examination of three hours duration in each of the theory paper/practical.

R. 2. Each semester shall be of 4 months duration

R. 3. Attendance: As per Bangalore University regulations I n force for science degree courses.

R. 4. A Candidate is allowed to carry over all the previous uncleared (failed) theory papers/Practical to subsequent semesters as per Bangalore University regulations in force for science degree courses.

R. 5. The maximum period for completion of the course shall be six years form the date of admission.

R. 6. Eligibility for admission:

a) A candidate who has passed the two years Pre-University Examination conducted by the Pre-University Education Board in Karnataka

b) A candidate who has passed JODC / Three years Diploma in Engineering of Government of Karnataka or any other examination considered as equivalent thereto shall be eligible for admission.

a) Any student who has passed PUC –II Science, Arts or Commerce securing a minimum of 35% OF MARKS

OR

b) Any student who has passed JODC or Diploma in Engg. (of three year duration of Govt. of Karnataka) with minimum of 35% of marks in aggregate in all the semester /years.

R. 7. Admission Procedure:

a) Through Counseling in respective colleges

b) 50% weight age for entrance test in respective colleges

c) 50% weight age for performance at qualifying examination.

d) Merit list shall be prepared based on item No, 7(b) and 7(c)

e) Reservation: As per the notification /Govt. orders form the University /Govt. from time to time.

f) Tuition and other fees: As fixed by the University from time to time

R8. The total number of students to be admitted to the course shall be decided by the University.

R9. Results: Results of candidate shall be declared and the classes awarded as per the procedure followed by the University for B.Sc. Courses.

R10. POWER TO REMOVE DIFFICULTIES

1) If may difficulty arises in giving effect to the provisions of these regulations, the Vice-Chancellor may be order make such provisions not inconsistent with the Act, Statutes, Ordinances or other Regulations, as appears to be necessary to expedient to remove the difficulty.

2) Every order made under this shall be subject to rectification by the appropriate University Authorities.

Title of Papers and Scheme of Study & Examination for BCA (Bachelor of Computer Applications) Under Choice Based Credit System - Semester System (Revised w.e.f. 2014-2015)

Semester	Part	Paper Code	Title of the paper	Hours / Week	Marks			Credits	
					IA	Exam	Total	Subject	Semester
I	Part - 1	BCA101T	Indian Language	4	20	80	100	2	16
		BCA102T	English	4	20	80	100	2	
	Part – 2	BCA103T	Problem Solving Techniques using C	4	30	70	100	2	
		BCA104T	Digital Electronics	4	30	70	100	2	
		BCA105T	Discrete Mathematics	5	50	100	150	3	
		BCA103P	C Programming Lab	3	15	35	50	1	
		BCA104P	Digital Electronics Lab	3	15	35	50	1	
	Part – 3	-	Foundation Course	3	30	70	100	2	
		-	CC & EC		50		50	1	
II	Part – 1	BCA201T	Indian Language	4	20	80	100	2	16
		BCA202T	English	4	20	80	100	2	
	Part - 2	BCA203T	Data structures	4	30	70	100	2	
		BCA204T	Database Management System	4	30	70	100	2	
		BCA205T	Numerical and Statistical Methods	5	50	100	150	3	
		BCA203P	Data Structures Lab	3	15	35	50	1	
		BCA204T	DBMS Lab	3	15	35	50	1	
	Part - 3	-	Foundation Course	3	30	70	100	2	
		-	CC & EC	-	50	-	50	1	
III	Part - 1	BCA301T	Indian Language	4	20	80	100	2	16
		BCA302T	English	4	20	80	100	2	
	Part - 2	BCA303T	Object Oriented Programming using C++	4	30	70	100	2	
		BCA304T	Financial Accounting and Management	4	30	70	100	2	
		BCA305T	Operating System	5	50	100	150	3	
		BCA303P	C++ Lab	3	15	35	50	1	
		BCA304T	Accounting Package Lab	3	15	35	50	1	
	Part - 3	-	Foundation Course	3	30	70	100	2	
		-	CC & EC	-	50	-	50	1	
IV	Part - 1	BCA401T	Indian Language	4	20	80	100	2	16
		BCA402T	English	4	20	80	100	2	
	Part - 2	BCA403T	Visual Programing	4	30	70	100	2	
		BCA404T	Unix Shell programming	4	30	70	100	2	
		BCA405T	Operation Research	5	50	100	150	3	
		BCA403P	Visual Programming Lab	3	15	35	50	1	
		BCA404T	UNIX Lab	3	15	35	50	1	
	Part - 3	-	Skill Development Course	3	30	70	100	2	
			CC & EC	-	50	-	50	1	

Semester	Part	Paper Code	Title of the paper	Hours / Week	Marks			Credits	
					IA	Exam	Total	Subject	Semester
V	Part - 2	BCA501T	Data Communication and Networks	4	50	100	150	3	20
		BCA502T	Software Engineering	4	50	100	150	3	
		BCA503T	Computer Architecture	4	50	100	150	3	
		BCA504T	Java Programming	4	30	70	100	2	
		BCA505T	Microprocessor and Assembly Language	4	30	70	100	2	
		BCA504P	Java Programming Lab	3	15	35	50	1	
		BCA505P	Assembly Language Programming Lab	3	15	35	50	1	
		BCA506P	Project	8	50	100	150	3	
	Part - 3	-	Skill Development Course	3	30	70	100	2	
VI	Part–2	BCA601T	Theory of Computation	4	50	100	150	3	20
		BCA602T	System Programming	4	50	100	150	3	
		BCA603T	Cryptography and Network Security	4	50	100	150	3	
		BCA604T	Web Programming	4	30	70	100	2	
		BCA604P	Web Programming Lab	3	15	35	50	1	
		BCA605P	Project Work	16	100	200	300	6	
	Part – 3	-	Skill Development Course	3	30	70	100	2	

FIRST SEMESTER BCA

BCA101T : INDIAN LANGUAGE

Syllabus as per the one prescribed for science courses of Bangalore University.

BCA102T : ENGLISH

Syllabus as per the one prescribed for science courses of Bangalore University.

BCA103T : PROBLEM SOLVING TECHNIQUES USING C

Total Teaching Hours : 60 No of Hours / Week : 04

Unit - I

Introduction to Programming Concepts: Software, Classification of Software, Modular Programming, Structured Programming, Algorithms and Flowcharts with examples. Overview of C Language: History of C, Character set, C tokens, Identifiers, Keywords, Data types, Variables, Constants, Symbolic Constants , Operators in C, Hierarchy of Operators, Expressions, Type Conversions and Library Functions.

[12 Hours]

Unit - II

Managing Input and Output Operation: Formatted and Unformatted I/O Functions, Decision making, branching and looping: Decision Making Statements - if Statement, if–else statement, nesting of if-else statements, else–if ladder, switch statement,?: operator, Looping - while, do-while, for loop, Nested loop, break, continue, and goto statements. Functions: Function Definition, prototyping, types of functions, passing arguments to functions, Nested Functions, Recursive functions.

[12 Hours]

Unit - III

Arrays: Declaring and Initializing, One Dimensional Arrays, Two Dimensional Arrays, Multi Dimensional Arrays - Passing arrays to functions. Strings: Declaring and Initializing strings, Operations on strings, Arrays of strings, passing strings to functions. Storage Classes - Automatic, External, Static and Register Variables.

[12 Hours]

Unit-IV

Structures-Declaring and Initializing, Nested structure, Array of Structure, Passing Structures to functions, Unions, typedef, enum, Bit fields. Pointers – Declarations, Pointer arithmetic, Pointers and functions, Call by value, Call by reference, Pointers and Arrays, Arrays of Pointers, Pointers and Structures. Meaning of static and dynamic memory allocation, Memory allocation functions.

[12 Hours]

Unit-V

Files - File modes, File functions, and File operations, Text and Binary files, Command Line arguments. C Preprocessor directives, Macros – Definition, types of Macros, Creating and implementing user defined header files.

[12 Hours]

TEXT BOOKS

1. E. Balaguruswamy, “Programming In ANSI C”, 4th edition, TMH Publications, 2007
2. Ashok N. Kamthane, “Programming with ANSI and Turbo C”, Pearson Education, 2006

REFERENCES BOOKS

1. Ashok N. Kamthane et. al., "Computer Programming and IT", Pearson Education, 2011
2. Mahapatra, " Thinking In C ", PHI Publications, 1998.
3. Yashwant Kanetkar, "Let Us C", 13th Edition, PHP, 2013.

BCA104T: DIGITAL ELECTRONICS

Total Teaching Hours : 60 No of Hours / Week : 04

Unit - I

Introduction to network theorems and AC fundamentals: Ohm's law: Statement, explanation. Kirchhoff's law: Statement & explanation of KCL and KVL. Mesh/loop analysis (up to 2 loops) and node voltage method, Numerical problems. Delta/star and star/Delta transformation: No derivation for Interco version equations, introduction of network, port of network (one port network, two port network), unilateral network, bilateral network, linear network. Need for application of network theorems. (DC Circuits only). Superposition theorem: statement, (only with TWO voltage sources) steps to apply the theorem explanation by considering a simple resistive network and problems. Thevenin's theorem: Statement, (Only with ONE voltage source) Steps to apply the theorem, explanation by considering a simple resistive networking and problems. Norton's theorem: Statement, (Only with ONE voltage source) steps to apply the theorem, explanation by considering a simple resistive network and problems. Maximum power transfer theorem: Statement, explanation of theorem by considering a simple resisting network, expression for maximum power deliver (P L (max) =Vth2/4Rth) (no derivation), graph of Vs Pl, numerical problems and applications. Reciprocity theorem, Statement, explanation using resistive network with dc source and numerical problems. AC Fundamentals: Representation of ac sine wave, instantaneous value, peak value, peak to peak value, average value, r.m.s value cycle, time period, frequency. (No derivations, only mention the expressions) Representation of non sinusoidal waves.

[12 Hours]

Unit - II

Semiconductor Devices: Introduction, atomic structure, energy level, energy band diagram in solids, classification of conductors, insulators and semiconductors. Semiconductor, properties, crystal structure of semiconductor, types – intrinsic and extrinsic semiconductor. Intrinsic semiconductor: Crystal structure (Ge& Si), thermal generated charges (electron and holes) carriers the effect temp on their motion. Extrinsic semiconductor: Doping, donor acceptor impurities, c-type, p-type semiconductor, majority and minority carriers, their currents, concept of immobile ions. Semiconductor devices : PN junction diode, formation of pn junction layer, potential barrier, energy level diagram of pn junction, Biasing of pn junction, behaviour of pn junction under forward and reverse biasing, break down in pn junction, avalanche and zener break down. Diode characteristics; V-I characteristic, forward and reverse bias, diode parameters, bulk resistance, knee voltage, static and dynamic resistance, PIV. Application of diode; As a rectifier, as logic gate, as a switch, etc. Rectifier, types, Half wave Full wave. Half wave rectifier: Circuit, working, wave forms and expression for ripple factor and efficiency (no derivation), advantages & disadvantages. Bridge wave rectifier: Circuit, working, wave forms and expressions for ripple factor and efficiently (no derivation), advantages & disadvantages. Logic families: Scale of integration, Digital IC's, classifications, DTL, TTL, ECL, MOS, CMOS, Mention of features: speed of operation, power dissipation, propagation delay, fan-in, fan-out. [12 Hours]

Unit – III

Number Systems: Introduction to number systems – positional and non-positional, Base /Radix. Decimal number system-Definition, digits, radix/base, Binary number system – Bit Byte, Conversions: Binary to Decimal and Decimal to Binary. Octal number system-Conversion from Octal to Decimal to Octal, Octal to Binary and binary to Octal. Hexadecimal number system –Conversion : Decimal to Hex, Hex to decimal, Hex to Binary, Binary to Hex, Octal to Hex, Hex to Octal, Binary, arithmetic –binary addition, subtraction, multiplication and division (only Integer part). 1's and 2's compliment: 2's complement subtraction. Binary code: BCD numbers, 8421 code, 2421 code- examples and applications. Gray code –Conversions-Gray to binary and Binary to Gray, application of gray code (Mention only). Excess-3 code – self complimenting property and applications. Definition and nature of ASCII code. Introduction to error detection and correction code, parity check. Boolean algebra:-Laws and theorems. AND, OR, NOT Laws, Commutative law, associative law, distributive law, Duality theorem. Demorgan's theorems-Statements, proof using truth tables; Simplification of Boolean expressions using Boolean laws. Definition of product term, sum term, minterm, maxterm, SOP, standard POS and Standard POS. Conversion of Boolean expression to Standard SOP and Standard POS forms. Karnaugh maps-Definition of Karnaugh map, K- map for 2, 3 and 4 variables. Conversion of truth tables into k-map grouping of cells, redundant groups and don't care conditions Karnaugh map technique to solve 3 variable and 4 variable expressions. Simplification of 3 and 4 variable Boolean expression using K-maps (SOP only)

[12 Hours]

Unit - IV

Logic Gates: AND Gate: Definition, symbol truth table, timing diagram, Pin diagram of IC 7408. OR Gate: Definition, symbol, truth table, timing diagram of IC 7432. NOT Gate: Definition symbol, truth table, timing diagram, Pin diagram of IC 7404. NAND Gate: Definition, symbol, truth table, Pin diagram of IC 7400, NOR Gate: Definition, symbol, truth table, timing diagram, Pin diagram of IC 7402. Exclusive OR Gate: Definition, symbol, truth table, timing diagram. Combinational logic circuits: Definition, applications. Half Adder: Symbol, Logic circuits using XOR and basic gates, Truth table, Full Adder: Symbol, Logic circuits using XOR and basic gates, Truth table, Half Subtractor: Symbol, Logic circuits using XOR and basic gates, Truth table. Full Subtractor: Symbol, Logic circuits using XOR and basic gates, Truth table. Adder – Subtractor; Logic circuit, Pin diagram IC 7483, IC 7486. Parallel Adder: 4 –bit parallel binary adder, BCD adder, IC 7483 NAND –NOR implementation of Adders.

[12 Hours]

Unit - V

Sequential Circuits: Importance of clock in digital circuit and introduction to flip flop. Flip –flop-difference between latch and flip-flop. Qualitative study of level and edge triggering. RS latch /unlocked, symbol and truth table. RS flip-flop using NAND gate, symbol, truth table and timing diagram. D flip –flop – Symbol, truth table, Realization of JK flip –flop using NAND gates, working, and timing diagram. Race around condition, present and clear inputs, pin diagram of IC 74112. T flip flop-Logic symbol, JK flip flop as a T flip –flop truth table and timing diagram. Master slave flip flop; Logic circuit, truth table and timing diagram, advantage of M/S flip-flop, pin diagram of IC 7473 IC 7476. Registers: Definition, types of registers-Serial in serial out, serial in parallel out, Parallel in serial out, Parallel in parallel our shift register (Block diagram representation for each), truth table, timing diagram and speed comparison.

[12 Hours]

Text Books:

1) Thomas L.Floyd ,''Digital Fundamentals", Peason Education Inc, New Delhi, 2003

Reference Books:

1) Morris Mano, "Digital Design", 5Th Edition, Prentice Hall, 2013
2) R.P.Jain, "Modern Digital Electronics", 3rd Edition, Tata Mc Graw Hill, 2003.
3) Bignell and Donovan, "Digital Electronics", 5th Edition, Thomson Publication, 2007.

BCA105T: DISCRETE MATHEMATICS

Total Teaching Hours: 65 No of Hours / Week: 05

Unit – I

Sets, Relations and Functions: Sets, Subsets, Equal Sets, Universal Sets, Finite and Infinite Sets, Operation on Sets, Union, Intersection and Complements of Sets, Cartesian Product, Cardinality of Set, De-mogan's law, Simple Applications. Relations, Properties of Relations, Equivalence Relation, Function: Domain and Range, Onto, Into, One to One, one to many Functions, Composite and Inverse Functions. Mathematical Logic: Proposition and truth values, Logical Connectives and their truth tables, Converse, Inverse and Contrapositive, Tautology and Contradiction, Logical Equivalence – Standard Theorems, Switching Circuits.

[13 Hours]

Unit - II

Matrices: Review of fundamentals: Definition of matrix, order, Types of matrices: zero, row, column, square, diagonal, scalar, unit, symmetric, skew-symmetric. Determinant: Value of determinant of order 2x2, 3x3, minors, cofactors, adjoint, inverse of a matrix. Solutions of linear equations: Cramers rule and matrix method involving two and three variables. Eigen values and Eigenvectors: Characteristic equation, characteristic roots, characteristic vectors (without any theorems) only 2x2 order. Cayley Hamilton theorem. (Only statement), verification of Cayley Hamilton theorem (only 2x2 matrices), using the same finding the powers of A (A^4, A^5, A^{-1}, A^{-2}), Inverse of a Matrix using Cayley-Hamilton theorem.

[13 Hours]

Unit - III

Logarithms: Definition of Logarithm, Indices leading to Logarithms and vice versa, Laws of Logarithms with proofs, Problems, Common Logarithm: Characteristic and Mantissa, Use of Logarithmic Tables, Problems. Permutation and Combination: Fundamental Principle of Counting, Factorial n, Permutations: Definition, Examples, Derivation of Formula ${}^nP_r$, Permutation when all the objects are not distinct, Problems, Combinations: Definition, examples, Proving ${}^nC_r = {}^nP_r\, r!$, ${}^nC_r = {}^nC_{n-r}$, ${}^nC_r + {}^nC_{r-1} = {}^{n+1}C_r$, Problems based on above formulae.

[13 Hours]

Unit - IV

Groups: Binary operation, Define of group, properties (only statement), problems (both finite and infinite groups), subgroup, theorems (no proof), problems. Vectors: Definition of vector and scalar, vector addition, dot and cross product, projection of a vector on the other (no geometrical meaning), area of parallelogram, area of a triangle, scalar triple product, volume of parallelepiped, co planarity of three vectors, vector triple product.

[13 Hours]

Unit - V

Analytical Geometry in Two Dimensions: Coordinates, Distance formula, Section Formula, Area of the Triangle formula (no derivation), Locus of point. Straight Line: Slope of a line and angle between two lines, Various forms of equations of lines – Derivation and Problems. Equation of family of lines passing through the point of intersection of two lines, Distance of a point from line (only problems).

[13 Hours]

Text Books

1. Grewal, B.S.Higher engineering Mathematings, 36th Edition

Reference Books

1. Satyrs S.S, Engineering Mathematics.
2. Peter V.O'Neil. Advanced Engineering Mathematics, 5th Edition.

BCA103P: C PROGRAMMING LAB

PART – A

1) Write a C Program to find the roots of the given quadratic equation using if-else if statement.
2) Write a menu driven C program using switch-case to find: (a) Sum of the digits of number (b) Factorial of N.
3) Write a C program to find cos (x) using series $\cos(x) = 1 - x^2/2! + x^4/4! - \ldots\ldots\ldots x^n/n!$]
4) Write a Program to find whether a given number is prime number are not
5) Write a C program to arrange the given set of numbers in ascending and descending order.
6) Write a C program to find product of two N x M matrices.
7) Write a C program to calculate NCR= N!/ R! * (N-R)! Using function.
8) Write a C program to display Fibonacci series using recursive function.
9) Write a C program to concatenate two strings using pointers.
10) Write a C program to copy content of one file to another file.

PART – B

During practical examination the External and Internal examiners may prepare exam question paper related to theory syllabus apart from Part-A. (A minimum of 10 Programs has to be prepared).

Note :

a) The candidate has to write both the programs One from Part-A and other from Part-B and execute one program as of External examiner choice.
b) A minimum of 10 Programs has to be done in Part-B and has to be maintained in the Practical Record.
c) Scheme of Evaluation is as follows:

Writing two programs	- 10 Marks
Execution of one program	- 10 Marks
Formatting the Output	- 05 Marks
Viva	- 05 Marks
Record	- 05 Marks
Total	**- 35 Marks**

BCA104P: DIGITAL ELECTRONICS LAB

1. Study of Logic Gates–AND, OR, NOT, NAND, NOR XOR (Using respective ICs)
2. Realization of AND, OR and NOT gates using Universal Gates.

3. Design and Realization of Half Adder/Subtracted using NAND Gates.
4. Design and Realization of Full Adder using Logic Gates.
5. Design and Realization of 4 bit Adder/Subtractor using IC 7483.
6. Design and Realization of BCD Adder using IC 7483.
7. Realization of J-K flip flop using IC 7400 and 7410.
8. Realization of T and D flip flop using IC 7476.
9. Implementation of PIPO Shift Registers using flip flops. (IC 7476).
10. Design and implementation of odd and even parity checker Generator using IC 74180.

PART – B

During practical examination the External and Internal examiners may prepare exam question paper related to theory syllabus apart from Part-A. (A minimum of 10 Programs has to be prepared).

Note :

a) The candidate has to write both the programs One from Part-A and other from Part-B and execute one program as of External examiner choice.
b) A minimum of 10 Programs has to be done in Part-B and has to be maintained in the Practical Record.
c) Scheme of Evaluation is as follows:

Writing two programs	- 10 Marks
Execution of one program	- 10 Marks
Formatting the Output	- 05 Marks
Viva	- 05 Marks
Record	- 05 Marks
Total	**- 35 Marks**

SECOND SEMESTER BCA

BCA201T: INDIAN LANGUAGE

Syllabus as per the one prescribed for science courses of Bangalore University.

BCA202T: ENGLISH

Syllabus as per the one prescribed for science courses of Bangalore University.

BCA203T: DATA STRUCTURES

Total Teaching Hours : 60 No of Hours / Week : 04

Unit-I

Introduction and Overview: Definition, Elementary data organization, Data Structures, data structures operations, Abstract data types, algorithms complexity, time-space tradeoff. Preliminaries: Mathematical notations and functions, Algorithmic notations, control structures, Complexity of algorithms, asymptotic notations for complexity of algorithms. String Processing: Definition, Storing Stings, String as ADT, String operations, word/text processing, Pattern Matching algorithms.

[12 Hours]

Unit-II

Arrays: Definition, Linear arrays, arrays as ADT, Representation of Linear Arrays in Memory, Traversing Linear arrays, Inserting and deleting, Sorting: Bubble sort, Insertion sort, Selection sort, Searching: Linear Search, Binary search, Multidimensional arrays,

Matrices and Sparse matrices.

[12 Hours]

Unit-III

Linked list: Definition, Representation of Singly linked list in memory, Traversing a Singly linked list, Searching a Singly linked list, Memory allocation, Garbage collection, Insertion into a singly linked list, Deletion from a singly liked list; Doubly liked list, Header liked list, Circular linked list.

