BHARATI VIDYAPEETH
(DEEMED TO BE UNIVERSITY)
PUNE, INDIA

B.C.A.- II (Sem.III & IV)
Revised Syllabus(CBCS 2018)
w.e.f. 2019-20

INSTITUTE OF MANAGEMENT,
KOLHAPUR

BHARATI VIDYAPEETH (DEEMED TO BE UNIVERSITY), PUNE
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:

Range of Marks (%)	Grade	Grade Point
80≤Marks≤100	O	10
70≤Marks<80	A+	9
60≤Marks<70	A	8
55≤Marks<60	B+	7
50≤Marks<55	B	6
40≤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 = Max/10 (since we have adopted 10 point system). Then GP is calculated by the following formulas

Range of Marks	Formula for the Grade Point
$8x \leq \text{Marks} \leq 10x$	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

$$SGPA = \frac{\sum Ck * GPk}{\sum Ck}$$

where, Ck is the Credit value assigned to a course and GPk 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

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

where, Ck is the Credit value assigned to a course and GPk 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≤CGPA ≤10	O	Outstanding	80≤Marks≤100
9.0≤CGPA ≤9.49	A+	Excellent	70≤Marks<80
8.0≤CGPA ≤8.99	A	Very Good	60≤Marks<70
7.0≤CGPA ≤7.99	B+	Good	55≤Marks<60
6.0≤CGPA ≤6.99	B	Average	50≤Marks<55
5.0≤CGPA ≤5.99	C	Satisfactory	40≤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		-	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	**General course-I:**Community Work I / Career & Life Skills / Waste Management	1	2	-	-	50	0
Total		**25**	**17**	**5**	**8**	**330**	**420**

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	**General Course II :** Community Work II (Swacchh Bharat Abhiyan) / Sectoral Analysis / Smart Cities	1	2	-	-	50	0
Total		**25**	**19**	**5**	**4**	**330**	**420**

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	**General Course III :** Community Work III / Start up management / Agro Tourism	1	2	-	-	50	0
Total		**25**	**17**	**5**	**8**	**330**	**420**

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	**General Course IV:** Community work IV / Basics of Taxation / Meditation & Yoga	1	2	-	-	50	0
Total		**25**	**19**	**5**	**4**	**290**	**460**

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	Elective I	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	**General Course V:**Social Media Management / Road Safety and Management / Event Management	1	2	-	-	50	0
Total		**25**	**19**	**5**	**4**	**290**	**460**

SEMESTER VI

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

Electives:

Elective No.	Elective Group	Course No	Course Name
01	**Information Security**	505-1-A	Information Security Concepts
		605-1-B	Information Security Administration
02	**Big Data**	505-2-A	Introduction to Big Data
		605-2-B	HADOOP
03	**Information Systems**	505-3-A	E-Commerce
		605-3-B	Knowledge Management

Practical Examinations:

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

SEMESTER III

Course Number	Course Name	L-T-P- Credits	Year of Introduction
301	Operating Systems	3L-1T-0P=4C	2018

Course Objective:

- To provide an understanding of the major operating system components
- To provide coverage of basic computer system organization
- The overall aim of this course is to provide a general understanding of how a computer works. This includes aspects of the underlying hardware as well as structure and key functions of the operating system.

Expected Outcome :

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

- Explain the concepts of process, address space and file
- Compare and contrast various CPU scheduling algorithms
- Understand functioning and working of Windows as well as Unix Operating System

Prerequisite:

Students should have basic knowledge of working on an operating system

References (Books, Websites etc) :

- Operating systems design and implementation by Andrew Tanenbaum and Albert Woodhull
- Operating systems concept and design by Milan Milenkovic
- Operating system Concepts by Silberschulz, Abraham and Galvin, peter raer

Suggested MOOC:

Please refer these websites for MOOCS:
NPTEL / Swayam
www. edx.com
www.coursera.com

Course Plan

Unit	Contents
1	**Introduction to Operating System:** Definition and concept of OS, History of OS, Importance and function of Operating system. Types of OS-Batch System, timesharing, Multitasking, multiprogramming, multiprocessing, online operating system, real time, distributed operating system. Views-command language users view, system call users view, structure of OS- simple, monolithic system and layered system, client server model. User operating-system interface: command line interface, GUI, system calls. **Case Study:** Unix History, General Structure of Unix, The shell of Unix operating system, The shell of Unix operating system

2	**Process Management:** Process concept, Process Control Block, process states and its transitions, context switch, OS services for Process management, scheduling and types of schedulers, scheduling algorithm-First come first served, shortest job first, shortest remaining time next, time slice scheduling, priority based scheduling, multilevel queue, multilevel queue with feedback **Case Study:** Process management in Unix
3	**Storage Management:** Basic concept of storage management, logical and physical address space, swapping, contiguous allocation, non-contiguous allocation, fragmentation, segmentation, paging, demand paging, virtual memory, page replacement algorithms- FIFO, Optimal page replacement algorithm, least recently page replacement algorithm, clock page replacement algorithm, design issue of paging, thrashing,
4	**Inter-process communication and synchronization:** Need, Mutual Exclusion, Semaphore, Busy-wait Implementation, characteristics of semaphore, queuing implementation of semaphore, producer consumer problem, critical region and conditional critical area. What is deadlock? Conditions to occur the deadlock, deadlock prevention, deadlock avoidance- banker's algorithm. resource request, resource release.
5	**File Systems:** Files-basic concept, file attributes, operations, file types, file structure, access methods, Directory- structure-single level directory system, two level directory system, hierarchical directory system, directory operations, protection, security, allocation method. **Case Study:** Unix File Management and Security
6	**Input/output System:** Principles of I/O hardware, I/O devices, device controller, DMA, Principles of I/O software-goals, interrupt handler, device driver. Mass storage structure-disk structure, disk scheduling (FCFS, SSTF, SCAN, LOOK, C-SCAN, C-LOOK) **Case Study:** Input output management in Unix

Course Number	Course Name	L-T-P- Credits	Year of Introduction
302	**Software Engineering**	3L-1T-0P = 4C	2018

Course Objective:

To introduce the current methodologies involved in the development and maintenance of Software over its entire life cycle.

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

- Understand life cycle models**,** Requirement elicitation techniques, understand the concept of Analysis and Design of software.
- Develop SRS as per any of the existing standards.
- Implement software engineering concepts in software development to develop quality software.

Pre-requisites:

Preliminary knowledge of computer, their operations and applications.

References (Books, Websites etc):

- SOFTWARE ENGINEERING A PRACTITIONERS APPROACH seventh edition BY Roger S. Pressman McGraw Hill International Edition.
- Software Engineering by Sommerville, Pearson Education, 7th edition
- Software Engineering by K.K. Aggarwal & Yogesh Singh, 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	**Introduction to Software Engineering:** Software, Program vs Software, software characteristics, Definition of Software Engineering, importance, principles of software engineering, Difference between software engineering and software programming, Members involved in software development.
2	**Software process and Feasibility study:** Need of Feasibility study, types of Feasibility study, Cost Benefit Analysis. General software development life cycle with all phases. Overview of software models (Waterfall, Prototyping, and Spiral and Rapid Application Development model).
3	**Requirement Engineering Concepts and Methods:** What is Requirement Engineering, Types of requirements, Requirement elicitation techniques- Traditional methods and Modern methods, Verification and validation process. Principles of Requirement Specification, Software Requirement Specification document Outline Characteristics of good SRS: - correct, complete, unambiguous, consistent, modifiable, traceable, Understandable

4	**Analysis and Structured System Design tools:** **Analysis and Design Tools** : Entity-Relationship Diagrams, Decision Tree and Decision Table , Data Flow Diagrams (DFD) , Data Dictionary , Elements of DD Advantage of DD , Pseudo code , Input And Output Design **Structured System Design:** Modules Concepts and Types of Modules Structured Chart , Qualities of Good Design , Coupling, Types of Coupling , Cohesion, Types of Cohesion, CASE STUDIES (Based on Above Topic)
5	**Software Testing and Software Quality Assurance** **Software Testing:** Definition, Test characteristics, Types of testing: Black-Box Testing , White-Box Testing ,Unit testing , Integration testing, Validation, Verification. **Quality concept:** (Quality, quality control, quality assurance, cost of quality), SQA activities, SQA plan. Formal Technical review: Review meeting, review reporting and review guidelines Software Configuration Management: - What is configuration management, Baseline, Software Configuration items, SCM process- Identification of objects, Version control and Change control.
6	**Software Maintenance:** What is software maintenance? Problems during software maintenance. **Categories of Software Maintenance**: Corrective maintenance, Adaptive maintenance, Perfective maintenance, and preventive maintenance. Cost of Maintenance, Maintenance Activities. **Maintenance Process and Models:** Maintenance processes, Fix Model, Iterative Enhancement Model, Reuse Oriented Model, Boehm Model, and Taute's Models.

