COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY

(Abstract)

Faculty of Social Sciences – Deen Dayal Upadyay Kaushal Kendra – B.Voc in Business Process and Data Analytics & M.Voc in Technology and Management Consulting – Revised Syllabus – Approved – Orders issued.

CONFERENCE SECTION

No. Conf II/2941/1/AC-Social Science/2020 Dated, Kochi-22, 14.10.2020

Read : Item No I(e-I & II) of the Minutes of the meeting of the Academic Council held on 08.07.2020

ORDER

The Academic Council at its meeting held on 08.07.2020 along with the recommendations of the Standing Committee resolved to approve vide Item read above, the revised syllabi of the following programmes, as per Outcome Based Education (OBE) frame work, offered at Deen Dayal Upadyay Kaushal Kendra (DDUKK) under the Faculty of Social Sciences, from 2020-2021 admission onwards:

1. B.Voc in Business Process and Data Analytics
2. M.Voc in Technology and Management Consulting

Also resolved to constitute a committee consisting of Deans and Chairman, Boards of Studies to formulate a common frame work for the University to adopt the UGC direction for adopting MOOC course from SWAYAM portal.

Orders are issued accordingly.

Dr. MEERA V
REGISTRAR

To

1. Dr. S Harikumar, Dean Faculty of Social Sciences, Govind, Geethanjali, Opposite Changampuzha Library, Edappally P.O, Kochi - 24
2. The Director, DDU Kaushal Kendra, CUSAT, Kochi - 22
3. Dr. M B Santhosh Kumar, Associate Professor & Co-ordinator, MOOC, Division of Computer Science, School of Engineering, Kochi - 22
4. The Controller of Examinations/Joint Registrar (Academic)/ Assistant Registrar(Academic)
5. Academic A/C/Exam D/E/Y/Exam Confidential/IRAA/UGC(S) SC/ST Cell Sections
6. Day File/Stock File/File Copy.

RPR 5

SYLLABUS

B.Voc

in

BUSINESS PROCESS AND DATA ANALYTICS

(Prepared as per Outcome Based Education Framework to be effective from 2020 admission)

DDU KAUSHAL KENDRA

COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY

DDU KAUSHAL KENDRA

Vision

"Empowering Youth for a Skilled and Sustainable Nation"

Mission

M1. Offer quality education in emerging vocational domains in technology and management

M2. Impart skills education to develop industry-ready, employable professionals.

M3. Promote entrepreneurial orientation and skills among the students

M4. Inculcate innovation mind-set in students to excel in the emerging dynamic, global economy.

M5. Foster social commitment and sustainable business philosophy in students

Program Description

B.Voc. in Business Process and Data Analytics course is a Bachelors level vocational programme conforming to National Skill Qualification Framework (NSQF). Flexible course exit with certification is provided at Diploma, Advanced Diploma and Degree levels corresponding progressive job roles in the domains of Business Process and Data analytics. Course curriculum is aligned with the norms of the concerned Sector Skill Councils (SSC) for enabling the students to obtain skill certifications from the SSC concerned at various exit points.

The programme syllabus provides a balanced course coverage in the domains of management, business process, data analytics, predictive modelling and quantitative methods of management. The programme blends vocational skill development in these areas with interdisciplinary knowledge of computing, statistics and social science to mould industry ready graduates. Introduction to modern computing and data analytics methods provides the graduates of this programme with a sound base for adapting to innovations in business environment.

Programme Educational Objectives

Graduates of the B.Voc. program are expected to attain or achieve the following Program Educational Objectives within a few years of graduation:

PEO 1: Identify and describe complex business problems in terms of analytical models and find solutions that achieve stated objectives.

PEO 2: Interact effectively and professionally across all levels and functions of businesses in a customer-centric, socially responsible and ethical manner.

PEO 3: Develop new and improved innovative business processes after gap analysis through process redesign that supports organizational strategic objectives.

PEO 4: Identify lifelong learning opportunities to enhance knowledge base and vocational skills that contribute to the professional advancement and societal betterment.

PEO 5: Deliver projects in a timely manner using project management tools and techniques respecting the diversity of the team and exhibiting leadership skills where necessary.

Programme Articulation matrix

	M1	M2	M3	M4	M5
PEO1	2	3		1	2
PEO2	3	2	3		2
PEO3	2	3		3	
PEO4		3	3	2	2
PEO 5	3	3	3	2	

Programme Learning Outcomes

Students in the B.Voc program are expected to attain the following programme learning outcomes by the time they graduate the course.

PLO1: Apply quantitative modelling and data analysis techniques to the solution of real-world business problems, communicate findings, and effectively present results using data visualization techniques.

PLO2: Analyse the key business processes that drive the value chain of an organization using principles of business process management, Big Data Analytical Techniques and data mining methodologies.

PLO3: Identify and develop models using appropriate data analysis software for business decision making.

PLO4: Use research-based knowledge and methods to conduct investigations on complex problems and provide valid conclusions.

PLO5: Create solutions by utilising modern software tools and enhance organizational effectiveness.

PLO6: Apply ethical practices in everyday business activities and make well-reasoned ethical business process and data management decisions.

PLO7: Effectively communicate technical and non-technical information through oral, written and digital forms in an organizational environment.

Mapping of PLOs with PEOs

	PEO 1	**PEO 2**	**PEO 3**	**PEO 4**	**PEO 5**
Domain Knowledge	*	*			
Problem Analysis	*	*	*		*
Design/Development of solutions	*	*	*		*
Conduct investigations	*		*		
Modern tool usage	*		*	*	*
Societal & Ethical outlook		*			
Individual/Teamwork and communication		*			*

Programme Structure

SEMESTER I

Sl. No	Course No.	Name of the Course	Hours			Marks		Credit
			L	T	P	Internal	End semester	
1	KBD 1101	English Language Skills	4	1	0	50	50	4
2	KBD 1102	Principles of Management and Organizations	5	0	0	50	50	5
3	KBD 1103	Statistics for Business	5	2	0	50	50	5
4	KBD 1104	Functional Management for Business	5	1	0	50	50	5
5	KBD 1105	Programming Languages for Data Analytics	2	0	6	50	50	5
6	KBD 1106	Business Environment Analysis	4	1	0	50	50	4
7	KBD 1107	Workshop on Business communication skills (5 Days)					50	2
		Total				**300**	**350**	**30**

SEMESTER II

Sl. No.	Course No.	Name of the Course	Hours			Marks		Credit
			L	T	P	Internal	End semester	
1	KBD 1201	Strategic Communication for Workplaces	5	2	0	50	50	5
2	KBD 1202	Information Systems for Business	4	0	2	50	50	5
3	KBD 1203	Operations Research	6	2	0	50	50	6
4	KBD 1204	Fundamentals of Business Process Management	4	1	2	50	50	5
5	KBD 1205	Database Fundamentals	3	0	4	50	50	5
6	KBD 1206	Project I -Organisation Study- 15 working days. (50 marks for continuous assessment and 50 for written report after completion of the project)					100	4
		Total				**250**	**350**	**30**

SEMESTER III

Sl. No.	Course No.	Name of the Course	Hours			Marks		Credit
			L	T	P	Internal	End semester	
1	KBD 1301	Managerial Skill Development & Design Thinking	3	2	4	50	50	5
2	KBD 1302	Financial Accounting	5	0	0	50	50	5
3	KBD 1303	Business Ethics and Cyber law	4	0	0	50	50	4
4	KBD 1304	Production and Operations Management	4	1	0	50	50	4
5	KBD 1305	Data Visualization for Analytics	2	0	6	50	50	5
6	KBD 1306	Data Mining Techniques	2	0	6	50	50	5
7	KBD 1307	Workshop on Personal Productivity Improvement (5 Days)					50	2
		Total				**300**	**350**	**30**

SEMESTER IV

Sl.No	Course No.	Name of the Course	Hours			Marks		Credit
			L	T	P	Internal	End semester	
1	KBD 1401	Research Methodology	3	0	2	50	50	4
2	KBD 1402	Environmental Management	3	0	2	50	50	4
3	KBD 1403	Modern Project Management Practices	3	0	2	50	50	4
4	KBD 1404	Introduction to Econometric Methods	5	1	0	50	50	5
5	KBD 1405	Predictive Modelling	2	0	6	50	50	5
6	KBD 1406	Elective 1	3	0	2	50	50	4
7.	KBD 1407	Project II -Business Process Mapping for a duration of 15 working days. (50 Marks for continuous assessment, 50 marks for a written report after the completion of the project)					100	4
		Total				**300**	**400**	**30**

SEMESTER V

Sl.No	Course No.	Name of the Course	Hours			Marks		Credit
			L	T	P	Internal	End semester	
1	KBD 1501	Entrepreneurship Development and Management of Startups	4	0	2	50	50	4
2	KBD 1502	Strategic Self Marketing & Personal Branding	5	2	0	50	50	4
3	KBD 1503	Digital marketing and social media analytics	2	3	4	50	50	4
4	KBD 1504	Big Data Analytics	2	0	4	50	50	4
5	KBD 1505	Text and Web Analytics	3	0	4	50	50	5
6	KBD 1506	Business Model Analysis	5	1	0	50	50	5
	KBD 1507	Elective 2	3	1	2	50	50	4
		Total				**350**	**350**	**30**

SEMESTER VI

Sl.No	Course No.	Name of the Course	Max. Marks	Credit
1	KBD 1601	Project III - Main Project & Viva-Voce (Duration–80 days) Evaluation scheme will comprise i) Continuous assessment–100 marks ii) Final report – 100 marks &iii) Viva-Voce– 100 marks) This project intends to provide students with real hands-on experience on data analytics. Students can attach themselves to an organisation or work independently for this project. However, the project requires real business data for analytics.	300	26
2	KBD 1602	Workshop on Career Building (10 Days)	**100**	4
		Total	**400**	**30**

LIST OF ELECTIVES

E-1 Practical Accounting in Business Organizations

E-2 Computational Finance

E-3 Investment Analysis and Portfolio Management

E-4 HR Analytics

E-5 Introduction to Machine Learning

E-6 Case Development Skills for Analysts

General - Skill Compenent Ratio

	Credits
Skill Component	109
General Component	71
Total Credit	180

Mode of Evaluation

Mode of Evaluation will be fully internal for all papers out of which 50% marks are for continuous assessment throughout the semester and 50 % marks are for End-semester examination. The courses offered under this programme are categorized into four groups based on the learning objectives and assessment criteria.