[12 Hours]

Unit-IV

Stacks – Definition, Array representation of stacks, Linked representation of stacks, Stack as ADT, Arithmetic Expressions: Polish Notation, Application of Stacks, Recursion, Towers of Hanoi, Implementation of recursive procedures by stack. Queues – Definition, Array representation of queue, Linked list representation of queues Types of queue: Simple queue, Circular queue, Double ended queue, Priority queue, Operations on Queues, Applications of queues.

[12 Hours]

Unit-V

Graphs: Graph theory terminology, Sequential representation of Graphs: Adjacency matrix, traversing a Graph. Tree – Definitions, Binary trees, Representing binary trees in memory, Traversing Binary Trees, Binary Search Trees, Searching, Inserting and Deleting in a Binary Search Tree.

[12 Hours]

TEXT BOOKS

1. Seymour Lipschutz, "Data Structures with C", Schaum's outL*ines*, Tata McGraw-Hill, 2011.

REFERENCES BOOKS

1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Second Edition, Pearson Education, 2013.
2. Robert Kruse, C.L.Tondo, Bruce Leung, Shashi Mogalla, "Data Structures and Program Design using C", Pearson Education, 2009.
3. Forouzan, "A Structured Programming Approach using C", 2nd Edition, Cengage Learning India, 2008.

BCA204T : DATA BASE MANAGEMENT SYSTEMS

Total Teaching Hours : 60 No of Hours / Week : 04

Unit - I

Introduction: Database and Database Users, Characteristics of the Database Approach, Different people behind DBMS, Implications of Database Approach, Advantages of using DBMS, When not to use a DBMS. Database System Concepts and architecture: Data Models, Schemas, and Instances. DBMS Architecture and Data Independence., Database languages and interfaces. The database system Environment, Classification of DBMS.

[12 Hours]

Unit - II

Data Modelling Using the Entity-Relationship Model: High level conceptual Data Models for Database Design with and example., Entity types, Entity sets, attributes, and Keys, ER Model Concepts, Notation for ER Diagrams, Proper naming of Schema Constructs, Relationship types of degree higher than two. Record Storage and Primary File Organization: Secondary Storage Devices. Buffering of Blocks. Placing file Records on Disk. Operations on Files, File of unordered Records (Heap files), Files of Ordered

Records (Sorted files), Hashing Techniques, and Other Primary file Organization.

[12 Hours]

Unit - III

Functional Dependencies and Normalization for Relational Database: Informal Design Guidelines for Relational schemas, Functional Dependencies, Normal Forms Based on Primary Keys., General Definitions of Second and Third Normal Forms Based on Primary Keys., General Definitions of Second and Third Normal Forms, Boyce-Codd Normal Form. Relational Data Model and Relational Algebra: Relational Model Concepts., relational Model Constraints and relational Database Schema, defining Relations, Update Operations on Relations., Basic Relational Algebra Operations, Additional Relational Operations., Examples of queries in the Relational Algebra., Relational Database design Using ER-to-Relational Mapping.

[12 Hours]

Unit – IV

Relational Database Language: Data definition in SQL, Queries in SQL, Insert, Delete and Update Statements in SQL, Views in SQL, Specifying General Constraints as Assertions, specifying indexes, Embedded SQL. PL /SQL: Introduction.

[12 Hours]

Unit - V

Transaction Processing Concepts: Introduction, Transaction and System Concepts, Desirable properties of transaction, Schedules and Recoverability, Serializability of Schedules, Transaction Support in SQL, Locking Techniques for Concurrency Control, Concurrency Control based on time stamp ordering.

[12 Hours]

Text book:

1. Remez Elmasri and Shamkant B. Navathe, "Fundamentals of Database Systems", 5th Edition, Pearson Education, 2007.

References:

1. Abrahamsi. Silberschatz, Henry. F. Korth, S. Sudarshan, "Database System Concepts" 6th Edition, McGraw Hill, 2012.
2. C.J.Date, "Introduction to database systems", Eight Edition, Addison Wesley, 2003.

BCA205: NUMERICAL AND STATISCAL METHODS

Total Teaching Hours: 65 No of Hours / Week : 05

Unit - I

Floating-point representation and errors-Normalized floating-point forms, Errors in representing numbers, Floating point machine number and machine epsilon, Loss of significance and its avoidance. Roots of equations-locating roots of f(x)=0 Bisection method, Newton's method, Secant method.

[13 Hours]

Unit - II

Interpolation and numerical differentiation-polynomial interpolation, Lagrange and Newton form of interpolating Polynomial, Divided difference and recursive property, Inverse interpolation, First and Second derivative formulae via interpolation Polynomials. Numerical integration-Trapezoidal, Simpson's and adaptive Simpson rules.

[13 Hours]

Unit - III

System of linear equations-Gaussian elimination and back substitution-partial and complete pivoting, Doolittle, Cholesky and Crout LU decomposition methods, Jacobi and

Gauss – Seidel iterative methods. Power (and inverse power) method of obtaining largest (smallest) eigenvalue and corresponding eigenvector. Ordinary differential equations-initial value problem, Picard's, Taylor series, Runge-Kutta first, second and fourth order methods.

[13 Hours]

Unit – IV

Basics concepts and definition of statistics. Mean, Standard deviation, coefficient of Variation, skewness & kurtosis, Carl Pearson Correlation, Rank correlation and illustrated examples. Probability: Basic concept and definition of probability, probability axioms, Laws of Probability, Conditional probability, Bayes theorem , Problems and application.

[13 Hours]

Unit - V

Random variable and Expectation: Discrete and continuous random variables, expectation of random variables, theorems on expectation, illustrative examples. Probability Distribution: Probability function, Probability mass/density function, Discrete Distribution – Bernoulli, Binomial Distribution, Continuous distribution – Normal Distribution, applications and problems.

[13 Hours]

Text Books:

1. M.K.Jain, SRK Iyengar and R.K. Jain Numerical methods for Scientific and Engineering Computation: Wiley Eastern.
2. Ronald E Walpole & Raymond H Meyers : Probability & Statistics for Engineers and Scientists (Second Edition).

References

1. J.Medhi : Statistical Methods New Age Publications.
2. S.C.Gupta and V.K.Kapoor – Elements of Mathematics, Statistics, Sultan Chand and Sons.

BCA203P : DATA STRUCTURES USING C LAB

PART - A

1. Write a menu driven C program to perform the following string operations without using string functions: (i) String Length (ii) String Concatenation (ii) String Reverse
2. Write a C program to search for an element in an array using Binary search
3. Write a C program to sort a list of N elements using Selection Sort Algorithm.
4. Write a C program to construct a singly linked list and perform insertion, deletion and Display operations.
5. Write a C program to demonstrate the working of stack using liked list.
6. Write a C program for Towers of Hanoi problem.
7. Write a C program to find GCD of two numbers using recursion
8. Write a C program to convert infix arithmetic expression to post fix expression.
9. Write a C program to simulate the working of Circular Queue using an array.
10. Write a C program to create and traverse a binary search tree.

PART – B

During practical examination the External and Internal examiners may prepare exam question paper related to theory syllabus apart from Part-A. (A minimum of 10 Programs has to be prepared).

Note :

a) The candidate has to write two the programs One from Part-A and other from Part-B and execute one program as of External examiner choice.
b) A minimum of 10 Programs has to be done in Part-B and has to be maintained in the Practical Record.
c) Scheme of Evaluation is as follows:

Writing two programs	- 10 Marks
Execution of one program	- 10 Marks
Formatting the Output	- 05 Marks
Viva	- 05 Marks
Record	- 05 Marks
Total	**- 35 Marks**

BCA304P: DATABASE MANAGEMENT SYSTEM LAB
PART - A

1. The STUDENT detail databases has a table with the following attributes. The primary keys are underlined. STUDENT(regno: int, name: string, dob: date, marks: int)

i) Create the above table.

ii) Remove the existing attributes from the table.

iii) Change the date type of regno from integer to string.

iv) Add a new attribute phoneno to the existing table.

v) Enter five tuples into the table.

vi) Display all the tuples in student table.

2. A LIBRARY database has a table with the following attributes.

LIBRARY(bookid:int, title:string, author:string, publication:string, yearpub:int, price:real)

i) Create the above table.

ii) Enter the five tuples into the table

iii) Display all the tuples in student table.

iv) Display the different publishers from the list.

v) Arrange the tuples in the alphabetical order of the book titles.

vi) List the details of all the books whose price ranges between Rs. 100 and Rs. 300

3. The SALARY database of an organization has a table with the following attributes.

EMPSALARY(empcod:int, empnamee:string, dob:date, department:string, salary:real)

i) Create the above table.

ii) Enter the five tuples into the table

iii) Display all the number of employees working in each dapartment.

iv) Find the sum of the salaries of all employees.

v) Find the sum and average of the salaries of employees of a particular department.

vi) Find the least and highest salaries that an employee draws.

4. Consider the insurance database given below. The primary keys are underlined and the data types are specified.

PERSON(driver-id-no: string, name: string, address:strong)

CAR(regno: string, model: string, year: int)

ACCIDENT(report-no: int, date: date, location: String)

OWNS(driver-id-no: string, regno: string)

PARTICIPATED(driver-id-no: string, regno: string, report-no: int, damage-amount: int)

i) Create the above tables by properly specifying the primary keys and the foreign keys

ii) Enter atleast five tuples for each relation.

iii) Demonstrate how you

   a) Update the damage amount for the car with a specific regno in the accident with report no 12 to 25000.

   b) Add a new accident to the database.

iv) Find total number of people who owned cars that were involved in accidents in 2002

v) Find the number of accidents in which cars belonging to a specific model were involved

5. Consider the following database of students enrollment in courses and books adopted for each course.

STUDENT(regno: string, name: string, major: strong, bdate: date)

COURSE(course-no: int cname: string, dept: string)

ENROLL(reg-no: string, course-no: int, sem: int, marks: int)

BOOK-ADOPTION(course-no: int, sem: int, book-isbn: int)

TEXT(book-isbn: int, book-title: string, publisher: string, author: string)

i) Create the above tables by properly specifying the primary keys and the foreign keys

ii) Enter atleast five tuples for each relation.

iii) Demonstrate how you add a new text book to the database and make this book be adopted by some department.

iv) Produce a list of text books (include Course-no, book-isbn, book-title) in the alphabetical order for courses offered by the ‘Compute Science’ department that use more than two books.

v) List any department that has all its adopted books published by a specific publisher.

6. The following tables are maintained by a book dealer

AUTHOR(author-id: int, name: string, city: string, country: string)

PUBLISHER(publisher-id: int name: string, city: string, country: string)

CATLOG(book-id: int, title : string, author-id: int, publisher-id: int, category: int, year: int, price: int)

CATEGORY(category-id: int, description: string)

ORDER-DETAILS(order-no: int, book-id: int, quantity: int)

i) Create above tables by properly specifying the primary keys and the foreign keys.

ii) Enter atleast five tuples for each relation.

iii) Give the details of the authors who have 2 or more books in the catalog and the price of the books is greater than the average price of the books in the catalog and the year of publication is after 2010.

iv) Find the author of the book which has maximum sales.

v) Demonstrate how to increase price of books published by specific publisher by 10%

7. Consider the following database for BANK.

BRANCH(branch-name: string, branch-city: string, assets: real)

ACCOUNT(accno: int, banch-name: string, balance: real)

DEPOSITOR(customer-name: string, accno: int)

CUSTOMER(customer-name: string, customer-street: string, customer-city: string)

LOAN(loan-no: int, branch-name: string, amount: real)

ORROWER(customer-name: string, loan-no: int)

i) Create the above tables by properly specifying the primary keys and foreign keys.

ii) Enter atleast five tuples for each relation.

iii) Find all the customers who have atleast two accounts at the main branch.

iv) Find all customer who have an account at all the branches located in a specific city.

v) Demonstrate how t0 delete all account tuples at every branch located in specific city.

8. Consider the following database for ORDER PROCEESING.

CUSTOMER(cust-no: int, cname: string, city: string)

ORDER(orderno: int, odate: date, ord-amt: real)

ORDER_ITEM(orderno: int, itemno:int, qty: int)

ITEM(itemno: int, unitprice: real)

SHIPMENT(orderno: int, warehouseno: int, ship-date: date)

WAREHOUSE(warehouseno: int, city: string)

i) Create the above tables by properly specifying the primary keys and the foreign keys

ii) Enter atleast five tuples for each relation.

iii) List the order number and ship date for all orders shipped from particular warehouse.

iv) Produce a listing: customer name, no of orders, average order amount

v) List the orders that were not shipped within 30 days of ordering

PART – B

During practical examination the External and Internal examiners may prepare exam question paper related to theory syllabus apart from Part-A. (A minimum of 8 Programs has to be prepared).

Note :

a) The candidate has to write two the programs One from Part-A and other from Part-B and execute one program as of External examiner choice.

b) A minimum of 8 Programs has to be done in Part-B and has to be maintained in the Practical Record.

c) Scheme of Evaluation is as follows:

Writing two programs	- 10 Marks
Execution of one program	- 10 Marks
Formatting the Output	- 05 Marks
Viva	- 05 Marks
Record	- 05 Marks
Total	**- 35 Marks**

THIRD SEMESTER BCA

BCA301T: INDIAN LANGUAGE

Syllabus as per the one prescribed for science courses of Bangalore University.

BCA302T: ENGLISH

Syllabus as per the one prescribed for science courses of Bangalore University.

BCA303T: OBJECT ORIENTED PROGRAMMING USING C++

Total Teaching Hours : 60 No of Hours / Week : 04

Unit - I

Introduction :Procedure Languages, definition of OOP, Basic concept of OOP, Object Class, Data Abstraction, Data Encapsulation, Data Hiding member functions , Reusability, Inheritance, Creating new Data Types, Polymorphism, Overloading , Dynamic binding and Message passing. C++ Features: The iostream class, C++ Comments, C++ Keywords, Variable declaration, The Const Qualifier. The Endl, Set Waste precision, Manipulators, The scope resolution operator, The new & delete Operations. Functions: Simple Functions, Function declaration, calling the function, function definition, Passing argument to, returning value from function, passing constants, Variables, pass by value , passing structure variables, pass by reference, Default arguments, return statements, return by reference, overloaded functions; Different number of arguments, Different Kinds of argument, inline function.

[12 Hours]

Unit - II

Objects & Classes: Classes & Objects, Class Declaration, Class member; Data Constructions, Destructors, Member functions, Class member visibility, private, public, protected . The scope of the class objects constructions, Default Constructor. Constructor with argument, constructor with default arguments, Dynamic constructor, copy constructor, Overloaded constructor, Objects as arguments returning objects from

functions, class conversion, manipulation private Data members, Destructors classes, object & memory, arrays as class member data: Array of objects, string as class member.

[12 hours]

Unit - III

Operator Overloading : Overloading unary operator: Operator Keyword, Operator arguments, Operator return value, Nameless temporary objects, limitations of increment operator, overloading binary operator, arithmetic operators, comparison operator, arithmetic assignment operator, data conversion; conversion between objects of different classes. Inheritance : Derived Class & Base Class: Specifying the Derived class accessing Base class members, the protected access specifier, Derived class constructor, Overriding member functions, public and private inheritance; Access Combinations, Classes & Structures, Access Specifiers, Level of inheritance; Multilevel inheritance, Hybrid inheritance, Multiple inheritance; member functions in multiple inheritance , constructors in multiple inheritance, Containership; Classes, within classes, Inheritance & Program development.

[12 Hours]

Unit - IV

Virtual functions: Normal member function accessed with pointers, Virtual member functions accessed with pointers, Dynamic binding, pure virtual functions, Friend function; Friends for functional notation, friend classes, the pointer; Accessing Member Data with this, using this for returning values. Templates & Exception Handling: Introduction, Templates, Class Templates, function templates, Member function templates, Template arguments, Exception Handling.

[12 Hours]

Unit V

Streams: The Stream class Hierarchy, Stream classes Header file, string I/O: Writing strings, reading strings, character I/O, Detecting End – of – file. Object I/O; writing an object to disk, reading an object from disk, I/O with multiple objects; the fstream class, The open function, File Pointers; Specifying the position, Specifying the offset. The tellg Function, Disk I/O with Memory Functions; Closing Files, Error Handling, Command Line Arguments.

[12 Hours]

Text books:

1. Lafore Robert, "Object Oriented Programming in Turbo C++", Galgotia Publications, 2012.

Reference:

1. Lippman, "C++ Primer", 3rd Edition, Pearson Education, 2010.
2. E. Balaguruswamy: Object Oriented Programming with C++, Tata McGraw Hill Publications, 2011.
3. Farrell, "Object Oriented Programming Using C++", 1st Edition 2008, Cengage Learning India

BCA304T: ACCOUNTING AND FINANCIAL MANAGEMENT

Total Teaching Hours : 60 No of Hours / Week : 04

Unit - I

Introduction: History and Development of Accounting –Meaning Objectives and functions of Accounting-Book–keeping V/s Accounting –Users of accounting data – systems of book-keeping and accounting – branches of accounting –advantages and limitations of accounting. Accounting Concepts and conventions: Meaning need and classification, Accounting standards –meaning, need and classification of Indian

accounting standards. Accounting principles V/s Accounting standards.

[12 Hours]

Unit - II

Financial Accounting Process: Classification of accounting transaction and accounts, rules of debit and credit as per Double Entry System. Journalisation and Ledger position Preparation of different subsidiary books: Purchase Day Book Sales Day Book, Purchase Returns Day Books, Sales Returns Day Book, Cash Book. Bank Reconciliation Statement: Meaning, Need, Definition, preparation of BRS.

[12 Hours]

Unit - III

Accounting for bill of exchange: Meaning, Need, Definition, Partice to Bill of Exchange, Types of Bills. Accounts Procedure: Honour of the Bill, Dishonour of the Bill, Endorsement, Discounting, Renewal, Bills for collection, Retirement of the Bill, Accommodation Bills, Bill Receivable Book and Payable Book. Preparation of Trial Balance: Rectification of errors and journal Proper.

[12 Hours]

Unit - IV

Preparation of Final accounts: Meaning, need and classification, Preparation of Manufacturing, Trading, Profit and loss account and Balance-Sheet of sale –traders and partnership firms.

[12 Hours]

Unit V

Accounting Package like Tally

[12 Hours]

Text Book

1. S.Ramesh, B.S.Chandrashekar, a Text Book of Accountancy.

References

1. V.A.Patil and J.S.Korihalli, Book–Keeping and Accounting, (R. Chand and Co. Delhi).
2. R.S.Singhal, Principles of Accountancy, Nageen Prakash pvt.Ltd, Meerut.
3. B.S.Raman, Accountancy, (United Publishers, Mangalore)

BCA305T: OPERATING SYSTEMS

Total Teaching Hours : 65 No of Hours / Week : 05

Unit - I

Introduction: Batch Systems, Concepts of Multiprogramming and Time Sharing, Parallel, Distributed and real time Systems, Operating System Structures, Components & Services, System calls, System programs, Virtual machines. Process Management: Process Concept, Process Scheduling, Co – Operating process, Threads, Inter process communication, CPU Scheduling Criteria, Scheduling algorithm, Multiple Processor Scheduling, Real time Scheduling, Algorithm evolution.

[13 Hours]

Unit - II

Process Synchronization and deadlocks: The Critical Section Problem, Synchronization hardware, Semaphores, Classical problems of synchronization, Critical regions, monitors, Dead locks – system model, Characterization, Dead lock prevention, avoidance and detection, Recovery from dead lock, Combined approach to deadlock handling.

[13 Hours]

Unit - III

Memory Management: Logical and Physical address space, Swapping, Contiguous allocation, Paging, Segmentation, Segmentation with paging in Mastics and Intel 386, Virtual memory-Demand paging and it's performance, Page replacement algorithms, Allocation of frames, thrashing, page size and other considerations. Demand Segmentation.

[13 Hours]

Unit - IV

File management (Systems, Secondary Storage Structure): File Concepts, Access methods, Directory Structure, Protection and consistency, File system structure, Allocation methods, Free space management, Directory Implementation, Efficiency and Performance, Recovery. Disk Management (Structure, Disk Scheduling Methods): Disk Structure & Scheduling methods, Disk management, Swap – Space management.

[13 Hours]

Unit - V

Protection and Security: Goals of protection, Domain Protection, Access matrix, Security Problem, Authentication, One time password, program threats, System threads.
Case Study of Windows and Linux Operating System

[13 Hours]

Text Books:

1. Abraham Silberschatz and Peter Baer Galvin, "Operating System Concepts", 7th Edition, Pearson Education, 2002.

Reference Books:

1. H.M.Deitel, "Operating Systems", Pearson Learning Solutions, 3rd Edition, 2003.
2. William Stallings, "Operating Systems", 6th Edition, Pearson Education, 2010.
3. Stuart, "Operating systems: Principles, Design and Implementation", 1st Edition 2008, Cengage Learning India

BCA303P : C++ PROGRAMMING LAB

PART-A

1. Write a program to prepare a shopping lists
2. Write a program to perform bank transactions.
3. Write a program to swap numbers using friend function.
4. Write a program to calculate area and circumference of circle using inline function
5. Write a program to perform multiplication of two matrices using operator overloading.
6. Write a program to implement operation on queue.
7. Write a program to create a student report using inheritance technique.
8. Write a Program to find the area and volume of respective figures using function overloading.
9. Write a program to show returning current object, accessing member data of current object and returning values of object using this pointer
10. Write a program to sort elements using template.

PART - B

During practical examination the External and Internal examiners may prepare exam question paper related to theory syllabus apart from Part-A. (A minimum of 8 Programs has to be prepared).

Note :

a) The candidate has to write two the programs One from Part-A and other from Part-B and execute one program as of External examiner choice.
b) A minimum of 10 Programs has to be done in Part-B and has to be maintained in the Practical Record.
c) Scheme of Evaluation is as follows:

Writing two programs	- 10 Marks
Execution of one program	- 10 Marks
Formatting the Output	- 05 Marks
Viva	- 05 Marks
Record	- 05 Marks
Total	**- 35 Marks**

BCA304P: ACCOUNTING PACKAGE LAB

FOURTH SEMESTER BCA

BCA401T: INDIAN LANGUAGE

Syllabus as per the one prescribed for science courses of Bangalore University.

BCA402T: ENGLISH

Syllabus as per the one prescribed for science courses of Bangalore University.