Course Number	Course Name	L – T – P Credits	Year of Introduction
303	DBMS – II	3L – 1T – 0P=4C	2018

Course Objectives:

The main objective is to teach the concepts related to database its techniques and operations. SQL (Structured Query Language) is introduced in this subject. This helps creates strong foundation for application of data design.

Expected Outcome:

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

- Creating tables, and queries using SQL
- Applying SQL Operators and SQL Functions in the created tables in SQL;
- Writing and solving complex queries based on joins, sub queries
- Writing PL/SQL blocks, objects

Text Books:

Ivan Bayross. SQL, PL/SQL The Programming Language of Oracle 3rd Revised Edition BPB Publications

Suggested MOOC:

Please refer these websites for MOOCS:
NPTEL / Swayam
www. edx.com
www.coursera.com

Syllabus

1.	**Introduction to Oracle and SQL:** Introduction to Oracle: History, Features, Versions of Oracle, Oracle File Management, Spool command **SQL:** Defining a database in SQL, Components of SQL: DDL, DML, DCL, DQL, SQL query Rules, Data types, Keywords, Delimiters, Literals. DDL Commands – Defining a database in SQL, Creating table, changing table definition, removing table. DML Commands- Inserting, updating, deleting data. DQL Commands: Select Statement with all options. Renaming table, Describe Command, Distinct Clause, Sorting Data in a Table. Data Constraints: Primary key, Foreign Key, NOT NULL, UNIQUE, CHECK constraint.
2.	**Operators:** Arithmetic, Logical, Relational, Range Searching, Pattern Matching, IN & NOT IN Predicate, all, % any, exists, not exists clauses, Set Operations: Union, Union All, Minus, Intersect.

3.	**Joins and Oracle Functions:** Join Concept. Simple join, equi join, non equi join, Self join, Outer join, Sub queries, Aggregate Functions, Numeric Functions, String Functions, Conversion functions, Date conversion functions, and Date functions.
4.	**Database Objects:** **Index**: Creating index, simple index, composite index, unique index, dropping indexes, multiple indexes on table **Sequence**: Creating sequence, altering sequence, dropping sequence. **Views**: Concept, creation, usage **Objects**: declaring and initializing objects in SQL, Manipulating object in PL/SQL
5.	**Introduction to PL/SQL programming:** Introduction, Advantages, PL/SQL Block, PL/SQL Execution Environment, PL/SQL Character set, Literals, Data types, Variables, Constants, Displaying User Message on screen, Conditional Control in PL/SQL, Iterative Control Structure: While Loop, For Loop, Goto Statement
6.	**Advanced Programming Techniques of PL/SQL:** **Cursors**: Introduction, Types of Cursors: Implicit Cursor, Explicit Cursors, Parameterized cursors, Programs on cursors **Triggers**: Introduction, Use of triggers, Types of Triggers, Creating triggers, Examples on Triggers **Stored Procedures / Functions:** Introduction, How oracle executes procedures/ functions, Advantages, How to create Procedures & Functions, Examples

Course Number	Course Name	L-T-P- Credits	Year of Introduction
304	**Statistics**	3L-1T-0P=4C	2018

Course Objective:

The main objective is to introduce basic concepts of statistics to the students and make them competent in collecting and analyzing the data by using statistical techniques

Expected Outcome : At the end of this course, student is expected to

- Tabulate the raw data by using frequency distribution and represent the data graphically.
- Analyse the data by using measures of central tendancy and dispersion
- Estimate the value of dependent variable
- Generate the relationship between two variables in the form of degree or equation

Prerequisite:

Students should have basic knowledge of use of calculator and research attitude

References:

1) Fundamentals of Statistics , S.C. Gupta , Himalaya Pub. House (5th Ed.)

2) Business Statistics , S.P. Gupta, M.P. Gupta –Sultan Chand & Sons, (16th Ed.)

Suggested MOOC:

Please refer these websites for MOOCS:
NPTEL / Swayam
www. edx.com
www.coursera.com

Course Plan

Unit	Contents
1	**Introduction to Statistics:** Definition of Statistics, Importance of Statistics, Scope of statistics : Economics, Computer Science, Business and Management, limitations of Statistics .
2	**Data Collection and representation:** Primary and Secondary data, Sources of Data collection, Tabular Representation of data: Ungrouped and grouped frequency distribution, Graphical representation of data: Simple bar, subdivided bar, percentage bar diagram, pie diagram, histogram, frequency polygon, ogive curves.
3	**Measures of central tendency:** a)**Mean**: Definition, problems on mean for listed data items, discrete distribution and continuous distribution, merits and demerits b)**Median**: Definition, problems on median for listed data items, discrete distribution and continuous distribution, merits and demerits c) **Mode**: Definition, problems on mode for listed data items, discrete distribution and continuous distribution, merits and demerits.

4	**Measures of Dispersion:** **a)Range:** Definition, problems on range for listed data items, discrete distribution and continuous distribution, merits and demerits of range **b)Mean Deviation:** Definition, problems on mean deviation about mean for listed data items, discrete distribution and continuous distribution, merits and demerits **c) Standard Deviation:** Definition, problems on standard deviation for listed data items, discrete distribution and continuous distribution, merits and demerits. **d)Deciles, percentiles, quartiles**
5	**Regression and Correlation:** a) **Regression**: Definition, regression equations, regression coefficients, problems on finding regression equations and estimations b) **Correlation**: Definition, Karl Pearson's correlation coefficient, Spearman's Rank correlation with correction factor
6	**Time series analysis:** Components of Time series Analysis , Fitting a straight line y=ax+b, fitting a curve $y=ax^2+bx+c$,3 yearly and 5 yearly moving averages

Course Number	Course Name	L-T-P-Credits	Year of Introduction
305	**Multimedia Technology**	3L-1T-0P=4C	2018

Course Objective:
The main objective of this course is to know the concept of multimedia by students. To know different software tools used in multimedia technology. To know multimedia computing.

Expected Outcome: After learning this course, student will be able

- To understand about various interactive multimedia devices, the basic concept about images and image formats.
- To understand different software tools used in multimedia.

Reference Books:

- Principles of Multimedia – Ranjan Parekh, Publisher: Tata McGraw Hills
- Multimedia: Making It Work (8th Edition) – by Tay Vaughan, Publisher: Tata McGraw Hills.
- Multimedia Communications: Applications, Networks, Protocols and Standards - Fred Halsall, Publisher: Pearson Education.

Suggested MOOC:

1) www.openlearning.com
2) www.mooc-list.com
3) www.coursera.org

Course Plan

Unit	Contents
1	What is multimedia? History of Multimedia, Steps for Creating multimedia presentation, Delivering multimedia, Where to Use multimedia? (Business, Schools, Home, and Public Places), Multimedia authoring tools, types of multimedia authoring tools, features of multimedia authoring tools.
2	Storage technology, Magnetic media (Hard disk, RAID), Optical Media (CD Storage, CD standards), DVD (Size and capacity of DVD, DVD video, DVD audio).
3	Using text in multimedia, text types, designing with text, Hypertext and Hypermedia, Characteristics of Hypertext and Hypermedia. Using image in multimedia, image color models, Dithering, Image file formats, Macintosh formats, Windows formats, Cross-platform formats.
4	What is sound? Characteristics of Sound, Digital Audio, MIDI audio, MIDI Vs Digital audio, Audio file formats, Copyright issues. Principles of animation, Animation techniques, Animation file formats, Making animation (A Rolling Ball, A Bouncing Ball), Creating animated scene.
5	Working of video, Video signal formats (Component Video, Composite Video and S-Video), Digital Video, Digital Video Standards (EDTV, CCIR Recommendations), HD Video and HDTV.
6	Multimedia communications, Multimedia information representation, Multimedia networks, Multimedia applications, Media types, Communication modes, network types, Multipoint conferencing, Network QOS.

