

**BHARATI VIDYAPEETH**  
**DEEMED TO BE UNIVERSITY**

**PUNE, INDIA**

**FACULTY OF MANAGEMENT STUDIES**

**Board of Studies in Computer Applications**

**Bachelor of Computer Applications Programme**

**(Under Choice Based Credit System)**

**To be effective from 2018-19 at Part I**

**BHARATI VIDYAPEETH (DEEMED TO BE UNIVERSITY), PUNE**  
**FACULTY OF MANAGEMENT STUDIES**  
**Board of Studies in Computer Applications and Systems Studies**  
**Bachelor of Computer applications Programme**  
**(Under Choice Based Credit System)**  
**To be effective from 2018-19 at Part I**

**1. INTRODUCTION:**

The BCA Programme is a full time 150 Credits program offered by Bharati Vidyapeeth (Deemed to be University), Pune and conducted at its management institutes in Delhi, Karad, Kolhapur, Pune, Sangli, and Solapur. All the six institutes have excellent faculty, Laboratories, Library, and other facilities to provide proper learning environment. The University is reaccredited by NAAC with an 'A+' grade. The expectations and requirements of the Software Industry, immediately and in the near future, are visualized while designing the BCA programme. This effort is reflected in the Vision and Mission statements of the BCA programme. Of course, the statements also embody the spirit of the vision of Late Dr. Patangraoji Kadam, the Founder of Bharati Vidyapeeth and Chancellor, Bharati Vidyapeeth University which is to usher in “Social Transformation through Dynamic Education.”

**2. VISION STATEMENT OF BCA PROGRAMME:**

To create high caliber solution architects and innovators for software development.

**3. MISSION STATEMENT OF BCA PROGRAMME:**

To teach 'things, not just words', 'how to think', and 'how to self-learn'.

**4. OBJECTIVES OF BCA PROGRAMME:**

The main objectives of BCA Programme are to prepare the youth to take up positions as system analysts, system engineers, software engineers and programmers. Accordingly the course curriculum aims at developing 'systems thinking' 'abstract thinking', 'skills to analyze and synthesize', and 'skills to apply knowledge', through 'extensive problem solving sessions', 'hands on practice under various hardware/software environments' and 'three projects'. In addition, 'social interaction skills', 'communication skills', 'life skills', 'entrepreneurial skills', and 'research skills' which are necessary for career growth and for leading quality life are also imparted.

**5. LEARNING OUTCOMES FROM THE BCA PROGRAMME:**

At the end of the course the student should be able to:

- (a) Analyze problems and design effective and efficient software solutions.
- (b) Develop software under latest Application Development Environments.
- (c) Learn new technologies with ease and be productive at all times.

(d) Read, write, and contribute to technical literature.

(e) Work in teams.

(f) Be a good citizen in all respects.

**6. ELIGIBILITY FOR ADMISSION TO THIS PROGRAMME:**

Admission to the course is open to any candidate who has passed (10+2) or equivalent examination of any recognized board.

Subject to the above condition, the final admission is based solely on the merit at the All India entrance test (BU-MAT) conducted by Bharati Vidyapeeth (Deemed to be University, Pune).

**7 DURATION OF THE PROGRAMME:**

The duration of this course is three years divided in to six semesters or a minimum of 150 credits whichever is later. The medium of instruction and examination will be only English.

**8 SCHEME OF EXAMINATION:**

For some courses there is Internal Assessment (IA) conducted by the respective institutes as well as a University Examination (UE) at the End-of-the Term. UE will be conducted out of 60 marks and IA will be conducted for 40 marks then these are converted to grade points and grades as per the Table I. For courses having only Continuous Assessment (CA) the respective institutes will evaluate the students in varieties of ways, three or four times, during the term for a total of 100 marks. Then the marks will be converted to grade points and grades using the Table I.

**9 STANDARD OF PASSING:**

For all courses, both UE and IA constitute separate heads of passing (HoP). In order to pass in such courses and to earn the assigned credits, the learner must obtain a minimum grade point of 5.0 (40% marks) at UE and also a minimum grade point of 5.0 (40% marks) at IA. A student who fails at UE in a course has to reappear only at UE as backlog candidate and clear the Head of Passing. Similarly, a student who fails in a course at IA has to reappear only at IA as backlog candidate and clear the Head of Passing to secure the GPA required for passing.

The 10 point Grades and Grade Points according to the following table:

<b>Range of Marks (%)</b>	<b>Grade</b>	<b>Grade Point</b>
$80 \leq \text{Marks} \leq 100$	O	10
$70 \leq \text{Marks} < 80$	A+	9
$60 \leq \text{Marks} < 70$	A	8
$55 \leq \text{Marks} < 60$	B+	7
$50 \leq \text{Marks} < 55$	B	6
$40 \leq \text{Marks} < 50$	C	5
Marks < 40	D	0

**Table 1**

The performance at UE and IA will be combined to obtain GPA (Grade Point Average) for the course. The weights for performance at UE and IA shall be 60% and 40% respectively. GPA is calculated by adding the UE marks out of 60 and IA marks out of 40. The total marks out of 100 are converted to grade point, which will be the GPA.

**10 Formula to calculate Grade Points (GP)**

Suppose that “Max” is the maximum marks assigned for an examination or evaluation, based on which GP will be computed. In order to determine the GP, Set  $x = \text{Max}/10$  (since we have adopted 10 point system). Then GP is calculated by the following formulas

<b>Range of Marks</b>	<b>Formula for the Grade Point</b>
$8x \leq \text{Marks} \leq 10x$	10
$5.5x \leq \text{Marks} < 8x$	Truncate (M/x) +2
$4x \leq \text{Marks} < 5.5x$	Truncate (M/x) +1

**Table 2**

Two kinds of performance indicators, namely the Semester Grade Point Average (SGPA) and the Cumulative Grade Point Average (CGPA) shall be computed at the end of each term. The SGPA measures the cumulative performance of a learner in all the courses in a particular semester, while the CGPA measures the cumulative performance in all the courses since his/her enrollment. The CGPA of learner when he /she completes the programme is the final result of the learner.

The SGPA is calculated by the formula

$$SGPA = \frac{\sum C_k * GP_k}{\sum C_k}$$

where, C<sub>k</sub> is the Credit value assigned to a course and GP<sub>k</sub> is the GPA obtained by the learner in the course. In the above, the sum is taken over all the courses that the learner has undertaken for the study during the Semester, including those in which he/she might have failed or those for which he/she remained absent. **The SGPA shall be calculated up to two decimal place accuracy.**

The CGPA is calculated by the following formula

$$CGPA = \frac{\sum C_k * GP_k}{\sum C_k}$$

where, C<sub>k</sub> is the Credit value assigned to a course and GP<sub>k</sub> is the GPA obtained by the learner in the course. In the above, the sum is taken over all the courses that the learner has undertaken for the study from the time of his/her enrollment and also during the semester for which CGPA is calculated. **The CGPA shall be calculated up to two decimal place accuracy.**

**The formula to compute equivalent percentage marks for specified CGPA:**

% marks (CGPA)	(10 * CGPA) - 10	If 5.00 ≤ CGPA < 6.00
	(5 * CGPA) + 20	If 6.00 ≤ CGPA < 8.00
	(10 * CGPA) - 20	If 8.00 ≤ CGPA < 9.00
	(20 * CGPA) - 110	If 9.00 ≤ CGPA < 9.50
	(40 * CGPA) - 300	If 9.50 ≤ CGPA ≤ 10.00

**Table 3**

### 11 Award of Honours:

A student who has completed the minimum credits specified for the programme shall be declared to have passed in the programme. The final result will be in terms of letter grade only and is based on the CGPA of all courses studied and passed. The criteria for the award of honours are given below.

Range of CGPA	Final Grade	Performance Descriptor	Equivalent Range of Marks (%)
$9.5 \leq \text{CGPA} \leq 10$	O	Outstanding	$80 \leq \text{Marks} \leq 100$
$9.0 \leq \text{CGPA} \leq 9.49$	A+	Excellent	$70 \leq \text{Marks} < 80$
$8.0 \leq \text{CGPA} \leq 8.99$	A	Very Good	$60 \leq \text{Marks} < 70$
$7.0 \leq \text{CGPA} \leq 7.99$	B+	Good	$55 \leq \text{Marks} < 60$
$6.0 \leq \text{CGPA} \leq 6.99$	B	Average	$50 \leq \text{Marks} < 55$
$5.0 \leq \text{CGPA} \leq 5.99$	C	Satisfactory	$40 \leq \text{Marks} < 50$
CGPA below 5.0	F	Fail	Marks below 40

**Table 4**

### **RULES OF ATKT:**

- 1.A student is allowed to carry backlog of any number of subjects upto Semester IV.
- 2.A student must pass Part I (Semester I and II) to appear for Semester V.