BCA403T: VISUAL PROGRAMMING

Total Teaching Hours : 60 No of Hours / Week : 04

Unit - I

Introduction to Visual Programming: The intergrated Development Environment – menu bar, tool bar, from designer, project explorer , properties window , from layout window , The Visual Programing editor. The form object: Properties , events and methods pf forms ; Properties – Name , Captain , Backcolor, Borderstyle , controlbox , maxbutton , minbutton, moveable, startup position , height, width , left, top, scalemode, window, state ; Events –load ,unload , Clerk, Activate , Deactivate , Resize, methods – Show , hide , cls , Unload ,print , Controls –Properties and events of different controls such as command buttons , labels , textboxes image controls , timer, horizontal and vertical scroll bars , option buttons , check boxes , frames lists and combo boxes. Predefined Dialog Boxes – MsgBox and InputBO

[12 Hours]

Unit - II

Programming: Data types, variables; declaration and scope arithmetic operations, Study of form and code modules, private and public procedures , Main o procedure , Suba and Functions. Mathematical and string Functions; Branching and Looping Statement ; If – Then , if –Then –Else and Nested If Statements; Select Case –different forms; For – Next , While – Wend and Do – Loops statements ; Arrays- declaration . Static and dynamic arrays. Array and Function, menus and toolbars-Creating menus and toolbars, Working with the menu editor , Designing Multiple Document interface forms. Microsoft common controls.

[12 Hours]

Unit - III

OOP methods and properties of an object, class Modules , Encapsultation and Inheritance characteristics Dynamic Link Libraries (DLLs) and Windows API ; Designing Help files ; File handling – Sequential ,Random access and Binary files, Database connectivity – DAO and ADO Tables and Queries, ActiveX Data objects.

[12 Hours]

Unit – IV

Visual C++ Programming: Objects-Classes-VC++Components – Resources-Event Handling – Menus – Dialog Boxes – Importing VBX Controls – Files – MFC File Handling – Document View Architecture – Serialization.

[12 Hours]

Unit – V

Interfacing Other Applications – Multiple Document Interface (MDI) – Splitter Windows – Exception Handling – Debugging – Object Linking and Embedding (OLE) – Database Application – DLL- ODBC.

[12 Hours]

Text Books:

1. Gurumit Singh, "Visual Basic 6", First Edition, Firewall Media, 2007.

Reference Books:

1. Charles Petzold, "Windows Programming", 5th Edition, Microsoft Press, 1999.
2. Steve Holzner, "Visual C++ Programming", Second Edition, PHI, 1994.
3. Go ttfried, "Programming with Visual Basic 6", PHI, 2000.

BCA404T : UNIX PROGRAMMING

Total Teaching Hours : 60 No of Hours / Week : 04

Unit - I

Introduction: History, salient features, Unix system architecture, Unix command format, Unix internal and external commands, Directory commands, File related commands, Disk related commands, general utilities. Unix File System: Boot inode, super and data block, in-core structure, Directories, conversion of pathname to inode, inode to a new file, Disk block allocation. Process Management: Process state and data structures of a Process, User vs, kernel node, context of a Process, background processes, Process scheduling commands, Process terminating and examining commands.

[12 Hours]

Unit - II

Secondary Storage Management: Formatting, making file system, checking disk space, mountable file system, disk partitioning, file compression. Special Tools and Utilities: Filters, Stream editor SED and AWK, Unix system calls and library functions, Processes, signals and Interrupts, storage and compression facilities.

[12 Hours]

Unix - III

Shell Programming: Vi editor, shell types, shell command line processing, shell script features, executing a shell script, system and user-defined variables, expr command, shell screen interface, read and echo statement, command substitution, escape sequence characters, shell script arguments, positional parameters, test command, file test, string test, numeric test. [12 Hours]

Unit – IV

Conditional Control Structures-if statement, case statement Looping Control Structure-while, until, for, statements. Jumping Control Structures – break, continue, exit. Shell Programs covering the above concepts. [12 Hours]

Unit – V

Unix System Communication: Introduction, write, read, wall commands, sending and handling mails. System Administration: Roles of a System Administrator, File System Maintenance, System Startup and Shutdown, User Management, Backup and Restore, Doemons, Domain Name System DNS, Distributed File System.

[12 Hours]

Text Books:

1. M.G.Venkateshmurthy, "Introduction to UNIX & SHELL Programming", First Edition, Pearson Education, 2004.

Reference Books:

1. Forouzan,"Unix and Shell Programming", 1st Edition,2008 Cengage Learning India
2. UNIX and Shell Programming, Archana Verma, Firewall Media.

BCA405T: OPERATIONS RESEARCH

Total Teaching Hours : 65 No of Hours / Week : 05

Unit - I

Linear Programming Problems: Origin and development of operations research, Linear Programming Problem –formulation of Lenear Programming problem, Graphical solution. Theory of simplex method. Use of artifical variables and their solution.

[13 Hours]

Unit - II

Transportation Problem: Mathematical formulation of transportation problem, Initial basic Feasible solution, North West corner rule, Matrix minima method, Vogel's approximation method, MODI method to find optimal solution.

[13 Hours]

Unit - III

Assignment Problem: Mathematical formulation of an Assignment problem, Assignment algorithm, Hungarian Method to solve Assignment Problem.

[13 Hours]

Unit - IV

Network Analysis: Basic components of Network, Rules for drawing Network diagram Time calculation in Networks. Critical Path Method and PROJECT Evaluation and Review Techniques. Algorithm and flow chart for CPM and PERT.

[13 Hours]

Unit - V

Theory of Games: Two –person Zero –sum Games, the maximin and Minimax principle, Saddle point and value of the Game. Game without saddle points, mixed strategies, solution for 2X2 games, Graphical method Dominance property.

[13 Hours]

Text books:

1. Taha, "Operations Research", 7th edition, Pearson Education, 2007.

References Book:

1. Billey E. Gillett, "Introduction to Operations Research" , Himalaya Publishing House, Delhi, 1979.
2. Hamady A.Taha "Operations Research" , Collin Mac Millan, 1982.

FIFTH SEMESTER BCA

BCA501T: DATA COMMUNICATIONS AND NETWORKS

Total Teaching Hours : 60 No of Hours / Week : 04

Unit – I

Introduction: Communication Network and services, Approaches to Network Design, Network Functions and Network Topology, Message ,packet and circuit Switching , Internet, Packet Switching ; Key factors in Communication Network Evolution ; Layered Architecture and Applications – Examples of Layering , OSI Reference Model, TCP/IP Model Telnet FTP and IP Utilities. Digital Transmission: Digital Representation of Information: Properties of digital transmission: Characterization of Communication Channels Frequency Domain and Time Domain : Fundamental limits in Digital Communication – The Nyquist Signalling rate, The Shannon channel capacity : Line coding , Modems & digital Modulations

[12 Hours]

Unit - II

Transmission Systems: properties of media and digital transmission Systems – Twisted Pair , Coaxial Cable, Optical Fibre, Radio Transmission Intrared Light Error detection and correction – Error detection , Two – dimensional parity checks , Internet checksum , Polynomial code; standardized Polynomial codes , Error detecting capability of a polynomial code, Multiplexing – frequency – Division , Time – Division , SONET; Wavelength Division Multiplexing Circuit switches; Telephone network , signalling Traffic and Overload control in Telephone networks – Concentration, Routing Control, Overload controls Cellular Telephone Networks, Satellite Cellular networks.

[12 Hours]

Unit – III

Peer –to-Peer Protocols:- Peer-to peer Protocols and service models ARQ Protocols stop and wait , Go –back-N Selective Repeat , Transmission efficiency of ARQ Protocols, Other adaptation functions , - Sliding window flow control Timing Recovery in Synchronous Services Reliable Stream Service, Data Link Control, HDLC, PPP ; Statistical Multiplexing.

[12 Hours]

Unit - IV

Local Area Networks and Medium access Control Protocols:- Multiple access communications; Local Area network – LAN Structure, MAC Sublayer, Logical link control layer, Random Access protocols ALOHA , Slotted ALOHA, CSMA, CSMA/CD, Scheduling approaches to medium access control – Reservation Systems, polling , Token passing rings, comparison of Random access & Scheduling access control Comparison of Radom access & SHEDULING MEDIUM access controls; Channelization – FDMA, TDMA, CDMA;

[12 Hours]

Unit - V

LAN Standard –Ethernet and IEF, 802.3 LAN Standard ; Token Ring and IEEE 8025 LAN standard , FDDI, Wireless LAN's and IEEE 802.11 Standards; LAN Bridges – Transparent Bridges , Source Routing Bridges , Mixed – media Bridges. Packet Switching Networks :- Network services & Internal Network Operation; Packet Network Topology; Datagrams & VIRTUAL circuits ; structure of switch/ Router, Connectionless packet switching ; Virtual – Circuit packet switching ; Overview of Routing and congestion in packet networks – Routing algorithms classification , Routing tables,

shortest path routing algorithms, Flooding , Hierarchical routing , Distance vector routing Link state routing , congestion control algorithms. [12 Hours]

Text Books:

1. Stallings, "Data and Computer Communications", 7th Edition,Pearson Education, 2012

Reference Books:

1. Andrew S Tanenbaim, "Computer Networks", 4th Edition, Pearson Education.
2. Behrouz Ferouzan, Introduction to Data Communication & Networking TMH, 1999.
3. Larry &Peterson & Bruce S Davis; Computer networks Second Edition , Morgan Kaufman, 2000.

BCA502T : SOFTWARE ENGINEERING

Total Teaching Hours : 60 No of Hours / Week : 04

Unit - I

Introduction: Software Products and Software process, Process models: Waterfall modal, Evolutionary Development, Bohemia's Spiral model, Overview of risk management, Process Visibility, Professional responsibility. Computer based System Engineering: Systems and their environment, System Procurement, System Engineering Process, System architecture modelling. Human Factors, System reliability Engineering. Requirements and Specification: The requirement Engineering Process, The Software requirement document, Validation of Evolution of requirements, Viewpoint – oriented & method based analysis , system contexts , Social 7 organizational factors . Data flow , Semantic, Objects, models , Requirement Specification, Non functional requirement.

[12 Hours]

Unit - II

Software Prototyping: Prototyping in software process, Prototyping techniques, User interface prototyping. Software Design: Design Process, Design Strategies, Design Quality , System Structuring control models, Modular decomposition , Domain Specific architecture.

[12 Hours]

Unit - III

Object Oriented& function oriented design: Objects, object Classes and inheritance Object identification, An object oriented design example, Concurrent Objects, Data flow design Structural decomposition, Detailed Design, A Comparison of design Strategies.

User interface design: Design Principles, User System interaction, Information Presentation, User Guidance, Interface Evaluation.

[12 Hours]

Unit - IV

Software Reliability and reusability : Software reliability metrics , Software reliability Specification , Statistical testing ,Reliability Growth modeling, Fault avoidance & tolerance, Exception handling & defensive programming , Software development with reuse, Software' development for reuse , Generator based reuse, Application System Portability.

[12 Hours]

Unit - V

Software Verification and Validation : The testing Process , Test Planning & Strategies, Black Box , Structural, interface testing , Program inspections , Mathematically based verification, Static analysis tools, Clean room software development. Management Issues: Project management, Quality management, Software cost estimation, Software maintenance. [12 Hours]

Text book

1. Ian Sommerville – Software Engineering, 9th Edition, Pearson Education Ltd, 2010.

Reference Books

1. Roger S. Pressman – Software Engineering, A Practitioner's approach, 7th Edition, McGRAW-HILL Publication, 2010.
2. Pankaj Jalote, "An integrated approach to Software Engineering", 3rd Edition, Narosa Publishing House, 2013.

BCA503T: COMPUTER ARCHITECTURE

Total Teaching Hours : 60 No of Hours / Week : 04

Unit - I

DIGITAL LOGIC CIRCUITS: Logic gates Boolean algebra, map simplification, combinational circuits, flip-flop, sequential circuits. INTEGRATED CIRCUITS AND DIGITAL FUNCTIONS: Digital integrated circuits, IC flip –flops and registers, decoders and multiplexers, binary counters, shift registers, random –access memories (RAM) read –only memories (ROM).

[12 Hours]

Unit - II

DATA REPRESENTATION: Data types, fixed-point representation, floating – point representation, other binary codes, error detection codes.

DATA TRANSFER OPERATIONS: Register Transfer, Memory Transfer and I/O Transfer.

[12 Hours]

Unit – III

BASIC COMPUTER ORGANISATION AND DESIGN: Instruction codes, computer instruction, timing and control, execution and instruction, input-output and interrupt, design of computer.

[12 Hours]

Unit - IV

CENTRAL PROCESSOR ORGANIZATION : Processor bus organization, arithmetic logic unit (ALU) instruction formats, addressing modes, data transfer and manipulation , program control, microprocessor organization.

[12 Hours]

Unit – V

INPUT-OUTPUT ORGANISATION: Peripheral devices . asynchronous data transfer , direct memory access (DMA) ,priority interrupt, input –output processor (IOP).

MEMORY ORGANIZATION : Auxiliary memory, microcomputer memory hierarchy , associative memory , virtual memory, cache memory.

[12 Hours]

Text Books

1. M.Moris Mano , Computer System, Architecture, 2nd Edition Prentice Hall of India.

References

1. Heuring and Jordan, Computer systems design and Architecture , Peason Edition
2. William Stallings , Computer Organisation and Archotecture, Peason Education
3. Floyed , Digital Fundamentals,8th Edition , Peason Education.
4. Andrew S. Temenbauam, Structured Computer Organization , 3rd Edition ; Prentice Hall of India.
5. David Patterson & Hennessy , Computer Organization & Design , Elsevier.

BCA504T: OBJECT ORIENTED PROGRAMMING USING JAVA

Total Teaching Hours : 60 No of Hours / Week : 04

Unit - I

Introduction to JAVA: JAVA Evolution: Java History, Java Features, How Java Differs from C and C++, Java and Internet, Java and World Wide Web, Web Browsers, Hardware and Software Requirements, Java Support Systems, Java Environment. Overview of JAVA Language: Introduction, Simple Java program, More of Java Statements, Implementing a Java Program, Java Virtual Machine, Command Line Arguments, Programming Style. Constants, Variables, and Data Types: Introduction, Constants, Variables, Data Types, Declaration of Variables, Giving Values to Variables, Scope of Variables, Symbolic Constants, Type Casting, Getting Values of Variables, Standard Default Values, Operators and Expressions: Introduction, 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, Type Conversion and Associativity, Mathematical Functions. Decision Making and Branching: Introduction, Decision Making with if Statement, Simple if Statement, The if…..else Statement, Nesting of if……Else Statements, The else if Ladder, The Switch Statement, The ?: Operator. Decision Making and Looping: Introduction. The while Statement, The do Statement, The for Statement, Jumps in Loops Labeled Loops.

[12 hours]

Unit -II

Classes, Arrays, Strings and Vectors: Classes, Objects and Methods: Introduction, Defining a Class, Adding Variables, Adding Methods, Creating Objects, Accessing Class Members, Constructors, Methods Overloading, Static Members, Nesting of Methods, Inheritance: Extending a Class Overriding Methods, Final Variables and Methods, Finalizer methods, Abstract Methods and Classes, Visibility Control. Arrays, Strings and Vectors: Arrays, One-dimensional Arrays, Creating an Array, Two -Dimensional Arrays, Creating an Array, Two – dimensional Arrays, Strings, Vectors, Wrapper Classes.

[12 Hours]

Unit - III

Interfaces, Packages, and Multithreaded Programming: Interfaces: Multiple Inheritance: Introduction, Defining Interfaces, Extending Interfaces, Implementing Interfaces, Accessing Interface Variables. Packages: Putting Classes together: Introduction, Java API Packages, Using System Packages, Naming Conventions, Creating Packages, Accessing a Package, Using a Package, Adding a Class to a Package, Hiding Classes. Multithreaded Programming: Introduction, Creating Threads, Extending the Thread Class, Stopping and Blocking a thread, Life Cycle of a thread, Using Thread Methods, Thread Exceptions, Thread Priority, Synchronization, Implementing the 'Runnable' Interface.

[12 Hours]

Unit - IV

Managing Exceptions, Applet Programming: Managing Errors and Exception: Introduction, Types of Exception Handling Code, Multiple Catch Statements, Using Finally Statement, Throwing Our Own Exceptions, Using Exceptions for Debugging. Applet Programming: Introduction, How Applets Differ from Applications, Preparing to Write Applets, Building Applet Code, Applet Life Cycle, Creating an Executable applet, Designing a Web Page, Applet Tag, Adding Applet to HTML File, running the Applet, More About HTML Tags, Displaying Numerical Values, Getting Input from the User.

[12 Hours]

Unit - V

Graphics Programming, Input/Output: Graphics programming: Introduction, The Graphics Class, Lines and rectangles, circles, and Ellipses, Drawing Arcs, Drawing Polygons, Lines Graphs, Using Control Loops in Applets, Drawing Bar Charts. Managing Input/Output Files in JAVA: Introduction, Concept of Streams, Stream Classes, Byte Stream Classes, Character Stream Classes, Using Streams, Other Useful I/O Classes, Using the File Class, Input / Output Exceptions, Creation of Files, Reading / Writing Characters, Reading / Writing Bytes, Handling Primitive Data Types, Concatenating and Buffering Files, Interactive Input and output, Other Stream Classes.

[12 Hours]

Text Books:

1. A.Balaguruswamy, "Programming with JAVA", A Primer, TMH, 1999.

Reference Books:

1. Thomas Boutel, "CGI programming in C and Perl", Addison – Wesley, 1996.
2. Jefry Dwight et al, Using CGI, Second Edition, Prentice Hall, India, 1997.
3. Patrick Naughton & Herbert Schildt, JAVA 2: The Complete Reference, THM, 1999.
4. Schildt, "JAVA The Complete Reference", 7th Edition.

BCA505T : MICROPROCESSOR AND ASSEMBLY LAGUAGE

Total Teaching Hours : 60 No of Hours / Week : 04

Unit - I

Architecture and Operation: Introduction to 8085, Microprocessor organization/ architecture & its operation Microprocessor based system, memory interfacing , basic interfacing concepts ,interfacing I/O devices

[12 Hours]

Unit - II

Programming the 8085: Programming model, instruction classification , Instruction format, addressing modes, writing assembly level programs-overview of instruction set, timing diagrams data transfer, Arithmetic, Logic branch operations.

[12 Hours]

Unit - III

Programming techniques- Looping Counting and Indexing , 16 bit arithmetic operations , logic operations Compare and rotate operations . Counters and Time delays , Generation of pulse waveforms. Stacks and subroutines- conditional CALL and RETURN instructions. Advanced subroutine concepts. BCD to Binary and Binary to BCD conversions, BCD to 7 segment conversion , Binary to ASCII and ASCII to Binary code conversion, BCD addition and subtraction , multiplication and division.

[12 Hours]

Unit – IV

Memory Interface: Memory and I/O mapping and interfacing concepts. Interrupts : 8085 vectored interrupts , Restart as Software instructions, additional I/O concepts and processes.

[12 Hours]

Unit – V

Interfacing of peripherals (I/Os) and applications: Interfacing Keyboard (linear and matrix) and 7 segment display including multiplexes, 8279 programmable keyboard /display interface, 8255 PPI , 8259 PIC , DMA and 8257 DMA controller , Serial communication using 8251, D to A converters and interfacing, RS323 serial

communication standards.

[12 Hours]

Text books

1. R.S.Gaonkar – Microprocessor Architectutre , Programming and Application with 8085. Penram Int. 3rd Edn.

References

1. Douglas V.Hall- Microprocessors and digital systems, MH.
2. Kenneth L.Short - Microprocessor and Programmed Logic ‘’, PHI , 2nd Edn.
3. Aditya P. Mathur- Introduction to Microprocessors, 3RD Edn. TMH
4. Antonakos: Introduction to Intel family of Microprosessors Pearson Education
5. Hoffer: Modern Systems Analysis and Design Pearson Eduction Kendall, System Analysis and Design

BCA504P : JAVA PROGRAMMING LAB

PART - A

1. Write a program to find factorial of list of number reading input as command line argument.
2. Write a program to display all prime numbers between two limits.
3. Write a program to sort list of elements in ascending and descending order and show the exception handling.
4. Write a program to implement all string operations.
5. Write a program to find area of geometrical figures using method.
6. Write a program to implement constructor overloading by passing different number of parameter of different types.
7. Write a program to create student report using applet, read the input using text boxes and display the o/p using buttons.
8. Write a program to calculate bonus for different departments using method overriding.
9. Write a program to implement thread, applets and graphics by implementing animation of ball moving.
10. Write a program to implement mouse events and keyboard events.

PART – B

During practical examination the External and Internal examiners may prepare exam question paper related to theory syllabus apart from Part-A. (A minimum of 10 Programs has to be prepared).

Note :

a) The candidate has to write both the programs One from Part-A and other from Part-B and execute one program as of External examiner choice.
b) A minimum of 10 Programs has to be done in Part-B and has to be maintained in the Practical Record.
c) Scheme of Evaluation is as follows:

Writing two programs	- 10 Marks
Execution of one program	- 10 Marks
Formatting the Output	- 05 Marks
Viva	- 05 Marks
Record	- 05 Marks
Total	**- 35 Marks**

BCA505P: ASSEMBLY LANGUAGE PROGRAMMING LAB

PART - A

1. Exchange of two 16-bit numbers.
2. Addition & Subtraction of two 8 –bit HEX numbers.
3. Subtraction of two 16 –bit numbers.
4. Two n-byte Number addition.
5. Block Transfer.
6. 'N' Decimal Number addition.
7. 4-Digit BCD addition.
8. Subtraction of 16 –bit number.
9. Sorting of array in ascending order.
10. Multiplication of 2 digit BCD

PART – B

During practical examination the External and Internal examiners may prepare exam question paper related to theory syllabus apart from Part-A. (A minimum of 10 Programs has to be prepared).

Note :

a) The candidate has to write both the programs One from Part-A and other from Part-B and execute one program as of External examiner choice.
b) A minimum of 10 Programs has to be done in Part-B and has to be maintained in the Practical Record.
c) Scheme of Evaluation is as follows:

Writing two programs	- 10 Marks
Execution of one program	- 10 Marks
Formatting the Output	- 05 Marks
Viva	- 05 Marks
Record	- 05 Marks
Total	**- 35 Marks**

BCA506P : PROJECT

Students can develop a project in team (maximum three members). They should implement their project in college in any RDBMS package or any language available in the college. The students have to collect data outside practical hours. Project may be taken outside but must be implemented in the college. Internal marks can be awarded by the guide by evaluating the performance of the students during the course of project work. In viva-voce the questions must be directed only on the project work to access the involvement and understanding of the problem by the students.

The project carries 100 marks is distributed as follows:

Demonstration and Presentation	65 Marks
Viva-voce	25 Marks
Project Report	10 Marks

SIXTH SEMESTER BCA

BCA601T : THEORY OF COMPUTATION

Total Teaching Hours : 60 No of Hours / Week : 04

Unit - I

Introduction to Finite Automata: The central concepts of Automata theory; Deterministic finite automata; Nondeterministic finite automata. An application of finite automata,

Finite automata with Epsilon transitions.

[12 Hours]

Unit - II

Regular Expressions: Finite Automata and Regular Expressions Applications of Regular Expressions. Regular languages; Proving languages not to be regular languages; Closure properties of regular languages; Decision properties of regular languages; Equivalence and minimization of automata.