Course Number	Course Name	L – T – P Credits	Year of Introduction
306	**Lab on Oracle and Multimedia**	0L-0T-4P=2C	2018

Course Objectives:

The main objective is to teach the concepts related to SQL (Structured Query Language) and multimedia. The different SQL commands to be introduced. It helps to the students in writing SQL queries and its implementations. It basically helps to design and develop database structure. This is foundational course for building up database and processing through different queries.

Expected Outcome:

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

- Creating tables, and queries using SQL
- Applying SQL Operators and SQL Functions in the created tables in SQL;
- Writing and solving complex queries based on joins, sub queries
- Writing PL/SQL blocks, objects
- Creating multimedia file
- Understanding the use of multimedia in web sites

Text Books:

Ivan Bayross. SQL, PL/SQL The Programming Language of Oracle 3rd Revised Edition BPB Publications

Suggested MOOC:

In house on www.bharatividyapeeth.edu

Part A: Lab on Oracle

Q. No.	Question
1	Create following tables in your user with specified constraints. Client_Master

Column Name	DataType	Size	Constraints
ClientNo	VARCHAR2	6	PRIMARY KEY, First Letter must start with 'C'
Name	VARCHAR2	20	NOT NULL
Address	VARCHAR2	30	
City	VARCHAR2	15	
State	VARCHAR2	15	
PinCode	NUMBER	6	
Bal_Due	NUMBER	10,2	

Product_Master

Column Name	DataType	Size	Constraints
ProductNo	VARCHAR2	6	PRIMARY KEY, First Letter must start with 'P'
Description	VARCHAR2	20	NOT NULL
ProfitPercent	NUMBER	2,2	NOT NULL
UnitMeasure	VARCHAR2	10	NOT NULL
QtyOnHand	NUMBER	8	NOT NULL
ReOrderLevel	NUMBER	8	NOT NULL
SellPrice	NUMBER	8,2	NOT NULL, Cannot be 0
CostPrice	NUMBER	8,2	NOT NULL, Cannot be 0

SalesMan_Master

Column Name	DataType	Size	Constraints
SalesManNo	VARCHAR2	6	PRIMARY KEY, First Letter must start with 'S'
Name	VARCHAR2	20	NOT NULL
Addresss	VARCHAR2	30	
City	VARCHAR2	20	
State	VARCHAR2	20	
SalsAmt	NUMBER	8,2	NOT NULL Cannot be 0
Target	NUMBER	6,2	NOT NULL, Cannot be 0
YtdSales	NUMBER	6,2	NOT NULL, Cannot be 0

2 **Insert following records into a related table.**

Data for Client_Master

ClientNo	Name	City	PinCode	State	Bal_Due
C00001	Ivan Bayross	Bombay	400054	Maharashtra	15000
C00002	Vandan Saitwal	Madras	780001	Tamil Nadu	0
C00003	Pramada Jaguste	Bombay	400057	Maharashtra	5000
C00004	Basu Navindagi	Bombay	400056	Maharashtra	0
C00005	Ravi Sreedharan	Delhi	100001	Delhi	2000
C00006	Rukmini	Bombay	400050	Maharashtra	0

Data for Product_Master

ProductNo	Description	ProfitPercent	UOM	QtyOnHand	ReOrderLevel	SellPrice	CostPrice
P00001	1.44 Floppies	5	Piece	100	20	525	500
P03453	Monitors	6	Piece	10	3	12000	11280
P06734	Mouse	5	Piece	20	5	1050	1000
P07865	1.22 Floppies	5	Piece	100	20	525	500
P07868	Keyboards	2	Piece	10	3	3150	3050
P07885	CD Drive	2.5	Piece	10	3	5250	5100
P07965	540 HDD	4	Piece	10	3	8400	8000
P07975	1.44 Drive	5	Piece	10	3	1050	1000
P08865	1.22 Drive	5	Piece	2	3	1050	1000

Data for Salesman_Master

SalesManNo	Name	Address	City	PinCode	SalAmt	Target	YtdSales	Remarks
S00001	Kiran	A/14, Warli	Bombay	400002	3000	100	50	Good
S00002	Manish	65, Nariman	Bombay	400001	3000	200	100	Good
S00003	Ravi	P-7, Bandra	Bombay	400032	3000	200	100	Good
S00004	Ashish	A/5, Juhu	Bombay	400044	3500	200	150	Good

3 Describe all tables.

Retrieve all records.

4 **Create following tables in your table with specified constraints.**

Sales_Order

Column Name	DataType	Size	Constraints
SalesOrderNo	VARCHAR2	6	PRIMARY KEY, First Letter must start with 'O'
SalesOrderDate	DATE		
ClientNo	VARCHAR2	6	FOREIGN KEY referencing Client_Master
DelyAddress	VARCHAR2	25	
SalesManNo	VARCHAR2	6	FOREIGN KEY referencing Salesman_Master
DelyType	CHAR	1	Delivery: Part(P)/Full(F), Default 'F'
BilledYN	CHAR	1	
DelyDate	DATE		Cannot be less than SalesOrderDate
OrderStatus	VARCHAR2	10	Values IN('In Process', 'Fulfilled', 'BackOrder','Canceled')

Sales_Order_Details

Column Name	DataType	Size	Constraints
SalesOrderNo	VARCHAR2	6	PRIMARY KEY, FOREIGN KEY referencing Sales_Order
ProductNo	VARCHAR2	6	PRIMARY KEY, FOREIGN KEY referencing Product_Master
QtyOrdered	NUMBER	8	
QtyDispatched	NUMBER	8	
ProductRate	NUMBER	10,2	

Challan_Header

Column Name	DataType	Size	Constraints
ChallanNo	VARCHAR2	6	PRIMARY KEY, First Letter two letter must start with 'CH'
SalesOrderNo	VARCHAR2	6	FOREIGN KEY referencing SalesOrderNo
ChallanDate	DATE		
BilledYN	CAHR	1	Values IN('Y','N'), Default 'N'

Challan_Details

Column Name	DataType	Size	Constraints
ChallanNo	VARCHAR2	6	PRIMARY KEY, FOREIGN KEY referencing Challan_Header
ProductNo	VARCHAR2	6	FOREIGN KEY referencing Product_Master
QtyDispatched	NUMBER	4,2	NOT NULL

5 **Insert following records into a related table.**

Data for Sales_Order

SalesOrderNo	SalesOrderDate	ClientNo	DelyType	BilledYN	SalesManNo	DelyDate	Order Status
O19001	12-Jan-96	C00001	F	N	S00001	20-Jan-96	IP
O19002	25-Jan	C00002	P	N	S00002	27-Jan-96	C
O46865	18-Feb-96	C00003	F	Y	S00003	20-Feb-96	F
O19003	3-Apr-96	C00001	F	Y	S00001	7-Apr-96	F
O46866	20-May-96	C00004	P	N	S00002	22-May-96	C
O10008	24-May-96	C00005	F	N	S00004	26-May-96	IP

Data for Sales_Order_Details

SalesOrderNo	ProductNo	QtyOrdered	QtyDispatched	ProductRate
O19001	P00001	4	4	525
O19001	P07965	2	1	8400
O19001	P07885	2	1	5250
O19002	P00001	10	0	525
O46865	P07868	3	3	3150
O46865	P07885	3	1	5250
O46865	P00001	10	10	525
O46865	P03453	4	4	1050
O19003	P03453	2	2	1050
O19003	P06734	1	1	12000
O46866	P07965	1	0	8400
O46866	P07975	1	0	1050
O10008	P00001	10	5	525
O10008	P07975	5	3	1050

Data for Challan_Header

ChallanNo	SalesOrderNo	ChallanDate	BilledYN
CH9001	O19001	12-Dec-95	Y
CH6865	O46865	12-Nov-95	Y
CH3965	O10008	12-Oct-95	Y

