ANNAMALAI UNIVERSITY

A State University Accredited with 'A' Grade by NAAC

90th Anniversary

FACULTY OF ARTS

DEPARTMENT OF BUSINESS ADMINISTRATION

MBA BUSINESS ANALYTICS

2 YEARS FULL-TIME PROGRAM
(CBCS)

REGULATIONS
—— 2019 ——

CURRICULUM & SYLLABUS

REGULATIONS FOR THE TWO-YEAR POST GRADUATE PROGRAMMES UNDER CHOICE BASED CREDIT SYSTEM (CBCS)

These Regulations are common to all the students admitted to the Two-Year Master's Programmes in the Faculties of Arts, Science, Indian Languages, Education, Marine Sciences, and Fine Arts from the academic year 2019-2020 onwards.

1. Definitions and Nomenclature

1.1 University refers to Annamalai University.

1.2 Department means any of the academic departments and academic centres at the University.

1.3 Discipline refers to the specialization or branch of knowledge taught and researched in higher education. For example, Botany is a discipline in the Natural Sciences, while Economics is a discipline in Social Sciences.

1.4 Programme encompasses the combination of courses and/or requirements leading to a Degree. For example, M.A., M.Sc.

1.5 Course is an individual subject in a programme. Each course may consist of Lectures/Tutorials/Laboratory work/Seminar/Project work/Experiential learning/ Report writing/viva-voce etc. Each course has a course title and is identified by a course code.

1.6 Curriculum encompasses the totality of student experiences that occur during the educational process.

1.7 Syllabus is an academic document that contains the complete information about an academic programme and defines responsibilities and outcomes. This includes course information, course objectives, policies, evaluation, grading, learning resources and course calendar.

1.8 Academic Year refers to the annual period of sessions of the University that comprises two consecutive semesters.

1.9 Semester is a half-year term that lasts for a minimum duration of 90 days. Each academic year is divided into two semesters.

1.10 Choice Based Credit System A mode of learning in higher education that enables a student to have the freedom to select his/her own choice of elective courses across various disciplines for completing the Degree programme.

1.11 Core Course is mandatory and an essential requirement to qualify for the Degree.

1.12 Elective Course is a course that a student can choose from a range of alternatives.

1.13 Value-added Courses are optional courses that complement the students' knowledge and skills and enhance their employability.

1.14 Credit refers to the quantum of course work in terms of number of class hours in a semester required for a programme. The credit value reflects the content and duration of a particular course in the curriculum.

1.15 Credit Hour refers to the number of class hours per week required for a course in a semester. It is used to calculate the credit value of a particular course.

1.16 Programme Outcomes (POs) are statements that describe crucial and essential knowledge, skills and attitudes that students are expected to achieve and can reliably manifest at the end of a programme.

1.17 Programme Specific Outcomes (PSOs) are statements that list what the graduate of a specific programme should be able to do at the end of the programme.

1.18 Learning Objectives also known as Course Objectives are statements that define the expected goal of a course in terms of demonstrable skills or knowledge that will be acquired by a student as a result of instruction.

1.19 Course Outcomes (COs) are statements that describe what students should be able to achieve/demonstrate at the end of a course. They allow follow-up and measurement of Learning Objectives.

1.20 Grade Point Average (GPA) is the average of the grades acquired in various courses that a student has taken in a semester. The formula for computing GPA is given in section 11.3

1.21 **Cumulative Grade Point Average (CGPA)** is a measure of overall cumulative performance of a student over all the semesters. The CGPA is the ratio of total credit points secured by a student in various courses in all semesters and the sum of the total credits of all courses in all the semesters.

1.22 **Letter Grade** is an index of the performance of a student in a particular course. Grades are denoted by the letters S, A, B, C, D, E, RA, and W.

2. **Programmes Offered and Eligibility Criteria**

The Department of Business administration offers SEVEN two Year MBA Programmes and the eligibility criteria for each of these programmes are detailed below.

Faculty of Arts		
S.No.	Programme	Eligibility
1.	M.B.A. Business Analytics	The candidate who has undergone 10+2+3/4 pattern of study in any discipline with a minimum of 50% marks in Part- III. Admission is through TANCET.
2.	M.B.A. Dual Specialization	
3.	M.B.A. Financial Management	
4.	M.B.A. Human Resource Management	
5.	M.B.A. Infrastructure Management	
6.	M.B.A. International Business Management	
7.	M.B.A. Marketing Management	

2.1 In the case of SC/ST and Differently-abled candidates, a pass is the minimum qualification for all the above Programmes.

3. **Reservation Policy**

Admission to the various programmes will be strictly based on the reservation policy of the Government of Tamil Nadu.

4. **Programme Duration**

4.1 The Two Year Master's Programmes consist of two academic years.

4.2 Each academic year is divided into two semesters, the first being from July to November and the second from December to April.

4.3 Each semester will have 90 working days (18 weeks).

5 **Programme Structure**

5.1 The Two Year Master's Programme consists of Core Courses, Elective Courses (Departmental & Interdepartmental), and Project.

5.2 Core courses

5.2.1 These are a set of compulsory courses essential for each programme.

5.2.2 The core courses include both Theory (Core Theory) and Practical (Core Practical) courses.

5.3 Elective courses

5.3.1 **Departmental Electives (DEs)** are the Electives that students can choose from a range of Electives offered within the Department.

5.3.2 **Interdepartmental Electives (IDEs)** are Electives that students can choose from amongst the courses offered by other departments of the same faculty as well as by the departments of other faculties.

5.3.3 Students shall take a combination of both DEs and IDEs.

5.4 Experiential Learning

5.4.1 Experiential learning provides opportUnities to students to connect principles of the discipline with real-life situations.

5.4.2 In-plant training/field trips/internships/industrial visits (as applicable) fall under this category.

5.4.3 Experiential learning is categorised as Core.

5.5   Project

5.5.1 Each student shall undertake a Project in the final semester.

5.5.2 The Head of the Department shall assign a Research Supervisor to the student.

5.5.3 The Research Supervisor shall assign a topic for research and monitor the progress of the student periodically.

5.5.4 Students who wish to undertake project work in recognised institutions/industry shall obtain prior permission from the University. The Research Supervisor will be from the host institute, while the Co-Supervisor shall be a faculty in the parent department.

5.6   Value added Courses (VACs)

5.6.1 Students may also opt to take Value added Courses beyond the minimum credits required for award of the Degree. VACs are outside the normal credit paradigm.

5.6.2 These courses impart employable and life skills. VACs are listed in the University website and in the Handbook on Interdepartmental Electives and VACs.

5.6.3 Each VAC carries 2 credits with 30 hours of instruction, of which 60% (18 hours) shall be Theory and 40% (12 hours) Practical.

5.6.4 Classes for a VAC are conducted beyond the regular class hours and preferably in the II and III Semesters.

5.7   Online Courses

5.7.1 The Heads of Departments shall facilitate enrolment of students in Massive Open Online Courses (MOOCs) platform such as SWAYAM to provide academic flexibility and enhance the academic career of students.

5.7.2 Students who successfully complete a course in the MOOCs platform shall be exempted from one elective course of the programme.

5.8   Credit Distribution

The credit distribution is organised as follows:

	Credits
Core Courses	65-75
Elective Courses	15
Project	6-8
Total (Minimum requirement for award of Degree)	**90-95***

*Each Department shall fix the minimum required credits for award of the Degree within the prescribed range of 90-95 credits.

5.9   Credit Assignment

Each course is assigned credits and credit hours on the following basis:
  1 Credit is defined as
  1 Lecture period of one hour per week over a semester
  1 Tutorial period of one hour per week over a semester
  1 Practical/Project period of two or three hours (depending on the discipline) per week over a semester.

6   Attendance

6.1   Each faculty handling a course shall be responsible for the maintenance of *Attendance and Assessment Record* for candidates who have registered for the course.

6.2   The Record shall contain details of the students' attendance, marks obtained in the Continuous Internal Assessment (CIA) Tests, Assignments and Seminars. In addition the Record shall also contain the organisation of lesson plan of the Course Instructor.

6.3 The record shall be submitted to the Head of the Department once a month for monitoring the attendance and syllabus coverage.

6.4 At the end of the semester, the record shall be duly signed by the Course Instructor and the Head of the Department and placed in safe custody for any future verification.

6.5 The Course Instructor shall intimate to the Head of the Department at least seven calendar days before the last instruction day in the semester about the attendance particulars of all students.

6.6 Each student shall have a minimum of 75% attendance in all the courses of the particular semester failing which he or she will not be permitted to write the End-Semester Examination. The student has to redo the semester in the next year.

6.7 Relaxation of attendance requirement up to 10% may be granted for valid reasons such as illness, representing the University in extracurricular activities and participation in NCC/NSS/YRC/RRC.

7 **Mentor-Mentee System**

7.1 To help the students in planning their course of study and for general advice on the academic programme, the Head of the Department will attach certain number of students to a member of the faculty who shall function as a Mentor throughout their period of study.

7.2 The Mentors will guide their mentees with the curriculum, monitor their progress, and provide intellectual and emotional support.

7.3 The Mentors shall also help their mentees to choose appropriate electives and value-added courses, apply for scholarships, undertake projects, prepare for competitive examinations such as NET/SET, GATE etc., attend campus interviews and participate in extracurricular activities.

8 **Examinations**

8.1 The examination system of the University is designed to systematically test the student's progress in class, laboratory and field work through Continuous Internal Assessment (CIA) Tests and End-Semester Examination (ESE).

8.2 There will be two CIA Tests and one ESE in each semester.

8.3 The Question Papers will be framed to test different levels of learning based on Bloom's taxonomy viz. Knowledge, Comprehension, Application, Analysis, Synthesis and Evaluation/Creativity.

8.4 **Continuous Internal Assessment Tests**

8.4.1 The CIA Tests shall be a combination of a variety of tools such as class tests, assignments, seminars, and viva-voce that would be suitable to the course. This requires an element of openness.

8.4.2 The students are to be informed in advance about the assessment procedures.

8.4.3 The pattern of question paper will be decided by the respective faculty.

8.4.4 CIA Test-I will cover the syllabus of the first two Units while CIA Test-II will cover the last three Units.

8.4.5 CIA Tests will be for two to three hours duration depending on the quantum of syllabus.

8.4.6 A student cannot repeat the CIA Test-I and CIA Test-II. However, if for any valid reason, the student is unable to attend the test, the prerogative of arranging a special test lies with the teacher in consultation with the Head of the Department.

8.5 **End Semester Examinations (ESE)**

8.5.1 The ESE for the first/third semester will be conducted in November and for the second/fourth semester in May.

8.5.2 A candidate who does not pass the examination in any course(s) of the first, second and third semesters will be permitted to reappear in such course(s) that will be held in April and November in the subsequent semester/year.

8.5.3 The ESE will be of three hours duration and will cover the entire syllabus of the course.

9 Evaluation

9.1 Marks Distribution

9.1.1. Each course, both Theory and Practical as well as Project/Internship/Field work/In-plant training shall be evaluated for a maximum of 100 marks.For the theory courses, CIA Tests will carry 25% and the ESE 75% of the marks.

9.1.2 For the Practical courses, the CIA Tests will constitute 40% and the ESE 60% of the marks.

9.2. Assessment of CIA Tests

9.2.1 For the CIA Tests, the assessment will be done by the Course Instructor

9.2.2 For the Theory Courses, the break-up of marks shall be as follows:

	Marks
Test-I & Test-II	15
Seminar	05
Assignment	05
Total	25

9.2.3 For the Practical Courses (wherever applicable), the break-up of marks shall be as follows:

	Marks
Test-I	15
Test-II	15
Viva-voce and Record	10
Total	40

9.3 Assessment of End-Semester Examinations

9.3.1 Evaluation for the ESE is done by both External and Internal examiners (Double Evaluation).

9.3.2 In case of a discrepancy of more than 10% between the two examiners in awarding marks, third evaluation will be resorted to.

9.4 Assessment of Project/Dissertation

9.4.1 The Project Report/Dissertation shall be submitted as per the guidelines laid down by the University.

9.4.2 The Project Work/Dissertation shall carry a maximum of 100 marks.

9.4.3 CIA for Project will consist of a Review of literature survey, experimentation/field work, attendance etc.

9.4.4 The Project Report evaluation and viva-voce will be conducted by a committee constituted by the Head of the Department.

9.4.5 The Project Evaluation Committee will comprise the Head of the Department, Project Supervisor, and a senior faculty.

9.4.6   The marks shall be distributed as follows:

Continuous Internal Assessment (25 Marks)		End Semester Examination (75 Marks)	
		Project / Dissertation Evaluation	Viva-voce
Review-I 10	Review-II: 15	50	25

9.5   Assessment of Value-added Courses

9.5.1   Assessment of VACs shall be internal.

9.5.2   Two CIA Tests shall be conducted during the semester by the Department(s) offering VAC.

9.5.3   A committee consisting of the Head of the Department, faculty handling the course and a senior faculty member shall monitor the evaluation process.

9.5.4   The grades obtained in VACs will not be included for calculating the GPA.

9.6   Passing Minimum

9.6.1   A student is declared to have passed in each course if he/she secures not less than 40% marks in the ESE and not less than 50% marks in aggregate taking CIA and ESE marks together.

9.6.4   A candidate who has not secured a minimum of 50% of marks in a course (CIA + ESE) shall reappear for the course in the next semester/year.

10.   Conferment of the Master's Degree

A candidate who has secured a minimum of 50% marks in all courses prescribed in the programme and earned the minimum required credits shall be considered to have passed the Master's Programme.

11.   Marks and Grading

11.1   The performance of students in each course is evaluated in terms Grade Point (GP).

11.2   The sum total performance in each semester is rated by Grade Point Average (GPA) while Cumulative Grade Point Average (CGPA) indicates the Average Grade Point obtained for all the courses completed from the first semester to the current semester.

11.3   The GPA is calculated by the formula

$$GPA = \frac{\sum_{i=1}^{n} C_i G_i}{\sum_{i=1}^{n} C_i}$$

where, C_i is the Credit earned for the Course i in any semester;

G_i is the Grade Point obtained by the student for the Course i and

n is the number of Courses passed in that semester.

11.4   CGPA is the Weighted Average Grade Point of all the Courses passed starting from the first semester to the current semester.

$$CGPA = \frac{\sum_{i=1}^{m} \sum_{i=1}^{n} C_i G_i}{\sum_{i=1}^{m} \sum_{i=1}^{n} C_i}$$

where, C_i is the Credit earned for the Course i in any semester;

G_i is the Grade Point obtained by the student for the Course i and

n is the number of Courses passed in that semester.

m is the number of semesters

11.5 Evaluation of the performance of the student will be rated as shown in the Table.

Letter Grade	Grade Points	Marks %
S	10	90 and above
A	9	80-89
B	8	70-79
C	7	60-69
D	6	55-59
E	5	50-54
RA	0	Less than 50
W	0	Withdrawn from the examination

11.6 Classification of Results. The successful candidates are classified as follows:

11.6.1 For **First Class with Distinction:** Candidates who have passed all the courses prescribed in the Programme *in the first attempt* with a CGPA of 8.25 or above within the programme duration. Candidates who have withdrawn from the End Semester Examinations are still eligible for First Class with Distinction (*See Section 12 for details*).

11.6.2 For **First Class:** Candidates who have passed all the courses with a CGPA of 6.5 or above.

11.6.3 For **Second Class:** Candidates who have passed all the courses with a CGPA between 5.0 and less than 6.5.

11. 6.4 Candidates who obtain highest marks in all examinations at the first appearance alone will be considered for University Rank.

11.7   Course-Wise Letter Grades

11.7.1 The percentage of marks obtained by a candidate in a course will be indicated in a letter grade.

11.7.2 A student is considered to have completed a course successfully and earned the credits if he/she secures an overall letter grade other than RA.

11.7.3 A course successfully completed cannot be repeated for the purpose of improving the Grade Point.

11.7.4 A letter grade RA indicates that the candidate shall reappear for that course. The RA Grade once awarded stays in the grade card of the student and is not deleted even when he/she completes the course successfully later. The grade acquired later by the student will be indicated in the grade sheet of the Odd/Even semester in which the candidate has appeared for clearance of the arrears.

11.7.5 If a student secures RA grade in the Project Work/Field Work/Practical Work/Dissertation, he/she shall improve it and resubmit if it involves only rewriting/ incorporating the clarifications suggested by the evaluators or he/she can re-register and carry out the same in the subsequent semesters for evaluation.

12.   Provision for Withdrawal from the End Semester Examination

12.1   The letter grade W indicates that a candidate has withdrawn from the examination.

12.2 A candidate is permitted to withdraw from appearing in the ESE for one course or courses in **ANY ONE** of the semesters **ONLY** for exigencies deemed valid by the University authorities.