## SEMESTER-WISE COURSE STRUCTURE FOR BCA

(To be effective from July 2018)

### SEMESTER I

Course Number	Course Title	Credits	Hours / Week			IA Marks	EoTE Marks
			L	T	P		
101	Fundamentals of Information Technology	4	3	1	-	40	60
102	Algorithm and program Design	4	3	1	-	40	60
103	C Programming – I	4	3	1	-	40	60
104	Business organization system	4	3	1	-	40	60
105	Business Mathematics	4	3	1	-	40	60
106	Lab on MS-Office Suite	2	-	-	4	40	60
107	Lab on C Programming – I	2	-	-	4	40	60
108	<b>General course-I:</b> Community Work I / Career & Life Skills / Waste Management	1	2	-	-	50	0
<b>Total</b>		<b>25</b>	<b>17</b>	<b>5</b>	<b>8</b>	<b>330</b>	<b>420</b>

### SEMESTER II

Course Number	Course Title	Credits	Hours / Week			IA Marks	EoTE Marks
			L	T	P		
201	Computer Organization and Architecture	4	3	1	-	40	60
202	DBMS I	4	3	1	-	40	60
203	C Programming - II	4	3	1	-	40	60
204	Financial Accounting	4	3	1	-	40	60
205	Principles of Management	4	3	1	-	40	60
206	Lab on C Programming - II	2	-	-	4	40	60
207	Environmental Studies	2	2	-	-	40	60
208	<b>General Course II :</b> Community Work II (Swacchh Bharat Abhiyan) / Sectoral Analysis / Smart Cities	1	2	-	-	50	0
<b>Total</b>		<b>25</b>	<b>19</b>	<b>5</b>	<b>4</b>	<b>330</b>	<b>420</b>

### SEMESTER III

Course Number	Course Title	Credits	Hours / Week			IA Marks	EoTE Marks
			L	T	P		
301	Operating Systems	4	3	1		40	60
302	Software Engineering	4	3	1		40	60
303	DBMS II	4	3	1		40	60
304	Statistics	4	3	1		40	60
305	Multimedia Technology	4	3	1		40	60
306	Lab on Oracle and Multimedia	2	-	-	4	40	60
307	Lab on Linux Operating System	2	-	-	4	40	60
308	<b>General Course III :</b> Community Work III / Start up management / Agro Tourism	1	2	-	-	50	0
<b>Total</b>		<b>25</b>	<b>17</b>	<b>5</b>	<b>8</b>	<b>330</b>	<b>420</b>

### SEMESTER IV

Course Number	Course Title	Credits	Hours / Week			IA Marks	EoTE Marks
			L	T	P		
401	Computer Networks	4	3	1	-	40	60
402	Software Testing	4	3	1	-	40	60
403	Java Programming	4	3	1	-	40	60
404	Operations Research	4	3	1	-	40	60
405	Entrepreneurship Development	4	3	1	-	40	60
406	Lab on Java	2	-	-	4	40	60
407	Minor Project - I	2	2	-	-	0	100
408	<b>General Course IV:</b> Community work IV / Basics of Taxation / Meditation & Yoga	1	2	-	-	50	0
<b>Total</b>		<b>25</b>	<b>19</b>	<b>5</b>	<b>4</b>	<b>290</b>	<b>460</b>

### SEMESTER V

Course Number	Course Title	Credits	Hours / Week			IA Marks	EoTE Marks
			L	T	P		
501	Introduction to the Internet Technologies	4	3	1	-	40	60
502	Object Oriented Analysis and Design	4	3	1	-	40	60
503	C# Programming	4	3	1	-	40	60
504	Graph Theory	4	3	1	-	40	60
505	E-commerce	4	3	1	-	40	60
506	Lab on Internet Technology and C# Programming	2	-	-	4	40	60
507	Minor Project II	2	2	-	-	0	100
508	<b>General Course V:</b> Social Media Management / Road Safety and Management / Event Management	1	2	-	-	50	0
<b>Total</b>		<b>25</b>	<b>19</b>	<b>5</b>	<b>4</b>	<b>290</b>	<b>460</b>

### SEMESTER VI

Course Number	Course Title	Credits	Hours / Week			IA Marks	EoTE Marks
			L	T	P		
601	Information Security	4	3	1		40	60
602	Data warehousing and Data Mining	4	3	1		40	60
603	Web Programming	4	3	1		40	60
604	Software project Management	4	3	1		40	60
605	Business Analytics	4	3	1		40	60
606	Lab on Web programming	2	-	-	4	40	60
607	Major Project	2	2	-	-	0	100
608	<b>General Course VI:</b> Business Ethics / Basics of Hospitality Management / Aptitude	1	2	-	-	50	0
<b>Total</b>		<b>25</b>	<b>19</b>	<b>5</b>	<b>4</b>	<b>290</b>	<b>460</b>

**Practical Examinations:**

For course Nos. 106,107,206,306,307,406,506,606 there will be practical examination.

**Project Viva:**

For course Nos. 407,507,607 there will be University Project Dissertation Viva carrying 100 marks.

# SEMESTER I

## Semester I

Course Number	Course Name	L-T-P- Credits	Year of Introduction
<b>101</b>	<b>Fundamentals of Information Technology</b>	<b>3-1-0 = 4C</b>	<b>2018-19</b>

### Course Objective:

The main objective is to introduce IT in a simple language to all undergraduate students, regardless of their specialization. It will help them to pursue specialized programs leading to technical and professional careers and certifications in the IT industry. The focus of the subject is on introducing skills relating to IT basics, computer applications, programming, interactive medias, Internet basics

### Expected Outcome :

At the end of this course, student should be able to

- (a) Understand basic concepts and terminology of information technology.
- (b) Have a basic understanding of personal computers and their operations.
- (c) Be able to identify issues related to information security.

### References (Books, Websites etc) :

How to solve computer – Dromey  
Computer Fundamentals by P. K. Sinha,

### Suggested MOOC :

Please refer these websites for MOOCS:

NPTEL / Swayam  
www. edx.com  
www.coursera.com

## Course Plan

Unit	Contents
1	<b>Introduction to Computers:</b> Definition, .Basics of Computer, Characteristics of computers, Evolution of Computer, Block Diagram Of a computer, Generations of Computer, Classification Of Computers, Applications of Computer, Capabilities and limitations of computer.
2	<b>Computer Arithmetic:</b> Binary, Binary Arithmetic, Number System: Positional & Non Positional, Binary, Octal, Decimal, Hexadecimal, Converting from one number system to another , 1's Complements, 2's Complements, Computer Codes, Rules and laws of Boolean algebra, Basic Gates (NOT, AND & OR)
3	<b>Input Output Devices:</b> Role of I/O devices in a computer system. Input Units: Keyboard, Terminals and its

	types. Pointing Devices, Scanners and its types, Voice Recognition Systems, Vision Input System, Touch Screen, Output Units: Monitors and its types. Printers: Impact Printers and its types. Non Impact Printers and its types, Plotters, types of plotters, Sound cards, Speakers.
4	<b>Storage Fundamentals:</b> Primary Vs Secondary Storage, Data storage & retrieval methods. Primary Storage: RAM ROM, PROM, EPROM, EEPROM. Secondary Storage: Magnetic Disks. Flash Drives, DVD, Blue-Ray disc.
5	<b>Software:</b> Software and its needs, Types of S/W. System Software: Operating System, Utility Programs Programming Language: Machine Language, Assembly Language, High Level Language their advantages & disadvantages. Application S/W and its types: Word Processing, Spread Sheets Presentation, Graphics, DBMS s/w, Algorithms and Flow Charts.
6	<b>Data Communication:</b> Communication Process, Data Transmission speed, Communication Types (modes), Data Transmission Medias, Modem and its working, characteristics, Types of Networks, LAN Topologies, Computer Protocols, Concepts relating to networking. Internet – Web Browsers, Web servers, Internet Protocol, Hyper text Transfer Protocol, Business Data Processing: Introduction, data storage hierarchy, Method of organizing data, File Types, File Organization, File Utilities.