Data for Challan_Details

ChallanNo	ProductNo	QtyDispatched
CH9001	P00001	4
CH9001	P07965	1
CH9001	P07885	1
CH6865	P07868	3
CH6865	P03453	4
CH6865	P00001	10
CH3965	P00001	5
CH3965	P07975	2

6	**Describe all tables.** **Retrieve all records.**
7	Based on above created tables Write down following queries. <u>Selection, Renaming, Logical Operators and Pattern Matching</u> a) Select ProductNo, Description and compute Sell_Price*0.05 and Sell_Price*1.05 for each row retrieved. Rename the columns Increase and New Price respectively. b) Select client information like client no, name, address, city for all clients in 'BOMBAY' or 'DELHI'. c) Select ProductNo, Description, and Profit Percent where Profit Percent is between 10 and 30 both inclusive. d) Select supplier name where the second letter of name is 'r' or 'h'. e) Select supplier name, city where name is 3-character long and the first two characters are 'ja'.
8	Based on above created tables Write down following queries. <u>Grouping</u> a) Select Product No with description and total qty_ordered for each product. b) Select Product No and description for which total qty_ordered of the products 'P00001', 'P03453'.
9	Based on above created tables Write down following queries. <u>Manipulating Date</u> Display the information like SalesOrderNo, ClientNo, SalesOrderDate for all the orders placed by the client in the ascending order of date. The SalesOrdereDate should be displayed in 'DD/MM/YY' format.
10	Based on above created tables Write down following queries. <u>Joins</u> a) Display the information like SalesOrderNo, ClientName, SalesOrderDate for all the orders placed by the client in the ascending order of date. The SalesOrdereDate should be displayed in 'DD/MM/YY' format. b) Select ProductNo, Description and total qty_ordered for each product.
11.	Based on above created tables Write down following queries. Print the information of the client_Master, product_master, sales_order table in the following format fro all records: {Description} worth Rs. {total sales for the product} was ordered in the month of {s_order_date}
12.	Based on above created tables Write down following queries. Find the list of clients who stay in city 'Bombay' or city 'Madras' or city 'Delhi'.
13.	Based on above created tables Write down following queries. <u>Using UNION, INTERSECT and MINUS Clause</u> a) Select all clients and the salesman in the city of 'Bombay'. b) Select salesman name in 'Bombay' who has at least one client located at 'Bombay'. c) Select all the productno of non-moving items in the product_master table. d) Select the productno, description, qty_on_hand, cost_price of non-moving items in the product_master table.
14.	Based on above created tables Write down following queries. a) Retrieve the list of names and the cities of all the clients. b) List the various products available from the product_master table. c) Find the names of the clients having 'a' as the second letter in their names. d) Find the list of clients who stay in city 'Bombay' or city 'Madras' or city 'Delhi'. e) Print the list of clients whose bal_due greater than values 10000. f) Display the Order Information for Clients 'C00002' and 'C00001'. g) Find the products whose selling price is more than 1500 and also find the new selling price as original selling price * 15. h) List the products in sorted order of their description.

i) Calculate the average price of all the products.
j) Determine the maximum and minimum products prices. Rename the titles as 'Max-Price' and 'Min-Price' respectively.
k) Count the number of products having price greater than or equal to 1500.
l) Find all the products whose Qty_On_Hand is less than Re_Order_Level.
m) Change the Sales_Order_Date of Client_No 'C00001' to 24/07/96.
n) Change the cost price of '1.22 Floppy Drive' to Rs. 950.00.
o) Delete all records having delivery date before 10th July' 96

15. **Exercise following functions using DUAL Table.**

- Number Functions

1. ABS () 2. MOD (m, n) 3. POWER (m, n) 4. ROUND (n, m)
5. SIGN (n) 6. SQRT (n) 7. TRUNC (n, m) 8. GREATEST ()
9. LEAST ()

- Aggregate Functions

1. AVG () 2. MIN () 3. COUNT (*) 4. COUNT (expr)
5. MAX () 6. SUM ()

- Character Functions

1. ASCII () 2. CHR () 3. INITCAP () 4. INSTR ()
5. LENGTH () 6. LOSER () 7. UPPER () 8.LTRIM ()
9. RTRIM () 10. LPAD () 11. RPAD () 12. SOUNDEX ()

- Date Functions

1. ADD_MONTHS () 4. LAST_DATE ()
2. MONTHS_BETWEEN () 5. NEXT_DATE ()
3. TRUNC () 6. SYSDATE ()

16. **Granting and Revoking Privileges to/from user**

a) Grant all privileges on the table product_master to the user Pradeep.
b) Grant SELECT and UPDATE privilege on table client_master to Neeta.
c) Grant all privileges on the table client_master to the user Ivan with grant option.
d) Select all records from product_master table belonging to Sunita.
e) Revoke DELETE privilege on supplier_master from Florian.
f) Revoke the remaining privileges on supplier_master that were granted to Florian.

17. **Writing PL/SQL Block**

a) Write a PL/SQL Block to generate any n odd and even numbers.
b) List the contents of product_master.
c) Write a PL/SQL Block that inverse the string or number. [if given number is 8973 then its inverse is 3798]. If the price of the product 'P00001' is < 4000 then change the price to 4000. The price change is recorded in the old_price table along with product_no and the date on which price was changed last.
d) Write a PL/SQL block that processes an order for "540 HDD".
[Check the availability of the product, if yes update its value.]

18. **Writing CURSORS**

1. Write a PL/SQL block that updates the acctmast table and sets the balance depending upon the account is debited or credited. The updation should be done only for those values that are not processed i.e. the processed flag is 'N' in the accttrans table.
acctmast (acctno*, name, balance)
accttrans (acctno, trndate, debt_crdt, amount, processed)
2. The HRD manager has decided to raise the salary of employees by 0.15. Write a PL/SQL block to accept the employee number and update the salary of that employee. Display appropriate message based on the existence of the record in the employee table.
3. The HRD manager has decided to raise the salary of employees working as

	"Programmers" by 0.25. Write a PL/SQL block to accept the employee number and update the salary of that employee. Display appropriate message based on the existence of the record in the employee table. 4. Create following 2 tables item-mast (item-id*, description, bal-stock) item-trans (item-id, description, operation, qty, status) -> the operations are for UPDATE – U, for INSERT –I, for DELETE –D Based on the value in the operation column of table item-trans the records for table item-mast is inserted, updated or deleted. On the basis of success/failure of insert, update and delete operation the status column in the table item-trans is updated with appropriate text indicating success or reason for failure. Following are the 3-cases which are to be taken care of: • if operation = 'I' then the item-id against along with description and qty is inserted into the required columns of the table item-mast. If the insert is successful then the status field of item-trans table is updated to 'SUCCESSFUL' else 'ITEM ALREADY EXIST'. • if operation = 'D' then row from item-mast is deleted whose item-id is equal to the item-id in the table item-trans with the operation column having the value 'D'. If delete is successful then the status column of item-trans table is updated to 'SUCCESSFUL' else 'ITEM DOES NOT EXIST'. • if operation = 'U' then the qty against this operation column is added to bal-stock column of the table item-mast where item-id of table item-mast is same as that of item-trans. if update is successful then the status of item-trans table is updated to 'SUCCESSFUL' else 'ITEM DOES NOT EXIST'. Write a parameterized CURSOR that defines all the above cases.
19.	**Writing TRIGGERS** 1. Create a transparent audit system for a table client-master. The system must keep track of the records that are being deleted or modified and when they have been deleted or modified. client-master (client-no, name, city, state, pin, bal-due) audit-client (client-no, name, bal, operation, o-date) • operation: the operation performed on the client-master table • o-date: the date when the operation was performed. 2. Write a database triggers that checks that the qty-on-hand does not become negative.
20	**Writing PROCEDURES** Create following 2 tables item-mast (item-id*, description, bal-stock) item-trans (item-id, description, operation, qty, status) -> the operations are for UPDATE – U, for INSERT –I, for DELETE –D Base on the value in the operation column of table item-trans the records for table item-mast is inserted, updated or deleted. On the basis of success/failure of insert, update and delete operation the status column in the table item-trans is updated with appropriate text indicating success or reason for failure. Following are the 3-cases which are to be taken care of: i. if operation = 'I' then the item-id against along with description and qty is inserted into the required columns of the table item-mast. If the insert is successful then the status field of item-trans table is updated to 'SUCCESSFUL' else 'ITEM ALREADY EXIST'. ii. if operation = 'D' then row from item-mast is deleted whose item-id is equal to the item-id in the table item-trans with the operation column having the value 'D'. If delete is successful then the status column of item-trans table is updated to 'SUCCESSFUL' else 'ITEM DOES NOT EXIST'. iii. if operation = 'U' then the qty against this operation column is added to bal-stock column of the table item-mast where item-id of table item-mast is same

	as that of item-trans. if update is successful then the status of item-trans table is updated to 'SUCCESSFUL' else 'ITEM DOES NOT EXIST'. Write a database procedure which will check for the existence of item-id in the table item-mast. The procedure must have one argument which receives a value for which a matching pattern for item-id in the table item-mast and another which will return value indicating whether a match has been found or not. The value returned by the procedure can be used to make a decision to perform further processing or not.