12.3 Permission for withdrawal from the examination shall be granted only once during the entire duration of the programme.

12.3   Application for withdrawal shall be considered **only** if the student has registered for the course(s), and fulfilled the requirements for attendance and CIA tests.

12.4 The application for withdrawal shall be made ten days prior to the commencement of the examination and duly approved by the Controller of Examinations. Notwithstanding the mandatory prerequisite of ten days notice, due consideration will be given under extraordinary circumstances.

12.5 Withdrawal is **not** granted for arrear examinations of courses in previous semesters and for the final semester examinations.

12.6 Candidates who have been granted permission to withdraw from the examination shall reappear for the course(s) when the course(s) are offered next.

12.7 Withdrawal shall not be taken into account as an appearance for the examination when considering the eligibility of the candidate to qualify for First Class with Distinction.

13. Academic misconduct

Any action that results in an unfair academic advantage/interference with the functioning of the academic community constitutes academic misconduct. This includes but is not limited to cheating, plagiarism, altering academic documents, fabrication/falsification of data, submitting the work of another student, interfering with other students' work, removing/defacing library or computer resources, stealing other students' notes/assignments, and electronically interfering with other students'/University's intellectual property. Since many of these acts may be committed unintentionally due to lack of awareness, students shall be sensitised on issues of academic integrity and ethics.

14. Transitory Regulations

Wherever there has been a change of syllabi, examinations based on the existing syllabus will be conducted for two consecutive years after implementation of the new syllabus in order to enable the students to clear the arrears. Beyond that, the students will have to take up their examinations in equivalent subjects, as per the new syllabus, on the recommendation of the Head of the Department concerned.

15. *Notwithstanding anything contained in the above pages as Rules and Regulations governing the Two Year Master's Programmes at Annamalai University, the Syndicate is vested with the powers to revise them from time to time on the recommendations of the Academic Council.*

ASSESSMENT PATTERN

Continuous Internal Evaluation (25 Marks)

Bloom's Category Marks (out of 25)	Test	Assignment	Seminar	Non CIA		
				Activities	Industrial Visit	Quiz
Knowledge	√					√
Comprehension	√	√	√		√	√
Apply			√	√		
Analyze	√					√
Evaluate	√					
Create	√		√	√		

End Semester Examination (75 Marks)

Bloom's Category Marks	Test (75 Marks)
Knowledge	
Comprehension	
Application	
Analysis	
Synthesis	
Evaluation	
Creation	

Annamalai University
Department of Business Administration
M.B.A. (Business Analytics)
(Two Year) Programme
Programme Code: ABUS27

Programme Structure
(For students admitted from the academic year 2019-2020)

Course Code	Course Title	Hours per week L	Hours per week P	C	Marks CIA	Marks ESE	Marks Total
19BBAC101	Core 1: Management Concepts and Organizational Behavior	4	-	3	25	75	100
19BBAC102	Core 2: Introduction to Analytics	4	-	3	25	75	100
19BBAC103	Core 3: Accounting for Managers	4	-	3	25	75	100
19BBAC104	Core 4: Statistical Decision Making	4	-	3	25	75	100
19MBAX105	Elective 1: Interdepartmental Elective			3	25	75	100
19BBAC106	Core 5: E- Business Management	4	-	3	25	75	100
19BBAP107	Core 6: Introduction to R (Practical)	-	4	3	40	60	100
19BBAC108	Core 7: Spread Sheet Modelling	4		3	25	75	100
	Total			**21**			
19BBAC201	Core 8: Marketing & CRM	4	-	3	25	75	100
19BBAC202	Core 9: Business Strategy	4	-	3	25	75	100
19BBAP203	Core10: PYTHON (Practical)	-	4	3	40	60	100
19BBAC204	Core11: Time Series Forecasting	4	-	3	25	75	100
19MBAX205	Elective 2: Interdepartmental Elective	3	-	3	25	75	100
19BBAE206	Elective 1: Departmental Elective	4	-	4	25	75	100
19BBAE207	Elective 2: Departmental Elective	4	-	4	25	75	100
19BBAC208	Applied Project in Big Data Analysis	-	-	2	25	75	100
	Total			**25**			
	Value Added Course (VAC)	**Carries Additional Credits**					
19BBAC301	Core 12: Data Visualization (HADOOP/TABLEAU)	4	-	3	25	75	100
19BBAC302	Core13: e-Governance and Cyber Law	4	-	3	25	75	100
19BBAC303	Core14: Soft Skills	4	-	3	25	75	100
19BBAP304	Core15: SQL (Practical)	-	4	3	40	60	100
19MBAX305	Elective 3: Interdepartmental Elective			3	25	75	100
19BBAE306	Elective 3: Departmental Elective	4	-	4	25	75	100
19BBAE307	Elective4: Departmental Elective	-	-	4	25	75	100
19BBAV308	Project Work (Intern with Analytics Firm)	-	-	4	25	75	100
	Total			**24**			
	Value Added Course (VAC)	**Carries Additional Credits**					
19BBAC401	Core16: Operations & Supply Chain Analytics	4	-	3	25	75	100
19BBAC402	Core17: HR Analytics	4	-	3	25	75	100
19BBAC403	Core18: Finance & Risk Analytics	4	-	3	25	75	100
19BBAC404	Core19: Marketing & Retail Analytics	4	-	3	25	75	100
19MBAX405	Elective 4: Interdepartmental Elective	3	-	3	25	75	100

19BBAE406	Elective 5: Departmental Elective	4	-	4	25	75	100
19BBAE407	Elective 6: Departmental Elective	4	-	4	25	75	100
19BBAV408	Comprehensive Viva-voce	4	-	2	25	75	100
	Total			**25**			
	Total credit						

Departmental Electives (DE)

Course Code	Course Title	Hours per week		C	Marks		
		L	**P**		**CIA**	**ESE**	**Total**
19BBAE206	Data Science	3	0	4	25	75	100
19BBAE207	Business Intelligence – Big Data & Cloud Computing	3	0	4	25	75	100
19BBAE306	Predictive Analysis & Modelling	3	0	4	25	75	100
19BBAE307	Business Optimization	3	0	4	25	75	100
19BBAE406	Machine Learning	3	0	4	25	75	100
19BBAE407	Social Media and Web Analytics	3	0	4	25	75	100

Interdepartmental Electives:

19MBAX115	Management Process (CBCS Elective)	Elective	4	75	25	100
19MBAX205	Marketing Management (CBCS Elective)	Elective	4	75	25	100
19MBAX305	Training and Development (CBCS Elective)	Elective	4	75	25	100
19MBAX405	Entrepreneurship Management (CBCS Elective)	Elective	4	75	25	100

Value added courses:

Even Semester	19BVAC211	Small Business Management	Additional Credit
Even Semester	19BVAC212	Introduction to Business Analytics	Additional Credit
Even Semester	19BVAC213	E-Governance and Cyber Law	Additional Credit
Odd Semester	19BVAC311	Machine Learning	Additional Credit
Odd Semester	19BVAC312	Block Chain Technology	Additional Credit
Odd Semester	19BVAC313	Sustainable Development	Additional Credit

Programme Outcomes

PO1:   Critical thinking
PO2:   Cultivating Cognitive skills required in the job market
PO3:   Effective Communication
PO4:   Familiarity with ICT to thrive in the information age
PO5:   Cultivating aptitude for research
PO6:   Respect for alternate view-points including those conflicting with one's own perspectives
PO7:   Ability to work individually and as members in a team
PO8:   Upholding ethical standards
PO9:   Acting local while thinking global
PO10: Commitment to gender equality
PO11: Commitment to Sustainable development
PO12: Lifelong learning

Programme Specific Outcomes

Annamalai University is a pioneering institution among all state universities in providing Business Administration programme in Business Analytics with the following objectives:

PSO1: To facilitate you develop proficiency in the key knowledge areas of business analytics
PSO2: To deepen analytical skills and investigate data to establish new relationships and patterns
PSO3: To provide practical hands-on experience with statistics programming languages and big data tools
PSO4: To develop understanding in data science and master technology trends of Data Analytics, Big Data, Cloud computing and Machine Learning
PSO5: To have proficiency in using tools and open source software to interpret data
PSO6: To understand and explore problems in business and provide viable solutions using analytics
PSO7: To interpret data as well as projects and tasks that are based on real-life case studies
PSO8: To demonstrate use of teamwork, leadership skills, decision making in their future career

PO/CO	Programme Outcomes												Programme Specific Outcomes							
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
CO1																				
CO2																				
CO3																				
CO4																				
CO5																				
CO6																				

| **Semester – I** | **19BBAC101: Management Process And Organisational Behaviour** | **Credits: 3** **Hours: 60** |

Learning Objective

The objective of this course is
LO1: To provide foundational knowledge associated with managerial functions
LO2: To enable students to effectively identify the recent management thoughts
LO3: To help students understand the conceptual framework of management and organizational behavior.
LO4: To explain how organizational change and culture affect working relationships within organizations.
LO5: To provide foundational knowledge on leadership theory and styles.

Course Outcome

Upon completion of this course, the student will have the ability to
CO1: Describe and assess the basic managerial functions and evaluate its impact on organizational development.
CO2: Evaluate the appropriateness of various leadership styles and conflict management strategies used in organizations.
CO3: Analyze individual and group behaviour, and understand the implications of organizational behaviour on the process of management.
CO4: Demonstrate critical thinking skills on application of motivational theories
CO5: Knowledge on organizational conflict and negotiations techniques in an organization and real life problems,
CO6: Ability to work as member in a team and to develop competitive edge to work with large corporate

Unit-1 Management Thought (12 h)
Definition of Management – Science or Art – Manager Vs Entrepreneur – types of managers – managerial roles and skills – Evolution of Management thought - Organisation Structure – Concept, Structure, Principles, Centralization, Decentralization, Span of Management.

Unit-2 Managerial Functions (12 h)
Planning - concept, significance, types; Organizing - concept, principles, theories, types of organizations, authority, responsibility, power, delegation. Decentralization; Staffing; Directing; Coordinating; Control - nature, process, and techniques.

Unit-3 Organizational Behaviour (12 h)
Organisational behaviour - concept and significance; Relationship between management and organisational behaviour; organizational culture, Attitudes; Perception; Learning; Personality and values; emotions and moods. Motivation: Process of motivation; Theories of motivation - need hierarchy theory, theory X and theory Y, two factor theory, Alderfer's ERG theory, Victor Vroom's expectancy theory.

Unit-4 Leadership Concept (12 h)
Leadership styles; Theories -trait theory, behavioral theory, Group dynamics -definition and importance, types of groups, group formation, group development, group composition, group performance factors; Approach to team development.

Unit-5 Organizational Conflict and Negotiations (12 h)
Dynamics and management; Sources, patterns, levels, and types of conflict; Traditional and modern approaches to conflict; Functional and dysfunctional organizational conflicts; Resolution of conflict. Organizational Development: Concept; Need for change, resistance to change; Theories of planned change; organization change and stress management, Organizational diagnosis. **"Current Streams of Thought"**.

Text Books

1) Suja R Nair, Organizational behaviour, Himalaya Publishing House, 2014.
2) Joseph M. Putti, Management Principles, Trinity Press, 2014.

Supplementary Readings

1) Robbins, Stephen P: Organizational Behavior" Prentice Hall, New Delhi, 2009.

2) Koontz, Harold, Cyril O'Donnell, and Heinz Weihrich: Essentials of Management, Tata McGraw-Hill, New Delhi, 2010.

3) Luthans, Fred: Organizational Behaviour, McGraw Hill, New York, 2008.

Outcome Mapping

PO/CO	Programme Outcomes												Programme Specific Outcomes							
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
CO1													M							
CO2															M					
CO3																L				
CO4					M													H		
CO5						L			M									H		
CO6				H															L	L

H	High Correlation	M	Medium Correlation	L	Low Correlation

Semester – I　　　　**19BBAC102: Introduction to Business Analytics**　　　　**Credits: 3**
Hours: 60

Learning Objective

The objective of this course is
LO1:　To Study core statistical techniques; data retrieval, analysis and mining
LO2:　To effectively persuade in the project-oriented world of data-driven decisions.
LO3:　To understand the purpose of using business analysis tools within an organization
LO4:　To analyse a dataset for making a business decisions.
LO5:　To use R studio for data analysis.

Course Outcome

Upon completion of this course, the student will have the ability to
CO1:　Critically analyze the business problems and apply analytical knowledge in big data
CO2:　Recognize, understand and apply the language, theory and models of the field of business analytics
CO3:　Able to cultivating cognitive skills on the applications of business analytics.
CO4:　Commitment to sustainable development of data visualization and time series analysis related to various sectors.
CO5:　Provide leadership in application of using R statistics
CO6:　Cultivating cognitive skills acquired on forecasting methods

Unit-1　Introduction to Business Analytics and Big Data (12 h)

Business Analytics – Definition - Need – Scope - A categorization of Analytical Methods – Analytics in action – Big data – Business analytics in practice – types of data – modifying data in excel – creating Distributions from data– measures of location

Unit-2 Application of Business Analytics (10 h)

Machine Learning - Introduction and Concepts - Differentiating algorithmic and model based frameworks, Decision analytics. Descriptive analytics - Predictive analytics - Prescriptive analytics.

Unit-3 Decision support and Data Visualisation (12 h)

DSS- Executive and enterprise support- Automated decision support - Web analytics- Data mining -Applied artificial intelligence - Visual analysis: Data concepts – Data Dashboards - Data exploration & visualization - Scorecards

Unit-4 Time Series and Forecasting (14 h)

Time series pattern – forecasting accuracy – moving averages and exponential smoothing - using regression analysis for forecasting – determining the best forecasting model to use - building good spreadsheet model – What-If analysis – some useful excel functions for modeling – auditing spreadsheet model – a simple maximization problem.

Unit-5 Data Analysis using R (12 h)

R Studio: Introduction – R data types and objects, reading and writing data - Data structures in R - R programming fundamentals - Advantages and disadvantages of using R. **"Current Streams of Thought"**.

Text Books

1) Majid Nabavi, David L.Olson, Introduction to Business Analytics, Business Expert Press, 2018
2) Umesh R Hodeghatta and Umesha Nayak, *Business Analytics Using R - A Practical Approach-* Apress, 2017.

Supplementary Readings

1) Jeffery D.Camm, James J. Cochran, Michael J. Fry, Jeffrey W. Ohlmann, David R. Anderson, Essentials of Business Analytics, Cengage Learning, 2015
2) Sandhya Kuruganti, Business Analytics: Applications To Consumer Marketing, McGraw Hill, 2015
3) Bernard Marr, Big Data: Using Smart Big Data, Analytics and Metrics to Make Better Decisions and Improve Performance, Wiley, 2015

Outcome Mapping

PO/CO	Programme Outcomes												Programme Specific Outcomes							
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
CO1	H												H							
CO2														H						
CO3		M											M							
CO4											L							M		
CO5																			M	
CO6		M																		L

	H	High Correlation		M	Medium Correlation		L	Low Correlation

Learning Objective
The objective of the course is
LO1:   To acquaint the students with the various concepts, techniques, methods, process of accounting data analysis and interpretation,
LO2:   To understand the concepts of decision making in the areas of Financial and Management Accounting.
LO3:   To provide foundational knowledge on fund flow analysis and ration analysis
LO4:   To enable students to effectively identify the techniques of Cost Accounting
LO5:   To provide the practice exposure on cost analysis

Course Outcome
After completion of this course, the student will have the ability to
CO1:   Have stronger understanding of the basic accounting and regulations of accounting format
CO2:   Analysis the financial statement with ethical standards.
CO3:   Understanding different financial items like ratio, capital budgeting, marginal costing etc.
CO4:   Evaluate and solve the accounting problems and it helps for financial decision making.
CO5:   Cultivating cognitive skills acquired on standard costing and variance analysis
CO6:   Commitment to sustainable development of budget and budgetary control system

Unit-1   Introduction to Management Accounting and Financial Accounting (12 h)
Introduction – Principles – Concept – Accounting conventions – Management accounting – Its origin – Role – Function – Growth – Cost accounting – Financial accounting – Difference between various accounting – Financial Accounting – Journal – Ledger – Trail Balance – Trading – Profit and Loss account – Balance sheet. (Final Accounting Problems with adjustments). Accounting Standards (IND-AS) – Generally Accepted Accounting Principles (GAAP).

Unit-2   Financial Statement Analysis, Ratio Analysis, Fund and Cash Flow Analysis (12 h)
Analysis and interpretation of financial statements – Analysis of Comparative Balance sheet – Common size statement (simple problems) – Ratio Analysis – Nature – Classification – Limitations – Interpretations of Ratios – Funds flow analysis – Concept – Merits and Demerits – Cash flow analysis – Concept – Merits and Demerits (simple problems).