Course Number	Course Name	L-T-P- Credits	Year of Introduction
<b>105</b>	<b>Algorithm and Program Design</b>	<b>3+1+0= 4C</b>	<b>2018-19</b>

**Course Objective:**

To understand good principles of algorithm design, elementary analysis of algorithms, and fundamental data structures. The emphasis is on choosing appropriate data structures and designing correct and efficient algorithms to operate on these data structures.

Syllabus Broad Units : 6

**Expected Outcome:**

This is a first course in data structures and algorithm design. Students will:

- learn good principles of algorithm design;
- learn how to analyze algorithms and estimate their worst-case and average-case behaviour (in easy cases);
- become familiar with fundamental data structures and with the manner in which these data structures can best be implemented; become accustomed to the description of algorithms in both functional and procedural styles;

**References (Books, Websites etc) :**

1. Dromey R. G. : How to Solve it by a Computer.
2. Sartaj Sahni: Data Structure, Algorithms and Applications in C++ (Ch II).

**Suggested MOOC :**

Please refer these MOOCS websites for suitable MOOCS

[www.edx.com](http://www.edx.com)

[www.coursera.com](http://www.coursera.com)

[www.alison.com](http://www.alison.com)

**Course Plan**

Unit	Contents
1	<b>Introduction:</b> Concept, of Problem, Procedure and Algorithm, Algorithm Representation through Pseudo - Code and Flow - Charts, Tracing of Algorithms Such as Swapping, Counting, Finding the Sum, Product, maximum, minimum, of a list of numbers.
2	<b>Concept of Structured Programming and Procedure Oriented Programming:</b> Introduction, Concept, Basic Control Structure, Benefits of Structured Programming and Procedure Oriented Programming
3	<b>Design of Algorithm:</b> Problem Analysis and Design of Algorithms for problems such as (1) Swapping (2) Counting (3) Finding the Sum, Product, maximum, minimum of a finite list of numbers, and (4) Simple variations of the above problem realization that, there may be alternative algorithm and that

	one algorithm may be better (in some sense) than the other.
4	<b>Problem Analysis and Design 1:</b> Design of algorithm for problem such as generating prime numbers, Evaluation of polynomial, Sum of first n factorials, Finding nth term of Fibonacci sequence.
5	<b>Problem Analysis and Design2:</b> Design of algorithm for problem such as Finding largest and second largest of list ,Determining nth root of a number, compute GCD and Base Conversion
6	<b>Concept of Array, Sort and Search Technique:</b> Introduction of Array, Array manipulation such as removing the duplicates, Partitioning of an array, listing of prime numbers, finding prime factor of a number, The problem of search and Merge, Linear, Binary search algorithms, The Problem of Sorting, Selection, Insertion and Bubble

Course Number	Course Name	L-T-P- Credits	Year of Introduction
<b>103</b>	<b>C Programming - I</b>	<b>3-1-0 = 4C</b>	<b>2018-19</b>

**Course Objective:**

This is a first course in programming. The objective of this paper is to teach the Programming Language C. However, the process of learning a computer language will also be emphasized. Emphasis is also on semantics and problem solving.

**Expected Outcome:**

At the end of the course a student should be able:

- To solve a given problem using programming/algorithm
- Understand and use C libraries,
- Trace the given C program manually
- Effectively use of Arrays and functions
- Write C program for simple applications of real life using structures and Unions.

**References (Books, Websites etc) :**

1. Let us C - Y.Kanetkar, BPB Publications
4. Yashawant Kanetkar, let Us C, BPB Publication
2. Programming in C - Gottfried B.S., TMH
3. The 'C' programming language - B.W.Kernighan, D.M.Ritchie, PHI
4. Programming in ANSI C - Balaguruswami, TMH
5. C- The Complete Reference - H.Sohildt, TMH
6. A Structured Programming Approach using C – B.A. Forouzan & R.F. Gillberg, THOMSON Indian Edition
7. Computer fundamentals and programming in C – Pradip Dey & Manas Ghosh, OXFORD

**Suggested MOOC :**

Please refer these websites for MOOCS:

- NPTEL / Swayam  
[www. edx.com](http://www.edx.com)  
[www.coursera.com](http://www.coursera.com)

**Course Plan**

Unit	Contents
1	<b>Introduction to C language</b> Origins of C, Character Set of C, C Tokens, Keywords and Identifiers, Constants, Variables, Data types, Declaration of variables, Declaration of variables as constant, Operators, Types of operators, Precedence and associativity, Expression, Type conversions in expressions, Input and Output functions - printf(), scanf(), getchar(), putchar(), Formatted input and formatted output.
2	<b>Decision Control and looping</b> Introduction, Control Statements- Sequential, Selection, Iteration Statements, Branching

	structure- if statement, if-else statement, Nested if-else statement, else if Ladder, Conditional operator, switch statement, Loop control structures- while loop, do-while loop, for loop, Nested for loop, Jump statements-break, continue, goto
3	<b>Functions</b> Introduction, Purpose of function, Function declaration/ Function prototype, Function definition, Function call, return statement, Function parameters, Types of functions, Call by value , Storage classes, Recursion, Examples on recursive function
4	<b>Arrays and Strings</b> Introduction to one-dimensional Array, Definition, Declaration, Initialization, Accessing and displaying array elements, Arrays and functions, Introduction to two-dimensional Array, Definition, Declaration, Initialization, Accessing and displaying array elements, Introductions to Strings, Definition, Declaration, Initialization, Input, output statements for strings, Standard library functions, Implementations with standard library functions
5	<b>Structures and union</b> Introduction to structure, Defining a structure, Declaring structure variables, Accessing structure members, nested structure, Array of structure, Array within structure, Introduction to union, Definition, Declaration, Differentiate between structure and union
6	<b>Pointers</b> Introduction to pointer, Definition, Declaring and Initializing pointer variable, Indirection operator and address of operator, Accessing variable through its pointer, Pointer arithmetic, Dynamic memory allocation, Pointers & Functions, Pointers & Array, Pointers & Structures

Course Number	Course Name	L-T-P- Credits	Year of Introduction
<b>104</b>	<b>Business Organization System</b>	<b>3-1-0 = 4C</b>	<b>2018-19</b>

**Course Objective:**

To acquaint students with fundamentals of Business Organization and management systems as a body of knowledge.

**Expected Outcome :**

1. Students shall know about business and structure
2. Students shall know about various forms of business
3. Students will have sound knowledge about overall business environment.

References (Books, Websites etc) :

**Reference Books:**

S.A. Sherlekar ,Modern Business Organization and Management – (Himalaya Publishing House)  
Y.K. Bhushan ,Fundamental of Business Organization & Management – (S Chand Publishers)  
Basu, C. R.; *Business Organization and Management*, Tata McGraw Hill, Publishing House, New Delhi, 1998  
B S Moshal, J P Mahajan, J S Gujral, Business Organization and Management –. Galgotia Publishing Co, New Delhi  
Redmond James, Robert Trager , Media Organization and Management –, Biztantra, New Delhi

**Suggested MOOC :**

Please refer these websites for MOOCS:

NPTEL / Swayam  
www. edx.com  
www.coursera.com

Laboratory Experiments:

1	<b>Nature of Business</b> Concept of Business – Meaning, Definition, Nature and Scope, Characteristics of Business. Business as an Economic Activity. Objectives of Business. Structure of Business (Classification of Business Activities. Requisites for Success in Modern Business.
2	<b>Evolution of Business</b> Beginning and development of Commerce, Evolution of Industry, Industrial Revolution, Beginning and growth of Indian Business, Industrialization in India.
3	<b>Forms of Business Ownership</b> Introduction to various forms – Factors affecting choices of an deal form of ownership, features Merits and Demerits of Sole Proprietorship – Joint Hindu Family Business – Partnership – Joint Stock Company – Co-operative Organisation, Public

	Enterprises.
4	<p><b>Formation of a Company</b></p> <p>Stages in formation and incorporation of a company (e Promotion – incorporation and registration – Capital Subscription – Commencement of Business. - Documents of a Company i.e. Memorandum of Association – Articles of Association – Prospectus.</p>
5	<p><b>Establishment of Business Enterprise</b></p> <p>Various factors to be considered while starting a new Business enterprise i.e. identification of Business Opportunity – Market Assessment – Suppliers – Technology – Location – Human Resource – Finance etc. Small and Medium Enterprises – Meaning Characteristics and objectives. Role of Support Organisation such as Trade Associations and Chambers of Commerce.</p>
6	<p><b>Organization of Trade</b></p> <p>Channels of Distribution – Meaning, Functions and types. Internal Trade – Wholesale and Retail</p> <p>External Trade – Import and Export. Role and importance of support services to Business such as Transport Insurance etc. Business Combinations – Mergers and Acquisitions. Franchising. Business Process Outsourcing. Multinationals – Concept and role of MNCs</p>