I. Courses Under Group I

1. KBD 1102 Principles of Management and Organizations
2. KBD 1106 Business Environment Analysis
3. KBD 1201 Strategic Communication for Workplaces
4. KBD 1202 Information Systems for Business
5. KBD 1204 Fundamentals of Business Process Management
6. KBD 1302 Financial Accounting
7. KBD 1303 Business Ethics and Cyber law
8. KBD 1304 Production and Operations Management
9. KBD 1402 Environmental Management
10. KBD 1502 Strategic Self Marketing & Personal Branding
11. KBD 1404 Introduction to Econometrics
12. KBD 1403 Modern Project Management Practices
13. KBD 1501 Entrepreneurship Development and Management of Startups
14. KBD 1506 Business Model Analysis

Assessment Scheme for courses under Group I

Assessed Cognitive Ability	Weightage as a Percentage of Total Marks
Remember/ Understand	20%
Apply/Analyse	40 %
Evaluate/ Create	40 %

II. Courses Under Group II

1. KBD 1205 Database Fundamentals
2. KBD 1203 Operations Research
3. KBD 1105 Programming Languages for Data Analytics
4. KBD 1103 Statistics for Business
5. KBD 1301 Managerial Skill Development & Design Thinking

6. KBD 1305 Data Visualization for Analytics
7. KBD 1306 Data Mining Techniques
8. KBD 1401 Research Methodology
9. KBD 1405 Predictive Modelling
10. KBD 1503 Digital marketing and social media analytics
11. KBD 1504 Big Data Analytics
12. KBD 1505 Text and Web Analytics

Electives

13. Practical Accounting in Business Organizations
14. Computational Finance
15. Investment Analysis and Portfolio Management
16. HR Analytics
17. Introduction to Machine Learning
18. Case Development Skills for Analysts

Assessment Scheme for courses under Group II

Assessed Cognitive Ability	**Weightage as a Percentage of Total Marks**
Remember/Understand	20%
Apply/ Analyse	20%
Evaluate/ Create	60%

III. Courses Under Group III

1. KBD 1107: Workshop on Business communication skills (5 Days)
2. KBD 1307- Workshop on Personal Productivity Improvement (5 Days)
3. KBD 1602- Workshop on Career Building (10 Days)

Assessment scheme for courses under Group III

Assessed Cognitive Ability	**Weightage as a Percentage of Total Marks**
Remember	5 %
Understand	5 %
Apply	10 %
Analyse	10 %
Evaluate	30 %
Create	40 %

4.

1V. Courses Under Group IV

1. KBD 1206- Project I -Organization Study
2. KBD 1407- Project II -Business Process Mapping
3. KBD 1601- Project III - Main Project & Viva-Voce

Assessment scheme for courses under Group IV

Assessed Cognitive Ability	Weightage as Percentage of Total Marks
Apply/Analyse	30 %
Evaluate/Create	70%

Assessment pattern for End-Semester Examinations

The question paper for the End-Semester examination shall be set by the concerned teacher in advance which shall be scrutinized by the respective Centre/Department Council or by a committee consisting of the HOD and faculty members offering courses in that semester to ensure that:

- Questions are within the scope of the syllabus,
- Entire syllabus of the course is fairly covered in the question papers, and
- The question paper adheres to the assessment methodology for the course.

Modifications can be suggested by the council if necessary and such suggestions shall be incorporated in the final version of the question paper. The End-Semester question paper for Group I subjects shall have three parts namely Part-A, Part-B and Part C. The maximum marks for End-Semester Examinations will be 50. In Part A, there will be 5 compulsory questions which will be of short answer type. Each question in Part A carries two marks. Part-B will consist of seven questions out of which students must answer four questions. Each question will carry five marks in this part. In Part-C, student will answer two questions of 10 marks each from a group of three questions. One case study would be preferred among the three questions in this section. In case of Group II practical exams and Group III this pattern need not be followed. For Group II, the pattern and number of questions can be varied according to the nature of the subject and the same will be decided by the examiners

concerned based on the norms set by the Centre/Department council based on course learning outcomes. For Group III, assessment will be conducted by the resource person/s using appropriate evaluation methods following the course learning outcomes. In the case of Group IV, KBD 1206-Project I (Organization Study) and KBD 1407-Project II (Business Process Mapping) the duration will be 15 working days. Maximum marks for the above subjects will be 100 marks, apportioned as 50 marks for continuous assessment and 50 marks for written report submitted on completion of the project. For KBD 1601- Project III - Main Project and Viva-Voce the duration will be 80 days. Evaluation scheme is as follows i) Continuous assessment–100 marks ii) Final report – 100 marks and iii) Viva-Voce–100 marks.

SEMESTER I

Sl. No	Course No.	Name of the Course						Credit
			L	T	P	Internal	End semester	
1	KBD 1101	English Language Skills	4	1	0	50	50	4
2	KBD 1102	Principles of Management and Organizations	5	0	0	50	50	5
3	KBD 1103	Statistics for Business	5	2	0	50	50	5
4	KBD 1104	Functional Management for Business	5	1	0	50	50	5
5	KBD 1105	Programming Languages for Data Analytics	2	0	6	50	50	5
6	KBD 1106	Business Environment Analysis	4	1	0	50	50	4
7	KBD 1107	5 Days Workshop Programme (Skills in business presentation, writing and documentation)					50*	2
		Total				**300**	**350**	**30**

KBD 1101: ENGLISH LANGUAGE SKILLS

Course Description

The course covers grammar at an advanced application level in both the written and spoken forms of English. Sentence patterns are developed from basic patterns after studying the construction and usage of clauses and phrases. Enhancing communication skills in written contexts, including writing under timed conditions, is the objective in learning written composition. Learning about common errors of spelling, grammar and usage are essential for report writing and helps in developing good editing skills.

Course Learning Outcomes

LO1	Understand the usage patterns of language relating it to the context.	Cognitive level-Understand
LO2	Apply the rules of grammar in speech and written communication to make it clear, concise and unambiguous	Cognitive level- Apply
LO3	Analyse clauses, phrases and sentence structures by comparison with standard forms.	Cognitive level- Analyze
LO4	Evaluate written communication, apply grammatical rules and accepted usage patterns to correct errors in such communication.	Cognitive level-Evaluate
LO5	Create error free written compositions of different forms, avoiding common mistakes under the influence of mother tongue	Cognitive level- Create

Mapping of course outcomes with programme outcomes: Low=1, medium=2, High=3

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
LO1	1						3
LO2	1						3
LO3	1						3
LO4				1			3
LO5	1						3

Module 1

Parts of speech: Modern English grammar - relevance - grammar of spoken and written language, Words - parts of speech – brief introduction. Nouns - different types. Pronoun - different types. Adjectives. Verbs - tense-aspect - voice -mood - concord - types of verbs – transitive - intransitive-finite - non-finite.

Module 2

Parts of speech: Helping verbs and modal auxiliaries - function and use. Adverbs - different types. Prepositions - types. Conjunctions - subordinating and coordinating. Articles - possessives – quantifiers

Module 3

Sentence patterns and formation: Basic sentence patterns in English - constituents of sentences – subject – verb - object - complement -adverbials. Clauses – types- analysis and conversion of sentences – Active to Passive and vice versa – Direct to Indirect and vice versa – Degrees of Comparison, one form to the other. Phrases - various types of phrases

Module 4

Writing skills: Written Composition – precis writing – outline story – expansion of proverb – short essay, Practice exercises are to be given in all the forms to develop writing skills.

Module 5

Errors in writing: Errors in sentences – from mistakes in use of parts of speech - concord – collocation - sequences of tense - errors due to mother tongue influence, Examples of common errors to be discussed in class, exercises requiring error correction to be included as class assignments.

Recommended Books

1. Thomson, A. J., & Martinet, A. V. (2010*). A Practical English Grammar*. Oxford University Press.
2. Swan, M. (2005). *Practical English Usage 3rd edition*. Oxford University Press.
3. Sinha, R. P. (2002). *Current English Grammar and Usage with Composition*. Oxford University Press
4. Murphy, R (2012). *English Grammar in Use*, 4th edn, Cambridge University Press.
5. Collins, T. (2012). *Correct your English Errors*. McGraw-Hill.
6. Manser,Martin H (2010), *Guide to Style: An Essential Guide to the Basics of Writing Style*. Viva Books.
7. Nelson, G., & Greenbaum, S. (2015). *An introduction to English grammar*. Routledge.

KBD 1102: PRINCIPLES OF MANAGEMENT AND ORGANISATIONS

Course Description

As a beginner learning the fundamentals of business, this course helps to lay foundation by giving a clear picture of types of business, and the factors to be considered to select one form of business from the options. The schools of management thought help them analyse the evolution of management theory. The Course gives importance to planning function in management by clearly defining the steps and types of plans. The decision-making process is discussed along with organization structures. Tools and techniques to make communication effective are discussed. The leadership theories and motivational theories are critically evaluated with pros and cons of each. The course finally puts a canvas of controlling processes and techniques. The topics emerging challenges in managing like workforce diversity, knowledge management and Innovation helps them get updated to the real-world scenarios in management.

Course Learning Outcomes

LO1	Understand the types and forms of business organizations	Cognitive level- Understand
LO2	Apply managerial skills essential in organizational management	Cognitive level- Apply
LO3	Analyse present conditions in business to identify the ways of attaining the desired position in the future.	Cognitive level- Analyse
LO4	Evaluate motivation levels in employees	Cognitive level- Evaluate
LO5	Create an environment conducive to innovation in organizations	Cognitive level- Create

Mapping of course outcomes with programme outcomes: Low=1, medium=2, High=3

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
LO1		3				3	
LO2		1				2	2
LO3			2	3	3		
LO4						2	3
LO5				3	2	1	2

Module 1

Types of business- Manufacturing – Services- Merchandise – Hybrid, Forms of Organisation- Sole proprietorship- Partnership- Corporation- Limited Liability Company (LLC)-

Cooperatives, Choice of form of Organisations. Management and Society- Ecological environment, Ethics and Social responsibility.

Module 2

Management vs Administration, Managerial skills, Management Functions, Schools of management Thought – Taylor and Fayol's contributions, Behavioural Approach, Systems Approach, Modern approaches.

Module 3

Planning- Importance and steps in planning, Types of plans- Strategy- Tactical and Operation plans – Single use plans, standing plans, Limitations of planning. Decision making- steps, Types of Decisions. Meaning of Organising, Process of Organising, Formal vs Informal Organisations, Organisation structures- Factors influencing structures, Departmentation and Organisation structures - Basis of Departmentation

Authority and Responsibility, Delegation- process, principles and types, Centralisation vs Decentralisation- need and determining factors in Business.