Unit-3   Methods and Techniques of Cost Accounting (10 h)
Concept of cost – Elements of cost – Cost Accounting – Objectives – Cost Sheet (Problems) – Classification of cost – Cost Unit and Cost Centre – Methods of Costing _ Techniques of Costing.

Unit-4 Marginal Costing, Budget and Budgetary Control (12 h)
Marginal Costing – Concept – Advantages and Disadvantages – Break even analysis – Cost volume profit analysis – Budget and Budgetary control – Objectives – Type of budgets – Preparation of Sales, Cash, flexible and master budgets (simple problems).

Unit-5 Standard Costing and Variance Analysis (12 h)
Standard Costing – Advantages of Standard Costing – Limitation of Standard Costing – Determination of Standard Costs – Revision of Standards – Standard Cost Card -Variance Analysis-Material Cost Variances – Sales Variances – Labour Variances (Simple Problems in Variances). **"Current Streams of Thought"**.

Text Books
1. Jain .S.P. and K.L.Narang, Advanced Accounts, Kalyani Publishers, Ludhiana 2018.
2. Khan. M.Y. and P.K. Jain, *Management Accounting*, Tata McGraw Hill Pub., 2017.
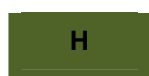
Supplementary Readings

1. Narayanasamy.R, Financial Accounting- A Managerial Perspective, PHI learning Private Limited , Sixth Edition, 2017.
2. Gupta.R.L and Radhaswamy M, Advanced Accounts, Vol I, Sulthan Chand & Sons, New Delhi 2017.
3. Maheswari, S.N., *Cost and Management Accounting*, Sultan Chand & Sons.,Publisher New Delhi, 2013.
4. Gunasekaran, E., *Accounting for Management*, Lakshmi Publication, Chennai, 2012.
5. Pandikumar, M.P, Management Accounting, Excel Books, New Delhi, 2010.

Outcome Mapping

PO/CO	Programme Outcomes												Programme Specific Outcomes							

PO/CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
CO1	M												H							
CO2								M							M					
CO3																M				
CO4																	H			
CO5		L																L		
CO6											M									

H	High Correlation	M	Medium Correlation	L	Low Correlation

Semester – I	**19BBAC104: Statistical Decision Making**	Credits: 3 Hours: 60

Learning Objective

The objective of the course is

LO1: To equip the students with the basic understanding of the research methodology
LO2: To provide an insight into the application of modern analytical tools and techniques for the purpose of management decision making
LO3: To provide hands on experience in SPSS software
LO4: To understand and analyze the factor and cluster analysis
LO5: To get idea on application of non-parametric tools.

Course Outcome

Upon completion of this course, the student will have the ability to

CO1: Develop expertise in describing data, cultivating aptitude for research design, hypothesis testing and model building
CO2: Increase their capability as a manager to think statistically using data
CO3: Apply cognitive skills to support the data collection methods to solve the problems
CO4: Provide experience in statistical methods in decision making process
CO5: Cultivating cognitive skills acquired on using the parametric and non-parametric tools for various service sectors.
CO6: Apply analytical knowledge in business statistics for sustainable development of an organisation

Unit-1   Introduction to Research (10 h)

Research – Meaning – Types – Nature and scope of research – Problem formulation – Statement of research Objective –Importance of research in Management – Research process – Research designs

Unit-2 Data Collection Methods (10 h)

Data Collection Methods of data collection – Observational and Survey methods – Field surveys – Sampling methods & techniques – Sample size

Unit-3 Research Tools (12 h)

Sources of Data – Primary – Secondary data – Questionnaire Design; Attitude measurement techniques – Scaling Techniques - Simple Tabulation and Cross Tabulation– Frequencies – Percentage – Charts

Unit-4 Parametric Tools (14 h)

Introduction to Statistics – Estimation of Population parameters – Point of Internal estimates of means and proportions – Correlation – Regression – Hypothesis testing –t test – F test – Two way ANOVA – Discriminant Analysis – Factor analysis - Cluster Analysis

Unit-5 Non-Parametric Tools (14 h)

Scale Validation - Normality Test - Chi–square test – 1-sample Wilcoxon signed rank test. - Friedman test - Kruskal-Wallis test - Mann-Whitney test - Spearman Rank Correlation. **"Current Streams of Thought"**.

Text Books

1. Pillai RSN., Statistics, Sultan Chand Company Ltd., 2016.
2. Kothari CR., Research Methodology – Methods and Techniques, New Age International Pvt. Ltd., 2015.

Supplementary Readings

1. Beri G.C., Business Statistics, Tata McGraw Hill Publishers, 2010.
2. Cunningham James B., Using SPSS, Sage publishers, 2012.
3. Anil Kumar Mishra, Handbook on SPSS for research work, Himalaya publishers, 2015.
4. Rajathi A., SPSS for you, MJP publishers, 2010.
5. Agarwal, Business Statistics, Vrindha publications Pvt Ltd., 2010.

Outcome Mapping

PO/CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
							Programme Outcomes									Programme Specific Outcomes				
CO1					M								H							
CO2														M						
CO3		H															H			
CO4																	H			
CO5																		L		
CO6												L				M				

	High Correlation		M	Medium Correlation		L	Low Correlation
H							

Learning Objective

The objective of the course is
  LO1: To understand the practices and technology to start an online business.
  LO2: To know how to build and manage an e-business.
  LO3: To recognize the fundamental principles of e-Business and e-Commerce.
  LO4: To distinguish the role of management in the context of e-Business and e-Commerce
  LO5: To explain the added value, risks and barriers in the adoption of e-Business and e-commerce

Course Outcome

Upon completion of this course, the student will have the ability to

CO1: Cultivating cognitive skills acquired on the internet in the development of a virtual e-commerce site.
CO2: Critically thinking a various issue in electronic payment systems which held in various fields.
CO3: Apply analytical knowledge in the security protocols and the issues in internet security
CO4: Examine the various legal and ethical issues specific to E-Business for effective decisions
CO5: Capable to analyze problem using the applications of e-Commerce in global level.
CO6: Commitment to sustainable development of e-business activities with unparalleled ideas.

Unit-1   Introduction to e-Business (12 h)
 Overview of E-Business; Fundamentals, E-Business framework; E-Business application; Major requirements in E-Business; Emerging trends and technologies in E-Business; From ECommerce to E-Business.

Unit-2 Technology Infrastructure (10 h)
 Internet and World Wide Web, internet protocols - FTP, intranet and extranet, information publishing technology- basics of web server hardware and software.

Unit-3 Business Applications (14 h)
 Consumer oriented e-business – e-tailing and models - Marketing on web – advertising, e-mail marketing, affiliated programs - e-CRM; online services, Business oriented e-business, e-governance, EDI on the internet.

Unit-4 E-Business Payments and Security (12 h)
 E-payments - Characteristics of payment of systems, protocols, e-cash, e-cheque and Micro payment systems- internet security – cryptography – security protocols – network security.

Unit-5 Legal and Privacy Issues (12 h)
 Legal, Ethics and privacy issues – Protection needs and methodology – consumer protection, cyber laws, contracts and warranties, Taxation and encryption policies. **"Current Streams of Thought"**.

Text Books
    1. Rayudu C.S., E-Commerce E-Business, Himalaya Publishing House, 2015.

    2. Ravi Kalakota, Frontiers of Electronic Commerce, Pearson Education, 2011.

Supplementary Readings
    1. Bharat Bhasker, Electronic Commerce – Framework Technologies and Applications, Tata McGraw Hill publishers, 2009.
    2. Dave Chaffey, E-Business and E-Commerce Management, Pearson Education, 2009.
    3. Ravi Kalakota, Electronic Commerce – A Manager's Guide, Pearson Education, 2009.

Outcome Mapping

PO/CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
	Programme Outcomes												**Programme Specific Outcomes**							
CO1		M											H							
CO2		L												M						
CO3														H						
CO4								L									M			
CO5									M									H		
CO6											M									M

H	High Correlation		**M**	Medium Correlation	**L**	Low Correlation

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Semester – I **19BBAC106: Introduction to R** **Credits: 3**
Hours: 60

Learning Objective
The objective of the course is
LO1: To give an introduction to the software R and how to write elementary programs
LO2: To demonstrate how statistical models are implemented and applied
LO3: To write simple program scripts for data analysis
LO4: To produce illustrative data plots and carry out statistical tests
LO5: To get hands-on experience to work with Statistical graphs.

Course Outcome
By the end of this course students should be able to
CO1: CO1: Critically thinking on import, manage and structure data files for using business analytics.
CO2: CO2: Apply analytical knowledge with the R interface and language for different fields.
CO3: CO3: Provide leadership in analytics in existing datasets into R or create new ones
CO4: CO4: Cultivating cognitive skills acquired on existing data and performs all conventional statistical analysis tests
CO5: CO5: Capable to analyze problems using R knowledge on data management for sustainable development of the organisation.
CO6: CO6: Effectively solve business problems and make effective decision making using R Statistics.

Unit-1 Introduction to the R language (12 h)
Introduction to the R language - SAS versus R - R, S, and S-plus - Obtaining and managing R - Objects - types of objects, classes, creating and accessing objects - Arithmetic and matrix operations - Introduction to functions.

Unit-2 Working with R (12 h)
Working with R - Reading and writing data - R libraries - Functions and R programming – the If statement - looping: for, repeat, while - writing functions - function arguments and options – Basic R commands

Unit-3 Graphics (10 h)
Graphics - Basic plotting - Manipulating the plotting window - Advanced plotting using lattice library - Saving plots.

Unit-4 Standard statistical models in R (12 h)
Standard statistical models in R - Model formulae and model options - Output and extraction from fitted models - Models considered:Linear regression: lm() , Logistic regression: glm() , Linear mixed models: lme()

Unit-5   Advanced R (14 h)

Advanced R - Data management - importing, sub-setting, merging, new variables, missing data; Plotting – Loops and functions - Migration SAS to R – Plotting and Graphics in R – Writing R functions, optimizing R code– Bio-conductor, analysis of gene expression and genomics data. More on linear models – Multivariate analysis, Cluster analysis, dimension reduction methods (PCA). **"Current Streams of Thought"**.

Text Books

1. Raghav Bali, Dipanjan Sarkar and Tushar Sharma, *Learning Social Media Analytics with R,* Packt Publishing Ltd,2017
2. Nina Zumel and John Mount, *Practical Data Science with R,* Manning Publications Company, 2014

Supplementary Readings

1. Peter Dalgaard, *Introductory Statistics with R (Paperback)* 1st Edition Springer-Verlag New York, Inc. (ISBN 0-387-95475-9)
2. W. N. Venables and B. D. Ripley. 2002, Modern Applied Statistics with S. 4th Edition. Springer. (ISBN 0-387-95457-0)
3. Andreas Krause, Melvin Olson. 2005, *The Basics of S-PLUS*, 4th edition, Springer-Verlag, New York (ISBN 0-387-26109-5)
4. An Introduction to R. Online manual at the R website at http://cran.rproject.org/manuals.html-2000

Outcome Mapping

PO/CO	Programme Outcomes												Programme Specific Outcomes							
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
CO1	M													H						
CO2														H						
CO3																				M
CO4		L													M					
CO5											M			M						
CO6																	H			

H	**High Correlation**	M	**Medium Correlation**	L	**Low Correlation**

Semester – I   **19BBAC107: Spreadsheet Modeling**   **Credits: 4**
Hours: 60

Learning Objective

The objective of the course is

LO1: To cover all aspects of creating spreadsheet, performing calculations, formatting, some very widely used formulas
LO2: To enable the students to create, build models and customize graphs,
LO3: To develop advanced solutions on the worksheet in the areas of marketing, finance, statistics, production and human resource and to assemble the proper Excel tools.
LO4: To become expertise on Spreadsheet Modeling in Statistics
LO5: To understand the concepts of Spread Sheet Modeling In Production and Human Resource

Course Outcome

Upon completion of this course, the student will have the ability to

CO1: Perform, recognize and formulate business problems in using Excel spreadsheets
CO2: Evaluate or solve Excel spreadsheet models using professional software
CO3: Apply analytical knowledge in the concepts and techniques of spread sheets to solve the real-world business situations and take effective decisions
CO4: Critically thinking and compare the applications of Spread sheet modeling in real life situation
CO5: Use cognitive skills to the application of t-test and ANOVA through spread sheet and develop competitive edge for a large corporate.
CO6: Capable to analyze problems using spread sheet modeling in Finance, HR and Marketing fields.

Unit-1 Introduction to Spread sheet Modeling   (12 h)

Formulas/Formatting/Printing/Functions Cell references, Lookup tables, Linking disparate work books, Dynamic, linking, updating links, data validation, Goal seek, Pivottable, Sorting Charting and filtering and protecting spread sheets

Unit-2 Spread Sheet Modeling in Sales and Marketing: (12 h)

New product decision making–Sales and marketing data analysis

Unit-3 Spreadsheet Modeling in Finance (12 h)

Forecasting financial statements – NPV & IRR, Bond valuation, Stock valuation -   Fundamentals, Budgeting, Ratio analysis

Unit-4 Spreadsheet Modeling in Statistics (12 h)

Measures of central tendency, t test, ANOVA, Correlation, Regression and Time series

Unit-5 Spread Sheet Modeling In Production and Human Resource (12 h)

ABC analysis, Economic Order Quantity, Production budget – Employee payroll decision making.
"Current Streams of Thought".

Text Books

1. Kenneth R. Baker, *Optimization Modeling with Spreadsheets,* John Wiley & Sons*2015*
2. Walkenbach, John. Excel Bible .New Delhi: WileyIndia Pvt Ltd. 2ndedition, 2010

Supplementary Readings

1. MacDonald, Mathew. Excel: The Missing Manual. Sebastopol: O'reilly .2ndedition, 2010
2. Ragsdale, Cliff. T, Spread sheet Modelling and Decision Analysis. New York: Thomson south– western publications.6th edition, 2008
3. Monahan, George E. Management Decision Making : Spread Sheet, Modelling, Analysis. London: Cambridge University. 8th edition, 2000

Outcome Mapping

PO/CO	Programme Outcomes												Programme Specific Outcomes							
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
CO1													H							
CO2																	M			
CO3																	H			
CO4																		M		
CO5																M				
CO6																		L		

H	High Correlation	M	Medium Correlation	L	Low Correlation

19BBAC201: Marketing And CRM Credits: 3
Hours: 60

Learning Objective
The objective of the course is
LO1: acclimatize the participants about the environment of market, consumer behaviour
LO2: To identify, understand, and apply basic marketing concepts to solving marketing challenges
LO3: To train the students to develop a sound Integrated Marketing Communications plan
LO4: To develop the ability to design the best marketing strategy by analyzing the factors influencing the consumer decision
LO5: To understand the importance of CRM, its practices, techniques and application

Course Outcomes
Upon completing this course, the student will be able to
CO1: Acquire required skills in solving marketing related problems and challenges
CO2: Analyse the relevance of Marketing concepts and theories in evaluating environmental changes on marketing planning, strategies and practices
CO3: Determine strategies for developing new products and services that are consistent with evolving market needs
CO4: Formulate marketing plan and employ digital tools to analyze the effectiveness of a marketing campaign
CO5: Understand the implementation of CRM best practices and customer relationships
CO6: Work professionally in CRM team and exhibit leadership skills

Unit-1 Introduction of Marketing (12 h)
Definition of Market, Types of Markets, Meaning and Definition of Marketing, Scope of Marketing, Importance of Marketing, Functions of Marketing, Difference between Marketing and Selling– Market Leader Strategies – Market follower Strategies – Market Challenger Strategies and Market Niche Strategies - Demand forecasting methods - Market Segmentation –Target Marketing – Product differentiation – Market Positioning Strategy.

Unit-2 Marketing Mix – Product & Price (12 h)
Product – Classification of consumer goods and Industrial goods – Product lines – Product Life Cycle – New Product Development – Launching New Product – Product Innovation; Brand – Types; Packaging – Labelling Trade Marks – Copyrights – Patents. Pricing Strategy – Methods of Setting Price.

Unit-3 Marketing Mix - Physical Distribution and Promotion (12 h)
Marketing Channels – Direct Marketing – Industrial Marketing – Network Marketing – e–marketing – B2B – B2C – Distribution Network – Channel Management – Retailing – Wholesaling – Advertising – Publicity – Trade Promotion and Sales Promotion Methods.

Unit-4 CRM in Marketing   (12 h)
One-to-one Relationship Marketing – Cross Selling & Up Selling – Customer Retention, Behaviour Prediction – Customer Profitability & Value Modeling, - Channel Optimization – Event-based marketing. – CRM and Customer Service – The Call Centre, Call Scripting – Customer Satisfaction Measurement.