Course Number	Course Name	L-T-P- Credits	Year of Introduction
<b>105</b>	<b>Business Mathematics</b>	<b>3-1-0 =4C</b>	<b>2018-19</b>

**Course Objective:**

To give general idea about mathematics and its application in Business

**Expected Outcome:**

The students will be able to solve small business problems by using the concepts of Business Mathematics

**References (Books, Websites etc) :**

Discrete Mathematics & its Applications by Kenneth Rosen

**Suggested MOOC :**

Please refer these websites for MOOCS:

NPTEL / Swayam

www.edx.com

www.coursera.com

**Course Plan**

Unit	Contents
1	<b>Set Theory :</b> Definition of a set, Representation of elements of sets, Methods of representing sets , types of sets, operations on sets , cardinality of a set, Principle of Inclusion and Exclusion , Venn Diagram , Proof by using Venn diagram
2	<b>Functions and Relations :</b> Definition of Function, Types of Functions ,Composite Function, Relation definition, representation of relations
3	<b>Logic:</b> Propositions, Logic Operations-Negation, Disjunction, Conjunction, Conditional and Biconditional, Truth Tables of compound propositions, Translating English sentences in to logical statements and vice versa, Logic gates and circuits
4	<b>Matrices:</b> Matrix Definition, General Form, Representation of matrix in computers, Types of matrices, Operations on matrices: Addition, Subtraction and Multiplication, transpose , row / column transformations , Inverse of the matrix by Co-factor and Adjoint method, solutions to three variable problems by using matrices, application problems of matrices
5	<b>Permutations and Combinations:</b> Concept- Permutation, Combination, Sum and Product rules, problems on Permutation and combination (with wording atleast, atmost, neither nor, any one etc.)
6	<b>Probability:</b> Concept and problem solving, general probability, conditional probability, partitions, Bayes Theorm

Course Number	Course Name	L-T-P- Credits	Year of Introduction
<b>106</b>	<b>Lab on MS-Office Suite</b>	<b>0-0-4 =2C</b>	<b>2018-19</b>

**Course Objective:**

The objective of this course is to help the student gain proficiency in text editing and formatting, spreadsheet and database management, and presentation preparation. An additional objective of the course is for the student to gain basic knowledge of modern-day computing technology.

**Expected Outcome :**

Upon completion of this course students will be able to:

- Demonstrate an advanced knowledge of the Word Processing package, MS Office and a knowledge of how to design & create effective and structured documents like technical reports, letters, brochures, etc.,
- Demonstrate the skills in the appropriate use of various features of the spread sheet package MS Excel and also to create useful spreadsheet applications like tabulated statements, balance sheets, statistical charts, business statements, etc.
- Demonstrate the skills in making an effective presentation with audio and video effects using the MS Excel package
- Draw graphical pictures, flow charts, block diagrams etc., using the drawing tools available in MS Word or MS Power Point and incorporate them into documents and presentations.

**Suggested MOOC :**

Please refer these websites for MOOCS:

NPTEL / Swayam

[www.edx.com](http://www.edx.com)

[www.coursera.com](http://www.coursera.com)

**Course Plan**

Unit	<b>Information Technology Essentials, Windows and Internet Explorer:</b>
1	Verify the components of a typical computer system, Explore, maintain files, and customize the Windows operating system, Review using the Internet Explorer.
2	<p><b>MS Word:</b></p> <p>Introduction: Introduction to MS Word, Menus, Shortcuts, Document types</p> <p>Working with Documents:</p> <ol style="list-style-type: none"> <li>a) Opening Files – New &amp; Existing, Saving Files</li> <li>b) Formatting page and Setting Margins</li> <li>c) Converting files to different formats : Importing, Exporting , Sending files to others</li> <li>d) Editing text documents : Inserting , Deleting ,Cut, Copy, paste , Undo, Redo , Find, Search, Replace</li> </ol>

	<p>e) Using Toolbars, Ruler, Icons and help</p> <p>Formatting Documents:</p> <p>a) Setting Font Styles: Font selection – style, size, color etc., Type face – Bold Italic, underline, Case settings, Highlighting, Special symbols</p> <p>b) Setting Paragraph style: Alignments, Indents, Line space, Margins and Bullets and Numbering</p> <p>c) Setting Page Style: Formatting, Border &amp; Shading, Columns, Header &amp; footer, Setting Footnotes, Inserting manual Page break, Column break and line break, Creating sections and frames, Inserting Clip arts, inserting pictures and other files, Anchoring &amp; Wrapping</p> <p>d) Setting Document Styles: Table of Contents, Index, Page Numbering, data &amp; Time, Author etc., Creating Master Documents</p> <p>Creating Tables: Table settings, Borders, Alignments, Insertion, deletion, Merging, Splitting, Sorting, Formula</p> <p>Drawing: Inserting Pictures/Files etc., Drawing Pictures, Formatting &amp; Editing pictures, Grouping and ordering, Rotating</p> <p>Tools: Word Completion, Spell Checks, Macros, Mail merge, Templates, Using Wizards, Tracking, Changes, Security</p>
3	<p><b>MS Power Point:</b></p> <p>Introduction: Opening new Presentation, Different presentation templates, Setting backgrounds, Selecting presentation layouts</p> <p>Creating a presentation: Setting presentation style, Adding Text to the presentation</p> <p>Formatting a presentation: Adding style, Color, gradient fills, Arranging objects, Adding Header &amp; Footer, Slide background, Slide layout</p> <p>Adding Graphics to the presentation: Inserting pictures, movies, tables, etc into the presentation, Drawing Pictures using Draw</p> <p>Adding effects to the presentation: Setting Animation &amp; transition effect, Adding audio and video</p> <p>Printing Handouts and Generating standalone presentation viewer</p>

4	<p><b>MS Excel:</b></p> <p>Introduction:  Spreadsheet &amp; its Applications , Opening spreadsheet, Menus &amp; Toolbars &amp; icons, Shortcuts , Using help</p> <p>Working with Spreadsheets:  Opening a File, Saving Files, Setting Margins, Converting files to different formats : Importing, Exporting and Sending files to others</p> <p>Spreadsheet addressing :  Rows, Columns &amp; Cells, Referring cells and Selecting cells</p> <p>Entering and Editing Data:  Entering Data, Cut, Copy, paste, Undo, Redo, Find, Search &amp; Replace, Filling continuous rows, columns, Inserting -Data, cells, column, rows &amp; sheets, Manual breaks</p> <p>Computing data :  Setting Formula, Finding total in a column or row, Mathematical Operations(Addition, Subtraction, Multiplication, Division, Exponentiation), Using other Formula</p> <p>Formatting Spreadsheets:  Formatting – Cell, row, column &amp; Sheet:  Alignment, Font, Border &amp; shading, highlighting values Hiding/Locking Cells</p> <p>Worksheet :  Sheet Name , Row &amp; Column Headers, Row Height, Column Width, Visibility – Row, Column, Sheet , worksheet Security</p> <p>Formatting – worksheet:  Sheet Formatting &amp; style - background, color, Borders &amp; shading, Anchoring objects, Formatting layout for Graphics, Clipart etc.,</p> <p>Working with sheets :  Sorting, Filtering, Validation, Consolidation, Subtotal , Creating Charts, Selecting charts, Formatting charts, label, scaling etc.,</p> <p>Using Tools:  Error Checking, Spell Checks, Macros, Formula Auditing, Creating &amp; using Templates, Tracking changes, customization, printing worksheet</p>
5	<p><b>Working with Excel Functions:</b></p> <p>Concept of Functions, Commonly used functions: Sum, Max,Min, Average, Count, Today, Now, Datedif, Countif, CountA, CountBlank, Round, RoundUp, RoundDown, ABS, Sign, Ceiling, Floor, Trim, Value, Clean, sqrt, if, sumif</p>
6	<p><b>MS Access:</b></p> <p>What is an Access Database, Opening a Database File, Create Table, Create and modify fields of tables, Construct simple queries, Saving and Running Queries</p>

Course Number	Course Name	L-T-P- Credits	Year of Introduction
107	<b>Lab on C Programming I</b>	<b>0-0-4=2C</b>	<b>2018</b>

**Course Objective :**

This is companion course of C Programming I

**Syllabus Broad Units:**

This Companion course of C programming; Practical aspects of C programming towards problem solving is covered.