Part B: Lab on Multimedia

Q.N	Question
1	Create a new document in a word processing application. Next, type in a line of text and copy the line five times. Now change each line into a different font. Recopy the entire set of lines three times. Finally, change the size of the first set to 10-point text, the second set to 18-point text, and the third set to 36-point text. a) Which of the smallest lines of text is most readable? b) Which line of text stands out the most?
2	Download three different images from a web site. One should be photographic, one should be a graphic (solid colors or gradients), and one should be a mix. Convert the images to 256 colors. Use the tools available to use different dithering patterns and palettes. Print out the files before and after reducing to 256 colors. Write the file sizes on each one.
3	Visit different web sites. Describe the use of colors for each in subjective terms. Is each site vibrant? childish? muted? subtle? Why? What cultural or other factors determined the color selection? Print out a page from each site, and write a paragraph describing the colors and images used in each one.
4	Open an image in an image-editing program capable of identifying colors. Select three different pixels in the image. Sample the color and write down its value in RGB, HSB, CMYK, and web (hexadecimal) color.
5	Visit three web sites that use sound (you may need to find Flash-based web sites). Where, when, and how is sound used? Does the sound fit the mood of the site? Is there background sound? Can the sounds be turned on and off? Document your findings.
6	Locate three web sites that offer "royalty-free" or "buyout" music. Such sites almost always allow visitors to listen to low-quality samples. What formats are the samples provided in? Listen to some of the samples. Try to identify which are synthesized and which are actual instruments playing the music. What are the license arrangements for using the music? Document your findings, noting the various lengths and formats the music is provided in.
7	Use a search engine to search on the words "animation" and "definition." Create a document that provides many different definitions of the term animation. Describe the differences among definitions. Which elements make the most difference among them—type of motion, process used for creation, method of playback, or something else? What do all (or, at least, most) of the definitions have in common?

8	Conceptualize a brief animated sequence. Include a number of moving elements that move into and out of the frame. Consider where the key frames should be. How do the elements move? Do they get bigger or smaller? Do they rotate? Do they “deform” (change shape)? Create a storyboard with sketches showing at least ten of the key frames.
9	Locate three web sites that include video clips. What format are they served in? Examine the HTML source code to discover what method of video delivery is used. Make a note of your findings.
10	Prepare five graphic images using paint or drawing program. Be sure to include a variety of colors and contrasts. Add text to the images. Use small text, large text, text with serifs, bold text, and text in contrasting and similar colors. Add drop shadows. Add boxes and other shapes to the images, in various weights.

Course Number	Course Name	L-T-P- Credits	Year of Introduction
307	**Lab on Linux Operating System**	0L-0T-4P=2C	2018

Course Objective:

The student would be able

- To obtain knowledge of how to manage files in Linux system.
- To understand Linux commands and write shell programming.
- To grasp the concepts of User Management in Linux.
- To control the system running Ubuntu operating system.

Expected Outcome :

The course is to provide the knowledge of the Linux Operating System. This course intends to teach various features that will help the students to use and learn the working of Ubuntu /Red Hat operating system

Prerequisite:

Students should have basic knowledge of working on an operating system.

- Linux for beginners : An introduction to the linux operating system and command line
- Linux: the complete reference, sixth edition paperback by Richard Petersen, McGraw Hill education
- Unix shell Programming: by yashwant Kanitkar
- UNIX Concepts and Applications - by Sumitabha Das

Course Plan

Unit	Contents
1	Introduction to Linux Operating system, various flavors of Linux O.S., Learning to use and Install Linux, Booting Any one flavor of Linux like ubuntu, red hat etc, Starting up ,Logging in, Exploring the desktop ,Working with virtual desktops, Getting Everything up and running ,Viewing your hardware , Getting online Using an Ethernet Card ,Joining wireless network ,Configuring Email and instant messaging, Adding a Printer , Configuring a local printer, Configuring a network printer, Setting up digital imaging devices, Transferring photos from digital camera, Configuring scanner, Configuring Bluetooth.
2	**General Purpose Utilities:** banner (display a blown-up message), cal (The calendar), date-display the system date, who-Login detail tty-knowing your terminal uname-know your machine name passwd-change your password lock-lock your terminal echo-display message bc-the calculator. who am i,- display login name

3	**Navigating the file system:-** pwd-checking your current directory, cd-changing directories, mkdir-Making directories rmdir-moving directories ls-listing files **Handling Ordinary files:** cat-displaying and creating files, touch-creating empty file cp-copying a file rm-deleting files mv-renaming files more-paging output lp-printing a fiile file-know the file type wc-line, word and character counting split-splitting file in to multiple files cmp-comparing two files comm.-finding common chmod-changing file permission files searches using find command, locate command, mount and unmount command. Understanding vi modes, Using vi to edit the file, Creating a new text file using vi, Searching through files.
4	**Filters:** pr- paginating files head-displaying the beginning of a file, tail- displaying the end of file cut- slitting a file vertically paste- pasting file sort- ordering file uniq- locating repeated line nl- line numbering tr-translating characters. regular expressions and grep to find text ps-process status kill-terminate process Other process related commands
5	sh command, pattern matching- the wild cards, escaping-the backslash(\), quoting, redirection, pipes, tees
6	What is Shell, Different types of shells, Shell as command processor, shell variables, creating command substitution, various shell scripts using functions, conditionals, loops, customizing environment

Course Number	Course Name	L-T-P- Credits	Year of Introduction
308	**Community Work III**	2L-0T-0P=2C	2018

Course Objective:

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

- To expose the students towards social reality and role of community development for social upliftment and well being
- 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 towards community development.

Reference Books :

- An Introduction to Community Development, Rhonda Phillips, Robert Pittman – 2014
- Community Development in Asia and The Pacific, Manohar S. Pawar, 2009

Online Resources:

https://community-wealth.org/sites/clone.community-wealth.org/files/downloads/tool-enterprise-directory.pdf
https://www.ahaprocess.com/solutions/community/events-resources/free-resources/

Community Hours:

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.

MOOCs:

https://alison.com/course/diploma-in-community-development

Course Plan

Unit	Contents
1	**Community work through Education:** Teaching at Schools, Teaching at Orphanages, Teaching to poor children ,study the role of government in the education sector ,study the NGOs particularly working in education sector.
2	**Community Work for Slums:** Learn the government facilities, NGOs which are working for the slums and try to connect any NGO.
3	**Community Work for Environment:** Role of Govt. and NGOs which are working to save the environment, Initiatives like Clean your city drive, Cycle day, Awareness of Dry and wet waste classification, Tree Plantation Drive, Environment awareness activities etc.

Course Number	Course Name	L-T-P- Credits	Year of Introduction
308	**Start-Up Management**	2L-0T-0P=2C	2018

Course Objective:

The objectives of the course is

- To Introduce to the students the idea of start ups and their role in the society and nation
- To impart knowledge about the organization and management of start ups

Expected Outcome :

Students will be able to understand the role of start ups and case studies of well known start ups in India.

Reference Books :

- Khanka S. S. – Entrepreneurship Development, S. Chand.
- Burns, P. (2001). Entrepreneurship and small business. New Jersey:Palgrave.
- Mullins, J. (2004). New business road test. New Delhi: Prentice Hall.