[12 Hours]

Unit - III

Context–free grammars: Parse trees; Applications; Ambiguity in grammars and Languages. Definition of the Pushdown automata; the languages of a PDA; Equivalence of PDA's and CFG's.

[12 Hours]

Unit - IV

Deterministic Pushdown Automata:Normal forms for CFGs; The pumping lemma for CFGs; Closure properties of CFLs. Problems that Computers cannot solve.

[12 Hours]

Unit – V

The Turing machine:Programming techniques for Turing Machines. Undecidability, A Language that is not recursively enumerable; An Undecidable problem that is RE; Post's Correspondence problem.

[12 Hours]

Text Book:

1. John E. Hopcroft, Rajeev Motwani, Jeffrey D.Ullman: Introduction to Automata Theory, Languages and Computation, 3rd Edition, Pearson Education, 2011.

Reference Books:

1. John C Martin: Introduction to Languages and Automata Theory, 3rd Edition, Tata McGraw-Hill, 2007.
2. Daniel I.A. Cohen: Introduction to Computer Theory, 2nd Edition, John Wiley & Sons, 2009.
3. Thomas A. Sudkamp: An Introduction to the Theory of Computer Science, Languages and Machines, 3rd Edition,Pearson Education, 2006

BCA602T: SYSTEM PROGRAMMING

Total Teaching Hours : 60 No of Hours / Week : 04

Unit - I

Background: Machine Structure, Evolution of the Components of a Programming System, Assembler, Loaders, Macros, Compliers, Formal Systems. Machine Structure, Machine Language and assembly language: General Machine Structure, Machine Language, Assembly Language

[12 Hours]

Unit - II

Assemblers: General Design Procedure, Design of assembler, Statement of Problem, Data structure, Format of databases, algorithm, look for modularity, Table Processing: Searching and Sorting. The Problem, Searching a table, linear Search, binary Search, Sorting, interchange sort, Shell Sort, Bucket Sort, Radix Exchange Sort, address calculation sort, comparison of sorts, hash or random entry searching.

[12 Hours]

Unit - III

MACRO LANGUAGE AND THE MACRO PROCESSOR: Macroinstruction, Features of macro Facility, Macro instruction arguments, conditional macro Expansion, macro calls within macros, macro Instructions defining macros, Implementation, Statement of problem, implementation of a restricted facility, A two pass algorithm. A single pass algorithm, implementation of macro calls within macros. Implementation within an assembles.

[12 Hours]

Unit - IV

LOADERS: Loader schemes, Compile & go, General loading Scheme, absolute loaders, Subroutine Languages, Relocating loaders, Direct linking loaders, other loading Schemes – Binders, linking loaders, Overlays, Dynamic binders. Design of absolute loader, Design of a Direct linking loader Specification of problem, Specification of data structure, format of data bases algorithm.

[12 Hours]

Unit - V

COMPILERS: Statement of problem, Problem1: Recognizing basic Elements, Problem2: Recognizing Syntactic cutis & interpreting meaning, Problem3: Storage Allocation, Problem4: Code Generation. Optimization (machine independent) optimization (machine dependent), Assembly Phase, General Model of complier. PHASES OF COMPILERS: Simple Structure of Compiler, Brief introduction to 7 Phases of Compliers.

[12 Hours]

Text Books:

1. John J. Donowon, System Programming, TATA McGraw-Hill.

Reference Books:

1. Dhamdhere: System programming and Operating System TMH
2. Beck: System Software, 3/e Pearson Education.

BCA603T : CRYPTOGRAPHY AND NETWORK SECURITY

Total Teaching Hours : 60 No of Hours / Week : 04

Unit - I

Introduction: Security Goals, Cryptographic Attacks, Services and Mechanism, Techniques. Mathematics of Cryptography: Integer Arithmetic, Modular Arithmetic, Matrices, Linear Congruence.

[12 Hours]

Unit – II

Traditional Symmetric-Key Ciphers: Introduction, Substitution Ciphers, Transpositional Ciphers, Stream and Block Ciphers. Data Encryption Standard (DES): Introduction, DES Structure, DES Analysis, Security of DES, Multiple DES, Examples of Block Ciphers influenced by DES. Advanced Encryption Standard: Introduction, Transformations, Key Expansion, The AES Ciphers, Examples, Analysis of AES.

[12 Hours]

Unit III

Encipherment using Modern Symmetric-Key Ciphers: Use of Modern Block Ciphers, Use of Stream Ciphers, Other Issues. Mathematics of Asymmetric-Key Cryptography: Primes, Primality Testing, Factorization, Chinese Remainder Theorem, Quadratic Congruence, Exponentiation and Logarithm. Asymmetric Key Cryptography: Introduction, RSA Cryptosystem, Rabin Cryptosystem, Elgamal Cryptosystem, Elliptic Curve Cryptosystems.

[12 Hours]

Unit - IV

Cryptography Hash Functions: Introduction, Description of MD Hash Family, Whirlpool, SHA-512. Digital Signature: Comparison, Process, Services, Attacks on Digital Signature, Digital Signature Schemes, Variations and Applications. Key Management: Symmetric-Key Distribution, Kerberos, Symmetric-Key Agreement, Public-Key Distribution, Hijacking.

[12 Hours]

Unit - V

Security at the Application Layer: PGP and S/MIME: Email, PGP, S/MIME. Security at the Transport Layer: SSL and TLS: SSL Architecture, Four Protocols, SSL Message Formats, Transport Layer Security. Security at the Network Layer: IPSec: Two modes, Two security protocols, Security association, security policy, Internet Key exchange, ISAKMP. [12 Hours]

Text Book:

1. Behrouz A. Forouzan, Debdeep Mukhopadhyay: Cryptography and Network Security, 2nd Edition, Special Indian Edition, Tata McGraw-Hill, 2011.

Reference Books:

1. Michael E. Whitman and Herbert J. Mattord: Principles of Information Security, 2nd Edition, Thomson, Cengage Delmar Learning India Pvt., 2012.
2. William Stallings: Network Security Essentials: Applications and Standards, 4th Edition, Pearson Education, 2012.

BCA604T: WEB PROGRAMMING

Total Teaching Hours : 60 No of Hours / Week : 04

Unit - I

Fundamentals of Web: Internet, WWW, Web Browsers, and Web Servers, URLs, MIME, HTTP, Security, The Web Programmers Toolbox. XHTML: Origins and evolution of HTML and XHTML, Basic syntax, Standard XHTML document structure, Basic text markup, Images, Hypertext Links, Lists, Tables.

[12 Hours]

Unit - II

HTML and XHTML: Forms, Frames in HTML and XHTML, Syntactic differences between HTML and XHTML. CSS: Introduction, Levels of style sheets, Style specification formats, Selector forms, Property value forms, Font properties, List properties, Color, Alignment of text, The Box model, Background images, The and tags, Conflict resolution.

[12 Hours]

Unit -III

Java Script: Overview of JavaScript; Object orientation and JavaScript; General syntactic characteristics; Primitives, Operations, and expressions; Screen output and keyboard input; Control statements; Object creation and Modification; Arrays; Functions; Constructor; Pattern matching using expressions; Errors in scripts; Examples.

[12 Hours]

Unit - IV

Java Script and HTML Documents: The JavaScript execution environment; The Document Object Model; Element access in JavaScript; Events and event handling; Handling events from the Body elements, Button elements, Text box and Password elements; The DOM 2 event model; The navigator object; DOM tree traversal and modification.

[12 Hours]

Unit - V

Dynamic Documents with JavaScript: Introduction to dynamic documents; Positioning elements; Moving elements; Element visibility; Changing colors and fonts; Dynamic content; Stacking elements; Locating the mouse cursor; Reacting to a mouse click; Slow movement of elements; Dragging and dropping elements. XML: Introduction; Syntax; Document structure; Document Type definitions; Namespaces; XML schemas; Displaying raw XML documents; Displaying XML documents with CSS; XSLT style sheets; XML Processors; Web services.

[12 Hours]

Text Books

1. Robert W Sebesta, "Programming the World Wide Web", 4th Edition, Pearson Education, 2008.

Reference Books

1. M.Deitel, P.J.Deitel, A.B.Goldberg, "Internet & World Wide Web How to program", 3rd Edition, Pearson Education / PHI, 2004.
2. Chris Bates, "Web Programming Building Internet Applications", 3rd Edition, Wiley India, 2006.
3. Xue Bai et al, "The Web Warrior Guide to Web Programming", Thomson, 2003.
4. Sklar, "The Web Warrior Guide to Web Design Technologies", 1st Edition, Cengage Learning India.

BCA604P : WEB PROGRAMMING LAB

PART -A

1. Write a program to find factorial of list of number reading input as command line argument.
2. Write a program to sort list of element in ascending and descending order and show the exception handling.
3. Write a program to implement all string operations.
4. Write a program to find area of geometrical figures using method overloading.
5. Write a program to implement constructor overloading by passing different number of parameter of different types.
6. Write a program to create student report using applet, read the input using text boxes and display the o/p using buttons.
7. Write a program to implement an apply by passing parameter to HTML.
8. Write a program to implement thread, applets and graphics by implementing animation of ball moving.
9. Write a program to implement mouse events.
10. Write a program to implement keyboard events.

PART – B

During practical examination the External and Internal examiners may prepare exam question paper related to theory syllabus apart from Part-A. (A minimum of 10 Programs has to be prepared).

Note :

a) The candidate has to write both the programs One from Part-A and other from Part-B and execute one program as of External examiner choice.

b) A minimum of 10 Programs has to be done in Part-B and has to be maintained in the Practical Record.

c) Scheme of Evaluation is as follows:

Writing two programs	- 10 Marks
Execution of one program	- 10 Marks

Formatting the Output	- 05 Marks
Viva	- 05 Marks
Record	- 05 Marks
Total	**- 35 Marks**

BCA604P : WEB PROGRAMMING LAB

PART - A

1. Create a form having number of elements (Textboxes, Radio buttons, Checkboxes, and so on). Write JavaScript code to count the number of elements in a form
2. Create a HTML form that has number of Textboxes. When the form runs in the Browser fill the textboxes with data. Write JavaScript code that verifies that all textboxes has been filled. If a textboxes has been left empty, popup an alert indicating which textbox has been left empty.
3. Develop a HTML Form, which accepts any Mathematical expression. Write JavaScript code to Evaluates the expression and Displays the result.
4. Create a page with dynamic effects. Write the code to include layers and basic animation.
5. Write a JavaScript code to find the sum of N natural Numbers. (Use user-defined function)
6. Write a JavaScript code block using arrays and generate the current date in words, this should include the day, month and year.
7. Create a form for Student information. Write JavaScript code to find Total, Average, Result and Grade.
8. Create a form for Employee information. Write JavaScript code to find DA, HRA, PF, TAX, Gross pay, Deduction and Net pay.
9. Create a form consists of a two Multiple choice lists and one single choice list

(a) The first multiple choice list, displays the Major dishes available

(b) The second multiple choice list, displays the Starters available.

(c)The single choice list, displays the Soft drinks available.

10. Create a web page using two image files, which switch between one another as the mouse pointer moves over the image. Use the on Mouse Over and on Mouse Out event handlers.

PART – B

During practical examination the External and Internal examiners may prepare exam question paper related to theory syllabus apart from Part-A. (A minimum of 10 Programs has to be prepared).

Note :

a) The candidate has to write both the programs One from Part-A and other from Part-B and execute one program as of External examiner choice.

b) A minimum of 10 Programs has to be done in Part-B and has to be maintained in the Practical Record.

c) Scheme of Evaluation is as follows:

Writing two programs	- 10 Marks
Execution of one program	- 10 Marks
Formatting the Output	- 05 Marks
Viva	- 05 Marks
Record	- 05 Marks
Total	**- 35 Marks**

BCA605P : PROJECT WORK

Students should individually develop a project. They should implement their project in college in any RDBMS package or any language available in the college. The project should web based. The students have to collect data outside practical hours. Project may be taken outside but must be implemented in the college. Internal marks can be awarded by the guide by evaluating the performance of the students during the course of project work. In viva-voce the questions must be directed only on the project work to access the involvement and understanding of the problem by the students.

The project carries 200 marks is distributed as follows:

Demonstration and Presentation	130 Marks
Viva-voce	50 Marks
Project Report	20 Marks

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BANGALORE UNIVERSITY

REGULATIONS, SCHEME AND SYLLABUS

For the course

I to VI Semesters

BACHELOR OF SCIENCE IN COMPUTER SCIENCE (BSc(CS))

(Choice Based Credit System (Semester Scheme) –Y2K14 Scheme)

Revised w.e.f.

Academic Year 2014-2015 and onwards

Regulations, Scheme of study and Examination for B Sc Degree Course
Under Choice Based Credit System - Semester System (Y2K14 SCHEME)
(Revised w.e.f. 2014 -2015)

R1.

a) Title of the course: **B. Sc in Computer Science**

b) Duration of the Course: Durations of the undergraduate programmes shall extend over FOUR semesters (TWO academic years) for the Associate Degree(Advance Diploma), SIX semesters (Three academic years) for the regular Bachelor Degree.

c) Scheme of study:

   i) There shall be one theory paper and one practical from first semester to fourth semester. The practical paper corresponds to theory papers.

   ii) There shall be two theory papers and two practical during fifth and sixth semesters.

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

d) Scheme of Examination: At the end of each semester there shall be University examination of three hours duration in each of the theory and practical papers.

The question paper pattern for theory paper has two sections. (70 Marks)

Section –A contains 12 questions, students has to attend 10 questions. Each carries 2 Marks (10 * 2 = 20)

Section – B contains 8 questions (question may contain sub questions), students has to attend 5 questions. each carries 10 Marks (5 * 10 = 50)

R2. Each semester shall be of 90 working days from the date of commencement of the each Semester.

R3. Attendance: As per Bangalore University regulations in force for science degree courses.

R4. POWER TO REMOVE DIFFICULTIES

If any difficulty arises in giving effect to the provisions of these regulations, the Vice – Chancellor may by order make such provisions not inconsistent with the Act, Statutes, Ordinances or other Regulations, as appears to be necessary or expedient to remove the difficulty. Every order made under this rule shall be subject to ratification by the appropriate University Authorities.

Title of Papers, Scheme of Study and Examination for B Sc in Computer Science, Revised w.e.f. 2014–2015.

Sem	Paper	Title of the paper	Hours/ Week	Marks			Credits
				IA	Exam	Total	
I	CS1T	Programming Concepts using C	4	30	70	150	3
	CS1P	C Programming Lab	3	15	35		
II	CS2T	Data Structures	4	30	70	150	3
	CS2P	Data Structures Lab	3	15	35		
III	CS3T	Database Management System and Software Engineering	4	30	70	150	3
	CS3P	DBMS Lab	3	15	35		
IV	CS4T	Operating System and UNIX	4	30	70	150	3
	CS4P	UNIX Programming Lab	3	15	35		
V	CS5T1	Object Oriented Programming using JAVA	3	30	70	150	3
	CS5P1	Java Programming Lab	3	15	35		
	CS5T2	Visual Programming	3	30	70	150	3
	CS5P2	Visual Programming Lab	3	15	35		
VI	CS6T1	Web Programming	3	30	70	150	6
	CS6P1	Web Programming Lab	3	15	35		
	CS6T2	Computer Networks	3	30	70	150	
	CS6P2	Project Lab	3	15	35		

I Sem B Sc

CS1T: PROGRAMMING CONCEPTS USING C

Total Teaching Hours : 60 No of Hours / Week : 04

Unit-I

Introduction to Programming Concepts: Software, Classification of Software, Modular Programming, Structured Programming, Algorithms and Flowcharts with examples. Overview of C Language: History of C, Character set, C tokens, Identifiers, Keywords, Data types, Variables, Constants, Symbolic Constants , Operators in C, Hierarchy of Operators, Expressions, Type Conversions and Library Functions.

[12 Hours]

Unit-II

Managing Input and Output Operation: Formatted and Unformatted I/O Functions
Decision making, branching and looping: Decision Making Statements - if Statement, if–else statement, nesting of if-else statements, else–if ladder, switch statement, ?: operator, Looping - while, do-while, for loop, Nested loop, break, continue, and goto statements. Functions: Function Definition, prototyping, types of functions, passing arguments to functions, Nested Functions, Recursive functions.

[12 Hours]

Unit-III

Arrays: Declaring and Initializing, One Dimensional Arrays, Two Dimensional Arrays, Multi Dimensional Arrays - Passing arrays to functions. Strings: Declaring and Initializing strings, Operations on strings, Arrays of strings, passing strings to functions. Storage Classes - Automatic, External, Static and Register Variables.

[12 Hours]

Unit-IV

Structures - Declaring and Initializing, Nested structure, Array of Structure, Passing structures to functions, Unions, typedef, enum, Bit fields. Pointers – Declarations, Pointer arithmetic, Pointers and functions, Call by value, Call by reference, Pointers and Arrays, Arrays of Pointers, Pointers and Structures. Meaning of static and dynamic memory allocation, Memory allocation functions.

[12 Hours]

Unit-V

Files - File modes, File functions, and File operations, Text and Binary files, Command Line arguments. C Preprocessor directives, Macros – Definition, types of Macros, Creating and implementing user defined header files.

[12 Hours]

TEXT BOOKS

1. E. Balaguruswamy, “Programming In ANSI C”, 4th edition, TMH Publications, 2007
2. Ashok N. Kamthane, “Programming with ANSI and Turbo C”, Pearson Education, 2006

REFERENCES BOOKS

1. Ashok N. Kamthane et. al., “Computer Programming and IT”, Pearson Education, 2011
2. Mahapatra, “ Thinking In C ”, PHI Publications, 1998.
3. Yashwant Kanetkar, “Let Us C”, 13th Edition, PHP, 2013.

CS1P: C PROGRAMMING LAB

PART – A

1) Write a C program to accept employee number, employee name, basic pay and calculate gross salary, deduction and find the net salary of an employee for the following details.

Dearness Allowance	40% of Basic Pay
House Rent Allowance	20% of Basic Pay
Provident Fund	12% of Basic Pay
Income Tax	4% of Basic Pay

2) Write a C Program to find the roots of the given quadratic equation using if-else if statement.
3) Write a menu driven C program to find ,
(i) Reverse of a number (ii) Factorial of N (Use Switch case)
4) Write a C program to find Sin(x). [$x - x^3/3! + x^5/5! - \ldots\ldots\ldots x^n/n!$]
5) Write a C program to arrange the given set of numbers in ascending and descending order.
6) Write a C program to find product of two N x M matrices.
7) Write a C program to calculate NCR= N!/ R! * (N-R)! Using function.
8) Write a C program to display Fibonacci series using recursive function.
9) Write a C program to compare two strings using pointers.
10) Write a C program to demonstrate the user defined header file.

PART – B

During practical examination the External and Internal examiners may prepare exam question paper related to theory syllabus apart from Part-A. (A minimum of 10 Programs has to be prepared).

Note :

a) The candidate has to write both the programs One from Part-A and other from Part-B and execute one program as of External examiner choice.
b) A minimum of 10 Programs has to be done in Part-B and has to be maintained in the Practical Record.
c) Scheme of Evaluation is as follows:

Writing two programs	- 10 Marks
Execution of one program	- 10 Marks
Formatting the Output	- 05 Marks
Viva	- 05 Marks
Record	- 05 Marks
Total	**- 35 Marks**

II Sem B Sc

CS2T: DATA STRUCTURES

Total Teaching Hours : 60 No of Hours / Week : 04

Unit-I

Introduction and Overview: Definition, Elementary data organization, Data Structures, data structures operations, Abstract data types, algorithms complexity, time-space tradeoff. Preliminaries: Mathematical notations and functions, Algorithmic notations, control structures, Complexity of algorithms, asymptotic notations for complexity of algorithms. String Processing: Definition, Storing Stings, String as ADT, String

operations, word/text processing, Pattern Matching algorithms.

[12 Hours]

Unit-II

Arrays: Definition, Linear arrays, arrays as ADT, Representation of Linear Arrays in Memory, Traversing Linear arrays, Inserting and deleting, Sorting: Bubble sort, Insertion sort, Selection sort, Searching: Linear Search, Binary search, Multidimensional arrays, Matrices and Sparse matrices.

[12 Hours]

Unit-III

Linked list: Definition, Representation of Singly linked list in memory, Traversing a Singly linked list, Searching a Singly linked list, Memory allocation, Garbage collection, Insertion into a singly linked list, Deletion from a singly liked list; Doubly liked list, Header liked list, Circular linked list.

[12 Hours]

Unit-IV

Stacks – Definition, Array representation of stacks, Linked representation of stacks, Stack as ADT, Arithmetic Expressions: Polish Notation, Application of Stacks, Recursion, Towers of Hanoi, Implementation of recursive procedures by stack. Queues – Definition, Array representation of queue, Linked list representation of queues Types of queue: Simple queue, Circular queue, Double ended queue , Priority queue, Operations on Queues, Applications of queues.

[12 Hours]

Unit-V

Graphs: Graph theory terminology, Sequential representation of Graphs: Adjacency matrix, traversing a Graph. Tree – Definitions, Binary trees, Representing binary trees in memory, Traversing binary trees

[12 Hours]

TEXT BOOKS

1. Seymour Lipschutz: Data Structures with C, Schaum's ouT*lines*, Tata McGraw-Hill, 2011.

REFERENCES BOOKS

1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Second Edition, Pearson Education, 2013.
2. Robert Kruse, C.L.Tondo, Bruce Leung, Shashi Mogalla, "Data Structures and Program Design using C", Pearson Education, 2009.
3. Forouzan, "A Structured Programming Approach using C", 2nd Edition, Cengage Learning India, 2008.

CS2P : DATA STRUCTURES USING C LAB

PART - A

1. Write a menu driven C program to perform the following string operations without using string functions: (i) String Length (ii) String Concatenation (ii) String Reverse
2. Write a C program to search for an element in an array using Binary search
3. Write a C program to sort a list of N elements using Bubble Sort Algorithm
4. Write a C program to demonstrate the working of stack using an array.
5. Write a C program for Towers of Hanoi problem.
6. Write a C program to find GCD of two numbers using recursion

7. Write a C program to convert and print a given valid fully parenthesized infix arithmetic expression to post fix expression, the expression consists of single character (letter or digit) as operands and +,-,*, / as operators, assume that only binary operators are allowed in the expression.
8. Write a C program to simulate the working of Circular Queue using an array.
9. Write a C program to construct a singly linked list and perform following operations
   a. LINSERT Inserting a node in the front of the list
   b. LDELETE Deleting the node based on value
   c. LSEARCH Searching a node based on value
   d. LDISPLAY Displaying all the nodes in the list
10. Write a C program to create and traverse a binary search tree.