**Expected Outcome :**

The students will develop adequate programming skills with respect to following

1. Implement a real world problem using basic constructs of C language.
2. Develop an application using Decision making and looping
3. Make use of proper operators to solve problem.
4. Make use of Arrays and pointers efficiently and handling strings.
5. Comprehend the dynamic memory allocation and pointers in C.
6. Able to define new data types using enum, structures and typedef.

**References (Books, Websites etc) :**

1. Let us C - Y.Kanetkar, BPB Publications
2. Programming in C - Gottfried B.S., TMH
3. The 'C' programming language - B.W.Kernighan, D.M.Ritchie, PHI
4. Programming in ANSI C - Balaguruswami, TMH
5. C- The Complete Reference - H.Sohildt, TMH
6. A Structured Programming Approach using C – B.A. Forouzan & R.F. Gillberg, THOMSON Indian Edition
7. Computer fundamentals and programming in C – Pradip Dey & Manas Ghosh, OXFORD

**Outline of Lab on C programming – I**

Sr. No	Programming Exercises
1	Compilation and Executing programs Arithmetic operations Use of Symbolic constants Demonstrating the following gcc options -o, -c, -D, -l, -I, -g, -E Programs to demonstrate use of operators and Input/ output <i>gcc or an equivalent compiler is assumed.</i>
2	Program to demonstrate the following – Branching

	<ul style="list-style-type: none"> <li>- Nested Branching</li> <li>- Looping</li> <li>- Selection</li> </ul>
<b>3</b>	<p>Working with functions</p> <ul style="list-style-type: none"> <li>- Writing function prototype and definition</li> <li>- Using functions to solve problems (Calling a function )</li> <li>- Using recursion</li> <li>- Storage classes - Using register, extern and static</li> </ul>
<b>4</b>	<p>Arrays and Strings</p> <p>1D - Linear Search, Sort</p> <p>2D - Matrix operations</p> <p>Strings: program to do operations on string using library and user defined functions</p> <p>Finding length of string, String concatenation, removing extra spaces, get substring, check whether second string is part of another, converting string to lowercase, uppercase etc.</p>
<b>5</b>	<p>Structures</p> <p>Making use of structures to define new types(user defined types)</p> <p>Arrays of structure, display all elements of array and sorting of them.</p>
<b>6</b>	<p>Pointers,</p> <p>Programs to demonstrate working of pointer; need of pointer</p> <p>Pointer as parameter to function</p> <p>Comparison of pointer with arrays and using pointer to refer an array</p> <p>Creating pointer dynamically by using dynamic memory allocation</p> <p>Array of Pointers, Ragged Arrays, Function pointer</p>

Course Number	Course Name	Credits	Year of Introduction
<b>108</b>	<b>Community Work I</b>	<b>1</b>	<b>2018-19</b>

**Course Objective:**

This course aims to expose the students to social issues and help them Participate in community service through trips/events organized at institute, state level etc and also to Volunteer at events like fundraising activities, fairs, festivals, slums, non profit organization etc

- (I) To expose the students towards social reality and role of community development for social upliftment and well being
- (II) To involve students in community work through active involvement and participation

**Expected Outcome:**

Students will be able to know the community needs and understand their role to contribute meaningfully towards community development

**Course Plan**

Unit	Contents
1	History, meaning, Goals, values, functions, role and process of community work. Professional and voluntary community work. Attitudes, roles and skills of a community worker .
2	Social concerns in India: poverty, unemployment, population, problems faced by women – dowry, domestic violence, etc. Social problems - terrorism, corruption, caste conflict, drug abuse, AIDS, ETC.
3	Types of community work. Caring for needy, helping the poor, fundraising drives-organizing.
	<p><b>COMMUNITY HOURS:</b></p> <p>Participate in community service trips/events organized at institute, state level etc , Volunteer at events like fundraising activities, fairs, festivals, slums, non profit organization etc , Submit a report on a particular type of community involvement undertaken.</p>

Course Number	Course Name	Credits	Year of Introduction
<b>108</b>	<b>Career &amp; Life Skills</b>	<b>1</b>	<b>2018-19</b>

**Course Objective:**

- a. To help students make well-informed, thoughtful decisions regarding your future as adults.
- b. To develop behaviours and attitudes that help students contribute to the community in a positive manner.
- c. Give you skills and knowledge to contribute to the well-being and respect of the self and others

**Expected Outcome:**

Students will be able to understand self potential and ways to enhance capabilities.

**References (Books, Websites etc) :**

*LifeChoices Series: - LifeChoices: Careers, Healthy & Well, Relationships, Venturing Out*

**Online Resources:**

1. the life-changing magic of tidying up: the japanese art of decluttering and organizing - marie kondo
2. how to organize (just about) everything: more than 500 step-by-step instructions for everything from organizing your closets to planning a wedding to creating a flawless filing system – peter walsh

Mindset: the new psychology of success -carol s. Dweck

**Course Plan**

Unit	Contents
1	<b>Unit 1: Introduction to Life Management</b> Life management-definition, scope and application, concept of emotions, self belief, setting realistic goals, understanding system
2	<b>Unit 2: Developing Emotional Potential and Physical Potential</b> Improving thinking skills, improving study skills, planning education Eating habits, healthy foods, staying healthy, changing habits-the self change model
3	<b>Developing Your Intellectual Potent</b> Effective communication, effective listening, effective speaking ,getting along with others, functioning in groups, how to delegate. Definition-stress, handling change and stress, managing time, managing money, formulation of career plan, bring it all together
4	<b>Career and Life Choices</b> Managing personal, lifelong career development. <b>Resource Choices...</b> Making responsible decisions in the use of finances and other

resources that reflect personal values and goals as well as a commitment to self and others.

**Personal Choices...** Understand the emotional/psychological, intellectual, social, spiritual, and physical dimensions of health and how these dimensions of health work together to contribute to personal well-being.

Course Number	Course Name	Credits	Year of Introduction
<b>108</b>	<b>Waste Management</b>	<b>1</b>	<b>2018-19</b>

**Course Objective:**

To expose students to the issue of waste and waste management tools and techniques applicable for waste disposal and management.

**Expected Outcome:**

After completion of the course students

- will be able to understand solid waste sources, health and environmental issues related to solid waste management.
- will get knowledge about Sources, handling and control of Biomedical, Chemical, Nuclear and e-wastes.

will be able to understand the issues regarding waste disposal and management and will become aware of Environment and health impacts due to solid waste mismanagement

**References (Books, Websites etc) :**

1. D. Bhide and B.B. Sundaresan, "Solid Waste Management – Collection, Processing and disposal" Mudrashilpa Offset Printers, Nagpur, 2001.
2. Biomedical waste (Management and Handling) Rules, 1998.
3. George Tchobanoglous, Hilary Theisen, Rolf Eliassen; Solid Wastes: Engineering Principles and Management Issues; McGraw-Hill.
4. Manual on Municipal Solid Waste Management, New Delhi, Controller of Publications.
5. Freeman H.M. (1988) Standard Handbook of Hazardous Waste Treatment and Disposal, New York, McGraw-Hill.
6. Constitutional Law of India – J.N. Pandey 1997 (31st Edn.) Central Law Agency Allahabad.
7. Diganta Bhusan Das , Diganta Bhusan Das; Solid Waste Management: Principles and Practice
8. George Tchobanoglous et al, "Integrated Solid Waste Management" McGraw - Hill, 1993.
9. A Study of Waste Management Systems in Pune Municipality Corporation, Rajendra Jagtap, Ph.D Thesis, Bharati Vidyapeeth University, Pune

**Online Resources:**

1. <http://www.moef.nic.in/legis/hsm/mswmhr.html>
2. [en.wikipedia.org/wiki/waste\\_management](http://en.wikipedia.org/wiki/waste_management)
3. <http://www.cyen.org/innovaeditor/assets/Solid%20waste%20management.pdf>
4. <http://www.ilo.org/oshenc/part-vii/environmental-pollution-control/item/514-solid-waste-management-and-recycling>
5. [www.houstontx.gov/solidwaste](http://www.houstontx.gov/solidwaste)
6. [www.epa.gov/tribalmsw/](http://www.epa.gov/tribalmsw/)
7. [www.unc.edu/courses/2009spring/.../SolidWasteIndiaReview2008.pdf](http://www.unc.edu/courses/2009spring/.../SolidWasteIndiaReview2008.pdf)
8. [http://www.digitalbookindex.org/\\_search/search010environmenwasterefusea.asp](http://www.digitalbookindex.org/_search/search010environmenwasterefusea.asp) (e-books)