Unit-5 Analytical CRM (12 h)
Managing and sharing customer data - Customer information 2 databases - Ethics and legalities of data use - Data Warehousing and Data Mining concepts - Data analysis - Market Basket Analysis (MBA), Click stream Analysis, Personalization and Collaborative Filtering. **"Current Streams of Thought"**.

Text Books
1. Karunakaran, K..Marketing Management.New Delhi: Himalaya Publishing House. 3rd edition, 2013
2. Raju JK and Hema patil, Marketing Management, Himalaya publishers, 2013.
3. Govinda Bhat K., Customer Relationship Management, Himalaya publishers, 2016.

Supplementary Readings
1. Kotler, P., Keller, K. L. ,Koshy, A., Jha, M. Marketing Management: A South Asian Perspective. New Delhi: Pearson Education , 14th edn,.2013
2. Alok Kumar Rai, Customer Relationship Management Concept & Cases, Prentice Hall of India Private Limted, New Delhi. 2011
3. Gupta, G.B. and Rajan Nair. N., Marketing Management, Sultan Chand & Sons, New Delhi, 2011.
4. Ramaswamy, V.S. and S. Namakumari, Marketing Management, Global Perspective Indian Context, Macmillan, New Delhi, 2009.
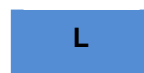5. Antony Lawrence, Customer Relationship Management, Himalaya Publishers, 2010.

Outcome Mapping

PO/CO	Programme Outcomes												Programme Specific Outcomes							
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
CO1		H												H			M			
CO2																		M		
CO3		L														L				
CO4				M																
CO5																		H		
CO6							M												M	M

H	High Correlation	M	Medium Correlation	L	Low Correlation

Semester – II   **19BBAC202: Business Strategy**   **Credits: 3**
Hours: 60

Learning Objective
The objective of the course is
LO1:   To describe the practical and integrative model of strategic management process that defines basic activities in strategic management
LO2:   To develop the ability in understanding business environment and formulation of strategies in the real business situation.
LO3:   To gain the knowledge and abilities in formulating strategies and strategic plans
LO4:   To demonstrate understanding of the concept of competitive advantage and its sources and the ability to recognize it in real-world scenarios
LO5:   To understand and think critically in relation to a particular problem, situation or strategic decision through real-world scenarios

Course Outcome

Upon completing this course, the student will be able to

CO1: Recognize the different stages of industry evolution and recommend strategies appropriate to each stage

CO2: Gain competence in crafting business strategies, evaluate action alternatives and make sound strategic decisions

CO3: Asses and analyse business risks and improve ability to achieve effective outcomes

CO4: Appraise the resources and capabilities of the firm in terms of their ability to confer sustainable competitive advantage

CO5: Demonstrate the ability to think critically in relation to a particular problem and formulate strategies that leverage a firm's core competencies

CO6: Recognize strategic decisions and make appropriate recommendations for ethical decision-making.

Unit-1   Basic concepts of strategy (12 h)

Evolution of Strategy – Strategic Management – Importance - Benefits – Strategic content - Strategic Management Process – Dimensions and levels of strategy – Strategy Formulation – Strategic Planning –– Strategic intent - Strategic Decision Making – Strategic Risks

Unit-2   Strategy Formulation – Competitive Strategy (12 h)

Strategic vision – Corporate Mission - Five forces that shape strategy – Generic Strategies – Environmental Scanning – Industry Analysis – Competitive Analysis –Value chain Analysis – BCG and GE Matrix.

Unit-3   Strategy Formulation - Corporate Strategy (12 h)

Long-term objectives – Grand Strategies: Development, Diversification, Integration, Defensive, Joint Ventures & Strategic Alliances – Functional Strategies: Marketing Strategies – Production Strategies – HR Strategies – Financial Strategies – Product Strategies.

Unit-4 Strategy Implementation (12 h)

Strategic Choice – 7S Framework – Strategy Implementation – Role of Organisational Structure, Leadership and Culture - Resource Allocation – Strategic Budgeting - Challenges of Strategy Implementation

Unit-5   Strategy Evaluation and control (12 h)

Strategy Review – Strategy Evaluation and Control – Strategic Audit – Michael Porter's Competitive Advantage - Strategy for Entrepreneurial Ventures and Small business - Strategy for non-profit organizations. **"Current Streams of Thought"**.

Text Books
1. Thompson A., Margaret A Peteraf, John E Gamble, A J Strickland and A K Jain, *Crafting and Executing Strategy*, McGraw Hill, New Delhi, 2013.
2. Ghosh, P.K., *Strategic Management Text & Cases*, Sultan Chand & Sons, New Delhi, 2012.

Supplementary Readings
1. John A. Pearce, Richard Robinson and Amita Mital, *Strategic Management*, Tata McGraw Hill, New Delhi, 2012.
2. Hill, Charles W.L., Gareth R. Jones, Strategic Management Theory: An Integrated Approach, Cengage Learning, New Delhi, 10th edition 2012
3. Francis Cherunilam, *Strategic Management*, Himalaya Publishing House, Mumbai, 2008.Fred R. David, *Strategic Management*, PHI Learning, New Delhi, 2009.

Outcome Mapping

PO/CO	Programme Outcomes												Programme Specific Outcomes							
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
CO1																M				
CO2																	H			
CO3																	M		M	
CO4											L									
CO5	H																			
CO6								M									H			

H	High Correlation	M	Medium Correlation	L	Low Correlation

Semester – II   **19BBAC203: Python For Decision Science (Practical)**   **Credits: 4**
Hours: 60

Learning Objective
The objective of the course is
LO1:   To learn to use Python for data analysis
LO2:   To understand how to use lists, tuples, and dictionaries in Python programs
LO3:   To define the structure and components of a Python program
LO4:   To learn how to design and program Python applications
LO5:   To provide students with an understanding of the role computation can play in solving problems

Course Outcome
Upon completing this course, the student will be able to
CO1:   Capture data from internet and other sources
CO2:   Plot data using appropriate Python visualization libraries
CO3:   Create and execute Pythton programs
CO4:   Interpret Object Oriented Programming using Python
CO5:   Design and program Python applications
CO6:   Adapt and combine standard algorithms to solve problems

Unit-1   Introduction to Python (12 h)
Knowledge, Machines, Languages, Types, Variables Operators and Branching –– Core elements of programs: Bindings, Strings, Input/Output, IDEs, Control Flow, Iteration, Guess and Check – Simple Programs: Approximate Solutions, Bisection Search, Floats and Fractions Newton - Raphson – Functions: Decomposition and Abstraction, Functions and Scope, Keyword Arguments, Specifications, Iteration vs Recursion, Inductive Reasoning, Towers of Hanoi, Fibonacci, Recursion on non-numerics, Files

Unit-2   Tuples and Lists (12 h)
Tuples, Lists, List Operations, Mutation, Aliasing, Cloning – Dictionaries: Functions as Objects, Dictionaries , Example with a Dictionary, Fibonacci and Dictionaries, Global Variables – Debugging: Programming Challenges, Classes of Tests, Bugs, Debugging, Debugging Examples– Assertions and Exceptions, Assertions, Exceptions, Exception Examples

Unit-3 Classes and Inheritance (12 h)
Object Oriented Programming, Class Instances, Methods Classes Examples , Why OOP, Hierarchies, Your Own Types – An Extended Example: Building a Class, Visualizing the Hierarchy, Adding another Class, Using Inherited Methods, Grade book Example, Generators

Unit-4 Computational Complexity (12 h)

Program Efficiency, Big Oh Notation, Complexity Classes Analyzing Complexity – Searching and Sorting Algorithms: Indirection, Linear Search, Bisection Search, Bogo and Bubble Sort, Selection Sort, Merge Sort

Unit-5 Optimization and Knapsack Problem (12 h)

Computational models, Intro to optimization - Knapsack Problem, Greedy solutions – Decision Trees and Dynamic Programming: Decision tree solution to knapsack Dynamic programming and knapsack, Divide and conquer – Graphs: Graph problems, Shortest path, Depth first search, Breadth first search. **"Current Streams of Thought"**.

Text Books
1. Python Programming using problem solving Approach by Reema Thareja, Oxford University, Higher Education Oxford University Press; First edition (10 June 2017), ISBN-10: 0199480173
2. Siddhartha Chatterjee and Michal Krystyanczuk, *Python Social Media Analytics*, Packt Publishing Ltd, 2017

Supplementary Readings
1. Thamassia and Micheal S Goldwasser, Data Structures and Algorithms in Python by Michael T Goodrich and Robertto, Wiley Publisher (2016)
2. Introduction to Computation and Programming using Python, by John Guttag, PHI Publisher, Revised and Expanded version (Referred by MIT)2010
3. Fundamentals of Python first Programmes by Kenneth A Lambert, Copyrighted material Course Technology Inc. 1st edition (6th February 2009)

Outcome Mapping

PO/CO	Programme Outcomes												Programme Specific Outcomes							
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
CO1				H									H							
CO2				H																
CO3				M																
CO4				M																
CO5				H																
CO6				H												M	M			

H	**High Correlation**	M	**Medium Correlation**	L	**Low Correlation**

Learning Objective

The objective of the course is

LO1: To understand various forecasting methods that includes obtaining the relevant data and carrying out the necessary computation

LO2: To equip students with various forecasting techniques

LO3: To gain knowledge on modern statistical methods for analyzing time series data

LO4: To enable students to use data for solving business and transactional problems

LO5: To understand and analyze complex multifactor data sets

Course Outcome

Upon completing this course, the student will be able to

CO1: Understand the various forecasting techniques and its advantages

CO2: Generate prediction equations to predict business behaviour based on critical inputs

CO3: Appreciate the fundamental advantage and necessity of forecasting in various situations

CO4: Apply knowledge to diagnose and solve problems in diverse situations

CO5: Choose an appropriate forecasting method in a particular environment

CO6: Improve forecast with better statistical models based on statistics

Unit-1   Introduction to Time Series Analysis (12 h)

Utility of the Time Series , Components of Time Series - Long term trend or secular trend - Seasonal variations - Cyclic variations - Random variations, Methods of Measuring Trend - Free hand or graphic method - Semi-average method - Method of moving averages - Method of least squares.

Unit-2   Models and Forecast for Time Series Data (12 h)

Additive model - multiplicative model, Editing of Time Series, Measurement of Seasonal Variation - Seasonal average method - Seasonal variation through moving averages - Chain or link relative method -Ratio to trend method, Forecasting Methods Using Time Series - Mean forecast - Naive forecast - Linear trend forecast - Non-linear trend forecast - Forecasting with exponential smoothing.

Unit-3 Vector Auto Regression Model (VAR) (12 h)

Estimation and Identification, - Variance decomposition and Impulse response functions, - Causality applying Granger Causality Tests and VAR model, -Forecasting using a VAR model.

Unit-4 Stochastic Process (12 h)

Stochastic process and its main characteristics - Stochastic process - Time series as a discrete stochastic process – Stationarity - Main characteristics of stochastic processes (means, auto co-variation and autocorrelation functions) - Stationary stochastic processes - Stationarity as the main characteristic of stochastic component of time series.

Unit-5 Linear Time Series (12 h)

Moving Average Models, Autoregressive Models, Mixed Autoregressive and Moving Average Models, Homogeneous Non-Stationary Processes: ARIMA Models, Box-Jenkins Methodology, Specification of ARFMA Models, SARFMA, ARMAX Models. **"Current Streams of Thought"**.
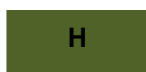
Text Books

1. K.Krishnamoorthy, Handbook of Statistical Distributions with Applications, Second Edition, November 6, 2015.

Supplementary Readings

1. Wayne A. Woodward, Henry L. Gray, Alan C Elliott, Applied Time Series Analyses, October 26, 2011 by CRC Press.
2. Jonathan D. Cryer, Kung-SikChan, Time Series Analysis: With Applications in R (Springer Texts in Statistics), second edition, November 17, 2010.
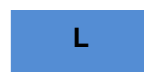3. Sally Lesik, Applied Statistical Inference with MINITAB®, December 21, 2009

Outcome Mapping

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1													M							
CO2	H																√			
CO3														H						
CO4														H						
CO5																		√		
CO6					M								M							

H	High Correlation	M	Medium Correlation	L	Low Correlation

Semester – II   **19BBAE206: Data Science**   **Credits: 4**
Hours: 60

Course Outcome
Upon completing this course, the student will be able to
CO1: Demonstrate an understanding of the importance of data mining and the principles of business intelligence
CO2: Appreciate the merits and demerits of various data mining models, tools & techniques
CO3: Design and develop Data warehouses
CO4: Apply Data mining techniques to match business objectives and add value to business
CO5: Define and apply metrics to measure the performance of various data mining algorithms
CO6: Apply BI to solve practical problems, interpret and visualize the results and provide decision support

Learning Objective
The objective of the course is
LO1: To know to derive meaning form huge volume of data and information
LO2: To work through all stages of a data mining methodology.
LO3: To enable students to effectively identify sources of data and process it for data mining
LO4: To make students well versed in all data mining algorithms, methods of evaluation
LO5: To develop competence in data mining applications

Unit-1 Introduction to Data Mining (12 h)
Data mining, Text mining, Web mining, Spatial mining, Process mining, BI process- Private and Public intelligence, Strategic assessment of implementing

Unit-2 Data Warehousing (12 h)
Data ware house – characteristics and view - OLTP and OLAP - Design and development of data warehouse, Meta data models, Extract/ Transform / Load (ETL) design.

Unit-3 Data Mining Tools, Methods and Techniques (12 h)
Regression and correlation; Classification- Decision trees; clustering –Neural networks; Market basket analysis- Association rules-Genetic algorithms and link analysis, Support Vector Machine, Ant Colony Optimization

Unit-4 Modern Information Technology & Its Business Opportunities (12 h)
Business intelligence software, BI on web, Ethical and legal limits, Industrial espionage, modern techniques of crypto analysis, managing and organizing for an effective BI Team

Unit-5 BI and Data Mining Applications (12 h)

Applications in various sectors – Retailing, CRM, Banking, Stock Pricing, Production, Crime, Genetics, Medical, Pharmaceutical field. **"Current Streams of Thought"**.

Text Books
1. Anil Maheshwari, Data Analytics Made Accessible, Kindle edition,2019
2. Foster Provost & Tom Fawcett, Data Science for Business: What You Need to KnowOreilly books, 2013.

Supplementary Readings
1. Jiawei Han, Micheline Kamber and Jian Pei, *Data Mining: Concepts and Techniques*, 3rd ed., Morgan Kaufmann Publishers, 2012
2. Ian H.Witten, Eibe Frank and Mark A.Hall, *Data Mining: Practical Machine Learning Tools and Techniques* (3rd ed.). Morgan Kaufmann, 2011 (ISBN 978-0-12-374856-0)
3. Efraim Turban, Ramesh Sharda, Jay E. Aronson and David King, *Business Intelligence,* Pearson, 2008.

Outcome Mapping

PO/CO	Programme Outcomes												Programme Specific Outcomes							
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
CO1															H					
CO2													H							
CO3																√				
CO4													L		√					
CO5														M						
CO6		M												M						

H	High Correlation		M	Medium Correlation		L	Low Correlation

Semester – II   **19BBAE207 Business Intelligence – Big Data & Cloud Computing**   **Credits: 4**
Hours: 60

Learning Objective

The objective of the course is
LO1: To provide foundational knowledge associated with the Cloud Computing
LO2: To acclimatize with different cloud programming platforms and tools
LO3: To understand big data analysis tools and techniques
LO4: To provide the knowledge based on the development of Cloud Service
LO5: To learn the applications of Cloud Computing

Course Outcome

Upon completing this course, the student will be able to
CO1: Understand the principles of Business Intelligence and Big data
CO2: Identify problems, and explain, analyze, and evaluate various cloud computing   solutions
CO3: Explain and identify the techniques of big data analysis in cloud
CO4: Choose appropriate technologies, algorithms, and approaches for the related issues
CO5: Compare the applications of Collaborating using Cloud Service
CO6: Apply Business Intelligence methods that support decision process in business operations

Unit-1   Understanding Cloud Computing (12 h)

Cloud Computing – History of Cloud Computing – Cloud Architecture – Cloud Storage –Cloud Computing Matters – Advantages and Disadvantages of Cloud Computing – Companies in the Cloud Today – Cloud Services

Unit-2   Developing Cloud Services (12 h)

Web-Based Application – Pros and Cons of Cloud Service Development – Types of Cloud Service Development – Software as a Service – Platform as a Service – Web Services – On-Demand Computing – Discovering Cloud Services Development Services and Tools – Amazon Ec2 – Google App Engine – IBM Clouds

Unit-3   Cloud Computing For Everyone (12 h)

Centralizing Email Communications – Collaborating on Schedules – Collaborating on To-Do Lists – Collaborating Contact Lists – Cloud Computing for the Community – Collaborating on Group Projects and Events – Cloud Computing for the Corporation

Unit-4 Using Cloud Services (12 h)

Collaborating on Calendars, Schedules and Task Management – Exploring Online Scheduling Applications – Exploring Online Planning and Task Management – Collaborating on Event Management – Collaborating on Contact Management – Collaborating on Project Management – Collaborating on Word Processing - Collaborating on Databases – Storing and Sharing Files

Unit-5 Other Ways to Collaborate Online (12 h)

Collaborating via Web-Based Communication Tools – Evaluating Web Mail Services – Evaluating Web Conference Tools – Collaborating via Social Networks and Groupware – Collaborating via Blogs and Wikis. **"Current Streams of Thought"**.