Module 4

Directing –Meaning, principles of Directing, Communication-importance and process of communication, Making communication effective – Transactional analysis, Johari Window. Leadership-Importance and functions of a leader, styles of leadership- Theories – Trait and situational theories in leadership. Motivation- Concept and importance- Theories–Maslow's need hierarchy, ERG theory, expectancy theory- Equity theory- Goal setting theory- Reinforcement theory, Theory X, Y & Z.

Module 5

Controlling – Meaning, process and importance. Types of control – Traditional and Modern control techniques, Cybernetic and non-Cybernetic controls. Emerging challenges in managing- workforce diversity- knowledge management- Quality- Innovation and change - technology.

Recommended Books

1. Tripathi P C, & Reddy P N, (2015) Principles of Management, Tata McGraw Hill Publications.
2. Koontz, H., & Weihrich, H. (2015). Essentials of Management: An International, Innovation, and Leadership Perspective. McGraw-Hill Education.
3. Drucker, P. F. (2008). The Essential Drucker: The Best of Sixty Years of Peter Drucker's Essential Writings on Management (Collins Business Essentials). New York: Harper Business.
4. Robbins S P, Coulter Mary, De Cenzo D, (2016). Fundamentals of management, Pearson Education India
5. Gilbert, D., Stoner, J., & Freeman, E. (2003). Management. Pearson Education India.
6. Gupta, C. B.(2011). Business Organisation and Management, Mayur Publications
7. Basu, C. (2017). Business Organisation and Management, McGraw Hill Education

KBD 1103: STATISTICS FOR BUSINESS

Course Description

The course intends to provide students with a background on statistical methods and techniques for business decision making. It develops the ability to analyse and interpret data to provide meaningful information to assist in making management decisions; and develop an ability to apply modern quantitative tools (Microsoft Excel) to data analysis in a business context.

Course Learning Outcomes

LO1	Critically evaluate the underlying assumptions of analysis tools	Cognitive level- Evaluate
LO2	Understand and critically discuss the issues surrounding sampling and significance	Cognitive level- Understand
LO3	Discuss critically the uses and limitations of statistical analysis	Cognitive level- Understand
LO4	Solve a range of problems using the techniques covered	Cognitive level-Apply

Mapping of course outcomes with programme outcomes: Low=1, medium=2, High=3

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
LO1	3	2			2		
LO2	3	2		3	2		
LO3	3			3	2		1
LO4	3	3	3		2		

Module 1

Introduction to statistics, Introduction Data collection; Presenting data in tables and charts, measures of central tendency and dispersion;

Module 2

Probability, Discrete probability distributions; Continuous probability distributions. Sampling distributions; statistical estimation; Hypothesis testing, Statistical inferences based on one sample test; statistical inferences based on two samples, Statistical quality control.

Module 3

Experimental design and analysis of variance; Simple linear regression analysis; correlation; Multiple regression.

Module 4

Chi-square tests; Nonparametric tests: sign test, rank sum tests, one-sample runs tests, Rank correlation, K-S.

Module 5

Time series forecasting, Decomposition of Time Series using Additive Models, Index numbers.

Note: The course delivery of this course is to necessarily use practice-oriented case studies and lab-based sessions.

Recommended Books

1. Chandrasekaran, N., & Umaparvathi, M. (2016). *Statistics for Management*. PHI Learning Pvt. Ltd.
2. Gupta, S. C. (2016). *Fundamentals of Statistics*. Himalaya Publishing House.
3. Keller, G. (2014). *Statistics for management and economics* Abbreviated. Nelson Education.
4. Levin, R. I. (2008). *Statistics for management*. Pearson Education India.
5. Sharma, J. K. (2010). *Fundamentals of business statistics*. Vikas Publishing House.
6. Bajpai, N. (2009). *Business Statistics*. Pearson.
7. Shenoy, G. V.,Srivastava, U.K.,Sharma, S.C. (2002*). Business Statistics*. New Age International.

KBD 1104 FUNCTIONAL MANAGEMENT FOR BUSINESS

Course Description

To introduce students to concepts and practices in the business functions of marketing, human resource management, and finance. Emphasis is on functional aspects of these so as to familiarise students to the practices and organisational activities related to these areas.

Course Learning Outcomes

LO1	Understand Segmentation, targeting, positioning strategies used by popular companies in the market.	Cognitive level- Understand
LO2	Apply integrated marketing communication to a marketing strategy	Cognitive level- Apply
LO3	Analyse and identify the problems relating to the recruitment and selection methods and sources used in different ways by organizations.	Cognitive level- Analyse
LO4	Evaluate the capital budgeting policies of a firm	Cognitive level- Evaluate
LO5	Create a job description that helps land the best hire	Cognitive level- Create

Mapping of course outcomes with programme outcomes: Low=1, medium=2, High=3

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
LO1		3	2		1		
LO2		3	2		3		
LO3	3		2			2	2
LO4		3	2		1		
LO5						1	2

Module 1

Marketing – definition, scope and importance, Strategic Planning, Segmentation, targeting, positioning, Marketing mix – elements, Products – Classification, Product and brand management fundamentals – product mix and its properties.

Module 2

Pricing - Objectives, Methods, and Strategies, Distribution – objectives, policies, strategies, types of channel, marketing logistics, integrated marketing communication- elements of

communication mix- advertising, sales promotion, public relations, publicity, personal selling, direct and online marketing.

Module 3

Introduction to Human Resource Management, Approaches to HRM; HRM Functions- Human resource planning- Process of HRP- Job Analysis, Job Description, Writing a Job Description, Job Specification.

Module 4

Recruitment and selection- Process; Concept and Significance of Training, Training Needs, Training Methods, Types of Training; Performance appraisal: Importance and methods of Performance appraisal; Compensation management- wage structure –Methods of Wage Fixation- Concept of Incentives, Types of Incentive Scheme; Statutory HR

Module 5:

Financial management: meaning and scope of finance; financial goals: profit maximization, wealth maximization; Finance functions- Investment, financing and dividend decisions. Capital budgeting: nature of investment decisions; investment evaluation criteria- Net Present Value, Internal Rate of Return, Profitability Index, Payback Period, Accounting Rate Of Return, NPV and IRR comparison; risk analysis in capital budgeting. Working capital: meaning, significance and types of working capital; financing of working capital; sources of working capital.

Recommended Books

1. Desler G, Varkey B. (2016) Human Resource Management, 15th e, Pearson
2. Aswathappa, K. (2013). Human resource management: Text and cases. Tata McGraw-Hill Education.
3. Noe, R. A., Hollenbeck, J. R., Gerhart, B., & Wright, P. M. (2007). Fundamentals of human resource management.,6th edn (2015), McGraw-Hill Education.
4. Kotler P, Keller K, (2015), Marketing Management, 15e, Pearson Education.
5. V S Ramaswamy, S. Namakumari. (2013), Marketing Management, McGrawhill India.
6. Kazmi, S. H. H. (2007). Marketing management: Text and cases, Excel Books India.

KBD 1105 PROGRAMMING LANGUAGES FOR DATA ANALYTICS

Course Description

The course provides foundations in two of the most popular programming languages used for data analytics – *viz*. R and Python. After having completed the course, the students should be knowledgeable in the principles of programming in R for data management, visualisation of data and basic statistical calculations. Augmented to this, the course enables the student.

Course Learning Outcomes

LO1	To understand the syntax of R and Python	Cognitive Level-Understand
LO2	To take a large dataset, break it up into manageable pieces and use a range of qualitative and quantitative methods	Cognitive level- Analyse
LO3	To learn to write small Python programs	Cognitive level-Create
LO4	To learn tools that help to communicate the findings using R visualization packages	Cognitive level- Understand
LO5	To acquire skills in Python programming for processing text-based data and interpreting the results	Cognitive level-Evaluate
LO6	To bring out the insights from the data analysis using Python.	Cognitive level- Synthesize

Mapping of course outcomes with programme outcomes: Low=1, medium=2, High=3

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
LO1	2		1				
LO2	2	1	3				
LO3	2		1				
LO4				2	3		3
LO5			2		3		3
LO6			2		3		3

Module 1

Python overview: Basic data types – Functions: arguments, block structure, scope, recursion – Modules - Conditionals and Boolean expressions - Sequences: Strings, Tuples, Lists - Iteration, looping and control flow - String methods and formatting.

Module 2:

File processing and Classes in Python: Dictionaries, Sets, Files – Text processing. Classes - Class instances, Methods - Iterators and Generators - Regular expression – Exceptions handling and testing.

Module 3:

Introduction to R: Getting started with an IDE – R Studio; Console as a calculator – variable assignment – arithmetic in R - basic data types: numeric, integers, logical and characters – type match errors – type checking – type conversion; Familiarization with packages.

Vectors and Loop functions: Create vectors – Element naming – Vector arithmetic – Select elements – Multiple elements – Compare vectors – Logical vectors – Missing values – Modify subset of elements. Control statements – if statements, for loop, repeat, while.

Module 4:

Arrays and Matrices: Array indexing – Array function – Array arithmetic. Construct matrix – Matrix naming – Matrix indexing - Matrix multiplication, linear equations, determinants, Least square fitting – Matrix partitioning – Frequency tables and factors – *levels() and summary()*functions– ordered factor.

Lists and Data frames: Creating and modifying lists – select list elements - concatenate lists. Creating data frame - select frame elements – Sorting – *attach() and detach()* functions – Search path.

Module 5:

Reading data from file – Importing data from XML - built-in datasets – Editing data – Annotating datasets – Sub-setting and merging datasets. Statistical tables and R – Distribution of data – Sample tests. Plotting commands – Bar plots, Pie charts, Histograms, Box plots. Contributed packages and CRAN – Namespaces. Debugging tools in R.