**Course Plan**

Unit	Contents
1	<p><b>Solid Waste Management- Introduction to waste Management</b>  Introduction, Meaning, Solid waste including municipal, hospital and industrial solid waste; health and environmental issues related to solid waste management. Provisions in Indian Penal Code for Environmental protection.</p>
2	<p><b>Biomedical, Chemical, Nuclear and e-wastes</b>  Biomedical wastes – Types – Management and handling – control of biomedical wastes, Chemical wastes – Sources –Environmental effects – Need for control – Health and environmental effects. Nuclear waste – Management of nuclear wastes, e-waste- sources and management.</p>
3	<p><b>Waste reduction at source</b>  Treatment and disposal techniques for solid wastes–composting, vermin-composting, autoclaving, microwaving, incineration, non- incineration, Thermal techniques, use of refuse derived fuels, land-filling. <b>Reduce Reuse and Recycling Techniques:</b> Need for the concept-Various Types - Handmade Paper production –Reuse of materials-Recycle of material</p>

# SEMESTER II

## Semester II

Course Number	Course Name	L-T-P- Credits	Year of Introduction
<b>201</b>	<b>Computer Organization and Architecture</b>	<b>3-1-0= 4C</b>	<b>2018-19</b>

**Course Objective:**

Main objective of this paper is to learn structure and functioning of various hardware components of digital computer. Also study the interactions and communication among these hardware components.

**Expected Outcome :**

At the end of this course, student should be able to understand

- Simple machine architecture and the reduced instruction set computers.
- Memory control, direct memory access, interrupts, and memory organization
- Basic data flow through the CPU (interfacing, bus control logic, and internal communications).
- Number systems, instruction sets, addressing modes, and data/instruction formats.

**References (Books, Websites etc) :**

M Morris Mano Computer systems Architecture third edition Prentice Hall of India Publication

**Suggested MOOC :**

Please refer these websites for MOOCS:

NPTEL / Swayam

[www. edx.com](http://www.edx.com)

[www.coursera.com](http://www.coursera.com)

### Course Plan

Unit	Contents
1	<b>Introduction To Digital Computer:</b> Data Representation – Data Types – Complements – Arithmetic Operations – Representations – Fixed –Point, Floating – Point , Decimal Fixed – Point – Binary Codes- Logic Gates, Boolean Algebra, Map Simplification – Combinational Circuits: Half-Adder, Full Adder- Flip Flops - Sequential Circuits
2	<b>Introduction To Digital Components And Micro Operations:</b> ICs – Decoders – Multiplexers – Registers – Shift Registers – Binary Counters – Memory Unit – Register Transfer Language – Register Transfer – Bus And Memory Transfers – Arithmetic, Logic And Shift Micro Operations , Arithmetic Logic Shift Unit.
3	<b>Computerorganization:</b> Instruction Codes – Computer Registers – Computer Instructions – Timing And Control – Instruction Cycle – Memory Reference Instructions – I/O And Interrupt – Machine Language – Assembly Language – Assembler.

4	<b>Memory Organization:</b> Memory Hierarchy – Main Memory – Auxiliary Memory – Associative Memory – Cache Memory – Virtual Memory – Memory Management.
5	<b>Central Processing Unit:</b> General Register Organization – Control Word – Stack Organization – Instruction Format – Addressing Modes – Data Transfer And Manipulation – Program Control, RISC
6	<b>Input – Output Organization:</b> Peripheral Devices – Input-Output Interface – Asynchronous Data Transfer – Modes Of Transfer – Priority Interrupt – DMA – IOP – Serial Communication.

Course Number	Course Name	L-T-P- Credits	Year of Introduction
<b>202</b>	<b>DBMS I</b>	<b>3-1-0 = 4C</b>	<b>2018-19</b>

**Course Objective:**

This is a foundational course on Data Modeling. The course aims to impart knowledge of the concepts related to database and operations on databases. It also gives the idea how database is managed in various environments with emphasis on security measures as implemented in database management systems.

**Expected Outcome :**

At the end of the course, student should be able to

- A) Understand the concepts of database and techniques for its management.
- B) Different Data Models at Conceptual and Logical level.
- C) Differentiate between the role of DBA and Data Architect
- D) Understanding Data Security standards and Methods

**References (Books, Websites etc) :**

- 1) Database System Concepts By Henry korth and A. Silberschatz
- 2) Database Systems Concepts, Designs and Application by Shio Kumar Singh, Pearson
- 3) Database Management Systems by Debabrata Sahoo ,Tata Macgraw Hill

**Suggested MOOC :**

Please refer these websites for MOOCS:

NPTEL / Swayam

[www. edx.com](http://www.edx.com)

[www.coursera.com](http://www.coursera.com)

**Course Plan**

Unit	Contents
1	<b>Introduction of Database Management System:</b> Difference between Data, Information, Data Processing & Data Management. File Oriented Approach, Database oriented approach to Data Management, Need for DBMS, Characteristic of Database, Database Architecture: Levels of Abstraction, Database schema and instances, 3 tier architecture of DBMS, Data Independence. Database users, Types of Database System. Database Languages, DBMS interfaces.
2	<b>Data Modeling:</b> Data Models, Logical Data Modeling: Hierarchical Data Model, Network Data Model, Relational Data Model, Advantages and Disadvantages of Logical Data Modeling. Conceptual Data Modeling: Entity Relationship Model, Entities, Attributes, Types of Attributes, Relationships, Degree of relationship Set, Mapping Cardinalities, Keys, ER Diagram Notations, Roles Participation: Total and Partial, Strong and Weak Entity Set. Case studies on ERD.
3	<b>Normalization:</b> Keys: Composite, Candidate, Primary, Secondary, Foreign, Super key, CODD's Rules,

	Mapping conceptual model into Relational Model. Functional Dependencies, Decomposition, Lossy and Lossless Decomposition, Dependency Preserving Decomposition Advantages and Disadvantages of Normalization, Normal Forms (1NF, 2NF, 3NF,) Case Studies on Normalization.
4	<b>File Structures and Data Administration:</b> File Organization, Overview of Physical Storage Media, Magnetic Disk, RAID, Tertiary Storage, Storage Access, Data Dictionary Storage, Organization of File (Sequential, Clustering), Indexing and Hashing, Basic Concepts, indices, B+ Tree index file, B- tree index file, Static hashing, Dynamic Hashing, Data administration, Role and Responsibility of DBA
5	<b>Transaction and Concurrency Control</b> Multiprogramming and Multiprocessing, Basic Database access operations, Concept of transaction, transaction state, ACID properties, Schedules, Serializability of schedules., Concurrency Control, lock based protocols, timestamp based protocols, Multiple granularity, Multiple Version Techniques, Deadlock and its handling, Wait-Die and Wound-Wait, Deadlock prevention without using timestamps, Deadlock detection and time outs
6	<b>Database Recovery and security Management:</b> Database Recovery, Types of Failures, and Data access. Recovery and atomicity, Recovery Techniques Algorithms: Log Based Recovery, Check points, Shadow Paging, Recovery with concurrent transactions

Course Number	Course Name	L-T-P- Credits	Year of Introduction
203	C Programming - II	3-1-0= 4C	2018-19

**Course Objective:**

- To understand file handling in C.
- To develop skills to analyze the problem given and to design & develop an efficient solution to given problem
- To develop capability to choose appropriate data structures for given problems
- To imbibe programming skills & thereby making industry ready

**Expected Outcome:**

After undergoing this course, student will

1. Have thorough knowledge about data structures
2. Ability to design & develop program using linear data structures & non linear data structures for solving problems
3. Ability to choose appropriate data structures for problem solving
4. Ability to use combination of these data structures for problem solving.