Online Resources:

https://www.entrepreneur.com/
https://www.shopkeep.com/blog/the-7-best-free-resources-for-planning-your-new-business

MOOCs:

https://startupindia.upgrad.com/ - Startup India Learning Programme Swayam

Course Plan

Unit	Contents
1	Meaning of Start ups, Formation of a start up, idea generation for start ups, scaling up process.
2	Managing a startup, Customer Development, Market Sizing, Lean Startups, Support by government for startups,
3	Case Studies on well known startups.

Course Number	Course Name	L-T-P- Credits	Year of Introduction
308	**Agro Tourism**	2L-0T-0P=2C	2018

Course Objective:
The objectives of the course are to familiarize students with principles and relationship between tourism and agricultural activities.

Expected Outcome :
Students will be able to obtain and diversify knowledge from tourism, rural tourism and their specific form agri-tourism.

Reference Books :

- Talwar, Prakash. Travel and Tourism Management. Gyan Books Pvt., Ltd.,Main Ansari Road, Darya Ganj, New Delhi- 110 002.
- Bagri, S. C. Trends in Tourism Promotion 2003.International Books Distributors, 9/3, Rajpur Road, Dehradun-248 001 Uttarakhand (India).

Online Resources:
http://www.agritourism.in
http://www.ecoindia.com

MOOCs:
https://www.mooc-list.com/tags/tourism
https://www.coursera.org/
https://swayam.gov.in/
https://alison.com/courses?query=agriculture+tourism

Course Plan

Unit	Contents
1	Introduction, importance, scope, forms of agro-tourism, advantages and implementations, sustainability component, difficulties involved.
2	Govt. policies and legislations in respect of tourism and agro-tourism and environment protection laws. Requirements for Agro-tourism Farm, forest, garden, fish tank/ponds, residential huts, etc. Introduction to Indian culture through agro tourism.
3	Profiling the tourist for: age, sex, life cycle, education, employment, income, satisfaction and expectations, values, purpose of visit, accommodation, duration of stay, preferences and perceptions regarding area management, environmental concerns, involvement and responsibility, motivations, etc.

SEMESTER IV

Course Number	Course Name	L-T-P- Credits	Year of Introduction
401	**Computer Networks**	3L-1T- 0P = 4C	2018

Course Objectives:

The key objective is to acquire a foundational understanding of computer network and communication technologies. Networking concepts will be illustrated using TCP/IP networks. To enable the learner with Network Technologies and applications of Network.

Learning Outcomes:

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

- Students will acquire a good knowledge of the computer network, its architecture and operation.
- Student will be able to pursue his study in advanced networking courses (This knowledge will help them to create base for the Network Electives to be studied in the next semesters).
- Students will be able to follow trends of computer networks. So, students will get exposer to advanced network technologies like MANET, WSN, and 4G.

References (Books, Websites etc) :

- 1.A.S. Tanenbaum, **Computer Networks** (4^{th} ed.), Prentice-Hall of India, Latest Edition
- 2.W.Behrouz Forouzan and S.C. Fegan, **Data Communication and Networking,** McGraw Hill, Latest Edition

Other Books:

- Network Essential Notes GSW MCSE Study Notes
- Internetworking Technology Handbook CISCO System
- Introduction to Networking and Data Communications Eugene Blanchard
- Computer Networks and Internets with Internet Applications Douglas E. Comer

Suggested MOOC :

Course Plan

Unit	Contents
1	**Introduction to Computer Networks:** What is Computer Network? Network Goals and Motivations, Application of Networks, Network Topologies, Classification of Networks, **Network software:** Network Protocols, Protocol Hierarchies, Design issues for the Layers, Connection Oriented and Connectionless Services, Service Primitives, Relation of services to Protocols, **Network Models:** The OSI Reference Model, The TCP/IP Reference Model, Comparison of OSI and TCP/IP Reference Model, A critique of OSI Model, A critique of TCP/IP Model, **Examples of some networks:** Internet, X.25, ISDN, Frame relay, ATM, Ethernet, Wireless Lans- (wi-fi)

2	**Data Transmission and Physical Layer:** **Signals:** Analog and Digital Signals, Data Rate, Transmission Impairment, Signal Measurement: Throughput, Propagation Speed and Time, Wavelength, Frequency, Bandwidth, Spectrum **Transmission Media& its Characteristics:** Guided and Unguided Media, Synchronous and Asynchronous Transmission, Multiplexing**:** FDM, WDM, TDM, Switching**:** Circuit, Message and Packet Switching, **Mobile Telephone Systems**: 1G, 2G, And 3G
3	**Network Layer: Network Layer Design Issues; Routing Algorithms:** Static/ Dynamic , Direct/ Indirect, Shortest Path Routing, Flooding, Distance Vector Routing , Link State Routing, Hierarchical Routing, Broadcast Routing, Multicast Routing, **Congestion Control Algorithms:** General Principal of Congestion Control, congestion prevention polices, Load shedding, Jitter Control, **IP Addressing:** IP-Protocol, IP-Address Classes (A, B, C, D, E), Broadcast address, Multicast address, Network Mask, Subnetting, Internet control Protocol-ICMP, IGMP, Mobile-IP, IPv6
4	**Transport and Application Support Protocols,:** Transport service, Service Primitives, Internet, and Transport Protocols: TCP/UDP, Remote Procedure Calls, RTP, **Session Layer:** Token Concept **Presentation Layer:** Data Encryption and Data Security, Message Authentication, **Application Layer:** Domain Name Service, Telnet, FTP, SMTP, SNMP, MIME, POP, IMAP, WWW,HTTP
5	**Advance Networks:** Concept of 4G Networks, Introduction of 802.16, 802.20, Bluetooth, Infrared, MANET, Sensor Networks. Technical Issues of Advanced Networks, **Mobile Ad-hoc Networks:** Introductory concepts, Destination-Sequenced Distance Vector protocol, Ad Hoc On-Demand Distance Vector protocol, **Wireless Sensor Networks:** Sensor networks overview: Introduction, applications, design issues, requirements.
6	**Internet Basics:** Concept and Characteristics of Internet , Intranet, Extranet . Structure of Internet through Client Sever . Domain name , Website Development formats for Business Applications.

Course Number	Course Name	L-T-P- Credits	Year of Introduction
402	**Software Testing**	3L-1T-0P=4C	2018

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:

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

References (Books, Websites etc) :

- Software Testing by Renu Rajani and Pradeep Oak
- Software Engineering by Roger S. Pressman
- Software Testing Principles And Practices by Srinivasan Desikan and Gopalaswamy Ramesh

Suggested MOOC :

Please refer these websites for MOOCS:

NPTEL / Swayam

www. edx.com

www.coursera.com

Course Plan

Unit	Contents
1	**Introduction to Software Concepts:** Introduction, Definition and Characteristics of oftware, Importance of Software, Software types, Software components, Members involved in software development, Overview of SDLC.
2	**Introduction to Testing:** What is testing, Why, When and How Testing, Importance of Testing. Testing goals and characteristics, Testing during planning stage, Testing during design stage, Testing during coding stage.

3	**Software Testing Lifecycle & Software Testing Process:** Overview of STLC, Principles of Verification and Validation, Techniques of verification (review, inspections, walkthroughs), V testing model Software development V & V Software acquisition V & V Software supply V & V **Software Testing Process:** Testing process: a) Plan b) Develop c) Execute d) Manage Conventional Software Architectures
4	**Software Testing Strategies:** Test strategies for conventional software a) Unit Testing b) Integration Testing i) Top-Down Integration ii) Bottom-Up Integration iii) Regression Testing iv) Smoke Testing v) Integration test documents c) Validation Testing a. Test Criteria b. Configuration Review c. Alpha and Beta Testing a) System Testing i) Recovery Testing ii) Security Testing iii) Stress Testing iv) Performance Testing Difference between Testing and Debugging, The Art of Debugging a) Debugging Process b) Debugging strategies c) Correcting the Error.