Recommended Books:

1. William N. Venables, David M. Smith (2009); An Introduction to R, Second edition, Network Theory Limited.
2. Robert Kabacoff (2015); R in Action: Data Analysis and Graphics with R, Manning Publication Company.
3. Guttag, John (2013); *Introduction to Computation and Programming Using Python*, Spring 2013 edition, MIT Press.
4. Marl Lutz (2013); Learning Python, Fifth edition, OReilly media.
5. William MKinney (2012);Python for Data Analysis, OReilly media.
6. https://developers.google.com/edu/python/

KBD 1106: BUSINESS ENVIRONMENT ANALYSIS

Course Description

The course intends to provide understanding of various components of environment and their interdependence so that students can assess the likely impact of environmental changes on business processes. The course examines the cause and effect relationship in the functional areas of firms; and the economic and non-economic environments like social, political, legal and regulatory, and technological environments - that affect them. It provides the knowledge of Indian Economy, which covers macroeconomic and socio-demographic indicators, planning structure and policies i.e. foreign direct investment, industrial, monetary and fiscal policy implications

Course Learning Outcomes

LO1	Understand the changing dimensions of business environment	Cognitive Level- Understand
LO2	Apply the principles of corporate governance to critically evaluate the performance of firms.	Cognitive Level- Apply
LO3	Analyse the impact of monetary and fiscal policies in achieving macroeconomic goals	Cognitive Level- Analyse
LO4	Critically examine the conceptual basis of HDI reports and assess its ability to further the development debate	Cognitive Level- Evaluate
LO5	Create plan to improve innovation capability of the country at various levels to develop Global Competitiveness	Cognitive Level- Create

Mapping of course outcomes with programme outcomes: Low=1, medium=2, High=3

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
LO1		2	2	2		2	1
LO2	3	3	3	3		3	2
LO3		1	1			2	1
LO4				1		3	2
LO5		3		2		1	

Module 1

Business environment: concept, significance and nature of business environment; elements of environment – internal and external; changing dimensions of business environment; environmental scanning and monitoring. Economic environment of business: Planning

Commission to NITI Aayog, economic planning in India; industrial policy, fiscal policy, monetary policy, export and import policy; public sector and economic development; economic reforms.

Module 2

Political and legal environment of business: Government and business; Regulatory bodies; SEBI, TRAI, IRDA, RBI. Small and micro enterprises in India; Indian Financial System: Monetary and Fiscal Policy, Economic Trends, Price Policy, Stock Exchange of India. National Income.

Module 3

Role of Industry in Economic Development, Foreign Trade and Balance of Payment, Poverty in India, Unemployment in India, Inflation, Human Development, Rural Development, Problems of Growth

Module 4

Socio-cultural environment: Critical elements of sociocultural environment; social institutions and systems; social values and attitudes; social groups; middle class; emerging rural sector in India; consumerism in India. Social responsibility of business; social audit; corporate governance;

Module 5

Social Responsibility of business enterprises, New Economic Policy, Globalization, EXIM policy and role of EXIM bank, FDI policy, Multinational Corporation (MNCs) and Transnational Corporations (TNCs), Global Competitiveness, technology and competitive advantage, technology transfer - importance and types, Appropriate technology and technology adaptation.

Recommended Books

1. Shaikh, S. (2010). *Business environment, 2/E*. Pearson Education India.
2. Francis, C. (2013). *Business Environment–Text & Cases*, Himalaya Publishing House
3. Mishra S K & Puri V K. (2008), *Economic Environment of Business*, Himalaya Publishing House.
4. Aswathappa, K. (2014). *Essentials of business environment*. Himalaya Publishing House, Delhi.
5. Worthington, I., & Britton, C. (2009). *The business environment*. Pearson Education.

SEMESTER II

Sl. No.	Course No.	Name of the Course	Hours			Marks		Credit
			L	T	P	Internal	End semester	
1	KBD 1201	Strategic Communication for Workplaces	5	2	0	50	50	5
2	KBD 1202	Information Systems for Business	4	0	2	50	50	5
3	KBD 1203	Operations Research	6	2	0	50	50	6
4	KBD 1204	Fundamentals of Business Process Management	4	1	2	50	50	5
5	KBD 1205	Database Fundamentals	3	0	4	50	50	5
6	KBD 1206	Project I -Organisation Study- 15 working days. (50 marks for continuous assessment and 50 for written report after completion of the project)					100	4
		Total	**600**					**30**

KBD 1201 STRATEGIC COMMUNICATION FOR WORKPLACES

Course Description

This course aims to equip students with the tools needed to remain relevant in the modern workplace. At the end of the course, students will be able to navigate the contingencies in a typical workday and be able to put into practice the principles of effective workplace communication and thereby equip themselves to be valuable employees.

Course Learning Outcomes

LO1	Understand how information is transmitted, listened to and interpreted in workplaces and the different models of communication.	Cognitive Level- Understand
LO2	Apply the concepts of nonverbal communication in strengthening the communication process at workplaces.	Cognitive Level- Apply
LO3	Analyse the possible conflict situations arising from lack of communication	Cognitive Level- Analyse
LO4	Evaluate the influence of digital communication tools in workplaces and the difference in using such media over traditional forms	Cognitive Level- Evaluate
LO5	Create appropriate communication frameworks drawing on the verbal and nonverbal tools of communication using traditional or digital media.	Cognitive Level- Create

Mapping of course outcomes with programme outcomes: Low=1, medium=2, High=3

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
LO1	2						3
LO2	2			1			3
LO3		1		1			2
LO4				2	1		3
LO5			1	1	1	2	3

Module 1

Basics requirements for effective communication in the workplace, understanding the communication loop in a work context - listening, clarifying, giving feedback - confirming if the information has been understood as intended - working according to the information received and sharing the progress of work.

Module 2

Verbal Communication Skills: Conversation - basic techniques - how to begin, interrupt, hesitate and end - how to express time, age, feelings and emotions - how to respond - using language in various contexts/situations - Language/Phrases for meetings; Phrases for telephoning; Phrases for greetings, introductions, partings.

Module 3

Non-verbal Communication Skills: Body language: postures - orientation - eye contact - facial expression - dress - posture - self-concept - self-image - self-esteem - attitudes.

Module 4

Handling Common Workplace Situations: Interviews - Group discussion- addressing an audience - rules for creating effective presentations - How to handle conflict - understanding cultural differences in a work context - Interaction with Clients/Customers; Formal/ Public speeches - informative, persuasive, and ceremonial.

Module 5

Digital Workplaces: Navigating the digital workplace - what is a digital workplace - intranets - chats and private messaging - discussion forum - internal blogs - email, enterprise social media tools, portals, ticketing, issue tracking and case software - learning digital etiquette - Digital task management using tools such as Trello.

Recommended books

1. Sasikumar V., P Kiranmai Dutt and Geetha Rajeevan. (2013) Communication Skills in English. Cambridge University Press and Mahatma Gandhi University
2. Anderson, K., Lynch, T., & Maclean, J. (2004). Study speaking (Vol. 1). Cambridge University Press.
3. Marilyn, A. (2010). Critical Thinking, Academic Writing and Presentation Skills (Mg University Edition). Pearson Education India.
4. Mukhopadhyay, Lina et al. Polyskills: (2012). A Course in Communication Skills and Life Skills. Foundation.
5. Dhanavel, S. P. (2011). English and communication skills for students of science and Engineering. Orient Blackswan, Chennai.
6. Aggarwal, S. (2009). Essential Communication Skills, ANE Books.
7. Searles G. J. (2014) Workplace Communications: The Basics, Pearson Publications

KBD 1202: INFORMATION SYSTEMS FOR BUSINESS

Course Description

This course aims to help students identify managerial challenges and opportunities for organizational advancement that may be resolved by the application of current new technologies. Students will be equipped to identify opportunities for and successfully apply various information technologies to gain competitive advantage. The course will help define and recognize key enabling technologies that may advance organizations now and in the future.

Course Learning Outcomes

LO1	Understand the information system requirements of an organization	Cognitive Level- Understand
LO2	Understand the role of business intelligence in decision making	Cognitive Level- Understand
LO3	Analyse the process of acquiring Information Systems through Projects	Cognitive Level- Analyse
LO4	Evaluate the various management information systems	Cognitive Level- Evaluate
LO5	Assess the IT security and data privacy levels of an organization	Cognitive Level- Assess

Mapping of course outcomes with programme outcomes: Low=1, medium=2, High=3

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
LO1		2	2		2		
LO2	2	3	1		3		1
LO3			2	2	3		
LO4		2	2	1	2		
LO5		1				2	1

Module 1

Information, Systems and Management - Information Technology and Strategy - The Virtual Organization.

Module 2

Decision Making and Business Intelligence - e-Commerce - Social Networking and Web 2.0 Management Support Technologies - The Network Economy: Trends and Opportunities.

Module 3

Information Technology Architecture - Knowledge management - Managing systems development - Acquiring Information Systems through Projects - Managing Change.

Module 4

Organizing and Leading the Information Technology Function - Information Technology Planning - Managing Information Technology Outsourcing

Module 5

Governance and Ethics - Managing Information Security and Privacy

Recommended books

1. Laudon, K. C., & Laudon, J. P. (2015). Management information systems (Vol. 8). Prentice Hall.
2. Applegate, L. M., Austin, R. D., & McFarlan, F. W. (2006). Corporate information strategy and management. McGraw-Hill/Irwin Custom Publishing.
3. Robson, W. (2015). Strategic management and information systems. Pearson Higher Ed.McNurlin, S. & Bui. (2013) Information Systems Management in Practice, Prentice Hall (8th Ed).
4. Sousa, K., & Oz, E. (2014). Management information systems. Nelson Education.
5. Efraim Turban, Jay Aronson & Tin-Peng Liang. (2010) Decision Support Systems and Intelligent Systems, Ninth International Edition, Pearson Prentice- Hall.
6. Galliers, R. D., & Leidner, D. E. (2014). Strategic Information Management: challenges and strategies in managing information systems. Routledge.

KBD 1203: OPERATIONS RESEARCH

Course Description

This course aims to impart knowledge and training on the use of optimization techniques under resource constraints for various engineering and business problems. The course covers topics on Linear Programming introducing the Simplex Algorithm, Duality, Transportation problem and Assignment problem. Dynamic programming is introduced as a method to solve large optimization problems. Inventory models show how mathematical models of real-world resource constrained problems are generated and solved.

Course Learning Outcomes

LO1	Understand the concept of optimal solutions for constrained problems and mathematical formulation of real-world constrained problems.	Cognitive Level- Understand
LO2	Apply selected algorithms to identified linear programming problems.	Cognitive Level- Apply
LO3	Analyse problems under the general class of transportation and assignment problems.	Cognitive Level- Analyse
LO4	Evaluate the constraining conditions in real situations and develop mathematical formulations.	Cognitive Level- Evaluate
LO5	Create appropriate mathematical models using linear programming or dynamic programming methods.	Cognitive Level- Create

Mapping of course outcomes with programme outcomes: Low=1, medium=2, High=3

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
LO1	2				2		2
LO2	3	2	2		2		
LO3	2	3	1		1		
LO4		2	2	2	2		
LO5		3	3	3	2		

Module 1

Introduction to Operations Research: Basics definition, scope, objectives, phases, models and limitations of Operations Research - Linear Programming Problem - Formulation of LPP, Graphical solution of LPP - Simplex Method - Artificial variables - big-M method - Two-phase method - Degeneracy and unbound solutions.