**References (Books, Websites etc) :**

1. Behrouz A. Forouzan and Richard F. Gilberg , 2nd Edition, Thomson, 2003, Computer Science A Structured Programming Approach Using C
2. Basavraj S Anami, Shanmukhappa Angadi, Sunil Kumar S Manvi, PHI Publications, 2010. A Holistic approach to learning C.
3. Andrew Tenenbaum, Thomson, 2005, Data Structures with C. Robert Kruse & Bruce Leung, Data Structures & Program Design in C, Pearson Education,

**Suggested MOOC :**

Data structures and Algorithms, Prof. Sudarshan Iyengar, IITRopar, 8 weeks, Rerun Feb 05, 2018 [https://onlinecourses.nptel.ac.in/noc16\\_cs06](https://onlinecourses.nptel.ac.in/noc16_cs06) at NEPTEL

**Course Plan**

Unit	Contents
1	<p><b>Elementary Data Structures:</b></p> <p>Basic concepts such as data object, array, and record;</p> <p>Operations and relations on data objects; definition of data structure; Built-in data types asexamples of data structures; concept of abstract data type; notation to specify an abstract data type; concepts of pre-conditions and post-conditions; Implementation of an ADT in a language; Specification and implementation of simple data structures such as Integer, Rational, Currency, Date, Temperature, distance, Pay, Marks, Grade_card etc.</p>
2	<p><b>Linear Data Structures:</b></p> <p>( Representation in Memory and operations like insertion, deletion and traversal) – one and multidimensional array, Pointer arrays, single link list, circular link list, double link</p>

	list
3	<p><b>Particular Linear Data Structures:</b> Representation in Memory and operations like insertion, deletion and traversal) - Stacks: Applications: implementation of recursion, factorial calculation, queues, circular queue, deque;</p>
4	<p><b>File Handling:</b> Creation, reading writing in a file. Pattern Matching and Extraction of data from a file. Reading and writing from files.</p>
5	<p><b>Hierarchical data structures :</b> General trees and related concepts; depth first and breadth first traversal of trees; n-ary trees and important properties of n-ary trees; binary trees and their properties; binary tree traversal algorithms.</p>
6	<p><b>The problem of search and Sorting :</b> Linear and binary search and their efficiency; Hash tables, The standard sort algorithms (Bubble/insertion/selection) and their efficiencies; Merge sort and quick sort algorithms and their efficiencies.</p>

Course Number	Course Name	L-T-P- Credits	Year of Introduction
<b>204</b>	<b>Financial Accounting</b>	<b>3-1-0 = 4C</b>	<b>2018-19</b>

**Course Objective:**

1. To impart basic accounting knowledge
2. To lay a foundation for further study of accounting at higher level
3. To enable the students to understand basic accounting principles, practice and its applications in modern business activities.

**Expected Outcome :**

- The knowledge of accounting and its principles at basic level.
- Practical's in Tally and Excel for Financial Accounting assignments

**References (Books, Websites etc) :**

1. Dr. S. N. Maheshwari , Financial Accounting For Management: (Vikas Publishing House)
2. Robert Anthony, David Hawkins, Business Accounting. (Tata McGraw –Hill)
3. M.G.Patkar, Book-Keeping & Accountancy.Std XI( FYJC) Commerce
4. Anil Chowdhry , Fundamentals of Accounting & Financial Analysis (PearsonEducation)
5. M.E.Thukaram Rao, Accounting for Managers.( New Age International Publishers)

**Suggested MOOC :**

Please refer these websites for MOOCS:

NPTEL / Swayam

www. edx.com

www.coursera.com

**Course Plan**

Unit	Contents
1	<b>Introduction:</b> Need for Accounting, Meaning and definition of book keeping, System of Book keeping. Financial Accounting-definition, Scope and objectives. Accounting v/s Book Keeping. Limitations of Financial Accounting, End users of financial statement.
2	<b>Accounting Principles, Concepts and Conventions:</b> Accounting Principles-definition and importance, Accounting Concepts and Conventions, Branches of accounting.
3	<b>Journal and ledger:</b> Journal-importance and utility, classification of accounts, journalizing of transactions. Ledger- meaning and utility, posting and balancing of account
4	<b>Subsidiary Books And Trial Balance:</b> Cash book, purchase book, sales book.Trial Balance- meaning and purpose, preparation of a trial balance.
5	<b>Preparation of final accounts:</b> Preparation of Trading and Profit & Loss Account and Balance Sheet of sole proprietary business.

6

**Computerized Accounting:**

Computers and Financial application, Accounting Software packages.(Orientation level)

Course Number	Course Name	L-T-P- Credits	Year of Introduction
<b>205</b>	<b>Principles of Management</b>	<b>3-1-0 = 4C</b>	<b>2018-19</b>

**Course Objective:**

To understand the concepts in Management and to develop the skills related to practice of management.

**Expected Outcome:**

To understand the functions and processes of business management.

**References (Books, Websites etc) :**

1. Heinz Wehrich & Harold Koontz , Principles and Practice of Management
2. Tripathi & Reddy , Principles of Management
3. Dr. L.M.Prasad, Principles of Management
4. Richard Daft., Management. Thomson South Western Publishers, Australia

**Suggested MOOC :**

Please refer these websites for MOOCS:

NPTEL / Swayam

[www.edx.com](http://www.edx.com)

[www.coursera.com](http://www.coursera.com)

**Course Plan**

Unit	Contents
1	<b>Introduction to Management:</b> Definitions and Meaning of Management, Characteristics of Management, Management Vs. Administration, Levels of Management, Functions of management, Scope and Importance of Management, Henry Fayol' s contribution to Management, Fredrick Taylor's contribution to Scientific Management, Social Responsibility of Management.
2	<b>Planning:</b> Meaning, Steps in planning process, Nature of planning , Types of plans, Mission and Objectives, Process of setting Objectives, Management by Objectives, Decision making - process.
3	<b>Organizing:</b> Meaning, Process of Organizing, Organization Structure, Forms of Organization
4	<b>Staffing:</b> Recruitment and its Sources, Selection process, Payment of Wages and Salaries, Incentives - Types, Motivation - Positive and Negative motivation.
5	<b>Directing:</b> Defining Leadership, Types of leadership. Authority & Responsibility, Delegation of Authority, Decentralization - Determinants of decentralization, Distinction between Delegation and Decentralization.

6

**Controlling:**

Meaning, Characteristics of Control, Process of Controlling, Modern methods of controlling, Requirements for Effective Control, Relationship between Planning & Controlling. Use of IT in Controlling. Zero Based Budgeting and Management audit.

Course Number	Course Name	L-T-P- Credits	Year of Introduction
206	<b>Lab on C Programming -II</b>	0-0-4 =2C	2018-19
<b>Course Objective :</b>			
This is companion course of C Programming II			
<b>Syllabus Broad Units:</b>			
This Companion course of C programming II; Practical aspects of C programming towards problem solving is covered.			
<b>Expected Outcome :</b>			
The students will develop adequate programming skills with respect to following			
<ol style="list-style-type: none"> <li>1. Define basic data structures such as Date, Currency and Rational; and using it.</li> <li>2. Defining and using and updating Linear data structures : arrays and Linked List</li> <li>3. Should define data types such as stack, queue and List</li> <li>4. Able to read and write data into files.</li> <li>5. Able to define hierarchical data types; manipulate and use it.</li> <li>6. Able to understand searching and sorting mechanism and use various algorithms on it.</li> </ol>			
<b>References (Books, Websites etc) :</b>			
<ol style="list-style-type: none"> <li>1. Behrouz A. Forouzan and Richard F. Gilberg , 2nd Edition, Thomson, 2003, Computer Science A Structured Programming Approach Using C</li> <li>2. Basavraj S Anami, Shanmukhappa Angadi, Sunil Kumar S Manvi, PHI Publications, 2010. A Holistic approach to learning C.</li> <li>3. Andrew Tenenbaum, Thomson, 2005, Data Structures with C. Robert Kruse &amp; Bruce Leung, Data Structures &amp; Program Design in C, Pearson Education,</li> </ol>			

### Lab on C programming -II

Sr. No	Programming Exercises
1	Elementary Data Structures <ul style="list-style-type: none"> <li>- Write a program having functionality of one dimension and two dimension arrays with use of simple data types such as Integer, Float, Date etc.</li> <li>- Write a program wherein mathematical calculations involves such as average, percentage calculation, Factorial calculation and Matrix multiplication</li> <li>- Write program for structure implementation for array and pointers.</li> <li>- Create a object of the class to achieve various functionalities of accounting such as Net Pay calculation, Tax deduction, Gross pay etc.</li> </ul>
2	Linear Data Structures