PART – B

During practical examination the External and Internal examiners may prepare exam question paper related to theory syllabus apart from Part-A. (A minimum of 10 Programs has to be prepared).

Note :

a) The candidate has to write two the programs One from Part-A and other from Part-B and execute one program as of External examiner choice.
b) A minimum of 10 Programs has to be done in Part-B and has to be maintained in the Practical Record.
c) Scheme of Evaluation is as follows:

Writing two programs	- 10 Marks
Execution of one program	- 10 Marks
Formatting the Output	- 05 Marks
Viva	- 05 Marks
Record	- 05 Marks
Total	**- 35 Marks**

III Sem B Sc

CS3T: DATABASE MANAGEMENT SYSTEM AND SOFTWARE ENGINEERING

Total Teaching Hours: 60 No of Hours / Week : 04

1. DATA BASE MANAGEMENT SYSTEM

Unit - I

Introduction: Data, Database, DBMS, Characteristics of Database Approach, Database Users, Advantages of DBMS. Database System Concepts and Architecture: Data Models, Schemas, and Instances, DBMS Architecture and Data Independence, Database languages and interfaces, The Database system Environment, Classification of Database Management Systems. Data Modeling Using the Entity-Relationship Model: High level Conceptual Data Models for Database Design with an example, Entity types, Entity sets, Attributes, and Keys, ER Model Concepts, Notation for ER Diagrams, Proper naming of Schema Constructs.

[12 hours]

Unit - II

RDBMS: Relational database concepts – attribute, tuple, types of attributes – single, multi-valued, stored, derived etc., keys – primary, index, candidate, alternate, foreign, Relationships, Relational algebra operations– UNION, INTERSECTION,

DIFFERENCE, CARTESIAN PRODUCT, SELECTION, PROJECTION, JOIN, DIVISION, relational calculus, Domain, Domain integrity, Integrity rules – Entity integrity, referential integrity, Normalization and its properties, I, II and III Normal forms.

[12 hours]

Unit - III

DDL and DML in SQL: DDL commands - create table/views/index, drop, alter, DML commands – select, insert, delete, update, etc., DCL commands – grant, revoke, commit, TCL commands, SQL – query, sub-query, nested query, Joins – natural, inner, outer join, aggregate functions in SQL. PL / SQL: Introduction, Exceptions & Cursor Management, Database Triggers, Functions,

[12 hours]

2. SOFTWARE ENGINEERING

Unit - IV

Software and Software Engineering: Defining Software, Software Application Domains, Software Engineering, Software Process, Software Engineering Practice, Software Myths. Process Models: A Generic Process Model, Process Assessment and Improvement, Prescriptive Process Models, Specialized Process Models, Agile Development: Agility, Agility and the cost of change, Agile Process, Extreme Programming, Other Agile Process Models. Understanding Requirements: Requirements Engineering, Establishing the Groundwork, Eliciting Requirements, Developing the use cases, Building the Requirements Model, Negotiating Requirements, Validating Requirements.

[12 Hours]

Unit - V

Requirements Modeling: Requirements Analysis, Scenario-Based Modeling, UML Models that Supplement the Use Case, Data Modeling Concepts, Class-Based Modeling, Flow-Oriented Modeling, Creating a Behavioral Model, Design Concepts: The Design Process, Design Concepts, The Design Model, Architectural Design, Component-Level Design, User Interface Design, Pattern-Based Design, Quality Concepts: Software Quality, Review Techniques, Software Quality Assurance Software Testing Strategies: A Strategic Approach to Software Testing, Strategic Issues, Test Strategies for Conventional Software, System Testing, The Art of Debugging, Software Testing Fundamentals, White box Testing, Block-Box Testing.

[12 hours]

Text Books

1. Remez Elmasri and Shamkant B. Navathe, “Fundamentals of Database Systems”, 5th Edition, Pearson Education, 2007.
2. Roger S. Pressman – Software Engineering, A Practitioner’s approach, 7th Edition, McGRAW-HILL Publication, 2010.

Reference Books

1. Pankaj Jalote, “An integrated approach to Software Engineering”, 3rd Edition, Narosa Publishing House, 2013.
2. Abrahamsi. Silberschatz, Henry. F. Korth, S. Sudarshan, “Database System Concepts” 6th Edition, McGraw Hill, 2012.
3. C.J.Date, “Introduction to database systems”, Eight Edition, Addison Wesley, 2003.
4. Ian Sommerville – Software Engineering, 9th Edition, Pearson Education Ltd, 2010.

CS3P : DATA BASE MANAGEMENT SYSTEM LAB
PART - A

1. The STUDENT detail databases has a table with the following attributes. The primary keys are underlined. STUDENT(regno: int, name: string, dob: date, marks: int)

i) Create the above table.

ii) Remove the existing attributes from the table.

iii) Change the date type of regno from integer to string.

iv) Add a new attribute phoneno to the existing table.

v) Enter five tuples into the table.

vi) Display all the tuples in student table.

2. A LIBRARY database has a table with the following attributes.

LIBRARY(bookid:int, title:string, author:string, publication:string, yearpub:int, price:real)

i) Create the above table.

ii) Enter the five tuples into the table

iii) Display all the tuples in student table.

iv) Display the different publishers from the list.

v) Arrange the tuples in the alphabetical order of the book titles.

vi) List the details of all the books whose price ranges between Rs. 100 and Rs. 300

3. The SALARY database of an organization has a table with the following attributes.

EMPSALARY(<u>empcod</u>:int, empnamee:string, dob:date, department:string, salary:real)

i) Create the above table.

ii) Enter the five tuples into the table

iii) Display all the number of employees working in each dapartment.

iv) Find the sum of the salaries of all employees.

v) Find the sum and average of the salaries of employees of a particular department.

vi) Find the least and highest salaries that an employee draws.

4. Consider the insurance database given below. The primary keys are underlined and the data types are specified.

PERSON(<u>driver-id-no</u>: string, name: string, address:strong)

CAR(<u>regno</u>: string, model: string, year: int)

ACCIDENT(<u>report-no</u>: int, date: date, location: String)

OWNS(<u>driver-id-no:</u> string, regno: string)

PARTICIPATED(<u>driver-id-no</u>: string, <u>regno</u>: string, <u>report-no</u>: int, damage-amount: int)

i) Create the above tables by properly specifying the primary keys and the foreign keys

ii) Enter atleast five tuples for each relation.

iii) Demonstrate how you

   a) Update the damage amount for the car with a specific regno in the accident with report no 12 to 25000.

   b) Add a new accident to the database.

iv) Find total number of people who owned cars that were involved in accidents in 2002

v) Find the number of accidents in which cars belonging to a specific model were involved

5. Consider the following database of students enrollment in courses and books adopted for each course.

STUDENT(regno: string, name: string, major: strong, bdate: date)

COURSE(course-no: int cname: string, dept: string)

ENROLL(reg-no: string, course-no: int, sem: int, marks: int)

BOOK-ADOPTION(course-no: int, sem: int, book-isbn: int)

TEXT(book-isbn: int, book-title: string, publisher: string, author: string)

i) Create the above tables by properly specifying the primary keys and the foreign keys

ii) Enter atleast five tuples for each relation.

iii) Demonstrate how you add a new text book to the database and make this book be adopted by some department.

iv) Produce a list of text books (include Course-no, book-isbn, book-title) in the alphabetical order for courses offered by the 'Compute Science' department that use more than two books.

v) List any department that has all its adopted books published by a specific publisher.

6. The following tables are maintained by a book dealer

AUTHOR(author-id: int, name: string, city: string, country: string)

PUBLISHER(publisher-id: int name: string, city: string, country: string)

CATLOG(book-id: int, title : string, author-id: int, publisher-id: int, category: int, year: int, price: int)

CATEGORY(category-id: int, description: string)

ORDER-DETAILS(order-no: int, book-id: int, quantity: int)

i) Create above tables by properly specifying the primary keys and the foreign keys.

ii) Enter atleast five tuples for each relation.

iii) Give the details of the authors who have 2 or more books in the catalog and the price of the books is greater than the average price of the books in the catalog and the year of publication is after 2010.

iv) Find the author of the book which has maximum sales.

v) Demonstrate how to increase price of books published by specific publisher by 10%

7. Consider the following database for BANK.

BRANCH(branch-name: string, branch-city: string, assets: real)

ACCOUNT(accno: int, banch-name: string, balance: real)

DEPOSITOR(customer-name: string, accno: int)

CUSTOMER(customer-name: string, customer-street: string, customer-city: string)

LOAN(loan-no: int, branch-name: string, amount: real)

ORROWER(customer-name: string, loan-no: int)

i) Create the above tables by properly specifying the primary keys and foreign keys.

ii) Enter atleast five tuples for each relation.

iii) Find all the customers who have atleast two accounts at the main branch.

iv) Find all customer who have an account at all the branches located in a specific city.

v) Demonstrate how t0 delete all account tuples at every branch located in specific city.

8. Consider the following database for ORDER PROCEESING.

CUSTOMER(cust-no: int, cname: string, city: string)

ORDER(orderno: int, odate: date, ord-amt: real)

ORDER_ITEM(orderno: int, itemno:int, qty: int)

ITEM(itemno: int, unitprice: real)

SHIPMENT(orderno: int, warehouseno: int, ship-date: date)

WAREHOUSE(warehouseno: int, city: string)

i) Create the above tables by properly specifying the primary keys and the foreign keys

ii) Enter atleast five tuples for each relation.

iii) List the order number and ship date for all orders shipped from particular warehouse.

iv) Produce a listing: customer name, no of orders, average order amount

v) List the orders that were not shipped within 30 days of ordering

PART – B

During practical examination the External and Internal examiners may prepare exam question paper related to theory syllabus apart from Part-A. (A minimum of 8 Programs has to be prepared).

Note :

a) The candidate has to write two the programs One from Part-A and other from Part-B and execute one program as of External examiner choice.
b) A minimum of 8 Programs has to be done in Part-B and has to be maintained in the Practical Record.
c) Scheme of Evaluation is as follows:

Writing two programs	- 10 Marks
Execution of one program	- 10 Marks
Formatting the Output	- 05 Marks
Viva	- 05 Marks
Record	- 05 Marks
Total	**- 35 Marks**

IV SEM B Sc

CS4T1: OPERATING SYSTEM AND UNIX

Total Teaching Hours : 60 No of Hours / Week : 04

Unit-I

Introduction: Definition, Types of Operating Systems, Functions of Operating System, services, system components System call. Process Management: Process Concept, Process Scheduling, Inter process communication, CPU Scheduling Criteria, Scheduling algorithm, Multiple Processor Scheduling, Real time Scheduling, Algorithm evolution.

[12 Hours]

Unit – II

Process Synchronization and deadlocks: The Critical Section Problem, Synchronization hardware, Semaphores, Classical problems of synchronization, Critical regions, monitors, Dead locks – system model, Characterization, Dead lock prevention, avoidance and detection, Recovery from dead lock, Combined approach to deadlock handling.

[12 Hours]

Unit - III

Memory management: Functions, single contiguous, Partitioned memory management: multiple relocatable partitioned memory management, paging segmentation, demand paging virtual memory management. File Management: Concept, access methods, directory structures, allocation methods, free space management, secondary storage structure. Disk Management: Disk Structure & Scheduling methods, Disk management, Swap – Space management.

[12 Hours]

Unit-IV

History of Unix, salient features, Unix Components, types of shell, Internal and External commands, Files and File Organization- Categories of files, Unix file system, directories, file related commands, Directory related commands, wild cards, Printing and Comparing files. Ownership of files, File attributes File permissions and Manipulations, Standard I/O, Redirection, pipe, filter.

[12 Hours]

Unit-V

Introduction to vi editor, The three modes of the vi editor, Invoking vi editor, Configuring the vi environment, Regular expressions, the grep command, The process - parent and child process, process creation, process related commands, Shell Programming - shell script features, shell variables, writing and executing a shell script, positional parameters, Branching control structures- if, case etc., Loop control structures

– while, until, for, etc., Jumping control structures – break, continue, exit, etc., Integer and Real arithmetic in shell programs, Debugging scripts.

[12 Hours]

TEXT BOOKS

1. Abraham Silberschatz and Peter Baer Galvin, "Operating System Concepts", 7th Edition, Pearson Education, 2002.
2. M.G.Venkateshmurthy, "Introduction to UNIX & SHELL Programming", First Edition, Pearson Education, 2004.

REFERENCE BOOKS

1. Forouzan,"Unix and Shell Programming", 1st Edition,2008 Cengage Learning India
2. H.M.Deitel, "Operating Systems", Pearson Learning Solutions, 3rd Edition, 2003.
3. William Stallings, "Operating Systems", 6th Edition, Pearson Education, 2010.

CS4P1: Shell Programming in Unix Lab

PART - A

1. Write a menu driven program to calculate (i) Simple interest (ii) Compound interest
2. To print all prime numbers between m and n (m<n).
3. Reverse a given number and check whether it is palindrome or not.
4. Shell script to find maximum and minimum of given set
5. To count the number of vowels in a given string.
6. Create a file containing the following fields: student No., student name, age, sex, height and weight. Print all the details in a neat format.
7. Write a C program to generate and print the GCD and LCM of two integers.
8. Shell script to take two numbers as arguments and output their sum using (i) bc (ii) expr. Include error checking to test whether two arguments were entered.
9. Find out the occurrences of three consecutive and identical word characters (like aaa or bbb) using (i) grep and (ii) sed.
10. Shell script to display all the file permissions.

PART – B

During practical examination the External and Internal examiners may prepare exam question paper related to theory syllabus apart from Part-A. (A minimum of 10 Programs has to be prepared).

Note :

a) The candidate has to write both the programs One from Part-A and other from Part-B and execute one program as of External examiner choice.
b) A minimum of 10 Programs has to be done in Part-B and has to be maintained in the Practical Record.
c) Scheme of Evaluation is as follows:

Writing two programs	- 10 (5 Marks each)
Execution of one program	- 10 Marks
Formatting the Output	- 05 Marks
Viva	- 05 Marks
Record	- 05 Marks
Total	**- 35 Marks**

V Sem B Sc

CS5T1: VISUAL PROGRAMMING

Total Teaching Hours: 52 No of Hours / Week : 03

Unit - I

Introduction to Visual Programming: The integrated Development Environment – menu bar, tool bar, from designer, project explorer, properties window, from layout window,

The VB editor. The form object: Properties, events and methods pf forms; Properties – Name, Captain, Backcolor, Borderstyle, controlbox, maxbutton, minbutton, moveable, startup position, height, width, left, top, scalemode, window, state; Events –load, unload, Clerk, Activate, Deactivate, Resize, methods – Show, hide, cls, Unload, print, Controls – Properties and events of different controls such as command buttons, labels, textboxes image controls, timer, horizontal and vertical scroll bars, option buttons, check boxes, frames lists and combo boxes. Predefined Dialog Boxes – MsgBox and InputBO

[13 Hours]

Unit - II

Programming: Data types, variables; declaration and scope arithmetic operations, Study of form and code modules, private and public procedures, Main procedure, Sub and Functions. Mathematical and string Functions; Branching and Looping Statement; If – Then, if –Then –Else and Nested If Statements; Select Case –different forms; For – Next, While – Wend and Do – Loops statements; Arrays- declaration. Static and dynamic arrays. Array Function, menus and toolbars-Creating menus and toolbars, Working with the menu editor, Designing Multiple Document interface forms. Microsoft common controls.

[13 Hours]

Unit - III

OOP methods and properties of an object, class Modules, Encapsultation and Inheritance characteristics Dynamic Link Libraries (DLLs) and Windows API; Designing Help files; File handling – Sequential ,Random access and Binary files, Database connectivity – DAO and ADO Tables and Queries, ActiveX Data objects.

[13 Hours]

Unit – IV

Visual C++ Programming: Objects-Classes-VC++Components – Resources-Event Handling – Menus – Dialog Boxes – Importing VBX Controls – Files – MFC File Handling – Document View Architecture – Serialization. Interfacing Other Applications – Multiple Document Interface (MDI) – Splitter Windows – Exception Handling – Debugging – Object Linking and Embedding (OLE) – Database Application – DLL- ODBC.

[13 Hours]

Text Books:

1. Gurumit Singh, “Visual Basic 6”, First Edition, Firewall Media, 2007.

Reference Books:

1. Charles Petzold, “Windows Programming”, 5th Edition, Microsoft Press, 1999.
2. Steve Holzner, “Visual C++ Programming”, Second Edition, PHI, 1994.
3. Go ttfried, “Programming with Visual Basic 6”, PHI, 2000.

CS5P1 : Visual Programming Lab

PART - A

1. Write a VB Program to design a simple calculator to perform addition, subtraction, multiplication and division(Use functions for the calculations).
2. Design a User Interface (UI) to accept the student details such as name, department and total marks. Validate the input data and calculate the percentage and division.
3. Design a VB application which has MDI and Child forms. Create a menu having the items such as file (New, Open),Format (Font, Regular, Bold ,Italic) and Exit in the MDI form. Also create a text box and use a Common Dialog Box control for changing the font, fore color and back color of the text box.

4. VB program to Encrypt and Decrypt a string. (Use Rnd() to generate the Encryption and Decryption keys).
5. Design a small Alarm Clock Application.
6. Write a VB Program to Validate the username and password form the database and display the appropriate message.(Use Data Control)
7. Design a VB application to record the employee details such as EmpId, EmpName, Designation and BaiscPay. Calculate the DA, HRA, Deduction and Gross Salary.(Make the necessary assumptions)Use Select .. case for decision making.
8. VB program to calculate the simple interest and compound interest. Use DLLs for the calculation.
9. VC++ program to create a Dialog box and display the position of mouse pointer within the dialog box.
10. VC++ program to create and load a simple menu in a Window.

PART – B

During practical examination the External and Internal examiners may prepare exam question paper related to theory syllabus apart from Part-A. (A minimum of 10 Programs has to be prepared).

Note :

a) The candidate has to write both the programs One from Part-A and other from Part-B and execute one program as of External examiner choice.
b) A minimum of 10 Programs has to be done in Part-B and has to be maintained in the Practical Record.
c) Scheme of Evaluation is as follows:

Writing two programs	- 10 Marks
Execution of one program	- 10 Marks
Formatting the Output	- 05 Marks
Viva	- 05 Marks
Record	- 05 Marks
Total	**- 35 Marks**

CS5T2: OBJECT ORIENTED PROGRAMMING USING JAVA

Total Teaching Hours : 52 No of Hours / Week : 03

Unit - I

Introduction to JAVA: JAVA Evolution: Java History, Java Features, How Java Differs from C and C++, Java and Internet, Java and World Wide Web, Web Browsers, Hardware and Software Requirements, Java Support Systems, Java Environment. Overview of JAVA Language: Introduction, Simple Java program, More of Java Statements, Implementing a Java Program, Java Virtual Machine, Command Line Arguments, Programming Style. Constants, Variables, and Data Types: Introduction, Constants, Variables, Data Types, Declaration of Variables, Giving Values to Variables, Scope of Variables, Symbolic Constants, Type Casting, Getting Values of Variables, Standard Default Values, Operators and Expressions: Introduction, Arithmetic Operators, Relational Operators Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operators, Bitwise Operators, Special Operators, Arithmetic Expressions, Evaluation of Expressions, Procedence of Arithmetic Operators, Type Conversion and Associativity, Mathematical Functions. Decision Making and Branching: Introduction, Decision Making with if Statement, Simple if Statement, The if…..else Statement, Nesting of if..else Statements, The else if Ladder, The Switch Statement, The ? : Operator. Decision Making and Looping: Introduction. The while

Statement, The do Statement, The for Statement, Jumps in Loops Labeled Loops.

[13 hours]

Unit -II

Classes, Arrays, Strings, Vectors and Interfaces: Classes, Objects and Methods: Introduction, Defining a Class, Adding Variables, Adding Methods, Creating Objects, Accessing Class Members, Constructors, Methods Overloading, Static Members, Nesting of Methods, Inheritance: Extending a Class Overriding Methods, Final Variables and Methods, Finalizer methods, Abstract Methods and Classes, Visibility Control. Arrays, Strings and Vectors: Arrays, One-dimensional Arrays, Creating an Array, Two - Dimensional Arrays, Creating an Array, Two – dimensional Arrays, Strings, Vectors, Wrapper Classes. Interfaces: Multiple Inheritance: Introduction, Defining Interfaces, Extending Interfaces, Implementing Interfaces, Accessing Interface Variables.

[13 Hours]

Unit - III

Packages, and Multithreaded Programming:

Packages: Putting Classes together: Introduction, Java API Packages, Using System Packages, Naming Conventions, Creating Packages, Accessing a Package, Using a Package, Adding a Class to a Package, Hiding Classes. Multithreaded Programming: Introduction, Creating Threads, Extending the Thread Class, Stopping and Blocking a thread, Life Cycle of a thread, Using Thread Methods, Thread Exceptions, Thread Priority, Synchronization, Implementing the 'Runnable' Interface. Managing Errors and Exceptions: Introduction, Types of Exception Handling Code, Multiple Catch Statements, Using Finally Statement, Throwing Our Own Exceptions, Using Exceptions for Debugging.

[13 Hours]

Unit - IV

Applet Programming, Graphics Programming, Input/Output:: Introduction, How Applets Differ from Applications, Preparing to Write Applets, Building Applet Code, Applet Life Cycle, Creating an Executable applet, Designing a Web Page, Applet Tag, Adding Applet to HTML File, running the Applet, More About HTML Tags, Displaying Numerical Values, Getting Input from the User. Graphics Programming: Introduction, The Graphics Class, Lines and rectangles, circles, and Ellipses, Drawing Arcs, Drawing Polygons, Lines Graphs, Using Control Loops in Applets, Drawing Bar Charts. Managing Input/Output Files in JAVA: Introduction, Concept of Streams, Stream Classes, Byte Stream Classes, Character Stream Classes, Using Streams, Other Useful I/O Classes, Using the File Class, Input / Output Exceptions, Creation of Files, Reading / Writing Characters, Reading / Writing Bytes, Handling Primitive Data Types, Concatenating and Buffering Files, Interactive Input and output, Other Stream Classes.

[13 Hours]

Text Books:

1. A.Balaguruswamy, "Programming with JAVA", A Primer, TMH, 1999.

Reference Books:

1. Thomas Boutel, "CGI programming in C and Perl", Addison – Wesley, 1996.
2. Jefry Dwight et al, Using CGI, Second Edition, Prentice Hall, India, 1997.
3. Patrick Naughton & Herbert Schildt, JAVA 2: The Complete Reference, THM, 1999.
4. Schildt, "JAVA The Complete Reference", 7th Edition.