Module 2

Transportation Problem - Formulation, solution, unbalanced Transportation problem - Finding basic feasible solutions - Northwest corner rule - Least Cost method and Vogel's approximation method - Optimality test: Stepping Stone method and MODI method.

Module 3

Assignment model – Formulation - Hungarian method for optimal solution - Solving unbalanced problem - Travelling salesman problem and assignment problem - Solving LPs using Solver - Revisiting the formulation - Three types of LPs - Dual solution - Sensitivity analysis.

Module 4

Dynamic programming: Characteristics of dynamic programming - Dynamic programming approach for Priority Management - Employment smoothening - Capital budgeting - Stage Coach/Shortest Path - Cargo loading and Reliability problems.

Module 5

Inventory models: Inventory costs - Models with deterministic demand - model (a) demand rate uniform and production rate infinite - model (b) demand rate non-uniform and production rate infinite - model (c) demand rate uniform and production rate finite.

Recommended books

1. Srinivasan G. (2017) Operations Research: Principles and Applications, PHI Learning Private Limited.
2. Taha H. A. (2013) Operations Research: An Introduction, Pearson.
3. Ravindran, A. R. (2016). Operations research and management science handbook. Crc Press.
4. Hillier, F. S. (2012). Introduction to operations research. Tata McGraw-Hill Education.
5. Kasana, H. S., & Kumar, K. D. (2013). Introductory operations research: theory and applications. Springer Science & Business Media.
6. Shah, N. H, Gor, R. M. Soni H. (2007) Operations Research, Eastern Economy Edition

KBD 1204 FUNDAMENTALS OF BUSINESS PROCESS MANAGEMENT

Course Description

The course introduces the idea of process thinking in business management and workflows in organizations. Theory of business process model generation with specific reference to the symbolic representations of BPMN is explained. Both quantitative and qualitative workflow analysis methods and queue analysis models that help in process analysis and design of new processes are explained.

Course Learning Outcomes

LO1	Understand the terminology of business process management and the notations used in BPMN.	Cognitive Level- Understand
LO2	Apply process discovery, quantitative process analysis methods and business process management principles to workflows in organizations.	Cognitive Level- Apply
LO3	Evaluate business processes as core, support and management processes to identify the process types, process architecture and process landscape.	Cognitive Level- Analyse
LO4	Design process flows in business process modelling software.	Cognitive Level- Evaluate
LO5	Create redesigned business processes on the basis of qualitative and quantitative analyses and process insights.	Cognitive Level- Create

Mapping of course outcomes with programme outcomes: Low=1, medium=2, High=3

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
LO1		3	2			1	1
LO2	2	3	2	1	2		
LO3		3	2		1		
LO4			3		3		1
LO5		1	3		3		1

Module 1

Introduction to BPM - The evolution of BPM - Process Modelling Languages- BPMN, Theory of Process Orientation.

Module 2

Process Modeling - Process Technology / Workflow Architecture - Swimlane diagram.

Module 3

Process Automation - Process Discovery - Process improvement methods.

Module 4

Process Analysis (Qualitative & Quantitative) - Modelling and assessing the As-Is process and To-Be process

Module 5

Introduction to Lean and TQM, Creating and Managing a business process using business process management software.

Note: The course delivery of this course is to necessarily use practice-oriented case studies and lab-based sessions.

Recommended Books

1. Dumas, M., La Rosa, M., Mendling, J., & Reijers, H. A. (2013). Fundamentals of business process management (Vol. 1, p. 2). Heidelberg: Springer.
2. Sharp, A., & McDermott, P. (2009). Workflow modeling: tools for process improvement and applications development. Artech House.
3. Harmon, P., & Trends, B. P. (2010). Business process change: A guide for business managers and BPM and Six Sigma professionals. Elsevier.
4. Leymann, F. & Roller, D.(1997) Workflow-based applications, IBM Systems Journal.
5. Jeston, J. (2014). Business process management. Routledge.
6. Rosemann, M., & vom Brocke, J. (2015). The six core elements of business process management. In Handbook on business process management 1 (pp. 105-122). Springer, Berlin, Heidelberg.
7. Smith, H., & Fingar, P. (2003). Business process management: The third wave. Tampa: Meghan-Kiffer Press.

KBD 1205: DATA BASE FUNDAMENTALS

Course Description

Database Fundamentals introduces database concepts, including relational databases, tables and data types, data selection and manipulation, views, stored procedures, functions, normalization, constraints, indexes, security, and backup and restore. The course i present an introduction to database management systems, with an emphasis on how to organize, maintain and retrieve - efficiently, and effectively - information from a DBMS. The course aims to impart the basic understanding of the theory and applications of database management systems; to give basic level understanding of internals of database systems; to expose to some of the recent trends in databases; to understand database transactions and to understand advancements in data base systems.

Course Learning Outcomes

LO1	Describe the fundamental elements of relational database management systems.	Cognitive Level- Understand
LO2	Explain the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra and SQL.	Cognitive Level- Understand
LO3	Analyse basic database storage structures and access techniques	Cognitive Level- Analyse
LO4	Describe the fundamental elements of relational database management systems	Cognitive Level- Understand
LO5	Construct the database by normalization.	Cognitive Level- Apply

Mapping of course outcomes with programme outcomes: Low=1, medium=2, High=3

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
LO1	3	3				1	1
LO2	3	3					1
LO3	3	3		1	2		1
LO4			3	2	3		
LO5		1	1		3		

Module 1

Introduction:Data: structured, semi-structured and unstructured data**,**Concept & Overview of DBMS, Data Models, Database Languages, Database Administrator, Database Users, Three Schema architecture of DBMS. Database architectures and classification. Entity-Relationship Model: Basic concepts, Design Issues, Mapping Constraints, Keys, Entity-

Relationship Diagram, Weak Entity Sets, Relational Model: Structure of relational Databases, IntegrityConstraints, synthesizing ER diagram to relational schema.

Module 2

Database Languages: Concept of DDL and DML relational algebra Structured Query Language (SQL): Basic SQL Structure, examples, set operations, Aggregate Functions, nested sub-queries Views, assertions and triggers

Module 3

Relational Database Design: Different anomalies in designing a database, normalization, functional dependency (FD), Armstrong's Axioms, closures, Equivalence of FDs, minimal Cover. Normalization using functional dependencies, INF, 2NF, 3NF and BCNF, lossless and dependency preserving decompositions.

Module 4

Transaction Processing Concepts: overview of concurrency control and recovery acid properties, serial and concurrent, schedules, conflict serializability, Two-phase locking, failure classification, storage structure, stable storage, log-based recovery, deferred database modification, check-pointing.

Module 5

Physical Data Organization: index structures, primary, secondary and clustering indices, single level and Multi-level indexing, B+- Trees. Query Optimization: Cost based heuristics-based query optimization. Recent topics: Semantic Web, RDF, GIS, Biological databases, Big Data, NOSQL.

CASE studies : 1. Familiarize Programming in SQL and Advanced SQL using MySQL and 2. Designing ER Diagram and ER Schema for real-world Problems.

Recommended Books

1. Elmasri R., Navathe S. (2013). Database Systems: Models, Languages, Design and Application Programming, Pearson Education.
2. Silberschatz, A., Korth, H. F., & Sudarshan, S. (2011). Database system concepts, 6/e, McGraw Hill.
3. Akerkar, R. (2009). Foundations of the semantic Web: XML, RDF & ontology. Alpha Science International, Ltd.
4. Plunkett, T., Mohiuddin, K., Macdonald, B., Harding, D., Nelson, B., Segleau, D., Sun, H., Mishra, G., Hornick, M., Stackowiak, R. and Laker, K., 2013. Oracle Big Data Handbook. Oracle Press, New York.
5. Perkins, L., Redmond, E., & Wilson, J. (2018). Seven databases in seven weeks: a guide to modern databases and the NoSQL movement. Pragmatic Bookshelf.
6. Thomasian, A. (2013). Database Concurrency Control: Methods, Performance, and Analysis (Vol. 1). Springer Science & Business Media.

SEMESTER III

Sl. No.	Course No.	Name of the Course	Hours			Marks		Credit
			L	T	P	Internal	End semester	
1	KBD 1301	Managerial Skill Development & Design Thinking	3	2	4	50	50	5
2	KBD 1302	Financial Accounting	5	0	0	50	50	5
3	KBD 1303	Business Ethics and Cyber law	4	0	0	50	50	4
4	KBD 1304	Production and Operations Management	4	1	0	50	50	4
5	KBD 1305	Data Visualization for Analytics	2	0	6	50	50	5
6	KBD 1306	Data Mining Techniques	2	0	6	50	50	5
7	KBd1307	5 Days Workshop Programme (Personal Productivity Improvement)					50*	2
		Total				**300**	**350**	**30**

KBD 1301: MANAGERIAL SKILL DEVELOPMENT AND DESIGN THINKING

Course Description

To equip students with basic skills to become effective team players, problem solvers at personal interpersonal, group and organizational levels**.**

Course Learning Outcomes

LO1	Understand the fundamentals of Self discipline	Cognitive Level- Understand
LO2	Understand the methods, processes and tools of design thinking.	Cognitive Level- Understand
LO3	Show one's own ability to work in teams	Cognitive Level- Apply
LO4	Analyse the role of primary and secondary research in design thinking	Cognitive Level- Analyze
LO5	Integrate design thinking approach to develop solutions	Cognitive Level- Create

Mapping of course outcomes with programme outcomes: Low=1, medium=2, High=3

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
LO1					1	3	
LO2	2	2		1	2		
LO3					2	1	3
LO4				2	2		
LO5			2	3	2		

Module 1

Self-Management: Self Evaluation, Self-Discipline, Self-Criticism, Recognition of One's Own Limits and Deficiencies, Independency Etc. Thoughtful & Responsible, Self-Awareness

Team Building / Coordination Skills: Team Building Practices Through Group Exercises, Team Task / Role Play, Ability to Mixing & Accommodation, Ability To Work Together

Module 2

Goal Setting: Wish List, Smart Goals, Blue Print for Success, Short Term, Long Term, Life Time Goals. Time Management Value of Time, Diagnosing Time Management, Weekly Planner to Do List, Prioritizing Work

Module 3

Stress Management: Causes of Stress And Its Impact, How To Manage & Distress, Circle Of Control, Stress Busters. Emotional Intelligence What Is Emotional Intelligence, Emotional Quotient Why Emotional Intelligence Matters, Emotion Scales. Managing Emotions.