Text Books
1. Wilfried Grossmann and Stefanie Rinderle-Ma, Fundamentals of Business Intelligence, Springer- 2015
2. Srinivasan A. and Suresh J., Cloud Computing: A Practical Approach for Learning and Implementation, Pearson Education, 2014

Supplementary Readings
1. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online,Que Publishing, August 2008
2. Haley Beard, Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008
3. John W. Rittinghouse, James F. Ransome, Cloud Computing: Implementation, Management, and Security, 2001
4. Sangeeta Gautam, BM Cognos Business Intelligence v10: The Complete Guide, IBM Press. Copyright. 2012.

Outcome Mapping

PO/CO	Programme Outcomes												Programme Specific Outcomes							
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
CO1				M									L							
CO2				M											M	M				
CO3				M					H						M					
CO4				M									L			M				
CO5				M													M			
CO6				M													M	H		

H	High Correlation	M	Medium Correlation	L	Low Correlation

Semester – II	**19BBAC208 Applied Project in Big Data Analysis**	Credits: 2

Course Objective

Students should undergo an observational study to learn from either, small and medium business units or from online resources. They should get versatile exposure in big data analysis using various data available in the establishments or they may get exposure in doing analysis with data available from social media or online resources. They can make use of second semester evening hours and weekends to undergo the study. They are expected to submit a report of their study for evaluation.

Applied project evaluation in big data analysis will be done for 100 marks which includes Dissertation (75 marks) and Viva voce (25 marks) and the minimum requirement for passing the project is 50 marks. A periodical review will be carried out to assess the originality of the project.

Guidelines

- The duration of the study is 40 hours.
- The students have to select a small and medium business units or from online resources.
- Students have to visit the enterprise during the evening hours or on leave days to complete the project if they select a business unit.
- Important concepts related to business analytics have to be studied and the same have to be reported.
- Students have to submit the report about the project they are involved in.
- Students should get the attendance from the firm and attach the same in the report if they do study in business unit.
- Students are allotted a guide in the department.
- Frequent discussions have to be made with the guide for the completion of the project.

| Semester – III | **19BBAC301: Data Visualization (HADOOP / TABLEU)** | Credits: 3
Hours: 60 |

Learning Objective
The objective of the course is
LO1: To provide the basics of data visualization techniques namely Hadoop and Tableu
LO2: To get hands-on experience to work with Data Visualization techniques
LO3: To understand the concepts related to Hadoop Ecosystem and Yarn
LO4: To get exposure to Tableu user interface and data connection
LO5: To attain knowledge on group and hierarchies in datasets

Course Outcome
After completing the course, students will be familiar with
CO1: the basics of data visualization techniques namely Hadoop and Tableu
CO2: working with data visualization techniques
CO3: understanding the concepts related to Hadoop Ecosystem and Yarn
CO4: getting exposure to Tableu user interface and data connection
CO5: knowledge on groups and hierarchies in datasets
CO6: distributing, sharing and exporting worksheets and dashboards

Unit-1 Introduction to HADOOP (12 h)
Big Data – Apache Hadoop & Hadoop Eco System – Moving Data in and out of Hadoop – Understanding inputs and outputs of Map Reduce - Data Serialization

Unit-2 HADOOP Architecture (12 h)
Hadoop Architecture, Hadoop Storage: HDFS, Common Hadoop Shell commands , Anatomy of File Write and Read., Name Node, Secondary Name Node, and Data Node, Hadoop Map Reduce paradigm, Map and Reduce tasks, Job, Task trackers - Cluster Setup – SSH &Hadoop Configuration – HDFS Administering –Monitoring & Maintenance.

Unit-3 HADOOP Ecosystem AND Yarn (12 h)
Hadoop ecosystem components - Schedulers - Fair and Capacity, Hadoop 2.0 New Features Name Node High Availability, HDFS Federation, MRv2, YARN, Running MRv1 in YARN

Unit-4 Introduction to TABLEAU (12 h)
Introduction to Tableau 8 - Tableau User Interface - Basic Tableau Design Flow - Basic Visualization Design - Show Me! choosing Mark Types color - Size, and Shape Options - shaped Axis Charts-combination Charts - Measure Names - Measure Values - Data Connection - Connecting to Various Data Sources - Customizing Your View of the DataSets

Unit-5 GROUPS – HIERARCHIES (12 h)
Groups – Hierarchies - Extracting Data - Data Blending - Top 10 Chart - Bar Chart, Line Chart - Area Chart - Text Table/Cross Tab - Scatter Plot/Bubble Chart - Bullet Chart, Box Plot- Tree Map - Pie Chart - World Cloud - Tableau maps - Geocoded Fields - Dashboard Actions - Distributing and Sharing Your Dashboards - Exporting Worksheets and Dashboards
Publishing to Tableau Server - Creating Tableau Server User Filters - Smartphones and Tablets with iOS and Android. **"Current Streams of Thought"**.

Text Books
1. Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, "Professional Hadoop Solutions",
2. Wiley, ISBN: 9788126551071, 2015.
3. Chris Eaton, Dirk deroos et al. , "Understanding Big data ", McGraw Hill, 2012.

Supplementary Readings
1. Tom White, "HADOOP: The definitive Guide" , O Reilly 2012.
2. "Information Dashboard Design: Displaying Data for At-a-glance Monitoring" by Stephen Few 2010
3. "Beautiful Visualization, Looking at Data Through the Eyes of Experts by Julie Steele, Noah Iliinsky" 2010
4. "The Visual Display of Quantitative Information" by Edward R.Tufte 2008

Outcome Mapping

PO/CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
				Programme Outcomes												**Programme Specific Outcomes**				
CO1				L									H							
CO2															M					
CO3		M												M						
CO4							M										L			
CO5																			M	
CO6																				M

H	High Correlation		**M**	Medium Correlation	**L**	Low Correlation

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Semester – III   **19BBAC302: E-Governance And Cyber Law**   **Credits: 3**
Hours: 60

Learning Objective
The objective of the course is
LO1:   To introduce the cyber world and cyber law in general
LO2:   To explain about the various facets of cyber crimes
LO3:   To enhance the understanding of problems arising out of online transactions and provoke them to find solutions
LO4:   To clarify the Intellectual Property issues in the cyber space and the growth and development of the law in this regard,
LO5:   To educate about the regulation of cyber space at national and international level.

Course Outcome
After completing the course, students will be familiar with
CO1:   Understanding concepts related to cyber world and cyber law in general
CO2:   Develop competitive edge on various facets of cyber crimes
CO3:   Problems arising out of online transactions and provoke them to find solutions
CO4:   Intellectual property issues in the cyber space and the growth and development of the law
CO5:   Regulation of cyber space at national and international level.
CO6:   Upholding ethical standards in cyber laws and intellectual property issues

Unit-1   Introduction to Web Technology (12 h)
Introduction, Computers and its Impact in Society, Overview of Computer and Web Technology, Need for Cyber Law, Cyber Jurisprudence at International and Indian Level –
Introduction to e-governance, techniques, e-governance in India, Challenges faced, Indian theory of Public administration

Unit-2   International Cyber Law (12 h)
Cyber Law - International Perspectives, UN & International Telecommunication Union (ITU) Initiatives, Council of Europe - Budapest Convention on Cybercrime, Asia-Pacific Economic Cooperation (APEC), Organization for Economic Co-operation and Development (OECD), World Bank, Commonwealth of Nations

Unit-3 Cyber Crimes & Legal Framework (12 h)

Concepts of Cyber Crimes & Legal Framework, Cyber Crimes against Individuals, Institution and State, Hacking, Digital Forgery, Cyber Stalking/Harassment, Cyber Pornography, Identity Theft & Fraud, Cyber terrorism, Cyber Defamation, Different offences under IT Act, 2000

Unit-4 Dispute in Cyberspace (12 h)

Dispute Resolution in Cyberspace 1.Concept of Jurisdiction 2. Indian Context of Jurisdiction and IT Act, 2000. 3. International Law and Jurisdictional Issues in Cyberspace. 4. Dispute Resolutions

Unit-5 Ethics and Business (12 h)

Moral & ethical dilemmas. Ethics and Business: A sense of business ethics. Ethics and International Business: Ethics Issues beyond borders. **"Current Streams of Thought"**.

Text Books

1. Satyanarayana.J, E Government: The Science of the Possible, PHI Learning Pvt. Ltd.. (2012)
2. SudhirNaib, The Information Technology Act, 2005: A Handbook, OUP, New York, (2011)

Supplementary Readings

1. Verma S, K, Mittal Raman, Legal Dimensions of Cyber Space, Indian Law Institute, New Delhi, (2004)
2. S. R. Bhansali, Information Technology Act, 2000, University Book House Pvt. Ltd., Jaipur (2003).
3. Vasu Deva, Cyber Crimes and Law Enforcement, Commonwealth Publishers, New Delhi, (2003)

Outcome Mapping

PO/CO	Programme Outcomes												Programme Specific Outcomes							
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CO1													L							
CO2																M				
CO3	L																M			
CO4				M										M						
CO5																				H
CO6								H										H		

H	High Correlation		M	Medium Correlation		L	Low Correlation

Semester – III **19BBAC303: SOFT SKILLS** Credits: 3
Hours: 60

Learning Objective

The objective of the course is

LO1: To enable students to better understand themselves and the importance of soft skills in order to meet the professional expertise and its competitiveness with necessary skills

LO2: To improve their communication skills both in oral and written

LO3: To enhance the employability skills of the students like goal setting, career planning, etc

LO4: To understand the concepts of emotional intelligence, team building and team spirit at work place

LO5: To make familiar with the decision making skills of the students so as to take right decision at right time

Course Outcome

After completing this course the students will be familiar with

CO1: Better understanding on themselves and know the importance of soft skills in order to meet the professional expertise and its competitiveness with necessary skills

CO2: Communication skills both in oral and written

CO3: Employability skills of the students like goal setting, career planning, etc

CO4: Understanding the concepts of emotional intelligence, team building and team spirit at work place

CO5: Decision making skills of the students so as to take right decision at right time

CO6: Commitment to sustainable development using various skills

Unit-1 Soft Skill and Personality Development (12 h)

Soft skills – Meaning and Importance, Self concept - Self awareness, Self development, Know Thyself – Power of positive attitude – Etiquette and Manners

Listening – Types of Listening – Effective Listening – Barriers to Listening – Assertive communication

Unit-2 Communication Skills (12 h)

Oral communication – Forms – Types of speeches - Public Speaking –– Presentation – Elements of effective presentation – Use of visual aids in presentation Written communication – Strategies of writing – Business letters – form, structure & formats – Types of business letters – Memos – Agenda & Minutes Non-verbal communication – Body language – Proxemics

Unit-3 Interpersonal Skills (12 h)

Interpersonal skills – Relationship development and maintenance – Transactional Analysis Conflict resolution skills – levels of conflict – handling conflict - Persuasion – Empathy – Managing emotions – Negotiation – types, stages & skills – Counselling skills

Unit-4 Employability Skills (12 h)

Goal setting – Career planning – Corporate skills – Group discussion – Interview skills – Types of Interview - Interview body language - E-mail writing – Job application – cover letter - Resume preparation

Unit-5 Work Skills (12 h)

Decision making skills – Problem solving – Emotional Intelligence – Team building skills – team spirit – Time management – Stress management – resolving techniques. **"Current Streams of Thought"**.

Text Books
1. Ghosh. B.N (2012), Managing Soft Skills for Personality Development, Edited volume, Tata McGraw Hill Education Pvt Ltd., New Delhi.
2. Bretag Tracey, Crossman Joanna and Bordia Sarbari (2012), Communication Skills, Tata McGraw Hill Education Pvt Ltd., New Delhi.

Supplementary Readings
1. Neera Jain and Shoma Mukherji (2012), Effective Business Communication, Tata McGraw Hill Education Pvt Ltd., New Delhi.
2. Rao. M.S (2011), Soft Skills - Enhancing Employability: Connecting Campus with Cororate, I.K International Publishing House Pvt. Ltd., New Delhi.
3. Ashraf Rizwi. M (2010), Effective Technical Communication, Tata McGraw Hill Education Pvt Ltd., New Delhi
4. Krishna Mohan and Meera Banerji (2009), Developing Communication Skills, 2nd Edition, MacMillan Publishers India Ltd., New Delhi.

Outcome Mapping

PO/CO	Programme Outcomes												Programme Specific Outcomes							
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CO1																M				
CO2			L													M				
CO3														L						
CO4							M												H	
CO5																	M			
CO6											H									H

H	High Correlation	M	Medium Correlation	L	Low Correlation

Semester – III   **19BBAC304: SQL (Practical)**   **Credits: 3**
Hours: 60

Learning Objective
The objective of the course is
LO1: To provide foundational knowledge on SQL
LO2: To familiarize the students with all concepts of SQL, exception handling
LO3: To understand the process of using and managing functions
LO4: To get familiar with the process of using, creating and managing packages
LO5: To practice various commands in SQL

Course Outcome
After completing this course the students will be familiar with
CO1: Analyzing foundational knowledge on SQL
CO2: Managing all concepts of SQL, exception handling
CO3: Understanding the process of using and managing functions
CO4: The process of using, creating and managing packages
CO5: Practicing various commands in SQL
CO6: Effective communication with computers in machine language

Unit-1 Introduction to PL/SQL (12 h)
Fundamentals: Introduction to PL/SQL - Benefits of PL/SQL - Creating PL/SQL Blocks. Defining Variables and Data types: Using Variables in PL/SQL - Recognizing PL/SQL Lexical Units - Recognizing Data Types - Using Scalar Data Types - Writing PL/SQL Executable Statements - Nested Blocks and Variable Scope - Good Programming Practices. Using SQL in PL/SQL: Review of SQL DML - Retrieving Data in PL/SQL - Manipulating Data in PL/SQL - Using Transaction Control Statements

Unit-2 Program Structures to Control Execution Flow (12 h)
Conditional Control: IF Statements - Conditional Control: CASE Statements - Iterative Control: Basic Loops - Iterative Control: WHILE and FOR Loops - Iterative Control: Nested Loops. Using Composite Datatypes: • User-Defined Records - • Indexing Tables of Records. Using Cursors and Parameters: Introduction to Explicit Cursors - Using Explicit Cursor Attributes - Cursor FOR Loops - Cursors with Parameters - Using Cursors for UPDATE - Using Multiple Cursors

Unit-3 Exception Handling (12 h)

Handling Exceptions - Trapping Oracle Server Exceptions - Trapping User-Defined Exceptions - Recognizing the Scope of Exceptions. Using and Managing Procedures: Creating Procedures - Using Parameters in Procedures - Passing Parameters

Unit-4 Using and Managing Functions (12 h)

Creating Functions - Using Functions in SQL Statements - Review of the Data Dictionary - Managing Procedures and Functions - Review of Object Privileges - Using Invoker's Rights and Autonomous Transactions. Using and Managing Packages: Creating Packages - Managing Package Concepts - Advanced Package Concepts. Getting the Best out of Packages: Persistent State of Package Variables - Using Oracle-Supplied Packages

Unit-5 Improving PL/SQL Performance (12 h)

Using Dynamic SQL - Improving PL/SQL Performance. Using and Managing Triggers: Introduction To Triggers - Creating DML Triggers - Creating DDL and Database Event Triggers - Managing Triggers. Recognizing and Managing Dependencies: Introduction to Dependencies - Understanding Remote Dependencies. Using the PL/SQL Compiler: Using PL/SQL Initialization Parameters - Displaying Compiler Warning Messages - Using Conditional Compilation - Hiding Your Source Code. **"Current Streams of Thought"**.