5	**Software Testing Techniques:** Overview of Black-Box and White-Box Testing, Methods of White-box Testing: a) Basis Path Testing i) Flow Graph Notation ii) Independent Program Paths iii) Deriving Test Cases iv) Graph Matrices b) Control Structure Testing i) Conditional Testing ii) Data Flow Testing iii) Loop Testing • Simple Loops • Nested Loops • Concatenated Loop Methods of Black-Box Testing: a) Graph Based Testing b) Equivalence Partitioning c) Boundary Value Analysis d) Orthogonal Array Testing Testing of client/server Architectures, Testing Documentation and Help Facilities, Testing for Real-Time Systems: a) Task Testing b) Behavioral Testing c) Intertask Testing d) System Testing Testing Patterns: a) Pair Testing b) Separate Test Interface c) Scenario Testing .
6	**Risk Management:** Introduction and Characteristics of Risks, Role of Testing in Risk Management, Types of Risks: a) Project Risks b) Technical Risks c) Business Risks d) Predictable Risks e) Unpredictable Risks

Course Number	Course Name	L-T-P- Credits	Year of Introduction
403	**Java Programming**	3L-1T-0P=4C	2018

Course Objective :

The Objectives of the course is to introduce Object Oriented Programming using Java, Make student to use Java for implementing OO Concepts and also make them familiarize to use JDK and Java API for concurrent programming, input/output, Java data structures and GUI (AWT) programming using java.

Expected Outcome :

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

- Design interfaces, abstract and concrete classes
- Use concurrent programming, java Collections and utility classes
- Able to achieve object persistence using object serialization.
- Design applications using event driven programming.
- Get the main features of Java Programming for Business Applications

References (Books, Websites etc) :

- Herbert Schildt, Java: The Complete Reference, McGraw-Hill Osborne Media; Seventh Edition, 2007
- Cay S. Horstmann and Gary Cornell ,Core Java-Volume-I, Sun Core Series, Eighth Edition, 2008
- Bruce Eckel , Thinking In Java – Printice Hall, Fourth Edition

Suggested MOOC:

Please refer these websites for MOOCS:
NPTEL / Swayam
www. edx.com
www.coursera.com

Course Plan

Unit	Contents
1	**Introduction to Java:** Features of Java, Java compiler, JVM, Garbage collection, Data types, concept of class and object, java naming conventions wrapper classes, control structures in java, arrays in java, array of objects.
2	**Class and Object Concepts:** Concepts of OOP, Defining a class, creating objects from class, adding attributes and methods to the class, using constructors, Passing values to the functions – pass by value, pass by reference, Function overloading. Modifiers – public, private, protected, default, static, final, Concept of package, Introduction to Exception Handling.
3	**Inheritance and Polymorphism:** Concept and importance of inheritance, is-a relationship, types of inheritance, Polymorphism – function overriding, dynamic method dispatch. Using abstract and final keywords with class declaration, Concept of interface and class.

4	**Concurrent Programming :** Concept of threads, lifecycle of threads, creating threads, Thread class, Runnable interface, Introduction to Tread Synchronization .
5	**Java Input/Output:** Concept of streams, types of streams – byte streams, character streams. The Console: System.out, System.in, and System.err, InputStream class, OutputStream class, File class, FileInputStreams, File OutputStream, Reader class, Writer class, FileReader, FileWriter. Buffered streams – BufferedInputStream, BufferedOutputStream, BufferedReader, BufferedWriter. Object Streams
6	**Java Applets and GUI:** Applet concept, creating basic applet, applet lifecycle, controlling applet content, introduction to AWT controls – Button, Lable, TextField, TextArea, List, Checkbox and RadioButtons, Scrollbar, Menu etc. (Only AWT Component)

Course Number	Course Name	L-T-P- Credits	Year of Introduction
404	**Operations Research**	3L-1T-0P=4C	2018

Course Objective :

Main objective of this paper is to learn historical development of O.R., need and characteristics of OR in business and management. Formulate a real-world problem as a mathematical programming model. To aware the students about the basic terms in operations research. Students will be able to formulate and solve optimization problems related to job/ work assignments.

Expected Outcome :

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

- Students will be able to describe characteristics and scope of OR.
- Students will be able to define and formulate mathematical problems.
- Students will be able to select optimal problems solving techniques for a given problem using LP.
- Students will be able to formulate and solve transportation, travelling sales problems.
- Students will be able to demonstrate and solve simple models of Game theory.
- Students will be able to solve different problems related to Network.

References (Books, Websites etc) :

- Operations Research: An Introduction by Hamdy Taha, Pearson
- Operations Research by A M Natarajan, P Balasubramani, A Tamilarasi, Pearson Education Inc
- Operations Research by P Mariappan, Pearson
- Operations Research by H N wagner, Prentice hall.
- Optimization in Operations Research by Ronald Rardin,(Pearson)
- Operations Research by R. Paneerselvam, Prentice Hall of India Pvt. Ltd.
- Quantitative Techniques in Management by N D Vohra, Tata McGraw-Hill

Suggested MOOC : List of Open Source Software/learning website:
www.nptel.ac.in/

Course Plan

Unit	Contents
1	**Basics of Operation Research :** Origin of Operation Research, Historical Standpoint, Methodology, Different Phases, Characteristics, Scope and Application of Operations Research, limitations of OR.
2	**Linear Programming :** Introduction, Requirement of LP, Basic Assumptions, Formulation of LP, General Statement of LP, Solution techniques of LP: Graphical Methods, Analytical Methods: Simplex Method , Concept of slack, surplus & artificial variables. Manual solutions of L.P.P. upto 3 iterations. Minimization & Maximization Problems. Special Cases – i)Alternative solution (ii) Unbounded solutions (iii) Infeasible solutions to be shown graphically & also by simplex method.

3	**Transportation Model** : North-West Corner rule, Least-cost method, Vogel's approximation method, Final Transportation cost using MODI method, **Special cases** : i)Degeneracy in transportation problem, ii)unbalanced supply and demand, iii)profit maximization problem iv) prohibited transportation routes
4	**Assignment Model:** Hungarian method for solution, non square matrix, **Special Cases** :i) unbalanced problem ii)restriction on assignments iii)Maximization problem iv)alternate solution
5	**Network Analysis :** Terms used in network analysis, Network or arrow diagram, Fulkerson's rule, Programme Evaluation and Review Technique (PERT), Critical path method (CPM), Time estimates for activities. Probability of completion of project. Determination of floats (total, free, independent & interfering) , Crashing of Simple Networks.
6	**Decision Theory And Decision Tree**: Introduction, Decision under certainty, Decision under risk, Payoff table, Regret table, Decision making under uncertainty, Maximin & Maximax criteria,Minimax Regret criterion, Laplace criterion, Hurwicz criterion, Expected Monetary Value criterion, Expected Value of Perfect Information (E.V.P. I.), Expected Opportunity Loss (E.O.L.), Decision Tree, Simple examples

Course Number	Course Name	L-T-P- Credits	Year of Introduction
405	**Entrepreneurship Development**	3L-1T-0P=4C	2018

Course Objectives :

To develop an understanding of entrepreneurship concepts

To provide sufficient knowledge to students aspiring to be entrepreneurs

To provide ways and means to start an enterprise

Expected Outcome :

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

- Evolution, definition, characteristics, function and types of entrepreneurs.
- Role of Entrepreneurship in Economic Development.
- Business Opportunity Identification
- Importance of Business plan
- Support Agencies
- Concept of Intellectual property rights

Reference Books :

- Dr. Dilip Sarwate, Entrepreneurship Development and Project Management, Everest Publishing house
- Vasant Desai, Dynamics of Entrepreneurship development and Management, Himalaya Publishing House
- David H Holt, Entrepreneurship and New Venture Creation, Prentice Hall
- Paul Ajit Kumar, Paul, Entrepreneurship Development, Himalaya Publishing House Mumbai
- Raj Shankar – "Entrepreneurship: Theory and Practice" – Vijay Nicole Imprints Pvt. Ltd.
- S.S. Khanka – Entrepreneurial Development – S. Chand And Company Ltd., New Delhi – 1999

Websites

- www.startupindia.gov.in
- www.india.gov.in
- http://www.makeinindia.com/home

Suggested MOOC :

Note:

1. **Case studies to be discussed on various aspects mentioned in the syllabus.**
2. **Visiting/Interaction with successful local entrepreneurs should be done.**

Course Plan

Unit	Contents
1	**Introduction to Entrepreneurship :** Evolution, Concept and definition of an entrepreneur, Characteristics, function and types of entrepreneurs, Qualities of an Entrepreneur, Growth of Entrepreneurship in India, role of Entrepreneurship in Economic Development, Women Entrepreneurship in India

2	**Business Opportunity Identification :** Search for Business Ideas, Market Assessment, Sources of Information, Environmental Analysis, Entrepreneurial opportunities in India, Business Opportunity identification and selection
3	**Business Plan Preparation :** Meaning of Business plan, Significance and Contents of a Business Plan, developing Business Plan, Presenting Business Plan, Elevator Pitch
4	**Project Finance :** Types of Finance, Sources of Finance, Venture Capital, Start-up and Make-in-India program, MUDRA
5	**Support Agencies :** Support to Entrepreneurs by DIC, SIDBI, SIDCO, SSIB, NSIC, SISI, Other Institutions etc. Entrepreneurship promotion by Government through various schemes.
6	**Entrepreneurial Motivation and Development :** Factors motivating entrepreneurs, Basic course contents of EDP ‟s Evaluation of EDP ‟s, Organizations involved in EDP ‟s. Basics of Intellectual property rights

Course Number	Course Name	L-T-P- Credits	Year of Introduction
406	**Lab on Java**	2	2018

Course Objective :
To develop logical abilities of students using Java Programming language

Expected Outcome: Provide foundation for programming and Enable the students to analyze and efficiently solve the problems using Java Programming.

References (Books, Websites etc) :

- Herbert Schildt, Java: The Complete Reference, McGraw-Hill , 2007
- Cay S. Horstmann and Gary Cornell ,Core Java-Volume-I, 8 ed., 2008
- Bruce Eckel , Thinking In Java – Printice Hall, Fourth Edition

S. N.	Contents
1	Program to demonstrate the following: 1. Branching Statements 2. Looping Statements 3. Classes and objects 4. Wrapper classes 5. Arrays 6. Array of objects.
2	Design Programs on following concepts: 1. Constructor 2. Constructor Overloading 3. Pass by value 4. Method Overloading 5. Package 6. Exception Handling
3	Working with Inheritance and Interface: 1. Programs to demonstrate working of Inheritance, types of inheritance and Polymorphism – function overriding. 2. Making use of abstract and final keywords with class declaration. 3. Programs to demonstrate working of interface.
4	Design Programs on following concepts: 1. Thread class, Runnable interface and Tread Synchronization.
5	Program to demonstrate Java Input/Output : 1. Concept of streams, byte streams, character streams. 2. The Console: System.out, System.in, and System.err 3. Making use of InputStream class, OutputStream class, File class, FileInputStreams, File OutputStream, Reader class, Writer class, FileReader, FileWriter. Buffered streams – BufferedInputStream, BufferedOutputStream, BufferedReader, BufferedWriter. Object Streams
6	Working with Java Applets and GUI: 1. Design program to demonstrate Applet concept. 2. Making use of AWT controls through programs– Button, Lable, TextField, TextArea, List, Checkbox and RadioButtons, Scrollbar, Menu etc.

Course Number	Course Name	**L-T-P- Credits**	**Year of Introduction**
407	**Minor Project I**	2 Credits	2018-19
Course Objective : Student has to complete a Minor project work under the guidance of the faculty member in the institute. Students has to develop any software using C in a group of 2 to 3. Each team has to give 4 minimum PPT presentation to the Project Guide during the semester. Final project viva will be conducted as per University Time Table.			

Course Number	Course Name	L-T-P-Credits	Year of Introduction
408	Community Work-IV	2L-0T-0P=2C	2018

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, nonprofit organization etc.

- To expose the students towards social reality and role of community development for social upliftment and well being
- 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.

Reference Books :

a. An Introduction to Community Development, Rhonda Phillips, Robert Pittman – 2014

b. Community Development in Asia and The Pacific, Manohar S. Pawar, 2009,

Online Resources:

https://community-wealth.org/sites/clone.community-wealth.org/files/downloads/tool-enterprise-directory.pdf

https://www.ahaprocess.com/solutions/community/events-resources/free-resources/

MOOCs:

https://alison.com/course/diploma-in-community-development

COMMUNITY HOURS:

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

Course Plan

Unit	Contents
1	Community work in Food and Nutrition related social concerns ,role of government and NGOs in India
2	Community work for old age people and its related social concerns, role of government and NGOs in India
3	Community work for woman empowerment ,its related social concerns ,role of Govt. and NGOs in in India

Course Number	Course Name	L-T-P- Credits	Year of Introduction
408	**Basics of Taxation**	2L-0T-0P=2C	2018

Course Objective:

- To provide a basic knowledge about direct tax system in India
- To provide a basic knowledge about indirect tax system in India.
- To upgrade with the latest amendments in taxation policy of India.

Expected Outcome :

- Students will be able to have a basic knowledge about direct tax system in India
- Students will be able to have a basic knowledge about indirect tax system in India.
- Students will be upgraded and upskilled with the latest amendments in taxation policy of India.

Reference Books :

1. Shukla and Grewal: Advanced Accounts. (S. Chand & Co. Ltd. New Delhi)
2. Jain and Narang: Advanced Accounts.(Kalyani Publishers, Ludhiana)
3. Sr. K. Paul: Accountancy, Volume-I and II.(New Central Book Agency
4. R. K. Lele and Jawaharlal: Accounting Theory (Himalaya Publishers)
5. Dr. L. S. Porwal: Accounting Theory (Tata McGraw Hill).
6. Robert Anthony, D.F.Hawkins& K.A. Merchant: Accounting Text & Cases (Tata McGrawHill

Online Resources:

1. https://incometaxindiaefiling.gov.in/
2. https://www.taxmann.com/#
3. http://www.gstcouncil.gov.in/

MOOCs:
Alison
Swayam

Course Plan

Unit	Contents
1	**Introduction :** Basic concepts: Income, agricultural income, person, assessee, assessment year, previous year, gross total income, total income, maximum marginal rate of tax; Permanent Account Number (PAN) Residential status; Scope of total income on the basis of residential status Exempted income under section 10
2	**Direct and Indirect Tax:** Income from Salaries; Income from house property, Profits and gains of business or profession; Capital gains; Income from other sources, Deductions from gross total income; Rebates and reliefs Computation of total income of individuals and firms; Tax liability of an individual Indirect taxes.
3	**Overview of GST:** Overview Of GST: Introduction to GST-Key Concepts – Taxes under GST – Central GST – State GST – Union Territory GST – Integrated GST - Cess

Course Number	Course Name	L-T-P- Credits	Year of Introduction
408	**YOGA - I**	2L-0T-0P=2C	2018

Course Objective:

- To introduce the practice of yoga and its benefits to students
- To impart practices of basic yogic kriyas

Expected Outcome :

Students will be able to understand the advantages of Yoga and practice basic yog kriyas

Reference Books :

- Yoga – Asanas, Pranayam, Mudras, Kriya, Vivekananda Ashram
- Yoga – Sivanand Yog Vedanta Center

Online Resources:

https://www.yogatoday.com/
https://www.youtube.com/user/yogatoday
https://m.youtube.com/user/yogawithadriene/playlists

MOOCs:

Swayam

Course Plan

Unit	Contents
1	i) Origin of Yoga & its brief development. ii) Meaning of Yoga & its importance iii) Yoga as a Science of Art (Yoga Philosophy). iv) Meaning of meditation and its types and principles.
2	i) Classification of Yoga/Types of Yoga ii) Hatha Yoga , Raja Yoga, Laya Yoga, Bhakti Yoga, Gyan Yoga, Karma Yoga. iii) Asthang Yoga.
3	i) Principles of Yogic Practices. ii) Meaning of Asana, its types and principles. iii) Meaning of Pranayama, its types and principles. iv) Meaning of Kriya its types and principles. v) Yogic therapies and modern concept of Yoga vi) Naturopathy, Hydrotherapy, Electrotherapy, Messotherapy, Acupressure, acupuncture.