Module 4

Why Design Thinking, The Design Process, Design Brief, Visualization, Ethnography, Identifying Insights (Using Mind-Mapping Design Tool),

Module 5

Design Criteria, Brainstorming, Concept Development, Pitch, Assumption Testing, Prototyping, Co-Creation, Learning Launch, Applying Design Thinking

Recommended Books:

1. Wentz, F. H. (2012). Soft Skills Training: A workbook to develop skills for employment. CreateSpace.
2. Mitra, B. K. (2016). Personality development and soft skills. Oxford University Press.
3. Mackenzie, A., & Nickerson, P. (2009). The time trap: The classic book on time management. Amacom., 1997.
4. Carnegie, D. (2017). How to win friends & influence people. Musaicum Books.
5. Goleman, D. (2006). Emotional intelligence. Bantam.
6. Liedtka, J., Ogilvie, T., & Brozenske, R. (2014). The designing for growth field book: A step-by-step project guide. Columbia University Press.
7. Martin, R. L. (2009). The design of business: Why design thinking is the next competitive advantage. Harvard Business Press.
8. Stickdorn, M., Schneider, J., Andrews, K., & Lawrence, A. (2011). This is service design thinking: Basics, tools, cases(Vol. 1). Hoboken, NJ: Wiley.

KBD 1302: FINANCIAL ACCOUNTING

Course Description

Course aims to introduce students to the fundamental principles of accounting, maintenance of accounts and finalization of accounts of business organizations. Students are expected to gain the ability of using accounting information as a tool in applying solutions for managerial problems, evaluating the financial performance, and interpreting the financial structure.

Course Learning Outcomes

LO1	Describe the role of accounting information and its limitations	Cognitive Level- Understand
LO2	Develop the skill of recording financial transactions and preparation of reports in accordance with GAAP	Cognitive Level- Apply
LO3	Develop the ability to prepare final accounts of sole trader	Cognitive Level- Apply
LO4	Recognize circumstances providing for increased exposure to errors and frauds	Cognitive Level- Evaluate

Mapping of course outcomes with programme outcomes: Low=1, medium=2, High=3

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
LO1		3			2		2
LO2	2	2			3		2
LO3	2				2		
LO4			1	3	1	1	

Module 1

Basics of Accounting : Introduction-Book Keeping-Accounting-Objectives & Functions of Accounting-Assets-Liabilities-Capital-Types of Accounts-Accounting Principles-Concepts-Conventions-Double entry system-Golden Rules of Accounting-Accounting Equation Approach-Systems of Accounting.

Module 2

Journal, Subsidiary Books and Ledger: Journal-Journalizing-Ledgers-Posting-Purchases Day Book, Sales Day Book-Purchases, Returns Book-Sales Returns Books-Cash Book-Bills Receivable Book-Bills Payable Book-Journal Proper-Petty Cash Book-Bank Reconciliation Statement.

Module 3

Trial Balance and Rectification of Errors: Objectives of Preparing Trial Balance-Rules for Preparing Trial Balance-Suspense Account-Stages of Errors-Types of Errors-Steps to Locate Errors-Rectification of Errors Before and After Preparation of Trial Balance.

Module 4

Depreciation Accounting: Factors in the measurement of Depreciation-Methods of Providing Depreciation-Profit/Loss in the sale of Depreciable Assets.

Module 5

Preparation of Final Accounts of Sole Proprietors and Joint Stock Companies: Final Accounts of sole proprietors and companies-Trading Account-Manufacturing Account-Profit and Loss Account-Balance Sheet-Arrangement of Assets and Liabilities-Opening Entry-Closing Entry-Adjusting Entry-Provisions and Reserves-Limitations of Financial Statement.

Recommended Books

1. Shukla, M. C., Grewal, T. S., & Gupta, S. C. (2016). Advanced Accounts. S. Chand & Company Ltd., New Delhi.
2. Bhattacharyya, A. K. (2012). Essentials of Financial Accounting: PHI Learning Pvt. Ltd.
3. Jain, S. P., & Narang, K. L. (2008). Advanced Cost Accounting. Kalyani Publishers.
4. Gupta, R. L., & Radhaswamy, M. (2017). Advanced Accountancy. Sultan Chand & Sons,
5. Maheshwari, S. N., Maheshwari, S. K., & Maheswari, S. K. (2013). An Introduction to Accountancy. Vikas Publishing House.
6. Narayanswamy R. (2017). Financial Accounting: A managerial perspective. PHI publication
7. Raman B. S. (2018) Financial Accounting, United Publishers & Distributors

KBD 1303 BUSINESS ETHICS AND CYBER LAW

Course Description

To enable students to understand the challenges and complexities faced by businesses as it tries to maximize returns while ethically managing their duties to stakeholders and society. It is also intended to help students develop an understanding of cyber law in India.

Course Learning Outcomes

LO1	Understand the process of ethical decision making and leadership	Cognitive Level- Understand
LO2	Understand the concepts of electronic records and electronic signatures	Cognitive Level- Understand
LO3	Analyse threat to privacy in cyberspace	Cognitive Level- Analyze
LO4	Evaluate possible scenarios of Intellectual Property Issues in Cyber Space for businesses	Cognitive Level- Evaluate
LO5	Assess the effectiveness of Ethics Programs in business	Cognitive Level- Evaluate

Mapping of course outcomes with programme outcomes: Low=1, medium=2, High=3

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
LO1	1	1		1		3	1
LO2		1				3	1
LO3		1			1	3	1
LO4				1	1	3	1
LO5		1				3	1

Module 1

The Importance of Business Ethics (Ethical Theory), Stakeholder Relationships, Social Responsibility, and Corporate Governance (Ethical Objectivity), Emerging Business Ethics Issues (Ethical Reasoning), Ethical Decision Making and Leadership (Ethical Reasoning, Core Values, Objectivity), Individual Factors: Moral Philosophies & Values.

Module 2

Organizational Factors: The Role of Ethical Culture and Relationships (Ethical Theory, Integrity, Objectivity). Managing and Controlling Ethics Programs (Independence, Integrity), Globalization of Ethical Decision-Making (Integrity, Core Values), Sustainability.

Module 3

Cyber Crimes against Individuals, Institution and State, Hacking, Digital Forgery, Cyber Stalking/Harassment, Cyber Pornography, Identity Theft & Fraud, Cyber Terrorism, Cyber Defamation, Right to Privacy and Data Protection on Internet –Threat to privacy on internet– Self-regulation approach to privacy – Confidentiality of information – Breach of sensitive personal information and confidentiality under IT Act.

Module 4

Digital signature and Electronic Signature and Data Protection, Creation and authentication of digital signature – Concept of electronic signature certificates. Electronic Governance – Concept of electronic records and electronic signatures– Rules for attribution, acknowledgement and dispatch.

E Contracting-Salient features of E-contract, E-mail Contracting, Indian Approach on E-contracts.

Module 5

E Commerce- E-commerce-Salient Features and advantages, Models of E-commerce like B2B, B2C, Indian Laws on E-commerce. Intellectual Property Issues in Cyber Space, Interface with Copyright Law, Interface with Patent Law, Trademarks & Domain Names Related issues, Dispute Resolution in Cyberspace, Open source software licensing policies.

Recommended Books

1. Singh Y. (2012). Cyber Laws, Universal Law Publishing Co, New Delhi.
2. Naib, S. (2011). The Information Technology Act, 2005: A Handbook.
3. Business Ethics, 2/e, A.C. Fernado, 2013, Pearson. Fernando, A. C. (2009). Business ethics: an Indian perspective. Pearson Education India.
4. Ferrell, O. C., Fraedrich, J., & Ferrell, L. (2015). Business ethics. Ethical decision making and cases.
5. Trevino, L. K., & Nelson, K. A. (2016). Managing business ethics: Straight talk about how to do it right. John Wiley & Sons.
6. Khadsare S (2017). Cyber security Handbook. Council of Information Security and Cyber Peace Foundation.
7. Godbole N & Belapure S. (2011), Cyber Security, Wiley Publications.

KBD 1304 PRODUCTION AND OPERATIONS MANAGEMENT

Course Description

To provide a broad understanding of Operations Management; to provide insights into the management of strategic and functional issues in the operational environment of any organization; and to provide the students with various concepts, tools and techniques for operational, tactical and strategic decision making for effective utilization of resources and meeting customer expectations.

Course Learning Outcomes

LO1	Understand the role of operations strategy in manufacturing and non-manufacturing sectors	Cognitive Level- Understand
LO2	Understand the different forecasting methods.	Cognitive Level- Understand
LO3	Evaluate location choices and plant layouts according to requirements of organizations.	Cognitive Level- Analyze
LO4	Examine quality management concepts and SQC techniques in organizations.	Cognitive Level- Analyze
LO5	Evaluate inventory control decision choices after selecting appropriate mathematical models helping develop purchasing plans for organizations.	Cognitive Level- Evaluate

Mapping of course outcomes with programme outcomes: Low=1, medium=2, High=3

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
LO1	3	3			2	1	
LO2	3	2	1				1
LO3	0	0	2	2	1		
LO4	2	2	2		1		
LO5	3	1	3		2		

Module 1

Introduction to Production and Operations Functions, nature and Scope, decision areas, Interaction of Operations Management with other functional areas of Management – Manufacturing and Non-Manufacturing operations and their Classifications – Operations Strategy as a part of Corporate Strategy – Operations Planning and Control – Operations Forecasting: Forecasting methods.

Module 2

Facility Locations – Cost competition and Hidden factors – Steps in location selection – Types of Manufacturing Systems and Layout – Facility Layouts – Layouts by Products and Process – Life balancing – Design of Operations Systems: Aggregate planning and Master Scheduling, MRP, CRP. Material Handling: Principles, Equipment‘s for Materials Handling.

Module 3

Work study, Time and Method study: Definition, Importance, Aims and Procedures, Implications on Productivity, Work measurement, Work sampling, Work environment, and Industrial safety, Value analysis. Design of Manufacturing process

Module 4

Materials Management – Functions – Material planning and Budgeting – Value analysis- Purchase functions and procedure- inventory control- Types of Inventory- safety stock- Inventory control systems- Perpetual- periodic-JIT-KANBAN. Managing vendors; Vendor Analysis, Rating and Selection – Procedure and Criterions.