Text Books

1. Anthony DeBarros, Practical SQL: A Beginner's Guide to Storytelling with Data, No Starch Press, 2018
2. Ben Forta, "SQL in 10 Minutes, Sams Teach Yourself", 4th Edition, Pearson Education, Inc, 2013

Supplementary Readings

1. James R. Groff and Paul N. Weinberg, Andrew J. Opel, "SQL: The complete reference", Third Edition, McGraw Hill, 2010
2. Alan Beaulieu "Learning SQL", Second Edition, O'Reilly Media, Inc., 2009
3. Alex Kriegal and Boris M Trucknov, "SQL BIBLE", Second Edition, Weily Publishing Inc.2008

Outcome Mapping

PO/CO	Programme Outcomes												Programme Specific Outcomes							
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
CO1														H						
CO2			L										L							
CO3			M												M					
CO4															H					
CO5																		M		
CO6			L														M			

H	**High Correlation**		**M**	**Medium Correlation**	**L**	**Low Correlation**

Learning Objective

The objective of the course is

LO1:　To provide fundamental knowledge on predictive analysis and modeling
LO2:　To familiarize the students with the concepts of sampling multivatiate design and analysis
LO3:　To get insights into sampling design, tools and techniques
LO4:　To understand the predictive analysis concepts like simple linear regression and logistics and multinomial regression
LO5:　To know the applications of predictive analysis in various functional areas

Course Outcome

After completing the course, students will be familiar with

CO1:　fundamental knowledge on predictive analysis and modeling
CO2:　the concepts of sampling multivariate design and analysis
CO3:　getting insights into sampling design, tools and techniques
CO4:　the predictive analysis concepts like simple linear regression and logistics and multinomial regression
CO5:　the applications of predictive analysis in various functional areas
CO6:　cultivating aptitude in designing the framework of quantitative research

Unit-1
Conceptual foundations of research (12 h)

Meaning of research and scope of research methodology, Identification of problem area, Formulation of research questions, Typology of Research Designs. Overview of quantitative research, Logic of Inquiry, Construction of theories, Conceptual framework in quantitative research. Introduction to Academic Writing, Structure of Academic Writing, Reading for Research, Academic Styles, Plagiarism, Publication, Online Resources – Specific Research Methodology

Unit-2　Sampling Design and Tools (12 h)

Sampling: Process and Types sampling; probability and non-probability sampling, Validity:
Internal and external validity, Threats to Validity: Threats to internal validity and external validity, balancing internal and external validity. Reliability: Factors influencing reliability.

Unit-3　Multivariate Designs and Analysis (12 h)

Introduction to Multivariate methods and analysis, Discriminant Analysis Multiple, logistic and hierarchical regression Factor analysis, structural equation modeling (SEM), Meta analysis, Mediational Analysis, Canonical Analysis. Advantages of multivariate strategies

Unit-4 Predictive analysis (12 h)

Simple linear regression: Coefficient of determination, Significance tests, Residual analysis, Confidence and Prediction intervals Multiple linear regression: Coefficient of multiple coefficient of determination, Interpretation of regression coefficients, Categorical variables, heteroscedasticity, Multi-collinearity, outliers, Auto regression and Transformation of variables

Unit-5 Logistic and Multinomial Regression (12 h)

Logistic and Multinomial Regression: Logistic function, Estimation of probability using logistic regression,　Deviance,　Wald Test,　Hosmer Lemshow Test Forecasting: Moving average, Exponential smoothing, Trend, Cyclical and seasonality components, ARIMA (autoregressive integrated moving average).Application of predictive analytics in retail, direct marketing, health care, financial services, insurance, supply chain, etc. **"Current Streams of Thought"**.

Text Books
1. Max Kuhn and Kjell Johnson, Applied Predictive Modeling, Springer Science & Business Media. 2018
2. Uma Sekaran and Roger Bougie, Research methods for Business, 5th Edition, Wiley India, New Delhi, 2012.

Supplementary Readings
1. William G Zikmund, Barry J Babin, Jon C.Carr, AtanuAdhikari,Mitch Griffin, Business Research methods, A South Asian Perspective, 8th Edition, Cengage Learning, New Delhi, 2012.
2. Donald R. Cooper, Pamela S. Schindler and J K Sharma, Business Research methods, 11th Edition, Tata McGraw Hill, New Delhi, 2012.
3. Alan Bryman and Emma Bell, Business Research methods, 3rd Edition, Oxford University Press, New Delhi, 2011.

Outcome Mapping

PO/CO	Programme Outcomes												Programme Specific Outcomes							
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
CO1				M									L							
CO2															L					
CO3																			H	
CO4																	M			
CO5					M									L				H		
CO6		L															M			

H	High Correlation	M	Medium Correlation	L	Low Correlation

Semester – III   **19BBAE307: Business Optimization**   Credits: 4
Hours: 60

Learning Objective
The objective of the course is
LO1: To provide foundational knowledge associated with the domain of business optimization and analytics
LO2: To get exposure to solution for business related problems with the help of linear programming models and methods
LO3: To get hands on experience in optimization using Excel to solve business problems
LO4: To familiarize the students with all concepts of optimization techniques
LO5: To understand the simulation for analytics, and process mining

Course Outcome
After completing the course, students will be familiar with
CO1: foundational knowledge associated with the domain of business optimization and analytics
CO2: getting exposure to solution for business related problems with the help of linear programming models and methods
CO3: getting hands on experience in optimization using Excel to solve business problems
CO4: all concepts of optimization techniques
CO5: the simulation for analytics and process mining
CO5: optimizing business using critical thinking process with the help of different mathematical models

Unit-1   Modeling (12 h)
Overview: processes, Big Data, Models. Productivity and efficiency. Classification of models. Sensitivity analysis. The seven-step modeling process. Spread sheet modeling. Excel's pivot function .

Unit-2   Linear Programming (12 h)
Linear Programming, Introduction to Linear Programming (LP). Graphical representation. Basic assumptions. The simplex algorithm. Infeasibility and unboundedness. Production problem example. Production scheduling. Bond portfolio optimization. Extracting additional meaning from LP models: shadow prices, sensitivity analysis

Unit-3   Visualization (12 h)
 Visualization, Organization/sources of data, Importance of data quality. Dealing with missing or incomplete data, Data Classificatio

Unit-4 Decision modeling (12 h)
Decision modeling, Optimization Use of Excel to solve business problems: e.g. marketing mix, capital budgeting, portfolio optimization, Goal programming; pareto optimality and trade-off curves; the Analytic Hierarchy Process (AHP)

Unit-5   Process Mining (12 h)
Process Mining, Concept and content of workflow logs; discovering the underlying process; discovering exceptions. Process Mining (Course Notes). ProM - process mining toolkit. **"Current Streams of Thought"**.

Text Books
1. Judith S. Hurwitz, Alan Nugent, Fern Halper and Marcia Kaufman, *Big Data For Dummies,* John Wiley & Sons- 2013
2. Weske, Mathias (2007), Business Process management: Concepts Languages and Architectures. Berlin: Springer-Verlag.

Supplementary Readings
1. Kelton, W. David, et al. (2006). Simulation with Arena, McGraw-Hill Professional (5th edition).
2. Winston, Wayne L. and S. Christian Albright, "Practical Management Science." Pacific Grove, CA: Duxbury, 2001 (3rd edition). (W&A)
3. VasantDhar and Roger Stein (1997). Seven methods for transforming corporate data into business intelligence. Upper Saddle River: Prentice Hall.

Outcome Mapping

PO/CO	Programme Outcomes												Programme Specific Outcomes							
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
CO1														L						
CO2																	M			
CO3				M												M				
CO4																M				
CO5																		H		
CO6	L																			H

H	High Correlation	M	Medium Correlation	L	Low Correlation

19BBAC308: Project
(Intern with Analytics Firm)

Project Training

Summer project is an on–the–job training that inculcates practical knowledge and improves performance by giving an insight into business realities. As a part of the curriculum, the project is intended to input practical and conceptual knowledge to the students which is to be carried out for 45 days during May–June.

A committee is constituted for the overall Co-ordination of the students. The students undertake projects in various business analytics firms all over the country. Faculty members also render their help in finding project placements at various business analytics firms. Students will be allotted faculty guides and they are advised to undertake projects based on their individual area of specialization. The topics are selected by consulting with their project guides and company guides.

MBA project End Semester Evaluation will be done for 75 marks which includes Dissertation (50 marks) and Viva voce (25 marks) and the minimum requirement for passing the project is 38 marks. The internal assessment evaluation carries 25 marks that constitute two reviews (I review-10 marks and II review-15 marks) and the minimum requirement for passing the internal evaluation is 12 marks. Overall the minimum passing requirement for the project is 50 marks.

A Project Evaluation Committee will be formed comprising the Head of the Department, Project Supervisor, and a senior faculty.

Project Related Activities

- Project discussions for students with their guides have to be made once in a week.
- Students can make use of the computer lab facilities for execution of their project work and for preparation of their report.
- Frequent workshops and review meetings will be conducted with trainers and experts of various disciplines.
- A formal interim – project presentation will be held before their juniors. This presentation acts as a good ground of experience on the part of the presenters while a good beginning of insight for the juniors.
- A mock viva–voce will be held before appearing for their main project viva–voce examination to gain an experience.
- Best Project Contest will be conducted every year to provide a platform to exhibit the skills they have acquired during the summer project training.
- Students are encouraged to participate in the National Level Project contest held at various institutions.
- Students are also encouraged to work towards publishing a paper along with the help of their faculty guide to add a real value to their project work.

Semester – IV	**19BBAC401: Operations And Supply Chain Analytics**	**Credits: 3** **Hours: 60**

Learning Objective

The objective of the course is

LO1:   To provide foundational knowledge associated with the operations analytics
LO2:   To provide foundational knowledge associated with the supply chain analytics
LO3:   To describe the various tools and techniques for implementation of analytics based on the supply chain drivers such as location, logistics and inventory
LO4:   To describe the various techniques for analytics based on the Multi Attribute Decision Making (MADM) and risk
LO5:   To provide the applications of analytics in operations and supply chain

Course Outcomes

After completing this course, the student will learn

CO1:   To recognize on the fundamental concepts of location and layout.
CO2:   To understand on the implementation of analytics in location and layout.
CO3:   To understand the inventory techniques for analytics.
CO4:   To analyze the inventory using aggregate production model
CO5:   To identify the different network models.
CO6:   To Analyze the role and applications of Descriptive Analytics in a Supply Chain

Unit-1 Warehousing Decisions (12 h)

Warehousing Decisions, Mathematical Programming Models, P-Median Methods, Guided LP Approach, Balmer – Wolfe Method, Greedy Drop Heuristics, Dynamic Location Models, Space Determination and Layout Methods

Unit-2 Inventory Management (12 h)

Inventory Management, Inventory aggregation Models, Dynamic Lot sizing Methods, Multi-Echelon Inventory models, Aggregate Inventory system and LIMIT, Transportation Network Models, Notion of Graphs, Minimal Spanning Tree,

Unit-3 Path Algorithms (12 h)

Shortest Path Algorithms, Maximal Flow Problems, Multistage Transshipment and Transportation Problems, Set covering and Set Partitioning Problems, Traveling Salesman Algorithms, Advanced Vehicle Routing Problem Heuristics, Scheduling Algorithms-Deficit function Approach and Linking Algorithms

Unit-4 Data Envelopment Analysis (12 h)

Analytic Hierarchy Process, Data Envelopment Analysis, Risk Analysis in Supply Chain, Measuring transit risks, supply risks, delivering risks

Unit-5 Application in SCM (12 h)

Risk pooling strategies, Fuzzy Logic and Techniques-Application in SCM. **"Current Streams of Thought"**.
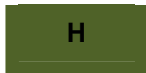
Text Books

1. Khalid Zidan,*Supply Chain Management: Fundamentals, Strategy, Analytics & Planning for Supply Chain & Logistics Management,* CreateSpace Independent Publishing Platform, 2016.
2. Chan, Hing Kai, Subramanian, Nachiappan, Abdulrahman and Muhammad Dan-Asabe, *Supply Chain Management in the Big Data Era,* IGI Global. 2016

Supplementary Readings
1. GeradFeigin, Supply Chain planning and analytics – The right product in the right place at the right time, Business Expert Press, 2011
2. Peter Bolstorff, Robert G. Rosenbaum, Supply Chain Excellence: A Handbook for Dramatic Improvement Using the SCOR Model, AMACOM Div American MgmtAssn, 2007
3. Robert Penn Burrows, Lora Cecere, Gregory P. Hackett, The Market-Driven Supply Chain: A Revolutionary Model for Sales and Operations Planning in the New On-Demand Economy, AMACOM Div American Mgmt Assn, 2001

Outcome Mapping

PO/CO	Programme Outcomes												Programme Specific Outcomes							
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
CO1					M								L							
CO2														M						
CO3		L															M			
CO4																	M			
CO5																		H		
CO6											H					M				

H	**High Correlation**	M	**Medium Correlation**	L	**Low Correlation**

Semester – IV **19BBAC402: Human Resource Analytics** Credits: 3 Hours: 60

Learning Objective
The objective of the course is
- LO1: To understand the concepts, tools and techniques of HR Analytics that could be applied as resource management evidence based.
- LO2: To understand HR reports & to understand the decisions technologies.
- LO3: Recognize the fundamental strategic priorities of the business and learn how to provide enhanced decision support leveraging analytics.
- LO4: Develop a structured approach to apply judgment, and generate insight from data for enhanced decision making.

Course Outcome
After completing this course, the student will be able to
- CO1: Analyse appropriate internal and external human resource metrics benchmarks and indicators.
- CO2: Operate relational databases and make recommendations regarding the appropriate HRIS to meet organization's human resource needs.
- CO3: Employ appropriate software to record, maintain, retrieve and analyse human resources information (e.g., staffing, skills, performance ratings and compensation information).
- CO4: Apply quantitative and qualitative analysis to understand trends and indicators in human resource data; understand and apply various statistical analysis methods
- CO5: Manage information technology to enhance the efficiency and effectiveness of human resource functions within the organization.
- CO6: Analyse the Employee work history & Multi-rater reviews

Unit-1 Introduction to HR Analytics: (12 h)

Basics of HR Analytics: Concept and Evolution of HR Analytics & data sources - HCM: 21Model. Use of workforce analytics to improve decision making. Analytics and Prediction.Introduction to HR Metrics and predictive analytics.Importance of HR Analytics.Data Analytic techniques using software packages.Future of Human Resource Analytics.HR Metrics and HR Analytics; Intuition versus analytical thinking.

Unit-2 Creating business understanding for HR initiatives: (12 h)

Workforce segmentation and search forcritical job roles; Statistical driver analysis – association and causation; Linking HR measures to business results; choosing the right measures for scorecards; Identifying and using key HR Metrics.

Unit-3 Forecasting budget numbers for HR costs: (12 h)

Workforce planning including internal mobility and career pathing; training and development requirement forecasting and measuring the value and results of improvement initiatives; optimizing selection and promotion decisions

Unit-4 Predictive modelling in HR: (12 h)

Employee retention and turnover; workforce productivity and performance; scenario planning.

Unit-5 Communicating with data and visuals (12 h)

Data requirements; identifying data needs and gathering data; HR data quality, validity and consistency; Using historical data; Data exploration; Data visualization; Association between variables; Insights from reports; Root cause analysis of HR issues. **"Current Streams of Thought"**.

Text Books

1. Jac Fitz-Enz and John Mattox, *Predictive Analytics for Human Resources,* John Wiley & Sons. 2014

Supplementary Readings

1. Tracey Smith, *HR Analytics: The What, Why and How*, Numerical Insights LLC. 2013
2. The New HR Analytics: Predicting the Economic Value of Your Companys Human Capital Investments: Predicting the Economic Value of Your Company's Human Capital Investments Hardcover – Import, 1 Jun 2010,
3. Jac Fitz-Enz , The New HR Analytics: Predicting the Economic Value of YouCompany's Human Capital Investments, Amacom.2009
4. Gene Pease, Boyce Byerly and Jac Fitz-enz, Human Capital Analytics: How to Harness the Potential of Your Organization's Greatest Asset, John Wiley & Sons-2009.