CS5P2: JAVA PROGRAMMING LAB

PART - A

1. Write a program to find factorial of list of number reading input as command line argument.
2. Write a program to display all prime numbers between two limits.
3. Write a program to sort list of elements in ascending and descending order and show the exception handling.
4. Write a program to implement all string operations.
5. Write a program to find area of geometrical figures using method.
6. Write a program to implement constructor overloading by passing different number of parameter of different types.
7. Write a program to create student report using applet, read the input using text boxes and display the o/p using buttons.
8. Write a program to calculate bonus for different departments using method overriding.
9. Write a program to implement thread, applets and graphics by implementing animation of moving ball.
10. Write a program to implement mouse events and keyboard events.

PART – B

During practical examination the External and Internal examiners may prepare exam question paper related to theory syllabus apart from Part-A. (A minimum of 10 Programs has to be prepared).

Note :

a) The candidate has to write both the programs One from Part-A and other from Part-B and execute one program as of External examiner choice.

b) A minimum of 10 Programs has to be done in Part-B and has to be maintained in the Practical Record.

c) Scheme of Evaluation is as follows:

Writing two programs	- 10 Marks
Execution of one program	- 10 Marks
Formatting the Output	- 05 Marks
Viva	- 05 Marks
Record	- 05 Marks
Total	**- 35 Marks**

VI Sem B Sc

CS6T1: WEB PROGRAMMING

Total Teaching Hours : 52 No of Hours / Week : 03

Unit - I

Fundamentals of Web: Internet, WWW, Web Browsers, and Web Servers, URLs, MIME, HTTP, Security, The Web Programmers Toolbox. XHTML: Origins and evolution of HTML and XHTML, Basic syntax, Standard XHTML document structure, Basic text markup, Images, Hypertext Links, Lists, Tables, Forms, Frames, Syntactic differences between HTML and XHTML.

[13 Hours]

Unit - II

Java Script: Overview of JavaScript; Object orientation and JavaScript; General syntactic characteristics; Primitives, Operations, and expressions; Screen output and keyboard input; Control statements; Object creation and Modification; Arrays;

Functions; Constructor; Pattern matching using expressions; Errors in scripts; Examples.

[13 Hours]

Unit - III

Java Script and HTML Documents, Dynamic Documents with JavaScript, The JavaScript execution environment; The Document Object Model; Element access in JavaScript; Events and event handling; Handling events from the Body elements, Button elements, Text box and Password elements; The DOM 2 event model; The navigator object; DOM tree traversal and modification. Introduction to dynamic documents; Positioning elements; Moving elements; Element visibility; Changing colors and fonts; Dynamic content; Stacking elements; Locating the mouse cursor; Reacting to a mouse click; Slow movement of elements; Dragging and dropping elements.

[13 Hours]

Unit - IV

CSS: Introduction, Levels of style sheets, Style specification formats, Selector forms, Property value forms, Font properties, List properties, Color, Alignment of text, The Box model, Background images, The and tags, Conflict resolution. XML: Introduction; Syntax; Document structure; Document Type definitions; Namespaces; XML schemas; Displaying raw XML documents; Displaying XML documents with CSS; XSLT style sheets; XML Processors; Web services.

[13 Hours]

Text Books

1. Robert W Sebesta, "Programming the World Wide Web", 4th Edition, Pearson Education, 2008.

Reference Books

1. M.Deitel, P.J.Deitel, A.B.Goldberg, "Internet & World Wide Web How to program", 3rd Edition, Pearson Education / PHI, 2004.
2. Chris Bates, "Web Programming Building Internet Applications", 3rd Edition, Wiley India, 2006.
3. Xue Bai et al, "The Web Warrior Guide to Web Programming", Thomson, 2003.
4. Sklar, "The Web Warrior Guide to Web Design Technologies", 1st Edition, Cengage Learning India.

CS5P2: WEB PROGRMMING LAB

PART - A

1. Create a form having number of elements (Textboxes, Radio buttons, Checkboxes, and so on). Write JavaScript code to count the number of elements in a form
2. Create a HTML form that has number of Textboxes. When the form runs in the Browser fill the textboxes with data. Write JavaScript code that verifies that all textboxes has been filled. If a textboxes has been left empty, popup an alert indicating which textbox has been left empty.
3. Develop a HTML Form, which accepts any Mathematical expression. Write JavaScript code to Evaluates the expression and Displays the result.
4. Create a page with dynamic effects. Write the code to include layers and basic animation.
5. Write a JavaScript code to find the sum of N natural Numbers. (Use user-defined function)
6. Write a JavaScript code block using arrays and generate the current date in words, this should include the day, month and year.
7. Create a form for Student information. Write JavaScript code to find Total, Average, Result and Grade.

8. Create a form for Employee information. Write JavaScript code to find DA, HRA, PF, TAX, Gross pay, Deduction and Net pay.
9. Create a form consists of a two Multiple choice lists and one single choice list
    a) The first multiple choice list, displays the Major dishes available.
    b) The second multiple choice list, displays the Starters available.
    c) The single choice list, displays the Soft drinks available.
10. Create a web page using two image files, which switch between one another as the mouse pointer moves over the image. Use the on Mouse Over and on Mouse Out event handlers.

PART – B

During practical examination the External and Internal examiners may prepare exam question paper related to theory syllabus apart from Part-A. (A minimum of 10 Programs has to be prepared).

Note:

a) The candidate has to write both the programs One from Part-A and other from Part-B and execute one program as of External examiner choice.
b) A minimum of 10 Programs has to be done in Part-B and has to be maintained in the Practical Record.
c) Scheme of Evaluation is as follows:

Writing two programs	- 10 Marks
Execution of one program	- 10 Marks
Formatting the Output	- 05 Marks
Viva	- 05 Marks
Record	- 05 Marks
Total	**- 35 Marks**

CS6T2 : COMPUTER NETWORKS

Total Teaching Hours : 52 No of Hours / Week : 03

Unit - I

Introduction: Growth of computer networking, Complexity in network system,
Motivation and Tools: Resource sharing, Growth of the internet, probing the internet, interpreting the ping response, tracing a route. Transmission Media: Copper wires, glass fibers, radio, satellite, Geosynchronous satellites, low earth orbit satellites, Low earth orbit satellite arrays, Microwave, Infrared, Light from a laser. Local Asynchronous Communications: Introduction, the need for asynchronous communications, using electric current to send bits, standards for communication, baud rate, Framing and errors, Half and Full duplex asynchronous communication, the effect of noise on communication. Long distance Communication: Sending signals across long distances, Modem hardware used for Modulations and Demodulation, Leased analog data circuites, optical, radio frequency and dialup Modems, carrier frequencies and Multiplexing, baseband and bradband technologies, wave length division multiplexing, spread spectrum, time division multiplexing [13 hours]

Unit - II

Packets, Frames and Error Detection: Concept of Packets, packets and Time-division Multiplexing, Packets and Hardware Frames, byte Stuffing, transmission errors, Parity bits and Parity checking, error detection, Detecting errors with checksums, detecting errors with CRC, Burst errors, frame formats and error detection mechanism. LAN Technologies and Network Topologies: Direct point-to-point communications, Shared Communications channels, LAN Topologies, Ethernet, Carries sense on CSMA,

Collision Detection and Backoff wih CSMA/CD, Ring Topology and Token Passing, Self-Healing Token Passing Networks, ATM. Hardware addressing and Frame Type Identification: specifying a recipient, How LAN hardware uses addresses to filer packets, format of a physical addresses, broadcasting, Multicast addressing, identifying packet contents, frame headers and frame format. LAN Wiring, Physical Topology and Interface Hardware: speeds of LANs and computers, Network Interface Hardware, The connection between a NIC and a network, original thick Ethernet wiring, connection multiplexing, thin Ethernet wiring, twisted pair Ethernet, Network interface cards and wiring schemes, categories of wires. [13 hours]

Unit - III

Extending LANs: Fiber Optic Extensions, Repeaters, bridges, frame filtering, switching, Long-distance and Local Loop Digital Technologies: Digital telephony, Synchronous communication, SONET, ISDN, Asymmetric Digital Subscriber Line Technology, other DSL technologies, cable modem technology, upstream communication, Broadcast Satellite systems. WAN technologies and Routing: Large Networks and Wide Areas, Packet switches, forming a WAN, store and forward, Physical addressing in a WAN, Next-Hop forwarding, Source independence, Routing Table Computation, Shortest path computation in a Graph, distance vector routing, like-state routing, Example of WAN technologies. Network Characteristics: Network ownership, Network performance characteristics, Jitter. Protocols and Layering: the need for protocols, the seven layers, Stacks: Layered Software. [13 hours]

Unit - IV

Internetworking: internet architecture, A virtual Network, Layering and TCP/IP protocols. Internet Protocol Addresses, APR, IP Datagram's and Datagram Forwarding, IP Encapsulation, Fragmentation, and Reassembly, IPv6, ICMP, UDP, TCP, Internet routing, DNS, WWW, MAIL. [13 hours]

Text Books:

1. Douglas E Comer and M.S.Narayana, "Computer Networks and Internets", 5th edition, Pearson Education, 2013.

Reference Books:

1. Andrew S.Tanenbaum, "Computer Networks", Fifth Edition, Prentice Hall, 2012
2. Behrouz Ferouzan, "Introduction to Data Communications and Networking", TMH, 1999.
3. S. Keshav, "An Engineering Approach to Computer Networks", Pearson Education, 2nd Edition.

CS6P2: PROJECT LAB

Total Practical hours / week: 03 hours

Students are required to take up a problem and develop a system by making use of the existing infrastructure available in their respective colleges.

Scheme of Evaluation is as follows:

Project Demo	- 15 Marks
Project VIVA	- 15 Marks
Project Report	- 5 Marks
Total	**- 35 Marks**

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BANGALORE UNIVERSITY B.Sc.(CBCS)
PHYSICS

Approved Syllabus effective from
Academic year 2016-17

BANGALORE UNIVERSITY
Scheme of Instruction & Examination for B.Sc. PHYSICS , CBCS

Serial Number	Paper Number	Teaching hours per week	Examination duration	Maximum marks		Maximum total marks	Credits
				Final exam	Internal Assessment		
01	PHY T101	4	3 hours	70	30	150	2
02	PHY P102	3	3 hours	35	15		1
03	PHY T201	4	3 hours	70	30	150	2
04	PHY P202	3	3 hours	35	15		1
05	PHY P301	4	3 hours	70	30	150	2
06	PHY T302	3	3 hours	35	15		1
07	PHY T401	4	3 hours	70	30	150	2
08	PHY P402	3	3 hours	35	15		1
09	PHY T501	3	3 hours	70	30	150	2
10	PHY P502	3	3 hours	35	15		1
11	PHY T503	3	3 hours	70	30	150	2
12	PHY P504	3	3 hours	35	15		1
13	PHY T601	3	3 hours	70	30	150	2
14	PHY P602	3	3hours	35	15		1
15	PHY T603	3	3 hours	70	30	150	2
16	PHY P604	3	3hours	35	15		1
Grand total						1200	16(T) 8(P)

Note-I:

- The paper number is a three digit number with ‘ **0** ’ in the middle
- The digit to the left of ‘ **0** ’ indicates the semester number
- Odd number to the right of ‘ **0** ’ indicates a theory paper
- Even number to the right of ‘ **0** ’ indicates a practical paper
- The prefix **T** indicates Theory paper and **P** indicates Practical

Note-II:

The marks distribution for the final practical examination is as follows:

1. Writing Principle / Statement/ Formula with explanation of symbols and units	05 Marks
2. Diagram/Circuit Diagram / Expected Graph	05 Marks
3. Setting up of the experiment + Tabular Columns + taking readings	10 Marks
4. Calculations (explicitly shown) + Graph	07 Marks
5. Accuracy of results with units	03 Marks
6. Class Records (to be valued at the time of practical examination)	05 Marks
Total for Practical Examination	**35 Marks**
Note : Wherever explicit setting up of experiments does not exist like in the case of spectral charts or pre – acquired data is involved(astrophysics or atmospheric experiments) , the marks for setting up of experiment may be provided for additional graphs and formulae	

Note-III:

- A minimum of **EIGHT** (8) experiments must be performed in each practical paper
- Experiments marked "Mandatory" should be performed necessarily

Syllabus for I Sem BSc, (Physics) Paper –I : Phy-T101:

MECHANICS – 1 , HEAT AND THERMODYNAMICS – 1

UNIT – I

- **MOTION** : Newton's Laws of Motion (Statement and illustration), Motion in a resistive medium; Drag force& Drag Coefficient, Drag force with v dependence (only vertical) and v^2 dependence (only vertical) – derivation for velocity and position- graphs with and without resistance, concept of terminal velocity

  4 hours

- **FRICTION** : Static and Dynamic Friction – Friction as a self adjusting force, Coefficient of Static and dynamic friction; Expression for acceleration of a body moving along an inclined plane with and without friction, Free Body Diagrams for the following cases (i)Two masses connected by a string hanging over a frictionless pulley (ii)Two masses in contact and masses connected by strings (horizontal only) (iii)Two masses connected by a string passing over a frictionless pulley fixed at the edge of a horizontal table.

  4 hours

- **PLANETARY & SATELLITE MOTION** : Motion along a curve - radial and transverse components of acceleration(derivation); Newton's law of gravitation (vector form only), Kepler's laws (statements only);Gravitational Field and Potential – relation between them; Field and Potential due to a solid sphere (derivation); Orbital and Escape Velocity (derivation), Satellite in circular orbit and applications; Geostationary and Geosynchronous orbits.

  5 hours

UNIT – II

- **WORK & ENERGY :**Work done by a constant and variable force; Work energy theorem; Work and potential energy; examples of potential energy; Work done by gravitational force; Work done by a spring force; Conservative and non – conservative force; Conservation of mechanical energy **4 hours**
- **SYSTEM OF PARTICLES :**Centre of mass of rigid bodies – General expression; Newton's law for a system of particles; Linear momentum for a particle and a system of particles; Conservation of linear momentum; System with varying mass; Single stage Rocket

motion – Velocity & Acceleration with and without gravity; Elastic and inelastic collisions (only 2D)

4 hours

- **BLACK BODY RADIATION** : Black body radiation and its spectral energy distribution; Kirchhoff's law, Stefan-Boltzmann's law, Wien's displacement law, Rayleigh-Jeans law (Statements), Derivation of Planck'-s law – deduction of Wien's Law & Rayleigh – Jeans Law, Solar constant and its determination using Angstrom's Pyrheliometer; Estimation of the surface temperature of the sun

5 hours

UNIT – III

- **KINETIC THEORY OF GASES :**Basic assumptions of kinetic theory; Derivation of - deduction of perfect gas equation; Maxwell's law of distribution of velocity *(without derivation)*- deduction of most probable velocity, mean velocity and root mean square velocity; Derivation of expression for mean free path $\left(\lambda = \frac{3}{4\pi\sigma^2 n}; Maxwell'sdistributionlaw: \lambda = \frac{1}{\sqrt{2}\pi\sigma^2 n}\right)$; Degrees of freedom and principle of equipartition of energy; Derivation of , Specific heats of an ideal gas, atomicity of gases

6 hours

- **TRANSPORT PHENOMENA** :

  Viscosity and thermal conduction in gases *(*with derivation) ;Relation between coefficient of viscosity and coefficient of thermal conductivity of a gas

2 hours

- **Real Gases :** Derivation of van der Waal's equation of state; Andrews experiments on Carbon dioxide; Derivation of the critical constants; Comparison of van der Waal's isotherms with Andrew's isotherms

5 hours

UNIT – IV

- **Basic Concepts and the Zeroth law of thermodynamics**

  Macroscopic and microscopic descriptions of a system; Thermal Equilibrium - Zeroth Law of Thermodynamics; Concept of temperature; Thermodynamic equilibrium;

Thermodynamic coordinates - extensive and intensive; Equations of state; Various processes - PV indicator diagrams **3 hours**

- **First Law of Thermodynamics**

  The first law of Thermodynamics; Sign convention for heat and work; Derivation of equation of state $PV^{\gamma} = const$; Work done in an isothermal and adiabatic process for an ideal gas; Internal energy as a state function; Application of the first law for (i) Cyclic Process (ii) Adiabatic Process (iii) Isochoric Process (iv) Isobaric Process and (v) Isothermal Process. **3 hours**

- **Second Law of Thermodynamics**

  Reversible and irreversible processes; Carnot Engine; Carnot Cycle and its efficiency (with derivation); Second law of thermodynamics (Kelvin's & Clausius' statements and their equivalence); Practical internal combustion engines - Otto and Diesel Cycles (qualitative treatment); Carnot theorem (proof); Refrigerator- Coefficient of performance

  4 hours

- **Entropy**

  The concept of entropy; Entropy of an ideal gas; Entropy - reversible process, Entropy - irreversible process; Entropy and the second law; Clausius inequality; Principle of increase of entropy; Entropy change in (i) adiabatic process (ii) free expansion (iii) cyclic process (iv) isobaric process; TdS diagram of a Carnot cycle; Entropy and disorder

  3 hours

References:

1. Fundamentals of Physics- R.Resnik,D. Halliday and Walker; Wiley 6ed(**2001**)
2. Physics-Classical and Modern, FJ Keller, E Gettys and J J Skove, McGraw Hill Second Revised Edition(**1993**)
3. Classical Mechanics-K N Sreenivasa Rao, Universities Press- Orient Longman (**2003** ed)
4. Concepts of Physics Vol (1)-H C Verma, Bharathi Bhavan Publishers, **2004** Edition

5. University Physics- F W Sears, M W Zemansky & H D Young, Pearson Education First ed.(**2014**)

6. Mechanics- J C Upadhaya, Himalaya (**2014** ed)

7. Mechanics- Berkeley Physics Course Vol(1)- SI units CharlesKittel etal, McGrawHill Education (India) 2e (2011)

8. Elements of Properties of matter – D S Mathur, S.chand(GL) 7 Co Ltd,Dehi 1ed(**2010**)

9. Properties of Matter - Brijlal & Subramanyam, S Chand & Co, (**2002)**

10. Newtonian Mechanics- A P French, Nelson & Sons UK, (**1971**)

11. Mechanics & Thermodynamics, G Basavaraju & Dipan Ghosh, McGrawHill Education (India) 1ed (**1985**)

12. A treatise on general properties of matter, Sengupta and Chatterjee, New Central Book Agency Pvt Ltd, Calcutta (7th Revised edition -**2010**)

13. Waves & Oscillations, P K Mittal & Jai Dev Anand, Hari Anand Publications Pvt Ltd (2011ed)

14. Heat and Thermodynamics- M M Zemansky,McGrawHill Education (India) 8ed (**2011**)

15. Heat & Thermodynamics, MWZemansky & RHDittman, McGraw Hill Book company,Inc.US Seventh Revised edition(**1997**)

16. Heat and Thermodynamics- Brij Lal and N Subramanyam, SChand & Co, New Delhi -1985

17. Heat and Thermodynamics – D S Mathur, SChand & Co, New Delhi, 5th Edition(2004)

18. Heat, Thermodynamics & Stastical Mechanics, BrijLal & Subramanyam, S. Chand & Company,Delhi; (**2008** ed)

19. Thermodynamics & Statistical Physics, Sharma & Sarkar, Himalaya Publishing House, Third Edition(1991)

20. Thermodynamics, Kinetic theory & Statistical Thermodynamics, FWSears & GLSalinger, Narosa Publishing House (Third Edition **1998**)

21. Fundamentals of Classical Thermodynamics, Gordon J V Wylen & Richard E Sonntag, John

Wiley Eastern Limited; 4th ed (**1994**)

22. Thermal Physics, S C Garg, R M Bansal & C K Ghosh, McGrawHill Education (India) Second ed (**2013**)

PHYSICS – P102, PRACTICAL PHYSICS – I

1. Error Analysis – Data analysis techniques and graphing techniques to be learnt (**Mandatory**)
2. Atwood machine – with photogate
3. Determination of coefficients of static, kinetic and rolling frictions
4. Verification of principle of conservation of energy
5. Simple pendulum - dependence of T on amplitude
6. Determination of coefficient of viscosity by Stokes' method
7. Determination the Acceleration due to Gravity and Velocity for a freely falling body, using Digital Timing Techniques.
8. Work done by variable force
9. Interfacial tension by drop weight method
10. Thermal behavior of a torch filament
11. Specific heat by Newton's law of cooling
12. Verification of Newton's law of cooling and Stefan's law of radiation
13. Determination of Stefan's constant by emissivity method
14. Determination of Solar constant
15. Calibration of Thermistor for Temperature measurement
16. Calibration of thermocouple for Temperature measurement

Note: A minimum of EIGHT (8) experiments must be performed

References:

1. B Saraf etc, - Physics through experiments, Vikas Publications (**2013**)
2. D P Khandelwal – A Laboratory Manual of Physics for Undergraduate Classes, Vikas Publications First ed (**1985**)
3. Advanced Practical Physics for Students – Worsnop & Flint, Methuen & Co, London

4. An Advanced Course in Practical Physics , D Chattopadhyay, P C Rakshit, B Saha, New Central Book Agency (P) Limited, Kolkata, Sixth Revised Edition, (**2002)**

5. BSC, Practical Physics, CL Arora, SChand & Co, New Delhi, (**2007**) Revised Edition

Syllabus for II Sem BSc (Physics) Paper II-Phy-T201:

MECHANICS – 2 , HEAT AND THERMODYNAMICS – 2

UNIT – I

- **OSCILLATIONS :** SHM ; Differential equation of SHM and its solutions, Kinetic and Potential energy, Simple and compound pendulum; oscillations of two masses connected by a spring; damped oscillations – over damped, under damped and un-damped oscillations; forced oscillations - concept of resonance; Coupled Oscillators - in phase and out of phase oscillations- energy transfer. **6 hours**
- **ELASTICITY**: Hooke's law, Stress – Strain diagram, definitions of three elastic moduli; Relationship between three elastic constants (derivation); Poisson's ratio; Work done in stretching a wire; Bending of beams; Bending moment, Theory of single cantilever, Couple per unit twist, Torsional oscillations.
  7 hours

UNIT – II

- **Thermodynamic potentials :** Internal Energy; Enthalpy; Helmholtz free energy; Gibbs free energy and their significance; Maxwell's thermodynamic relations (using Thermodynamic potentials) and their significance; TdS relations; Energy equations and Heat Capacity equations; Third law of thermodynamics (Nernst Heat theorem)
  4 hours
- **Phase transitions of the first order :** Melting, vaporization and sublimation; Condition of equilibrium of phases in terms of Gibbs potential;Clausius-Clapeyron equation - elevation of boiling point, depression of freezing point; Equilibrium between phases - triple point **3 hours**
- **Low Temperature Physics :** Methods of producing low temperatures: (i) Joule Thomson (Joule Kelvin / Throttling / Porous plug) experiment, Joule Thomson

Coefficient, inversion temperature (ii) Adiabatic demagnetization - working and theory **4 hours**

- **Liquefaction of gases :** Regenerative cooling coupled with Joule Thomson cooling; Adiabatic expansion with Joule Thomson cooling (qualitative)

2 hours

UNIT – III

- **FRAMES OF REFERENCE :** Inertial and Non inertial frames of reference - Importance of Inertial frame, Linearly accelerated frames, Concept of frame dependent forces; Galilean relativity - Transformation of Position, Distance/Length, Velocity (Non-relativistic velocity addition theorem), Acceleration; Principle of Invariance, Michelson – Morley Experiment, Search for ether

5 hours

- **SPECIAL THEORY OF RELATIVITY :** Postulates of the special theory of relativity; Lorentz Transformations – Length Contraction, Time Dilation – twin paradox, Velocity Addition Theorem; Variation of mass with velocity; Mass – Energy equivalence; Relativistic momentum and kinetic energy

8 hours

UNIT – IV

- **MOMENT OF INERTIA** : Review of rotational motion of Rigid bodies; Kinetic energy of rotation-Moment of Inertia of a body; Theorem of Moment of Inertia-Parallel and perpendicular axes theorem with proofs (2-D case); Calculation of moment of inertia of a disk, annular ring, solid sphere and rectangular bar; Conservation of angular momentum with illustrations.