	<ul style="list-style-type: none"> <li>- Demonstrate various functionalities for Link list, Circular link list and double link list with the reference of array and pointer.</li> <li>- Write a C program to insert and delete string / integer data from specific place of linked list.</li> <li>- Search a specific string/ integer in a given data set also find how many time it occurs or repeats in a set given</li> </ul>
<b>3</b>	<b>Particular Linear Data Structures</b> <ul style="list-style-type: none"> <li>- Write program for implementation of recursion</li> <li>- Demonstrate Insertion, Deletion and Searching functionalities with their nomenclatural for – <ul style="list-style-type: none"> <li>o Stack</li> <li>o Queues</li> <li>o Circular Queues</li> </ul> </li> <li>- Do necessary assumption for implementation of it</li> </ul>
<b>4</b>	<b>File Handling</b> <ul style="list-style-type: none"> <li>- Program to create and write data into files</li> <li>- Program to read data from files.</li> <li>- Programs on pattern matching on data of files and using this pattern matching at the time of reading and writing data into file</li> </ul>
<b>5</b>	<b>Hierarchical data structures</b> <ul style="list-style-type: none"> <li>- Programs for defining data structure to represent a tree. Creating tree and adding data/nodes into it.</li> <li>- Programs to traverse trees: DFS, BFS and other</li> <li>- Deleting and nodes in tree</li> </ul>
<b>6</b>	<b>The problem of search and Sorting</b> <ul style="list-style-type: none"> <li>- Programs to use liners/sequential searching and binary searching</li> <li>- Programs to implement standard sorting algorithms with efficiency measurement</li> <li>- Reading data form and using it with various sorting algorithms</li> </ul>

Course Number	Course Name	L-T-P- Credits	Year of Introduction
207	<b>Environmental Studies</b>	2-0-0 = 2C	2018-19

**Course Objective:**

To Understand and the nature and function of the natural environment affecting society.

**Expected Outcome :**

Understand the importance of Environment in the life of living things.

**References (Books, Websites etc) :**

- Agrawal K.C.:Environmental Biology:Nidhi Publishers Ltd(2001)
- Bharucha Erach: The Biodiversity of India: Mapin Publishing Pvt. Ltd.
- Jadhav H and Bhosale V.M.: Environmental Protection and Laws: Himalaya Publishing House.
- Miller T.G. Jr.: Environmental Science: Wadsworth Publishing Co.

Suggested MOOC :

**Course Plan**

Unit	Contents
1	<p><b>The multidisciplinary nature of environment studies:</b> Definition, scope and importance-need of public awareness.</p> <p><b>Natural Resources:</b></p> <p><b>Renewable and non-renewable resources:</b></p> <p><b>Forest resources:</b> Use and over- exploitation, deforestation. Case studies. Timber extraction, mining, dams and their effects on forest and tribal people.</p> <p><b>Water resources:</b> Use and over-utilization of surface and groundwater, floods, droughts, conflicts over water, dams- benefit and Problems.</p> <p><b>Mineral Resources:</b> Use and exploitation 'environmental effects of extracting and using mineral resources, case studies.</p> <p><b>Food resources:</b> World food problems, changes caused by agriculture. Fertilizer-pesticide problems, water logging, salinity, case studies.</p> <p><b>Energy resources:</b> Growing energy needs, renewable and non-renewable energy resources, use of alternative energy sources.</p> <p><b>Land resources:</b> Land as resources, land degradation, man induced landslides, desertification. Role of individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles</p>
2	<p><b>Ecosystem:</b> Concept of ecosystem, structure and function of an ecosystem, producers, consumers and decomposers .Energy flow in the ecosystem, Ecological succession, food chains, food webs and ecological pyramids, introduction, types, characteristics features structure and function of the following ecosystem, forest ecosystem ,grassland ecosystem, Desert</p>

	ecosystem, Aquatic ecosystems, ponds, stream, lakes, rivers, estuaries.
3	<p><b>Biodiversity and its conservations:</b></p> <p>Introduction, Definition: genetic, species and ecosystem diversity, Biogeographically classification of India, value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option vales, India as a mega diversity nation, Hot-Spots of biodiversity, Threats to biodiversity: habitat loss, poaching of wildlife, Man wildlife conflicts, Endangered and endemic species of India, Conservation of biodiversity: In situ and Ex-situ conservation of biodiversity.</p>
4	<p><b>Environmental Pollution:</b></p> <p>Definition- Causes, effects and control measures of:-Air pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution, and nuclear hazards .Soil waste management: cause, effects and control measures of urban and industrial waste. Role of an individual in prevention of pollution. Pollution case studies. Disaster management: floods, earthquakes, cyclone and landslide.</p>
5	<p><b>Social issues and Environment:</b></p> <p>From unsustainable to sustainable development, urban/problems related to energy, water conservation, rain water harvesting, watershed management, Resettlement and rehabilitation of people; its problems and concerns Case Studies, Environment ethics: Issues and possible solutions ,wasteland reclamation, Consumerism and waste products, Environment protection Act, Air(presentation and Control of Pollution)Act. Water (Prevention and Control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act. Issues involved in enforcement of environmental legislation. Public awareness.</p>
6	<p><b>Human Population and the Environment:</b></p> <p>Population growth, variation among nations, population explosion-Family Welfare Programme. Environment and Human health.Human Rights Value Education. HIV/AIDS Women and Child Welfare.Role of Information Technology in Environment and human health.</p>

Course Number	Course Name	Credits	Year of Introduction
208	Community Work II – Swachh Bharat Abhiyan	1	2018-19

**Course Objective:**

This course aims to expose the students to Swachh Bharat Abhiyan initiative of the government.

**Expected Outcome :**

Students will be able to understand the details about the Swachh Bharat Abhiyan and its impact on society.

**References (Books, Websites etc) :**

[www.swachhbharaturban.in/](http://www.swachhbharaturban.in/)  
[swachhbharatmission.gov.in](http://swachhbharatmission.gov.in)

**Course Plan**

Unit	Contents
1	History, meaning, Goals of Cleanliness initiatives
2	Initiators of cleanliness drive in India. Sant Ghadage Baba, Mahatam Gandhi, Efforts taken towards the Swachh Bharat Abhiyan, Swachh Bharat Mission
3	Impact of Cleanliness initiatives. Social Awareness, Case Studies.
	<p><b>COMMUNITY HOURS:</b></p> <p>Internship of 15 days (100 hours) to be undertaken</p> <p>Submit a report on a particular type of community involvement undertaken</p>

Course Number	Course Name	Credits	Year of Introduction
<b>208</b>	<b>Sect oral Analysis</b>	<b>1</b>	<b>2018-19</b>

**Course Objective:**

- To expose the students to the different sectors of the economy
- To enable the students to understand the importance and contribution of the sectors to business, economy and global environment
- To expose the students towards rural problems To awaken sense of responsibility amongst students towards senior citizens

**Expected Outcome :**

Students will get exposure to the different sectors of the economy and their contribution to the national development.

**References (Books, Websites etc) :**

1. S.A. Sherlekar ,Modern Business Organization And Management – (Himalaya Publishing House)
2. Y.K. Bhushan ,Fundamental Of Business Organization & Management – (S Chand Publishers)
3. Basu, C. R.; *Business Organization And Management*, Tata Mcgraw Hill, Publishing House, New Delhi, 1998
4. Business World

**Course Plan**

Unit	Contents
1	Introduction to the sectors of the economy
2	Detailed view of the IT, Manufacturing, Agriculture, Banking Insurance, Service Sector, Retail
3	Project work on detailed analysis of any one sector – national and global scenario

Course Number	Course Name	Credits	Year of Introduction
<b>208</b>	<b>Smart Cities</b>	<b>1</b>	<b>2018-19</b>
<b>Course Objective:</b>			
To give exposure to tools and techniques applicable for planning, controlling & monitoring of Smart Infrastructure and Cities. This subject would also enable to develop insight for managing project risks, uncertainties and complexities of smart cities project.			
<b>Expected Outcome :</b>			
Students will get an understanding of road map for Planning Smart Cities and benchmarking their performance for Indian context.			
<b>References (Books, Websites etc) :</b>			
<b>Suggested MOOC :</b>			
<b>Course Plan</b>			
Unit	Contents		
1	Introduction to Smart Cities, •Introduction to "City Planning", Understanding Smart Cities		
2	Dimensions of Smart Cities, Global Experience of Smart Cities, Smart Cities –Global Standards and Performance, Benchmarks, Practice Codes, India "100 Smart Cities" Policy and Mission		
3	<ul style="list-style-type: none"> <li>•Smart City Planning and Development</li> <li>•Financing Smart Cities Development</li> <li>•Governance of Smart Cities, Case Studies on Smart Cities</li> </ul>		