Outcome Mapping

PO/CO	Programme Outcomes												Programme Specific Outcomes							
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
CO1					M								L							
CO2														M						
CO3		L															M			
CO4																	M			
CO5																		H		
CO6												H				M				

H	High Correlation	M	Medium Correlation	L	Low Correlation

Learning Objective
The objective of the course is
LO1:   To provide hands on experience in financial statement analysis.
LO2:   To expose to general tools of financial analysis, theoretical concepts, and practical valuation issues.
LO3:   To be comfortable with using firm's financial statements to develop understanding of their performance and to establish basis for making reasonable evaluation estimates.
LO4:   To identify the value-relevant information contained within financial statements;
LO5:   To understand the impact of financial reporting choices on the usefulness of reported earnings to predict future performance

Course Outcome
After completing this course, the student will be able to
CO1:   Describe and apply the basic techniques of financial statement analysis
CO2:   Understand the relationship between strategic business analysis, accounting analysis and financial analysis
CO3:   Identify and utilise value-relevant information contained within financial statements
CO4:   Recognize and explain the fundamental role of accounting numbers in the¬ valuation of entities and the key financial claims on these entities assets (equity and debt securities)
CO5:   Understand the impact of financial reporting choices on the usefulness of reported¬ earnings to predict future performance
CO6:   To introduces basic concepts of Investment

Unit-1   Introduction to financial analysis (12 h)
Finance and accounting – meaning –Types of companies - Financial statement analysis – on the basis of materials used – on the basis of modus operandi – Comparing financial and non-financial listed companies performance through annual as a bench marking against competitor and industry.

Unit-2   Financial analysis through ratios (12 h)
Accounting analysis – Factors influencing accounting quality – Steps in accounting analysis – Drivers of firms profitability and growth – Measuring overall profitability – Decomposing profitability – Measuring earnings - Evaluating Investment management – Liquidity analysis and net trade cycle - Evaluating financial management& leverage analysis – Assessing sustainable growth rate of companies – Assessing historical pattern of key ratios among financial (CAMEL analysis) and non financial firms – Analysis of cash flow

Unit-3   Prospective and Credit analysis (12 h)
Prospective analysis – Techniques - Elements of detailed forecast – Sensitivity analysis –-Decision tress analysis of capital budgeting - Credit analysis – Market for credit –Credit analysis process – Factors driving debt rating – Kalpan – Urwitz model of debt rating – Prediction of distress and turnaround – MDA, PCA and RPA

Unit-4   M & A and Equity analysis (12 h)
Mergers and acquisition – Motivations for M & A – Valuation of M & A - Valuation of equity and debt – Primary and secondary market analysis - Assessing market value of equity with book value and index, P/B analysis, Price earnings ratio – PEG analysis – F Score – Risk and return of equity – Dividend pattern analysis.

Unit-5   Financial reporting (12 h)
Financial reporting –Concepts – users, Objectives of financial reporting – Qualitative characteristics of information in financial reporting – basic problems of disclosure – Role of SEBI in IFRS – Statutory disclosures in IFRS – Corporate reporting practices in India-Challenges in financial reporting. **"Current Streams of Thought"**.

Text Books
1. Raghurami Reddy Etukuru, *Enterprise Risk Analytics for Capital Markets: Proactive and Real-Time Risk,* iUniverse, 2014
2. Victoria Lemieux, *Financial Analysis and Risk Management: Data Governance, Analytics and Life,* Springer Science & Business Media. 2012

Supplementary Readings
1. M Y Khan and P H Jain, " Management accounting, McGraw hill, 5th edition-2009
2. Palepu Healy and Bernard, : Business analysis & valuation, South western college publication, 2nd edition-2009
3. Raghu Palat, " Fundamental analysis for investors" ,-2008

Outcome Mapping

PO/CO	Programme Outcomes												Programme Specific Outcomes							
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
CO1	L												L							
CO2								M							M					
CO3																M				
CO4																	M			
CO5		M																	H	
CO6											H									

H	High Correlation	M	Medium Correlation	L	Low Correlation

Semester – IV   **19BBAC404: Marketing And Retail Analytics**   Credits: 3
Hours: 60

Learning Objective
The objective of the course is
LO1: To create an understanding of the use of analytics in Marketing and Retail Management.
LO2: To use the predictive analysis in decision making.
LO3: To Understand the types of positioning strategies followed by the companies.
LO4: To analyze and contrast products and services.
LO5: To understand the various segments for a product.

Course Outcome
After completing this course, the student will learn
CO1: To understand the market place and the changing consumer needs.
CO2: To identify various methods followed to build CRM practices.
CO3: To recognize the various segments for a product.
CO4: To identify the various positioning strategies followed by the companies.
CO5: To compare and contrast products and services.
CO6: To Understand the Role of Analytics in Retail sector

Unit-1   Introduction to Marketing (12 h)
Understanding the marketplace and consumer needs, Designing a Customer Driven Marketing Strategy, Building Customer Relationships, Consumer Behaviour and Business Buyer Behaviour

Unit-2   Marketing Strategy (12 h)
Market Segmentation and Product Positioning, Market Segmentation, Market Targeting, Target Market Strategies, Product Positioning and Differentiation, Choosing a Differentiation and Positioning Strategy.

Unit-3   Product and Service (12 h)
Products and services, product and service classifications, consumer products, industrial products, product and service decisions, product and service attributes, product support services, services marketing – the nature and characteristics of a service

Unit-4   Retail Analytics – I (12 h)
Customer Analytics Overview; Quantifying Customer Value.Using Stata for Basic Customer Analysis.Predicting Response with RFM Analysis, Statistics Review, Predicting Response with Logistic Regression, Predicting Response with Neural Networks.Predicting Response with Decision Trees.

Unit-5   Retail Analytics – II (12 h)
The digital evolution of retail marketing, Digital natives, Constant connectivity Social interaction, Predictive modeling, Keeping track, Data availability, Efficiency optimization. **"Current Streams of Thought"**.

Text Books
1. Karunakaran, K..Marketing Management. New Delhi: Himalaya Publishing House. 3rd edition, 2013
2. Kumar, A., Meenakshi. Marketing Management. New Delhi: Vikas Publishing House Pvt Ltd. , 2nd edition,2013

Supplementary Readings
1. Kotler, P., Keller, K. L. ,Koshy, A., Jha, M. Marketing Management: A South Asian
2. Perspective. New Delhi: Pearson Education , 14th edn,.2013
3. Ramaswamy, V. S., Namakumari, S. Marketing Management Global Perspective, Indian Context. New Delhi: Macmillan India Limited. 3rd edition, 2009
4. Rajan, S. Marketing Management. India: New Delhi: Tata McGraw-Hill Education. 4th edn,2005
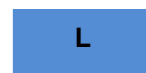
Outcome Mapping

PO/CO	Programme Outcomes												Programme Specific Outcomes							
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
CO1		L											L							
CO2		M												M						
CO3														M						
CO4								M									M			
CO5									H									H		
CO6											H									H

H	High Correlation		M	Medium Correlation		L	Low Correlation

Learning Objective
The objective of the course is
LO1:   To understand the basic theory underlying machine learning.
LO2:   To be able to formulate machine learning problems corresponding to different applications.
LO3:   To understand a range of machine learning algorithms along with their strengths and weaknesses.
LO4:   To be able to apply machine learning algorithms to solve problems of moderate complexity.
LO5:   To apply the algorithms to a real-world problem, optimize the models learned and report on the expected accuracy that can be achieved by applying the models.

Course Outcome
After completing this course, the student will be able to
CO1:   Appreciate the importance of visualization in the data analytics solution
CO2:   Apply structured thinking to unstructured problems
CO3:   Understand a very broad collection of machine learning algorithms and problems
CO4:   Learn algorithmic topics of machine learning and mathematically deep enough to introduce the required theory
CO5:   Develop an appreciation for what is involved in learning from data.

Unit-1   Introduction (12 h)
Learning Problems – Perspectives and Issues – Concept Learning – Version Spaces and Candidate Eliminations – Inductive bias – Decision Tree learning – Representation – Algorithm – Heuristic Space Search.

Unit-2   Neural Networks and Genetic Algorithms (12 h)
Neural Network Representation – Problems – Perceptrons – Multilayer Networks and Back Propagation Algorithms – Advanced Topics – Genetic Algorithms – Hypothesis Space Search – Genetic Programming – Models of Evalution and Learning.

Unit-3 Bayesian and Computational Learning (12 h)
Bayes Theorem – Concept Learning – Maximum Likelihood – Minimum Description Length Principle – Bayes Optimal Classifier – Gibbs Algorithm – Naïve Bayes Classifier – BayesianBelief Network – EM Algorithm – Probability Learning – Sample Complexity – Finite and Infinite Hypothesis Spaces – Mistake Bound Model.

Unit-4 Instant Based Learning (12 h)
K- Nearest Neighbour Learning – Locally weighted Regression – Radial Bases Functions – Case Based Learning.

UNIT-5 Advanced Learning (12 h)
Learning Sets of Rules – Sequential Covering Algorithm – Learning Rule Set – First Order Rules – Sets of First Order Rules – Induction on Inverted Deduction – Inverting Resolution – Analytical Learning – Perfect Domain Theories – Explanation Base Learning – FOCL Algorithm – Reinforcement Learning – Task – Q-Learning – Temporal Difference Learning. **"Current Streams of Thought"**.

Text Books
1. Marco Gori , *Machine Learning: A Constraint-Based Approach*, Morgan Kaufmann. 2017
2. Ethem Alpaydin, Machine Learning: The New AI, MIT Press-2016

Supplementary Readings
1. Ryszard S. Michalski, Jaime G. Carbonell and Tom M. Mitchell, *Machine Learning: An Artificial Intelligence Approach, Volume 1,* Elsevier. 2014
2. Machine Learning: An Algorithmic Perspective, Stephen Marsland, Taylor & Francis 2009
3. Machine Learning – Tom M. Mitchell, - MGH 2009

Outcome Mapping

PO/CO	Programme Outcomes												Programme Specific Outcomes							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	L												L							
CO2														M						
CO3		M											M							
CO4											H							H		
CO5																			H	
CO6		M																		H

H	**High Correlation**		
M	**Medium Correlation**		
L	**Low Correlation**		

Semester – IV	**19BBAE407: Social & Web Analytics**	Credits: 4
		Hours: 60

Learning Objective
The objective of the course is
LO1: To understand how big data principles implemented in Social media & Web
LO2: To understand the data processing for Social media &Web analytics
LO3: To describe the different metrics for Social media &Web analytics
LO4: To understand the application for Social media & Web analytics
LO5: To analyze the types of data for Social media & Web analytics.

Course Outcome
After completing this course, the student will learn
CO1:   To recognize the fundamental concepts of Social media.
CO2:   To recognize the fundamental concepts of Web.
CO3:   To analyze data obtained from social media.
CO4:   To explain the experimental methods in web data analytics.
CO5:   To recognize the types of data for Social media & Web analytics.
CO6:   To Utilize various Application Programming Interface (API) services to collect data from different social media sources

Unit-1   Introduction (12 h)
History of Social media- Basics of Social Media and Business Models- Basics of Web Search Engines and Digital Advertising. Web& social media (websites, web apps , mobile apps & social media) .

Unit-2   Web analytics (12 h)
Web analytics 2.0 framework (clickstream, multiple outcomes analysis, experimentation and testing, voice of customer, competitive intelligence, Insights) - Experimental methods in web data analytics - Air France Internet Marketing Case Study - Econometric modeling of search engine ads

Unit-3 Structured data Vs unstructured data (12 h)
Data (Structured data, unstructured data, metadata, Big Data and Linked Data) -Lab testing and experiment design (selecting participants, within-subjects or between subjects study, counterbalancing, independent and dependent variable; A/B testing, multivariate testing, controlled experiments)

Unit-4 Web metrics and web analytic (12 h)
Web metrics and web analytics - PULSE metrics (Page views, Uptime, Latency, Seven-day active users) on business and technical issues; -HEART metrics (Happiness, Engagement, Adoption, Retention, and Task success) on user behaviour issues; -On-site web analytics, off-site web analytics, the goal-signal-metric process

Unit-5 Social media analytics (12 h)

Social media analytics - Social media analytics (what and why) - Social media KPIs (reach and engagement) - Performing social media analytics (business goal, KPIs, data gathering, analysis, measure and feedback) 6. Data analysis language and tools Cases and examples - User experience measurement cases - Web analytics cases 8. Group work and hands on practice - Usability study planning and testing; and data analysis using software tools (Google Analytics, Google Sites, R and Deducer). **"Current Streams of Thought"**.

Text Books
1. Brian Clifton, Advanced Web Metrics with Google Analytics, John Wiley & Sons; 3rd Edition edition (30 Mar 2012)
2. Jim Sterne, Social Media Metrics: How to Measure and Optimize Your Marketing Investment, John Wiley & Sons (16 April 2010)

Supplementary Readings
1. AvinashKaushik, Web Analytics 2.0: The Art of Online Accountability and Science of Customer Centricity, John Wiley & Sons; Pap/Cdr edition (27 Oct 2009)
2. Tom Tullis, Bill Albert, Measuring the User Experience: Collecting, Analyzing, and Presenting Usability Metrics, Morgan Kaufmann; 1 edition (28 April 2008) .
3. Avinash Kaushik, *Web Analytics: An Hour a Day,* John Wiley & Sons. - 2007

Outcome Mapping

PO/CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
	Programme Outcomes												**Programme Specific Outcomes**							
CO1		L											L							
CO2		M												M						
CO3														M						
CO4								M									M			
CO5									H									H		
CO6										H										H

	High Correlation		Medium Correlation		Low Correlation
H		M		L	

19BBAC408: Comprehensive Viva-voce (Business Analytical and Subjects)   Credits: 2

VALUE ADDED COURSES

Even (II) Semester   19BVAC211 : SMALL BUSINESS MANAGEMENT   Credits: 2

Hours: 60

Learning Objectives:

The objectives of this course is

LO 1 To impart knowledge in project management tools and techniques practiced in a project.

LO 2 To provide exposure in the methods adopted in identifying a new project and to know the difference between pre-feasibility and feasibility study.

LO 3 To understand the role of entrepreneur in the Indian context and to expose to the importance of small scale industry.

Course outcomes:

Upon completion of the course, students will be able to

CO 1 Generate new methods to identify a project.

CO 2 Analyse the project organization structure.

CO 3 Critically evaluate the reasons for the sickness in small scale industry.

Unit–I Project Planning (14 hrs)

Definition of project – Classifications of projects – Importance – Scope – Project Identification – Idea generation and Screening – Project selection and Planning – Project Formulation – Project life cycle – Project Organisation – Roles and Responsibilities of project manager – Managing project team.

Unit–II Project Feasibility and Project Finance and Evaluation (12 hrs)

Pre–feasibility study – Market and Demand analysis – Feasibility Study: Technical – Commercial – Environmental – Socio economic – Managerial and Financial analysis – Detailed Project Report – Resource Survey – Selection of plant location – Project contracts – Insurance for projects – Project Implementation.

Estimating project time and cost – Cost of capital – Source of finance – Cost control – Project Scheduling and Monitoring – Project Information System and Documents – Project Report – Social Cost Benefit Analysis – Project Evaluation and Performance Review Techniques.

Unit–III Introduction to Entrepreneur (10 hrs)

Definition – Concept – Classification and types of entrepreneurs – Entrepreneurial Traits – Need and Important – Roles and Responsibilities of Entrepreneurs in Indian business context – Entrepreneurial Motivation – Entrepreneurial Development Programme: Role and objectives of the programme – Contents – Institutions aiding Entrepreneurs – Central and State level Institutions.

Unit–IV   Entrepreneurship Environment and Challenges (10 hrs)

Entrepreneurship environment: Social – Cultural – Political – Natural – Geographic – Technological – Economic Environment and its impact on Entrepreneurship – Factors affecting entrepreneurial growth – Globalization and its challenges – Steps to face global challenges – Strategies for the development of women entrepreneurs.

Unit–V   Small Business Management (14 hrs)

Small Enterprises – Definition – Classification – Characteristics – Ownership Structures – Steps involved in setting up a small business – Identifying and selecting a good Business opportunity – Market potential analysis – Marketing methods: Pricing and Distribution methods. Sickness in small Business: Concept – Magnitude – Causes and Consequences – Corrective Measures – Government Policy on Small Scale Enterprises – Growth Strategies in small industry: Expansion – Diversification – Joint Venture – Merger and Sub Contracting.

Text books:
1. Prasanna Chandra, Projects, Tata Mcgraw hill, Newdelhi, 2007
2. Khanka.S.S, Entrepreneurial Development, S.Chand& company, Nwedelhi, 2008.

Supplementary readings:
1. Clifford F. Gray and ErikW.Larson, Project management, Tata Mcgraw hill, Newdelhi,20007.
2. Nagarajan.K, Project Management, New Age International publishers, Newdelhi, 2007.
3. Robert D Hisrich, Michael P.Petersand Dean A. Shepherd, Entrepreneurships, Tata Mcgraw hill, Newdelhi,2007.
4. Vasant Desai, Dynamics of Entrepreneurial Development and Management, Himalayas publishing house, Newdelhi, 2008.