Module 5

Maintenance Management Function – Types of Maintenance – Total Productive Maintenance (TPM). Statistical Quality Control (SQC), Cost of Quality (COQ), ISO 9000 certification, Total Quality Management, OC curve , Control charts, SCM, Lean and Agile Manufacturing.

Recommended Books

1. B. Mahadevan (2015) Operations Management: Theory and Practice, Pearson.
2. Monks, Joseph, J (1988) Operations Management (Theory and Problems), McGraw Hill .
3. Chase, Richard, B., Aquilano, Nicholaus J and Jacobs, Roberts, F(2009) Production and Operations Management, McGraw Hill.
4. Bhat,K.S (2010) Operations Management, Himalaya Publishing House.
5. Heizer, J and Render, Barry (2008), Operations Management, Pearson Education, New Delhi.
6. S. N. Chary(2012) Production and Operations Management,McGraw Hill.
7. Adam, Everette, and Ebert,Roanld, J (1992) Production and Operations Management, Prentice Hall India, New Delhi.

KBD 1305: DATA VISUALIZATION FOR ANALYTICS

Course Description

This course introduces the basic design principles and techniques for visualizing data interactively. The course intends to provide understanding on how visual representations can help in the analysis and understanding of complex data in the first place. The course also teaches on how to design visualizations, and how to implement interactive visualizations using effective software tools. Students will also learn to evaluate the effectiveness of visualization designs, and think critically about each design decision, such as choice of color and choice of visual encoding. Students will create their own data visualizations and learn to use Open Source data visualization tools.

Course Learning Outcomes

LO1	Use knowledge of perception and cognition to understand data visualization	Cognitive Level- Understand
LO2	Apply data transformations such as aggregation and filtering for visualization.	Cognitive Level- Analyze
LO3	Examine opportunities for application of data visualization in various domains.	Cognitive Level- Analyze
LO4	Evaluate existing visualizations based on data visualization theory and principles	Cognitive Level- Evaluate
LO5	Design colour palettes for visualization based on principles of perception.	Cognitive Level- Create

Mapping of course outcomes with programme outcomes: Low=1, medium=2, High=3

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
LO1	3			1	2		2
LO2	3		3		2		1
LO3				2	2		
LO4		1	2	1	1		
LO5				1	3		1

Module 1

Value of visualization: What is visualization – Why create visualizations – Conveying information to others – Telling stories with data – Data checking and verification - Data Maps – Time series – Graphical excellence.

Module 2

Data and Image Models: Visualization reference model – data: physical and abstract types – metadata, semantics, conceptual data – properties of images – conceptual model – relational data model – statistical data model, dimensions and measures – Roll-up and Drill-down – Visual encoding and sign systems - Multidimensional Data -Large design space.

Module 3

Design of Visualization: Visual encodings, mapping data to image – Design criteria, expressiveness, effectiveness – Data transformation – Presentation, titles, captions, annotations, legend and grid lines- Testing designs – Graphical integrity – Charting, Bar chart, Line chart, Dot plot, Tables, Heat-maps - Data-based grids – Multi-functioning labels.

Module 4

Exploratory Data Analysis: EDA vs Classical Data analysis – Goals of EDA – Assumptions – Data diagnostics – Statistical models into graphics – Confirmatory analysis – Hypothesis formulation – Testing procedure, significance – Graphical inference. Text visualization: Text data; documents, SMS, tweets, logs, tags - Word clouds, word trees and tag clouds – Theme visualization – Topic modeling –Seriation, Quantification.

Module 5

Interactive Visualization: Interaction techniques; View specification – Navigation, highlighting, filtering, sorting, extraction, recording, guiding – Pointing methods; hovering, clicking, tapping, bubble cursors, area cursors, rubber banding – Dynamic queries – Sampling, Binning and Aggregation – Multivariate data tiles – Data cubes – Visual querying of big data.

Note: The course is to be delivered through lab-based sessions

Recommended Books

1. Tufte, E.(2005). *Envisioning Information*, E. Tufte. Graphics Press, 2005.
2. Tamara Munzner, Visualization Analysis and Design, CRC Press, 2014.
3. Nathan Yau, Visualize This- The FlowingData Guide to Design, Visualization, and Statistics, Wiley, 2011.
4. Scott Murray, Interactive Data Visualization for the Web, O'Reilly, 2013.
5. Colin Ware, Visual Thinking for Design, Morgan Kaufman, 2008.
6. Exploratory Data Analysis, NIST Engineering Statistics Handbook
7. Heer, J. and Shneiderman, B., Interactive dynamics for visual analytics, Communications of the ACM 55, Vol 4, pp. 45-54, 2012.

KBD 1306: DATA MINING TECHNIQUES

Course Description

The course offers a comprehensive introduction to both data mining theory and practice. It provides an understanding of major data mining techniques. This course is an introductory course on data mining. It introduces the basic concepts, principles, methods, implementation techniques, and applications of data mining.

Course Learning Outcomes

LO1	Understand basic concepts and techniques of Data Mining stages	Cognitive Level- Understand
LO2	Analyze and reduce large sets of data to gain useful business understanding	Cognitive Level- Analyze
LO3	Evaluate data classification methods, models and issues regarding the same	Cognitive Level- Evaluate
LO4	Apply association rules for solving data mining problems.	Cognitive Level- Create
LO5	Develop data mining application based on custom requirements using R/WEKA/MATLAB/PYTHON	Cognitive Level- Create

Mapping of course outcomes with programme outcomes: Low=1, medium=2, High=3

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
LO1	3	2	3		2		
LO2	3		2		2		
LO3	3		2		2		
LO4			3	2	3		
LO5				1	3		

Module 1

Basics of data mining: definition of data, information and data analysis, fundamentals of data mining, data mining stages, Applications of data mining, Data Pre-processing: Need for Pre-processing the Data, Data Cleaning

Module 2:

Data Integration and Transformation, Data Reduction, Introduction to data warehouse and business intelligence.CASE studies: Download free data sets from online repositories, analyse and clean them using tools such as MS Excel and SPSS.

Module 3

Classification models: Classification and Prediction: Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, KNN, Bayesian Classification, neural networks, Support Vector Machines

Case studies: Using the clean data prepared in case study of module 1, classify using the decision tree and SVM models using tools such as R/WEKA/MATLAB/PYTHON

Module 4

Association rules mining: Mining Frequent Patterns, Associations and Correlations: Basic Concepts, Efficient and Scalable Frequent Item set Mining Methods, Mining various kinds of Association Rules, From Association Mining to Correlation Analysis, Improvement of Apriori algorithms and FP-Trees. Case studies: Using WEKA, perform association rule mining over the standard transaction datasets.

Module 5

Advances in data mining, Time Series and Sequence patterns in Transactional Databases, Mining Sequence Patterns in Biological Data, Graph Mining, Social Network Analysis and web mining. Case studies: Create a sample text mining application using python/R to create a keyword index for a set of uploaded files in a directory.

Recommended Books

1. Han, J., Pei, J., & Kamber, M. (2011). *Data mining: concepts and techniques*. Elsevier.
2. Hall, M., Frank, E., Holmes, G., Pfahringer, B., Reutemann, P., & Witten, I. H. (2009). The WEKA data mining software: an update. *ACM SIGKDD explorations newsletter*, *11*(1), 10-18.
3. Gupta, G.K (2014) Introduction to Data Mining with Case Studies, 2014, Prentice Hall India.
4. Elayidom, M.Sudheep (2014) Data Mining and WareHousing, , Cengage Learning India Pvt.Ltd,
5. Zhao, Y (2015) R and data mining: Examples and case studies, Access at www.RDatamining.com
6. Pujari, Arun K (2016) Data Mining Techniques,Third edition, Universities Press.
7. Soman, K.P, Diwakar, S, Ajay, V (2008)Insight into Data Mining, Prentice Hall India
8. PaulrajPonnaiah (2001) Data Warehousing Fundamentals, John Wiley& Sons
9. Roiger, R., Gaetz , M .W (2003) Data Mining – A Tutorial Based Primer, Pearson.

Online support training materials and videos:

- The NPTEL data mining course from IITKGP
- "Introduction to data analytics:" MOOC course from IITM
- The EDUREKA data mining certification program
- The Intellipaat Data Science Certification program
- Data mining with WEKA, MOOC courses from University of Waikato, Newzeland

SEMESTER IV

Sl.No	Course No.	Name of the Course	Hours			Marks		Credit
			L	T	P	Internal	End semester	
1	KBD 1401	Research Methodology	3	0	2	50	50	4
2	KBD 1402	Environmental Management	3	0	2	50	50	4
3	KBD 1403	Modern Project Management Practices	3	0	2	50	50	4
4	KBD 1404	Introduction to Econometric Methods	5	1	0	50	50	5
5	KBD 1405	Predictive Modelling	2	0	6	50	50	5
6	KBD 1406	Elective 1	3	0	2	50	50	4
7.	KBD 1407	Project II -Business Process Mapping for a duration of 15 working days. (50 Marks for continuous assessment, 50 marks for a written report after the completion of the project)					100	4
		Total	**700**					**30**

KBD 1401 RESEARCH METHODOLOGY

Course Description

Research Methodology is a hands- on course designed to impart education in the foundational methods and techniques of academic research in social sciences and business management context. Research scholars would examine and be practically exposed to the main components of a research framework i.e., problem definition, research design, data collection, ethical issues in research, report writing, and presentation. Once equipped with this knowledge, participants would be well-placed to conduct disciplined research under supervision in an area of their choosing. Besides their application in an academic setting, many of the methodologies discussed in this course would be like those deployed in professional research environments.

Course Learning Outcomes

LO1	Understand some basic concepts of research and its methodologies	Cognitive Level- Understand
LO2	Be aware of the ethical principles of research, ethical challenges and approval processes.	Cognitive Level- Analyze
LO3	Apply quantitative, qualitative and mixed methods approaches to cases.	Cognitive Level- Evaluate
LO4	Develop literature review for a research problem.	Cognitive Level- Create
LO5	Develop competence in scholarly writing and research presentation.	Cognitive Level- Create

Mapping of course outcomes with programme outcomes: Low=1, medium=2, High=3

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
LO1	2			3		2	3
LO2				3		3	2
LO3		2	1	3	2	1	
LO4				3		1	2
LO5				3		1	3

Module 1

Research Process - Research Problem Formulation from a Decision Problem- Problem Audit - Development of Appropriate Research Design: research design types, characteristics, overview of data collection methods used for each type of design. - Research Ethics- Literature Search and Review – Using reference management systems for literature review.