9 hours

- **WAVES :** Wave Equation, Speed of transverse waves on a uniform string; Speed of longitudinal waves in a fluid; Group velocity and Phase velocity – relation between

them; **4 hours**

References:

1. **References:**
2. Fundamentals of Physics- R.Resnik,D. Halliday and Walker; Wiley 6ed(**2001**)
3. Physics-Classical and Modern, FJ Keller, E Gettys and J J Skove, McGraw Hill Second Revised Edition(**1993**)
4. Classical Mechanics-K N Sreenivasa Rao, Universities Press- Orient Longman (**2003** ed)
5. Concepts of Physics Vol (1)-H C Verma, Bharathi Bhavan Publishers, **2004** Edition
6. University Physics- F W Sears, M W Zemansky & H D Young, Pearson Education First ed.(**2014**)
7. Mechanics- J C Upadhaya, Himalaya (**2014** ed)
8. Mechanics- Berkeley Physics Course Vol(1)- SI units CharlesKittel etal, McGrawHill Education (India) 2e (2011)
9. Elements of Properties of matter – D S Mathur, S.chand(GL) 7 Co Ltd,Dehi 1ed(**2010**)
10. Properties of Matter - Brijlal & Subramanyam, S Chand & Co, (**2002)**
11. Newtonian Mechanics- A P French, Nelson & Sons UK, (**1971**)
12. Mechanics & Thermodynamics, G Basavaraju & Dipan Ghosh, McGrawHill Education (India) 1ed (**1985**)
13. A treatise on general properties of matter, Sengupta and Chatterjee, New Central Book Agency Pvt Ltd, Calcutta (7th Revised edition -**2010**)
14. Waves & Oscillations, P K Mittal & Jai Dev Anand, Hari Anand Publications Pvt Ltd (2011ed)
15. Heat and Thermodynamics- M M Zemansky,McGrawHill Education (India) 8ed (**2011**)
16. Heat & Thermodynamics, MWZemansky & RHDittman, McGraw Hill Book company,Inc.US

Seventh Revised edition(**1997**)

17. Heat and Thermodynamics- Brij Lal and N Subramanyam, SChand & Co, New Delhi -1985
18. Heat and Thermodynamics – D S Mathur, SChand & Co, New Delhi, 5th Edition(2004)
19. Heat, Thermodynamics & Stastical Mechanics, BrijLal & Subramanyam, S. Chand & Company,Delhi; (**2008** ed)
20. Thermodynamics & Statistical Physics, Sharma & Sarkar, Himalaya Publishing House, Third Edition(1991)
21. Thermodynamics, Kinetic theory & Statistical Thermodynamics, FWSears & GLSalinger, Narosa Publishing House (Third Edition **1998**)
22. Fundamentals of Classical Thermodynamics, Gordon J V Wylen & Richard E Sonntag, John Wiley Eastern Limited; 4th ed (**1994**)
23. Thermal Physics, S C Garg, R M Bansal & C K Ghosh, McGrawHill Education (India) Second ed (**2013**)
24. Physics of Waves, University Leadership Project, Prasaranga, Bangalore University
25. Perspectives of Modern Physics, Arthur Beiser, Mc- Graw Hill;
26. Introduction to Special Theory of Relativity, Rober Resnick, John Wiley and Sons First Edition
27. Special Relativity, A P French, MIT, w.w.Nortan and CompanyFirst Ed (**1968)**
28. Concepts of Modern physics McGraw hill Education(India) Pvt Ltd;6th ed **(2000)**

PHYSICS – P202, PRACTICAL PHYSICS – II

1. Torsional pendulum – to determine C and Rigidity modulus
2. Bar pendulum – determination of g
3. Spring mass- (a) static case to determine 'k'
   (b) dynamic case to determine 'k'
   (c) 'k' as a function of L of spring
4. Rigid pendulum – T and decay of amplitude
5. Coupled oscillator – string coupled with change of tension
6. Rolling dumb bell - on parallel inclined rails
7. Verification of parallel and perpendicular axis theorem
8. Searle's double bar
9. Cantilever of negligible mass to find Young's modulus
10. q- by Stretching
11. q by uniform bending
12. q by single cantilever
13. q by Koenig's method
14. n by dynamic method
15. Fly wheel
16. Verification of Clausius-Clapeyron equation using pressure cooker
17. Thermal conductivity of a bad conductor by Lee's and Charlton's method
18. Thermal conductivity of rubber
19. Determination of thermal conductivity of a good conductor by Angstrom method / Searle's method

Note: A minimum of EIGHT (8) experiments must be performed

References:

1. B Saraf etc, - Physics through experiments, Vikas Publications
2. D P Khandelwal – A Laboratory Manual of Physics for Undergraduate Classes, Vani Publications
3. Advanced Practical Physics for Students – Worsnop & Flint, Methuen & Co, London
4. An Advanced Course in Practical Physics , D Chattopadhyay, P C Rakshit, B Saha, New Central Book Agency (P) Limited, Kolkata, Sixth Revised Edition, 2002

5. BSC, Practical Physics, C L Arora, S Chand & Co, New Delhi, 2007 Revised Edition

Syllabus for III Sem BSc (Physics) Paper III-Phy-T301:

ELECTRICITY and MAGNETISM

UNIT – I

DC CIRCUIT ANALYSIS : Concept of Voltage and Current Sources, Kirchhoff's Current Law, Kirchhoff's Voltage Law (statements). Principle of Duality (voltage and current source equivalents). Thevenin's Theorem (statement and proof), Superposition Theorem(statement and proof), Norton's Theorem (Statement and explanation). Reciprocity Theorem. Maximum Power Transfer Theorem (statement and proof).

8 hours

Transient currents : Self inductance – definition, explanation, expression $L = \frac{\mu N^2 A}{l}$; Magnetic field energy stored in an inductor; Growth and decay of charge in series RC circuit, Growth and decay of current in series LR circuit, Decay of charge in series LCR circuit - Damped, under-damped and over-damped conditions

5 hours

UNIT – II

Magnetic Field and Forces : Force on a moving charge in a magnetic field, Lorentz force and definition of **B**, force on a current carrying conductor in uniform magnetic field, Force between parallel conductors; Definition of ampere;

Biot – Savart's law, Magnetic field due to a straight current carrying conductor (Derivation for Finite/Infinite Length, Amperes swimming rule, Right hand palm rule), Magnetic field of a circular loop; Force and torque on a circular current loop in a magnetic field, magnetic dipole moment, Field on the axis of a solenoid (derivation and explanation), Principle and theory of a moving coil BG, Concept of dead beat galvanometer, determination of high resistance by leakage, theory of HTG, Ampere's Circuital law (statement), Application of Ampere's law to straight wire, solenoid and toroid

13 hours

UNIT III

Scalar and vector fields : Gradient of a scalar function (use of del operator), Divergence and Curl product rules (explanation with geometrical representation), Line, surface and volume integrals

(explanation with examples), Fundamental theorem for divergence and curl (statements only).

3 hours

ELECTROMAGNETIC WAVES : Equation of Continuity, Displacement Current, Maxwell's equations in differential form (Derivation and physical significance), Derivation of wave equation (for one dimension), Velocity of em waves in free space and isotropic dielectric medium(derivation), Relation between refractive index and permittivity (qualitatively), Transverse nature of Plane em waves, , Poynting Vector, Energy density in electromagnetic field, Momentum and Pressure of em waves (derivation), Electromagnetic waves in a conducting medium – skin effect and skin depth

10 hours

UNIT IV

ALTERNATING CURRENT : rms and average value of ac – definition and expressions, Representation of sinusoids by complex numbers (brief explanation), response of LR, CR and LCR series circuit to sinusoidal voltage – j operator method, series and parallel resonant (LR parallel C) circuits (mention condition for resonance with expressions for impedance and current), expression for Q factor, band width, AC bridge - Maxwell bridge (derivation of condition for balance , determination of self-inductance of a coil).

6 hours

THERMOELECTRICITY : Seebeck effect (brief explanation, experiment and temperature dependence), Thermoelectric series, Neutral temperature, Laws of thermoelectricity (qualitative), Peltier effect, Peltier coefficient (qualitative analysis), Thomson effect, Thomson coefficient (qualitative analysis), Theory of thermoelectric circuits using thermodynamics (Application of thermodynamics to a thermocouple and connected relations with derivation), Thermoelectric diagrams and uses (in finding the Seebeck Coefficients, Peltier coefficient, Thomson coefficient, total emf of a thermocouple, neutral temperature) Applications of thermoelectricity - Boys' Radio-micrometer, thermopile and thermoelectric pyrometer (brief explanation with experimental setup).

7 hours

References:

1. Electricity and magnetism by Brij Lal and N Subrahmanyam, Rathan Prakashan Mandir, Nineteenth Edition, 1993

2. Principles of Electronics by VK Mehta and Rohit Mehta, SChand & Company, Eleventh Edition, **2008**

3. Feynman Lecture series, VolII, RPFeynnman et al, Narosa Publishing House, New Delhi

4. Electricity & Magnetism, NSKhare & SSSrivastava, AtmaRam & Sons, New Delhi

5. Electricity & Magnetism, DLSehgal, KLChopra, NKSehgal, SChand & Co, Sixth Edition, (**1988**)

6. Electricity & Electronics, DCTayal, Himalaya Publishing House, Sixth Edition(**1988**)

7. Basic Electronics & Linear Circuits, NN Bhargava, DC Kulshrestha & SC Gupta, TMH Publishing Company Limited, 28th Reprint, (**1999**)

8. Fundamentals of Physics by Halliday, Resnick and Walker, Asian Books Private Limited, New Delhi, 5th Edition, (**1994**)

9. Introduction to Electrodynamics by DJ Griffiths Pearson Education (**2015**)

10. Electromagnetism by BB Laud 2ed

11. Electrical Networks, Theraja 3rd revised edition

PHYSICS – P302, PRACTICAL PHYSICS – III

1. To find L and C by equal voltage method
2. Energy consumption in an electrical circuit - to find power factor
3. Resonance in LCR series circuit
4. Resonance in LCR parallel circuit
5. Mirror galvanometer- figure of merit
6. High resistance by leakage using BG
7. Thermoelectric circuit - find Seebeck coefficients
8. Verification of Law of intermediate metals
9. Study of thermo emf as a heat pump
10. Load regulation of constant current source

11. Black box - identify & measure R, L and C
12. Verification of Thevenin's theorem
13. Verification of Superposition theorem
14. Verification of maximum power transfer theorem
15. Maxwell's impedance bridge
16. Desauty's bridge
17. Anderson's bridge

Note: A minimum of EIGHT (8) experiments must be performed

References:

1. Physics through experiments, BSaraf etc,Vikas Publications **1987**
2. Advanced practical physics, Chauhan & Singh, Pragathi Publications 1ed
3. Practical Physics, DChattopadhyaya et al, Central Publications
4. An Advanced Course in Practical Physics , D Chattopadhyay, PC Rakshit, B Saha, New Central Book Agency (P) Limited, Kolkata, Sixth Revised Edition, **2002**
5. Practical Physics, D C Tayal **2002**

Syllabus for IV Sem BSc (Physics) Paper IV - PhyT401:

OPTICS and FOURIER SERIES

UNIT I

WAVE OPTICS: Huygen's wave theory of light; Huygen's principle, construction Huygen's wave front, Laws of reflection and refraction using spherical wave for at a plane surface (derivation of image distance = object distance using Huygen's construction, derivation of Snells law).

3 hours

INTERFERENCE :

Coherent sources and their production; Conditions for observing interference (mention); Conditions for

constructive and destructive interference (mention)

1 hour

Coherent sources by division of wave front

Biprism-theory and working, experiment to determine wavelength; Effect of thin film in the path of one of the beams; Calculation of thickness of the **5 hours**

Coherent sources by division of amplitude:

Interference at thin films - reflected and transmitted light, Colours of thin films; Theory of air wedge; Theory of Newton's rings (Only reflected System). Determination of Refractive index of a liquid **4 Hours**

Unit - II

Diffraction - Fresnel diffraction

Concept of Fresnel's half period zones; Theory of rectilinear propagation; Fresnel diffraction, Construction and working of Zone plate; Comparison of Zone plate with lens; Cylindrical Wavefront (Half period strips – qualitative), Theory of diffraction at a straightedge **7 hours**

Fraunhoffer diffraction

Theory of single slit diffraction; Theory of grating - normal and oblique incidence - Experimental determination of wavelength; Discussion of Dispersive power; Resolving power, Rayleigh's criterion; Expression for resolving power of grating and telescope; Comparison of prism and grating spectra **6 Hours**

UNIT III

Polarization

Review of plane polarized light and method of production; Double refraction at crystals; Huygens' explanation of double refraction; Theory of retarding plates - Quarter wave plates and Half wave plates; Theory of superposition of two plane polarized waves with perpendicular vibrations, Production and detection of linearly , elliptically and circularly polarized light; Optical activity - Fresnel's explanation, Laurent's half shade polarimeter. **6 Hours**

Lasers

Introduction; Spontaneous and stimulated emission; Einstein's coefficients and optical amplification; Population inversion; Main components of a laser; Lasing action; Ruby Laser - construction and working - energy level diagram; He-Ne Laser - construction and working - energy level diagram;

Spatial Coherence and directionality, estimates of beam intensity, temporal coherence and spectral energy density

7 hours

UNIT IV

Fourier Series: Periodic functions. Orthogonality of sine and cosine functions, Dirichlet Conditions (Statement only). Expansion of periodic functions in a series of sine and cosine functions and determination of Fourier coefficients. Complex representation of Fourier series {Example : Fourier Series for

(i) $f(x) = e^x if - \pi < x < \pi$

(ii) $f(x) = \begin{cases} -1 - \pi \leq x \leq 0 \\ 10 \leq x \leq \pi \end{cases}$

(iii) $f(x) = x^2 \in theinterval[-1, +1]$ }

Expansion of functions with arbitrary period.

(Concept of change of scale; Fourier Series for Periodic Rectangular Wave; Half – Wave rectifier; Trapezoidal wave :

$$f(x) = \begin{cases} x, 0 \leq x \leq 1 \\ 1, 1 \leq x \leq 2 \\ 3 - x, 2 \leq x \leq 3 \end{cases}$$

)Application to Square wave, triangular Wave and Saw Tooth Wave (superposition of first three components to be shown graphically) . **9 hours**

Optical Fibres

Optical fiber-principle, description and classification; Why glass fibers? Coherent bundle; Numerical aperture of fiber; Attenuation in optical fibers - limit Multimode optical fibers; Ray dispersion in multi-mode step index fibers; **4 hours**

References:

1. Optics, Ajoy Ghatak, Tata Mc Graw Hill, 4th Edition

2. Introduction to Modern Optics, Ajoy Ghatak, Tata McGraw Hill Publications (**2009**)

3. Fundamentals of Physics by Halliday, Resnick and Walker, Asian Books Private Limited, New Delhi, 5th Edition, (**1994)**

4. A K Ghatak and K Thyagarajan, Contemporary Optics, Macmillan/Premium Publishing Corp (**1978**)

5. Jenkins and White, Optics, McGraw Hill Education India Pvt Ltd 4th ed(**2011**)

6. Optics, Brij Lal and Subramaniam, SChand & Company, 22nd Edition, (**1994**)

7. Principles of Optics, B K Mathur, Gopal Printing Press, Kanpur, 6th Edition, (**1996**)

8. An Introductions to LASERS-Theory & Applications, M N Avadhanulu, S Chand & Co, (**2001**)

9. Introduction to Fibre Optics, Ajoy Ghatak & K Thyagarajan, Cambridge University Press, First Edition Reprint,(**2002**)

10. Optical Fibre Communications, Gerd Keiser, McGraw Hill, 3rd Edition, (**2000**)

10. Fibre Optic Communication, DCAgarwal, Wheeler Publications, Second Edition Reprint,(**1996**)

11. Optics, Klein and Furtak, Wiley Publications Pvt Ltd 2ed (**2011**)

12. B B Laud, Lasers and Non-Linear optics. NewAge International Pvt Ltd Publishers (**2011**)

13. Physics of Waves, University Leadership Project, Prasaranga, Bangalore University(1ed **1981**)

14. Advanced Engineering Mathematics, Erwin Kreyszig, Wiley 10th ed(**2003**)

15. Mathematical Physics, B D Gupta, Vikas Publshing House, 4th ed (**2016**)

PHYSICS – P402, PRACTICAL PHYSICS – IV

1. Verification of Brewster's law
2. Refractive index of a liquid by parallax method
3. Focal length of combination of lenses separated by a distance
4. Biprism – determination of wavelength of light
5. Air wedge – determination of thickness of object
6. Newton's rings – determination of radius of curvature of lens surface
7. Newton's rings – determination of refractive index of a liquid.
8. Diffraction grating in minimum deviation position
9. Diffraction grating in normal incidence position
10. Resolving power of telescope
11. Resolving power of a grating
12. Diffraction at straight edge
13. Polarimeter – determination of specific rotation of a solution
14. Diffraction of LASER at a wire
15. Measurement of numerical aperture of an optical fibre.
16. Fraunhoffer diffraction of LASER at single slit
17. Diffraction of LASER at graduations of a metal scale

Note: A minimum of EIGHT (8) experiments must be performed

References:

1. An Advanced Course in Practical Physics , D Chattopadhyay, P C Rakshit, B Saha, New Central Book Agency (P) Limited, Kolkata, Sixth Revised Edition, **2002**

2. Practical Physics, Experiments with He-Ne laser, R S Sirohi 2nd ed

3. Advanced Practical Physics, Worsnop & Flint Asia Pub.(1979)

4. BSc, Practical Physics, C L Arora, S Chand & Company, New Delhi, Revised Edition, **2007**

Syllabus for V Sem. B.Sc. (Physics) Paper V – Phy T501:

STATISTICAL PHYSICS, QUANTUM MECHANICS – I, ATMOSPHERIC PHYSICS AND NANOMATERIALS

UNIT I : STATISTICAL PHYSICS (15 HOURS)

Specification of state of the system, Macro state, Micro State, Phase Space, Stirling's Approximation, Thermodynamic Probability and its calculation (Description of each with an example); Entropy and Thermodynamic probability ($S = kln\Omega$). Basic postulates of Statistical Physics ; Ensemble (Micro – canonical, canonical and grand canonical ensembles)

2 hours

Maxwell – Boltzmann Statistics : Maxwell – Boltzmann Distribution function (Derivation of $n_i = \frac{g_i}{e^{\alpha+\beta E_i}}$, Energy distribution function $f(E_i) = \frac{n_i}{g_i}$); Maxwell – Boltzmann law of velocity distribution (mention- most probable velocity, average velocity, rms velocity) Limitations of M – B statistics **3 hours**

Bose – Einstein Statistics : B-E distribution function (Derivation of $n_i = \frac{g_i}{e^{\alpha+\beta E_i - 1}}$) Bose-Einstein condensation properties of liquid He (qualitative) [Mention of expression of Bose Temperature T_B– Concept BE Condensation –variation of N_o (number of particles in Zero energy state) and N_e (number of particles in non-Zero energy state) with temperature- BE condensation properties of Liquid He^4 (Qualitative description)]

Radiation as photon gas, Bose's derivation of Planck's law, Rayleigh-Jeans law, Wein's law ; Specific Heat capacity of metals [Einstein's theory of specific heat capacity of solids – [Derivation of the equation where $\theta = h\nu/k$] **5 hours**

Fermi – Dirac Statistics :

Fermi-Dirac distribution function; Fermi sphere and Fermi energy, Fermi gas; Electronic Specific heat Capacity in metals (Mention of the contribution to specific heat capacity from free electrons)

Comparison of Maxwell – Boltzmann, Bose – Einstein and Fermi – Dirac distribution functions

5 hours

UNIT II : QUANTUM MECHANICS – I

Failure of Classical Physics to explain the phenomena such as stability of atom, atomic spectra, black body radiation, photoelectric effect, Compton effect and specific heat of solids, Planck's quantum theory, Explanation of the above effects on the basis of quantum mechanics

[Experimental observation, failure of classical theory, quantum mechanical explanation, Photoelectric effect -Einstein's explanation, Compton Effect – mention of expression for wavelength shift (no derivation), Specific heat of solids -Einstein's and Debye's explanation of specific heat (qualitative). Stability of atom and atomic spectra, Black body radiation [Mention of Planck's equation, arrive at Wien's and Rayleigh-Jean's equation for energy distribution from Planck's equation]. **5 hours**

de Broglie's hypothesis of matter waves (λ in terms of momentum, energy, temperature for monoatomic gas molecules); Thomson's experiment; Davisson and Germer's experiment – normal incidence method; Concept of wave packet, Group velocity and particle velocity (relation between group velocity and particle velocity) Heisenberg's uncertainty principle - different forms; Gamma ray microscope experiment; Application to Non – existence of electron in nucleus **10 hours**

UNIT III : ATMOSPHERIC PHYSICS

Fixed gases and variable gases; Temperature structure of the atmosphere; Hydrostatic balance, Variation of pressure with altitude, scale height; Relative and Absolute humidity **4 hours**

Beer's law (derivation); Global energy balance for earth – atmosphere system, Greenhouse effect; Atmosphere dynamics –Accelerated rotational frames of reference – Centripetal and Coriolis force (derivation), Gravity and pressure gradient forces (with derivation), Applications of Coriolis force – Formation of trade winds, cyclones, erosion of river banks **6 hours**

NANOMATERIALS

Nanomaterials – Introduction, classification – (0D, 1D, 2D). Quantum dots, nanowires and nanofilms, Multilayered materials- Fullerene, Carbon Nano Tube (CNT), Graphene (Mention of structures and properties); Synthesis techniques (Top down- Explanation of Milling & bottom up - Sol gel process). Characterisation techniques- (brief description of SEM, TEM, AFM).