Outcome Mapping

PO/CO	Programme Outcomes												Programme Specific Outcomes							
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
CO1								M					L							H
CO2										H						M				
CO3	L									H							M			H
CO4				M										M						
CO5										H										H
CO6								M										H		

H	High Correlation	M	Medium Correlation	L	Low Correlation

Even (II) Semester   19BVAC212: INTRODUCTION TO BUSINESS ANALYTICS   Credits: 2

Hours: 60

Learning Objective:

LO 1 Studies core statistical techniques; data retrieval, analysis and mining;

LO 2 Decision modeling to effectively persuade in the project-oriented world of data-driven decisions.

LO 3 To understand the purpose of using business analysis tools within an organization, dataset for making a business decisions and R studio for data analysis.

Course Outcome

Upon completion of this course, the student will have the ability to

CO 1 Critically analyze the business problems especially solves business problems.

CO 2 Recognize, understand and apply the language, theory and models of the field of business analytics

CO 3 Students can able to understand the applications of business analytics.

CO 4 They have get ideas on data visualization and time series analysis.

CO 5 Compare the application of using R statistics

UNIT I Introduction to Business Analytics and Big Data (14 hrs)

Business Analytics – Definition - Need – Scope - A categorization of Analytical Methods – Analytics in action – Big data – Business analytics in practice – types of data – modifying data in excel – creating Distributions from data– measures of location

UNIT II   Application of Business Analytics (10 hrs)

Machine Learning - Introduction and Concepts - Differentiating algorithmic and model based frameworks, Decision analytics. Descriptive analytics - Predictive analytics - Prescriptive analytics.

UNIT III Decision support and Data Visualisation (10 hrs)

DSS- Executive and enterprise support- Automated decision support - Web analytics- Data mining -Applied artificial intelligence - Visual analysis: Data concepts – Data Dashboards - Data exploration & visualization - Scorecards

UNIT IV Time Series and Forecasting (14 hrs)

Time series pattern – forecasting accuracy – moving averages and exponential smoothing - using regression analysis for forecasting – determining the best forecasting model to use - building good spreadsheet model – What-If analysis – some useful excel functions for modeling – auditing spreadsheet model – a simple maximization problem.

UNIT V Data Analysis using R (12 hrs)

R Studio: Introduction – R data types and objects, reading and writing data - Data structures in R - R programming fundamentals - Advantages and disadvantages of using R.

Text Books

1) Majid Nabavi, David L.Olson, Introduction to Business Analytics, Business Expert Press, 2018
2) Umesh R Hodeghatta and Umesha Nayak, *Business Analytics Using R - A Practical Approach*- Apress, 2017.

Supplementary Readings

1) Jeffery D.Camm, James J. Cochran, Michael J. Fry, Jeffrey W. Ohlmann, David R. Anderson, Essentials of Business Analytics, Cengage Learning, 2015
2) Sandhya Kuruganti, Business Analytics: Applications To Consumer Marketing, McGraw Hill, 2015
3) Bernard Marr, Big Data: Using Smart Big Data, Analytics and Metrics to Make Better Decisions and Improve Performance, Wiley, 2015

Outcome Mapping

PO/CO	Programme Outcomes												Programme Specific Outcomes							
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
CO1			M					M					L							H
CO2										H										H
CO3	L									H							M			H
CO4				M										M						
CO5										H										H
CO6								M										H		

H	High Correlation		M	Medium Correlation		L	Low Correlation

Even (II) Semester   19BVAC213: E-GOVERNANCE AND CYBER LAW   Credits: 2

Hours: 60

Learning Objective

The objective of the course is

LO1:   To introduce the cyber world and cyber law in general

LO2:   To explain about the various facets of cyber crimes

LO3:   To enhance the understanding of problems arising out of online transactions and provoke them to find solutions

LO4:   To clarify the Intellectual Property issues in the cyber space and the growth and development of the law in this regard,

LO5:   To educate about the regulation of cyber space at national and international level.

Course Outcome

After completing the course, students will be familiar with

CO1:   Understanding concepts related to cyber world and cyber law in general

CO2:   Develop competitive edge on various facets of cyber crimes

CO3:   Problems arising out of online transactions and provoke them to find solutions

CO4:   Intellectual property issues in the cyber space and the growth and development of the law

CO5:   Regulation of cyber space at national and international level.

CO6:   Upholding ethical standards in cyber laws and intellectual property issues

Unit-1   Introduction to Web Technology (12 h)

Introduction, Computers and its Impact in Society, Overview of Computer and Web Technology, Need for Cyber Law, Cyber Jurisprudence at International and Indian Level –

Introduction to e-governance, techniques, e-governance in India, Challenges faced, Indian theory of Public administration

Unit-2   International Cyber Law (12 h)

Cyber Law - International Perspectives, UN & International Telecommunication Union (ITU) Initiatives, Council of Europe - Budapest Convention on Cybercrime, Asia-Pacific Economic Cooperation (APEC), Organization for Economic Co-operation and Development (OECD), World Bank, Commonwealth of Nations

Unit-3 Cyber Crimes & Legal Framework (12 h)

Concepts of Cyber Crimes & Legal Framework, Cyber Crimes against Individuals, Institution and State, Hacking, Digital Forgery, Cyber Stalking/Harassment, Cyber Pornography, Identity Theft & Fraud, Cyber terrorism, Cyber Defamation, Different offences under IT Act, 2000

Unit-4 Dispute in Cyberspace (12 h)

Dispute Resolution in Cyberspace 1.Concept of Jurisdiction 2. Indian Context of Jurisdiction and IT Act, 2000. 3. International Law and Jurisdictional Issues in Cyberspace. 4. Dispute Resolutions

Unit-5 Ethics and Business (12 h)

Moral & ethical dilemmas. Ethics and Business: A sense of business ethics. Ethics and International Business: Ethics Issues beyond borders. "Current Streams of Thought".

Text Books

3. Satyanarayana.J, E Government: The Science of the Possible, PHI Learning Pvt. Ltd.. (2012)
4. SudhirNaib, The Information Technology Act, 2005: A Handbook, OUP, New York, (2011)

Supplementary Readings
4. Verma S, K, Mittal Raman, Legal Dimensions of Cyber Space, Indian Law Institute, New Delhi, (2004)
5. S. R. Bhansali, Information Technology Act, 2000, University Book House Pvt. Ltd., Jaipur (2003).
6. Vasu Deva, Cyber Crimes and Law Enforcement, Commonwealth Publishers, New Delhi, (2003)

Outcome Mapping

PO/CO	Programme Outcomes												Programme Specific Outcomes							
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
CO1													L							
CO2																M				
CO3	L																M			
CO4				M										M						
CO5																				H
CO6								M										H		

H	High Correlation	M	Medium Correlation	L	Low Correlation

Odd (III) Semester   19BVAC311: MACHINE LEARNING   Credits: 2

Hours: 60

Learning Objective

The objective of the course is

LO1:   To understand the basic theory underlying machine learning.

LO2:   To be able to formulate machine learning problems corresponding to different applications.

LO3:   To understand a range of machine learning algorithms along with their strengths and weaknesses.

LO4:   To be able to apply machine learning algorithms to solve problems of moderate complexity.

LO5:   To apply the algorithms to a real-world problem, optimize the models learned and report on the expected accuracy that can be achieved by applying the models.

Course Outcome

After completing this course, the student will be able to

CO1:   Appreciate the importance of visualization in the data analytics solution

CO2:   Apply structured thinking to unstructured problems

CO3:   Understand a very broad collection of machine learning algorithms and problems

CO4:   Learn algorithmic topics of machine learning and mathematically deep enough to introduce the required theory

CO5:   Develop an appreciation for what is involved in learning from data.

Unit-1   Introduction (12 h)

Learning Problems – Perspectives and Issues – Concept Learning – Version Spaces and Candidate Eliminations – Inductive bias – Decision Tree learning – Representation – Algorithm – Heuristic Space Search.

Unit-2   Neural Networks and Genetic Algorithms (12 h)

Neural Network Representation – Problems – Perceptrons – Multilayer Networks and Back Propagation Algorithms – Advanced Topics – Genetic Algorithms – Hypothesis Space Search – Genetic Programming – Models of Evalution and Learning.

Unit-3   Bayesian and Computational Learning (12 h)

Bayes Theorem – Concept Learning – Maximum Likelihood – Minimum Description Length Principle – Bayes Optimal Classifier – Gibbs Algorithm – Naïve Bayes Classifier – BayesianBelief Network – EM Algorithm – Probability Learning – Sample Complexity – Finite and Infinite Hypothesis Spaces – Mistake Bound Model.

Unit-4   Instant Based Learning (12 h)

K- Nearest Neighbour Learning – Locally weighted Regression – Radial Bases Functions – Case Based Learning.

UNIT-5   Advanced Learning (12 h)

Learning Sets of Rules – Sequential Covering Algorithm – Learning Rule Set – First Order Rules – Sets of First Order Rules – Induction on Inverted Deduction – Inverting Resolution – Analytical Learning – Perfect Domain Theories – Explanation Base Learning – FOCL Algorithm – Reinforcement Learning – Task – Q-Learning – Temporal Difference Learning. "Current Streams of Thought".

Text Books

3. Marco Gori , *Machine Learning: A Constraint-Based Approach*, Morgan Kaufmann. 2017
4. Ethem Alpaydin, Machine Learning: The New AI, MIT Press-2016

Supplementary Readings
4. Ryszard S. Michalski, Jaime G. Carbonell and Tom M. Mitchell, *Machine Learning: An Artificial Intelligence Approach, Volume 1,* Elsevier. 2014
5. Machine Learning: An Algorithmic Perspective, Stephen Marsland, Taylor & Francis 2009
6. Machine Learning – Tom M. Mitchell, - MGH 2009

Outcome Mapping

PO/CO	Programme Outcomes												Programme Specific Outcomes							
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
CO1	L												L							
CO2														M						
CO3		M											M							
CO4											H							H		
CO5																			H	
CO6		M																		H

H	**High Correlation**	M	**Medium Correlation**	L	**Low Correlation**

Odd (III) Semester   19BVAC312: BLOCK CHAIN TECHNOLOGY   Credits: 2

Hours: 60

Learning Objectives

The Objective of this course is

LO1. To assess blockchain applications in a structured manner.
LO2.   To impart knowledge in block chain techniques and able to present the concepts clearly and structured.
LO3. To get familiarity with future currencies and to create own crypto token.

Course Outcomes

Upon completion of this course the students will be able to

CO1.Understand the various technologies and its business use.
CO2. Analyse the block chain applications in a structure manner.
CO3. Explain the modern concepts of block chain technology systematically.
CO4.Handle the cryptocurrency.
CO5. Understand the modern currencies and its market usuage.

Unit–I : Basic Concepts– No. of Hours - 12
     Introduction - Decentralized society - Disturbed Database, Byzantine General problem - Fault tolerance, Hadoop Distributed File System, Distributed Hash Table, ASIC resistance, Turing Complete - P2P network - Private key - Public key - Cryptography - Hash Function - Digital Signature - ECDSA - Memory Hard Algorithm - Zero Knowledge Proof.

Unit–II : Block Chain - No. of Hours – 12
     Introduction - Advantage over conventional distributed database - Network and protocols - Block chain network - Mining - Mechanism - Life Cycle of Block chain - Distributed consensus - Merkle Patricia Tree - Gas Limit - Transactions and Fee - Anonymity - Reward - Chain policy- Life of Block chain applications -Soft and Hard Fork - Private and Public blockchain.

Unit–III : Distributed Consensus - No. of Hours - 12
     Nakamoto consensus - Proof of work - Proof of Stake - Proof of Burn - Difficulty level - Sybil Attack - Energy Utilization and alternate - Fabric model - SDKs - Components of Fabric Model - Architecture of Hyperledger fabric.

Unit–IV: Cryptocurrency - No. of Hours - 12

   History - Distributed ledger - Bitcoin protocols - Mining strategy and rewards - Ethereum - construction - Truffle - DAO - dApps - Smart Contract - Boot strapping - GHOST Vulnerability - Attacks - Sidechain - Namecoin.

Unit–V : Cryptocurrency Regulations - No. of Hours - 12

   Stakeholders - Roots and Bitcoin - Legal Aspects - Crypto currency exchange - Black market and Global economy. Applications : IoT - Medical Record Management system - Domain Name Service and future of Blockchain - Business applications and assessing blockchain projects.

Text Books

1. Daniel Drescher, Block chain basics A non-technical introduction in 25 steps, Apress , 2017.
2. Paul Vigna & Michael J.Casey, The Age of Cryptocurrency, 2015.

Supplementary Readings

   1. Antonopoulos, Mastering Bitcoin : Unlocking Digital Cryptocurrencies.

   2. Satosh Nakamoto, Bitcoin : A peer-to-peer electronic Cash system.

   3. Mastering Blockchain - Imar Bashir - Second edition - Packt - 2018.

Outcome Mapping

PO/CO	Programme Outcomes												Programme Specific Outcomes							
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
CO1	L												L							
CO2														M						
CO3		M											M							
CO4											H							H		
CO5																			H	

H	High Correlation		M	Medium Correlation		L	Low Correlation	

Odd (III) Semester   19BVAC313: SUSTAINABLE DEVELOPMENT   Credits: 2

Hours: 60

Learning Objectives

The objective of this course is

LO1   : Understand the basic concept of sustainable management the environmental,

social and economic dimensions.

LO2   : Know the history of the sustainable development idea.

LO3   : Be able to discuss the conflicts which are involved in the SD concept on the

national as well as on the global scale.

LO4   : Be familiar with potential strategic options for SD (efficiency, sufficiency).

LO5   : Be able to discuss the (dis-) advantages of instruments for SD.

LO6   : Understand the SD challenge for companies their responsibility and their

potentials for action.

Course Outcomes

Upon completion of the course students will be able to

CO1 Further develop the ability of students to integrate and make autonomous use of their knowledge to sustain the environment.

CO2 Develop the students ability to deal with complex phenomena, issues and situations of sustainable development.

CO3 Develop the students potential towards, sustain the environment for professional activities that demand considerable autonomy or for research and development work.

CO4 Develop the ability of students to integrate various management concepts and procedures to sustain the environment with minimum cost.

CO5 Understand the role of corporate in environment sustainability.

CO6 Understand the role of various national and international organisation in sustainable development.

Unit-I: Introduction Fundamentals of Environment (14 h)

Status of environment - Environmental, social and economical issues - Need for sustainability - Nine ways to achieve sustainability - Linkage between population, resources, development and environment.

Unit -II Sustainable Concept (10 h)

Concept of sustainability - factors governing sustainable development-linkages among sustainable development - Environment and poverty - Determinants of sustainable development.

Unit - III Sustainable Development Goals (10h)

UN sustainable development goals -causes and potential consequences of climate change and their relationship to SDG. Environmental finance - Eco marketing - green advertisement - organic products - issues in marketing of organic products - Eco -tourism - Natural resource conservation and management.

Unit – IV Organisational Social Responsibility (12hr)

Corporate / Organisation Social Responsibility - sustainability strategy development - management tools for sustainable development - sustainable / ethical investment accounts - sustainable product development and design - conflict between farming and the environment.

Unit – V Organisations in SD (14 h)

Environmental impact assessment - participants in environmental management - approaches to environmental management - approaches to environmental management - emerging environmental issues - Role of international organisations, national and local governments, environmental organisation industry and commerce and non-government organisation.

Text Books

1. "Sustainable Development: Linking Economy, Society, Environment" by Tracey Strange and Anne Bayley, Himalaya Publication, Mumbai 2004.
2. "Innovation for Sustainable Development" by Jean - Yves Grosclaude and Rajendra K. Pachauri , Sultan Chand & Sons, New Delhi, 2011.

Supplementary Readings

1. "Engineering Applications in Sustainable Design and Development" by Bradley Striebi, New Delhi, Prentice Hall of India, 2003.
2. "Ecology and Sustainable Development" by P.S. Ramakrishnan, Sultan Chand & Sons, New Delhi, 2013.
3. "Management of Resources for Sustainable Development" by Sushma Goel, PHI Learning, New Delhi, 2008.

Outcome Mapping

PO/CO	Programme Outcomes												Programme Specific Outcomes							
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CO1	L						M						L							
CO2														M						
CO3		M											M							
CO4											H							H		
CO5								M											H	

H	High Correlation	M	Medium Correlation	L	Low Correlation

ASSESSMENT PATTERN

Continuous Internal Evaluation (25 Marks)

Bloom's Category Marks (out of 25)	Test	Assignment	Seminar	Non CIA		
				Activities	Industrial Visit	Quiz
Knowledge	√					√
Comprehension	√	√	√		√	√
Apply			√	√		
Analyze	√					√
Evaluate	√					
Create	√		√	√		

End Semester Examination (75 Marks)

Bloom's Category Marks	Test (75 Marks)
Knowledge	
Comprehension	
Application	
Analysis	
Synthesis	
Evaluation	
Creation	