Electron confinement (0D, 1D, 2D- energy levels as a particle in a box); Size effect-Surface to volume ratio; distinction between nanomaterials and bulk materials in terms of energy band. Distinct properties of nano materials (Mention- optical, electrical, mechanical and magnetic properties);

Mention of applications: (Fuel cells, catalysis, phosphors for HD TV, next generation computer chips, elimination of pollutants, sensors) **5 hours**

References :

1. Quantum Mechanics, ***B.H. Bransden and C.J. Joachain***, 2nd Edition, Pearson Education (**2004**)
2. Introduction to Quantum Mechanics, ***David J. Griffiths***, 2nd Edition, Pearson Education ,(**2005**)
3. Modern Quantum Mechanics, ***J.J. Sakurai***, Pearson Education, (**2000**)
4. Principles of Quantum Mechanics, ***Ghatak and Lokanathan***, Macmillan, (**2004**)
5. Statistical Mechanics, An Introduction, **Evelyn Guha**, Narosa (**2008**)
6. Statistical Mechanics, ***R.K.Pathria***, 2nd edition, Pergamon Press (**1972**)
7. Statistical and Thermal physics, ***F.Reif***, McGraw Hill International(**1985**)
8. Statistical Mechanics, ***K.Huang***, Wiley Eastern Limited, New Delhi (**1975**)
9. Basic of Atmospheric Physics, A Chandrasekar, PHI Learning Private Limited (EEE)
10. Weather, climate and atmosphere by Siddartha.
11. Atmospheric Science by John M Wallace and Peter V Hobbs, Elsevier Publications (**2006**).
12. Introduction to Atmospheric Science by Turberick &Lutzens,Elsevier Publications
13. Nano materials, A K Bandopadhyay. New Age International Pvt Ltd Publishers (**2007**)
14. Nanocrystals, C. N. Rao, P. John Thomas.
15. Nanotubes and wires, C. N. Rao, A. Govindaraj.

PHYSICS – P502, PRACTICAL PHYSICS – V(A)

1. Applications of CRO in the (a) study of Lissajous figures (b) calculation of rms voltage (c) calculation of frequency of AC. **(Mandatory)**
2. Monte Carlo experiment & error analysis
3. Verification of Maxwell's distribution of velocity
4. Maxwellian distribution of velocities for electron using EZ81vacuum diode
5. Dice experiment – to study statistical nature of results
6. Study of statistical distribution on nuclear disintegration data (using GM counter as a black box)
7. Characteristics of a photo cell-determination of stopping potential.

8. Determination of Planck's constant.
9. Characteristics and spectral response (selenium photocell)
10. Determination of particle size using XRD Scherer's formula.
11. Temperature of atmospheric air - by using Thermograph (Bimetallic type)- Plotting the graph of temperature Vs time.
12. Relative humidity using hair hygrometer
13. Estimation of relative humidity using wet and dry bulb thermometer
14. Wind speed and direction by Hand held anemometer and wind wane
15. Estimation of height from the given pressure data
16. Regulated power supply (using zener diode).
17. Determination of transistor h-parameters.
18. Frequency response of a CE amplifier.
19. Transistor as a switch and active device.
20. Construction of RFO or AFO - using transistor
21. Emitter follower

Note: A minimum of EIGHT experiments must be performed.

References :

1. Worsnop and Flint , Advanced practical physics for students, Asia Pub.(**1979**)
2. Singh and Chauhan, Advanced practical physics, 2 vols., Pragati prakashan, (**1976**)
3. Misra and Misra, Physics Lab. Manual, South Asian publishers (**2000**)
4. Gupta and Kumar, Practical physics, Pragati prakashan, (**1976**)
5. Ramalingom & Raghuopalan : A Lab. Course in Electronics
6. Bharagav et al : Electronics, TTI tata MacGraw Hill 33rd Reprint (**2002**)

Syllabus for V Sem. B.Sc. (Physics) Paper VI – Phy T503:

ASTROPHYSICS, SOLID STATE PHYSICS AND SEMICONDUCTOR PHYSICS

UNIT-I : ASTROPHYSICS (15 hours)

Parallax and distance: Helio-centric parallax, Definition of parsec (pc), Astronomical unit (AU), light year (ly) and their relations.

Luminosity of stars: Apparent brightness, Apparent magnitude - scale of Hipparchus. Absolute magnitude - distance - modulus relationship. Distinction between visual and bolometric magnitudes, Radius of a star. **3 hours**

Stellar classification: Pickering classification and Yerke's luminosity classification. H-R diagram, Main sequence stars and their general characteristics.

Gravitational potential energy or self energy of a star based on the linear density model, Statement and explanation of Virial theorem.

Surface or effective temperature and color of a star : Wien's displacement law. Expressions for - average temperature, core temperature, hydrostatic equilibrium, core pressure of a star based on the linear density model of a star. Photon diffusion time (qualitative), Mass – Luminosity relationship and expression for lifetime of a star.

7 hours

Evolution of stars: Stages of star formation (GMC – Protostar- T-Tauri) and main sequence evolution, White dwarfs, Pulsars, Neutron stars and Black holes, Variable stars, Supernova explosion- its types, Chandrasekhar limit. Event Horizon,Singularity,Schwarzchildradius(qualitative)

5Hours

Unit-2: Solid State Physics (15 hours)

Crystal systems and X-rays: Crystal systems-Bravais lattice; Miller indices– Spacing between lattice planes of cubic crystals, Continuous and characteristic X-ray spectra; Moseley's law, Scattering of X-rays - Compton effect, Bragg's law. **6 hours**

Free electron theory of metals : Electrical conductivity- classical theory (Drude-Lorentz model); Thermal conductivity; Wiedemann - Franz's law; Density of states for free electrons (with derivation); Fermi-Dirac distribution function and Fermi energy; Expression for Fermi energy and Kinetic energy at absolute zero(derivation). Hall Effect in metals

6 Hours

Superconductivity : Introduction – Experimental facts – Zero resistivity – The critical field – The critical current density – Meissner effect, Type I and type II superconductors– BCS Theory (qualitative); Applications - SQUIDs. **3 hours**

Unit-3: Semiconductor Physics

Distinction between metals, semiconductors and insulators based on band theory. Intrinsic semiconductors - concept of holes – effective mass - expression for carrier concentration(derivation for both holes and electrons) and electrical conductivity – extrinsic semiconductors – mention of expressions for carrier concentrations and conductivity – impurity states in energy band diagram and the Fermi level.

Formation of P-N junction, depletion region, Biased P-N junction, variation of width of the depletion region, drift and diffusion current –expression for diode current.

6 hours

Special Diodes: Zener diode – characteristics and its use as a voltage regulator.

Photo diodes, Solar cells and LED (principle, working and applications). **4 hours**

Transistors: Transistor action, Characteristics (CE mode), DC Biasing , Load line analysis (Operating Point, Fixed Bias – Forward bias of Base – Emitter, collector – emitter loop, transistor saturation, Load line analysis ; Voltage divider bias – Transistor saturation, Load line analysis)

Transistor as an amplifier(CE mode); . H-parameters **5 hours**

References :

1. Astronomy : Fundamentals and Frontiers – **Jastrow & Thompson,** John Wileyand Sons 4th Revised ed (**1984**)
2. Chandrashekhar and his limit – **G. Venkataraman,** University press, reprint (**1997**)
3. An introduction to Astrophysics – **Baidyanath Basu,** PHI 2nd ed (**2010**)
4. Astrophysics Concepts, ***M. Herwit***: John Wiley, (**1990**).
5. Astrophysics. ***Krishnaswamy*** (ed)New Age Publishers,(**1996**)
6. Introduction to solid State Physics, ***Charles Kittel***, VII edition, (**1996**)
7. Solid State Physics- **A J Dekker**, MacMillan India Ltd, (**2000**)
8. Elementary Solid State Physic, **J P Srivastava**,PHI,(**2008**)
9. Essential of crystallography**, M A Wahab**, Narosa Publications (**2009)**
10. Solid State Physics-**F W Ashcroft and A D Mermin**-Saunders College (**1976**)
11. Solid State Physics-**S O Pillai**-New Age Int. Publishers (**2001**)

PHYSICS – 504, PRACTICAL PHYSICS – V(B)

1. Parallax Method – Distance of objects using trigonometric parallax.
2. HR Diagram & the physiMisra and Misra, Physics Lab. Manual, South Asian publishers (**2000**)
3. Gupta and Kumar, Practical physics, Pragati prakashan, (**1976**)
4. Ramalingom & Raghuopalan : A Lab. Course in Electronics
5. Bharagav et al : Electronics, TTI tata MacGraw Hill 33rd Reprint (**2002**)cal properties of stars.
6. Analysis of stellar spectra.
7. Determination of temperature of a star (artificial) using filters.
8. Analysis of sunspot photographs & solar rotation period.
9. Mass luminosity curve – Estimation of mass of a star.
10. Mass of binary stars.
11. Resistivity of a material by four probe method.
12. Determination of Lorentz Number
13. Semiconductor temperature sensor.
14. Temperature coefficient of resistance and energy gap of thermistor.
15. LED characteristics and spectral response.
16. LDR characteristics – dark resistance – saturation resistance.

17. Solar cell characteristics – Open circuit voltage – short circuit current – efficiency.
18. Study of Hall effect in a metal.
19. Characteristics of LASER diode.
20. Spectral response of a photodiode and its I – V characteristics.
21. Analysis of X-ray diffraction pattern obtained by powder method to determine properties of crystals.
22. Determination of Fermi energy of a metal.
23. Determination of thermal conductivity of a metal by Forbe's method.
24. Measurement of heat capacity of metals.

Note: A minimum of EIGHT experiments must be performed.

References :

1. IGNOU : Practical Physics Manual IGNOU publications
2. Saraf : Experiment in Physics Vikas publicatios
3. S.P. Singh : Advanced Practical Physics
4. Melissons : Experiments in Modern Physics.
5. Misra and Misra, Physics Lab. Manual, South Asian publishers (**2000**)
6. Gupta and Kumar, Practical physics, Pragati prakashan, (**1976**)
7. Ramalingom & Raghuopalan : A Lab. Course in Electronics
8. Bharagav et al : Electronics, TTI tata MacGraw Hill 33rd Reprint (**2002**)

Syllabus for VI Sem. B.Sc. (Physics) Paper VII – Phy T601:

ATOMIC, MOLECULAR AND NUCLEAR PHYSICS

UNIT I : ATOMIC AND MOLECULAR PHYSICS (15 HOURS)

Vector Model of the Atom

Review of Bohr's theory of hydrogen atom, Sommerfeld's modification of the Bohr atomic model (qualitative). Spatial quantization and spinning electron. Different quantum numbers associated with the vector atom model, Spectral terms and their notations, Selection rules, Coupling schemes(*l*-s and j-j coupling in multi electron systems), Pauli's Exclusion Principle, Expression for maximum number of electrons in an orbit. Spectra of alkali elements (sodium D-line), Larmor precession, Bohr magneton, Stern-Gerlach Experiment **.** Zeeman Effect- Experimental study, theory of normal and anomalous Zeeman effect based on quantum theory. **10 hours**

Molecular Physics: Pure rotational motion, Spectrum and selection rules; Vibrational motion, vibrational spectrum and selection rules; Rotation-Vibration spectrum; Scattering of light-Tyndall scattering, Rayleigh scattering and Raman scattering. Experimental study of Raman effect, Quantum theory of Raman effect - Applications . **5 hours**

UNIT II : RADIOACTIVE DECAY, DETECTORS AND ACCELERATORS (15 HOURS)

Alpha particle scattering : Rutherford's theory of alpha scattering (assuming the path to be hyperbolic) **2 hours**

Radioactive Decay : Laws of radioactive decay, half – life, mean life, decay constant; theory of successive disintegration (expression for number of atoms of nth element in the chain – Bateman equations); radioactive equilibrium (secular and transient - cases of long lived parent, short lived parent, daughter and parent of nearly equal half – life).

3 hours

Alpha decay : Range and energy, Geiger- Nuttal law , Characteristics of alpha spectrum, Gamow's theory of alpha decay [Barrier height, tunneling effect, λ=Pf f is the frequency of collision of nucleon with the potential barrier; P is the probability of transmission through the barrier); Barrier

penetrability factor (p)$e^{-\sqrt{\frac{2\mu}{\hbar^2}}\int_{r_0}^{r_i}\sqrt{V(r)-E}dr}$ (no derivation)]

Derivation of Q-value-of alpha decay; Exact energy of alpha particle emitted

3 hours

Beta decay : Types of beta decay (electron, positron decay and electron capture) Characteristics of beta spectrum and Pauli's neutrino hypothesis **2 hours**

Detectors : Variation of ionization current with applied voltage in a gas counter, Proportional counter, GM Counter (Construction, working, characteristics, efficiency and quenching)

3 hours

Particle accelerators : Linear accelerator, Cyclotron, Betatron **2 hours**

UNIT III : NUCLEAR REACTIONS AND PARTICLE PHYSICS

NUCLEAR REACTIONS : Types of reactions, Conservation laws in nuclear reactions with examples, derivation of Q – value for reactions using the energy – momentum conservation, exoergic and endoergic reactions, threshold energy , reaction rate, reaction cross – section, concept of direct and compound reactions, resonance reaction; Power reactors

8 hours

ELEMENTARY PARTICLES : Classification of elementary particles, Fundamental interactions (Gravitational, Electromagnetic, Weak, strong – range, relative strength, particle interactions for each);

Symmetries and Conservation Laws (momentum, energy, charge, parity, lepton number, baryon number, isospin, strangeness and charm); Concept of Quark Model, Color quantum number and gluons; **7 hours**

Reference Books:

1. Concepts of Modern Physics, Beiser 3rd edition, Student edition, New Delhi (1981).
2. Introduction to Atomic Physics – H.E. White
3. Introduction to Modern Physics – H.S. Mani, G.K. Mehta-West Press (1989).

4. Principles of Modern Physics, A.P. French, John Wiley, London (1958).
5. Modern Physics - S.N. Ghoshal, Part 1 and 2 S. Chand and Company (1996).
6. Physics of the Atom, Wehr et. al. McGraw Hill
7. Atomic and Nuclear Physics, S. N. Ghoshal: Vol. II. (2000).
8. Alpha, beta and gamma spectroscopy, K. Seighbahn: Vol. I and II, John Wiley (1967)
9. Introductory nuclear Physics by Kenneth S. Krane (Wiley India Pvt. Ltd., 2008).
10. Nuclear Physics, D C Tayal, Himalaya Publishing House, 5th Edition
11. Concepts of nuclear physics by Bernard L. Cohen. (Tata Mcgraw Hill, 1998).
12. Introduction to the physics of nuclei & particles, R.A. Dunlap. (Thomson Asia, 2004)
13. Introduction to Elementary Particles, D. Griffith, John Wiley & Sons 2nd revised ed (**2008**)
14. Quarks and Leptons, F. Halzen and A.D. Martin, Wiley India, New Delhi(**2008**)
15. Basic ideas and concepts in Nuclear Physics - An Introductory Approach by K. Heyde (IOP-Institute of Physics Publishing, (2004).
16. Radiation detection and measurement, G.F. Knoll (John Wiley & Sons, (**2000**).
17. Theoretical Nuclear Physics, J.M. Blatt & V.F.Weisskopf (Dover Pub.Inc., (**1991**)

PHYSICS – 602, PRACTICAL PHYSICS – VI(A)

1. Study of hydrogen spectrum.
2. Sommerfeld's fine structure constant determination.
3. Determination of e/m by Thomson's method.
4. Characteristics of GM counter.
5. Determination of half-life of K^{40}.
6. Millikan's Oil drop experiment
7. Analysis of band spectrum of PN molecule.
8. Analysis of rotational spectrum of nitrogen.
9. Analysis of rotational vibrational spectrum of a diatomic molecule (HBr).
10. Absorption spectrum of $KMnO_4$.
11. B – H Curve using Oscilloscope
12. Verification of Curie – Weiss Law
13. To verify and design AND, OR, NOT and XOR gates using NAND gates
14. To convert a Boolean Expression into Logic Gate Circuit and assemble it using logic gate ICs.
15. Digital Half-adder & Full-adder circuits using logic gate ICs.

16. Half Subtractor & Full Subtractor, using logic gate ICs

Note : A minimum of EIGHT experiments must be performed.

References :

1. IGNOU : Practical Physics Manual
2. Saraf : Experiment in Physics Vikas Publications
3. S.P. Singh : Advanced Practical Physics
4. Melissons : Experiments in Modern Physics
5. Misra and Misra, Physics Lab. Manual, South Asian publishers, 2000
6. Gupta and Kumar, Practcal physics, Pragati prakashan, 1976

Syllabus for VI Sem. B.Sc. (Physics) Paper VIII – Phy T603:

ELECTRONICS, MAGNETIC MATERIALS, DIELECTRICS AND QUNTUM MECHANICS – II

UNIT I : OPAMPS

Operational amplifiers

Block Diagram of an OPAMP, Characteristics of an Ideal and Practical Operational Amplifier (IC 741), Open loop configuration - Limitations, Gain Bandwidth Product, Frequency Response, CMRR, Slew Rate and concept of Virtual Ground **2 hours**

Feedback concepts, Advantages of feedback, types of feedback, Expression for Gain; OPAMP as a feedback amplifier – Non – Inverting and Inverting amplifier, Modification of input and output impedances with feedback ; Voltage follower; Differential amplifier with feedback;

2 hours

Linear Applications - frequency response of Low pass, high pass and band pass filters (first order), inverting summing amplifier, ideal Differentiator, Integrator;

2 hours

OPAMP Oscillators

Positive Feedback concept - oscillator operation –Barkhausen Criterion; Types of oscillator circuits (Qualitative); Phase shift oscillator and Wien bridge oscillator (using op amp).

2 hours

DIGITAL ELECTRONICS

Number Systems : binary, octal, hexadecimal (interconversions); Number codes : BCD, Gray Code (conversions to other systems); Signed Numbers; Arithmetic using Radix and Radix -1 complement.

2 hours

Logic gates and truth tables : OR gate, AND gate; Inverter (the NOT function); NAND and NOR; exclusive OR; exclusive NOR. **1 hour**

Boolean laws and theorems – simplification of SOP equations; Realization of AND, OR, NOT using universal gates NAND and NOR; **2 hours**

Combination logic: Adders (full and half adder) and Subtractors (half) **2 hours**

UNIT II – Magnetic Properties of Matter and Dielectrics

Magnetic Properties of Matter

Review of basic formulae : Magnetic intensity, magnetic induction, permeability, magnetic susceptibility, magnetization (M), Classification of Dia – , Para –, and ferro – magnetic materials;

3 hours

Classical Langevin Theory of dia – and Paramagnetic Domains. Quantum Mechanical Treatment of Paramagnetism. Curie's law, Weiss's Theory of Ferromagnetism and Ferromagnetic Domains. Discussion of B-H Curve. Hysteresis and Energy Loss, Hard and Soft magnetic materials

5 hours

Dielectrics : Static dielectric constant, polarizability (electronic, ionic and orientation), calculation of Lorentz field (derivation), Clausius-Mosotti equation (derivation), dielectric breakdown, electrostriction (qualitative), electrets. Piezo electric effect, cause, examples and applications.

7 hours

UNIT-III : Quantum mechanics-II

The concept of wave function, physical significance of wave function. Development of time dependent and time independent Schrodinger's wave equation. Max Born's interpretation of the wave function. Normalization and expectation values, Quantum mechanical operators, Eigen values and Eigen functions. Applications of Schrodinger's equation – free particle, particle in one dimensional box- derivation of Eigen values and Eigen function – extension to three dimensional box; Development of Schrodinger's equation for One dimensional Linear harmonic oscillator, Rigid rotator, Hydrogen atom – mention of Eigen function and Eigen value for ground state.

15 hours

References

1. OPAMPS and Linear Integrated Circuits, **Ramakant A Gayakwad**, PHI Learning Private Limited, 4th Edition
2. Operational Amplifiers with Linear Integrated Circuits, **William D Stanley**, Pearson, 4th Edition
3. Electronic Devices and Circuit Theory**, Robert Boylestead and Louis Nashelsky**, PHI Learning Private Limited, 10th Edition
4. Digital Principles and applications, **Leach and Malvino**, MC – Graw Hill, 5th Edition
5. Introduction to solid State Physics, ***Charles Kittel***, VII edition, (**1996**.)
6. Solid State Physics- **A J Dekker**, MacMillan India Ltd, (**2000**)
7. Elementary Solid State Physic, **J P Srivastava**,PHI,(**2008**)
8. Essential of crystallography**, M A Wahab**, Narosa Publications (**2009**)
9. Solid State Physics-**F W Ashcroft and A D Mermin**-Saunders College (**1976**)
10. Solid State Physics-**S O Pillai**-New Age Int. Publishers (**2001**)
11. Quantum Mechanics, ***B.H. Bransden and C.J. Joachain***, 2nd Edition, Pearson Education (**2004**)

12. Introduction to Quantum Mechanics, ***David J. Griffiths***, 2nd Edition, Pearson Education, (**2005**)
13. Modern Quantum Mechanics, ***J.J. Sakurai***, Pearson Education, (**2000**)
14. Principles of Quantum Mechanics, ***Ghatak and Lokanathan***, Macmillan, (**2004**)

2004PHYSICS – 604, PRACTICAL PHYSICS – VI(B)

1. Low pass filter using Op-amp
2. High pass filter using Op-amp
3. Band pass filter using Op-amp
4. Op-amp inverting and non – inverting amplifier – ac or dc
5. OPamp as a differential amplifier – COMMON MODE AND DIFFERENTIAL MODE
6. Op-amp-summing amplifier – ac and dc,
7. OPamp as integrator and differentiator.
8. Phase shift oscillator using op –amp
9. Wien-bridge Oscillator using op – amp
10. To design an Astable Multivibrator of given specifications using 555 Timer
11. Determination of dielectric constant.
12. Determination of dipole moment of organic liquid
13. Verification of inverse square law using GM counter (with a radioactive source).
14. Determination of mass absorption coefficient of gamma rays.

Note : A minimum of EIGHT experiments must be performed.

References :

1. IGNOU : Practical Physics Manual
2. Saraf : Experiment in Physics, Vikas Publications
3. S.P. Singh : Advanced Practical Physics
4. Melissons : Experiments in Modern Physics
5. Misra and Misra, Physics Lab. Manual, South Asian publishers, (**2000**)
6. Gupta and Kumar, Practical physics, Pragati prakashan, (**1976**)

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