Module 2

Qualitative and Quantitative Approaches to Research: Qualitative and Exploratory Data Collection Methods – Experience Surveys, Focus Groups, Depth Interviews - Secondary Data Research – Observational Techniques – Survey Method –

Module 3

Measurement: Validity and Reliability - Basic Levels of Scales - Criteria for Scale Development, Attitude Measurement Scales: Comparative and Non-comparative Scales. – Questionnaire Design

Module 4

Sampling: fundamental concepts, Sampling methods, Determination of Sample Size – Types of Sampling – Developing Appropriate Sampling Plan - Managing Field Work.

Module 5

Data Preparation: Data Validation – Data Editing and Coding – Tabulation: Single & Cross – Graphical Representation of Data.

Testing of Hypothesis – Process, Type I and Type II Errors –Testing of Difference in Means, Testing for Association. Research report preparation

Recommended Books

1. Booth, W. C., Colomb, G. G., & Williams, J. M. (2003). *The craft of research*. University of Chicago press.
2. Bryman, A., & Bell, E. (2015). *Business research methods*. Oxford University Press, USA.
3. Cooper, D. R., Schindler, P. S., & Sun, J. (2006). *Business research methods* (Vol. 9). New York: McGraw-Hill Irwin.
4. Field, A. (2009). *Discovering statistics using SPSS*. Sage publications.
5. Hair, J. F., Celsi, M. W., Ortinau, D. J., & Bush, R. P. (2008). *Essentials of marketing research*. McGraw-Hill/Higher Education.
6. Malhotra, N. K. (2008). *Marketing research: An applied orientation, 5/e*. Pearson Education India.
7. Saunders, M. N. (2011). *Research methods for business students, 5/e*. Pearson Education India.
8. Sekaran, U., & Bougie, R. (2016). *Research methods for business: A skill building approach*. John Wiley & Sons.

KBD 1402 ENVIRONMENTAL MANAGEMENT

Course Description

This course is to raise awareness about the complicated and life supporting relationship of environment and other human endeavours. Intended to be a general course suitable for undergraduates it covers the fundamental relationships and cyclic processes that govern the ecosystems on earth. This course prepares the learner to meaningfully contribute towards sustainable development and reduce environmental degradation.

Course Learning Outcomes

LO1	Understand the relationships between the biotic and abiotic forms in ecological systems	Cognitive Level- Understand
LO2	Understand ecological problems like pollution, loss of habitat, waste generation and disposal.	Cognitive Level- Understand
LO3	Analyse specific case studies on pollution and man-made ecological issues like waste disposal.	Cognitive Level- Analyse
LO4	Evaluate technologies for reducing the ecological footprint of human activities and reduce adverse environmental impacts.	Cognitive Level- Evaluate
LO5	Assess the impacts of human activities on the environment by interpreting the complex relation among population, natural resources and economic development.	Cognitive Level- Evaluate

Mapping of course outcomes with programme outcomes: Low=1, medium=2, High=3

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
LO1						3	2
LO2		1				3	2
LO3		2		1		3	1
LO4		3				3	
LO5		3				3	

Module 1

Environmental studies as a multidisciplinary field: Definition, scope, importance and components - Natural resources and associated problems (forest, water, food, land and energy resources) - Role of an individual in conservation of natural resources - Equitable use of resources for sustainable lifestyles.

Module 2

Ecosystems and Biodiversity: Concept, Structure and function of an ecosystem - Energy flow in the ecosystem - Ecological succession: Food chains, food webs and ecological pyramids – Types and characteristics of: Forest ecosystem, Grassland ecosystem, Desert ecosystem and Aquatic ecosystems - Definition of genetic, species and ecosystem diversity -Bio-geographical classification of India - Value of biodiversity - Biodiversity at global, national and local levels -Hot-spots of biodiversity - Threats to biodiversity - Endangered and endemic species of India -Conservation of biodiversity - In-situ and Ex-situ conservation of biodiversity.

Module 3

Environmental pollution and Environmental Legislation: Types of pollution - Solid waste Management: Causes, effects and control measures of urban and industrial wastes - Role of an individual in prevention of pollution - Pollution case studies - Environment Protection Act - Air (Prevention and Control of Pollution) Act - Water (Prevention and control of Pollution) Act - Wildlife Protection Act - Forest Conservation Act - Hazardous Waste Handling and Disposal in India - relevant Acts - Issues involved in enforcement of environmental legislation.

Module 4

Environmental ethics - Social issues and the environment - Issues and possible solutions - Climate change - global warming - acid rain - ozone layer depletion - nuclear accidents and holocaust - Case Studies - Wasteland reclamation - Consumerism and waste products - From Unsustainable to Sustainable development - Urban problems related to energy - Water conservation : rain water harvesting and watershed management - Resettlement and rehabilitation of people: its problems and concerns - Case Studies - Public awareness.

Module 5

Human Population and the environment - Population growth - variation among nations - Population explosion - Family Welfare Programme - Environment and human health - Human rights - Role of Information Technology in Environment and human health - Case Studies - Field work.

Note: Field work report: A short report shall be submitted by the students after a field visit with an objective related to any of the broad areas covered in the subject.

Recommended Books

1. Ahluwalia,V.K (2016) Environmental Studies, Second edition, New Delhi, TERI Press.
2. AninditaBasak (2009) Environmental Studies, Pearson.
3. Chawla, Sashi (2012) A Textbook of Environmental Studies, McGrawHill.
4. Davis, Mackenzie L., and Cornwell, David A. (2014) Introduction to Environmental Engineering, Fifth edition, McGrawHill.

5. Glynn Henry, J., and Heinke, Gary W (2015) Environmental Science and Engineering, Pearson.
6. Ramachandra, T.V., and Kulkarni, Vijay (2015) Environmental Management, New Delhi, TERI Press
7. Thomas, Jacob (2014) Environmental Management: Text and Cases, Pearson.

KBD 1403 MODERN PROJECT MANAGEMENT PRACTICES

Course Description

This course aims to familiarize students with the concepts of project life cycle and to develop competency in project scoping, work definition, and work breakdown structure. At the end of this course, students will be able to handle the complex tasks of time estimation and project scheduling. Modules 3 and 4 introduce the students to the Agile methods for project management. Module 4 provides an understanding of project management and its principles in a contemporary iterative, incremental agile project environment. Module 5 introduces the students to some of the powerful practices in agile methodologies.

Course Learning Outcomes

LO1	Understand the challenges in project management.	Cognitive Level- Understand
LO2	Apply project cost estimating techniques and earned value management	Cognitive Level- Apply
LO3	Analyse risks involved in a project and find out methods to reduce risks	Cognitive Level- Analyse
LO4	Evaluate agile practices in latest software projects	Cognitive Level- Evaluate
LO5	Evaluate an agile transition plan	Cognitive Level- Evaluate

Mapping of course outcomes with programme outcomes: Low=1, medium=2, High=3

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
LO1		2		2	3	2	1
LO2	3	2	2		2	1	2
LO3	3	2	2		2	1	2
LO4		2		3	2		
LO5		2		3	2		

Module 1

Basics of Project Management - need for project management - project management knowledge areas - the project life cycle - project management processes - challenges in project management.

Module 2

Organizational Structure and Organizational Issues: Concept of Organizational Structure - Roles and Responsibilities of Project Manager - Leadership - Conflict Resolution. Resources

Considerations in Projects: Introduction - Resource Allocation - Scheduling - Project Cost Estimating.

Module 3

Project Risk Management - Risk Identification - Risk Analysis - Reducing Risks - Project Quality Management - Quality Concepts, Project Execution - Project Control Process - Purpose of Project Execution - Project Close-out -Termination and Follow-up.

Module 4

Agile project management principles - Agile manifesto - Agile technical team: Roles and responsibilities, team empowerment, leadership collaboration. Agile practices: iterative development methodologies – SCRUM and XP, modeling, time-boxing - Agile project planning – Sprint planning - Agile approach to estimating.

Module 5

Transitioning to agile – Agile metrics - User stories – story points – ideal days - Customer Satisfaction and the KANO modelling – Velocity calculation – burn down chart – Customer testing – Test first – Refactoring – Daily stand up – Pair programming – Continuous delivery – DevOps - Software delivery as the Core Competency.

Recommended Books

1. Bentley, C. (2011).*The Essence of the Project Management Method*, 7th Edition. CAIS Management.
2. Cobb, C. G. and Hoboken (2011). *Making Sense of Agile Project Management: Balancing Control and Agility*, John Wiley and Sons.
3. Kerzner, H. R. (2013). *Project management: a systems approach to planning, scheduling and controlling.* 11th Edition, John Wiley and Sons.
4. Meredith, M.J. (2005) *Project management: a managerial approach*. 6th edition, Wiley and Sons.
5. Project Management Institute (2008). *A guide to the project management body of knowledge (pmbok guide).* 4th edition.
6. Schwalbe, K. (2008) *Information Technology Project Management*, 5th edition.
7. Wysocki, R.K. (2014). *Effective project management: traditional, agile, extreme,* (7thEd): Wiley India
8. Highsmith, J. (2009).*Agile Project Management (2nd Ed)*: Addison-Wesley Professional.
9. Goodpasture,J.C.(2014). *Project Management the Agile Way: Making it Work in the Enterprise (1st Ed)*,Cengage Learning India.
10. Kim, G., Behr, K., & Spafford, K. (2014). *The phoenix project: A novel about IT, DevOps, and helping your business win*. IT Revolution.
11. Humble, J., & Farley, D. (2010). *Continuous delivery: reliable software releases through build, test, and deployment automation*. Pearson Education.

KBD 1404 INTRODUCTION TO ECONOMETRIC METHODS

Course Description

The course is designed to impart the learning of principles of econometric methods and tools. This is expected to improve student's ability to understand of econometrics in the study of economics. This course intends to provide a thorough and sound understanding of the essential theoretical base, an introduction into the important and useful techniques of modelling and also an understanding of the broad applications of econometrics.

Course Learning Outcomes

LO1	Understand the basic principles of decision making using micro economic analysis	Cognitive Level- Understand
LO2	Build, estimate and interpret linear regression models	Cognitive Level- Apply
LO3	Use LOGIT and ANCOVA models for understanding relationships and variables	Cognitive Level- Analyse
LO4	Interpret key statistics and diagnostics typically generated by software	Cognitive Level- Evaluate

Mapping of course outcomes with programme outcomes: Low=1, medium=2, High=3

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
LO1	3	3	3	2	2		1
LO2	3		3	1			
LO3	3		3	1			
LO4	3				3		2

Module 1

Basics of Econometrics-Linear regression model, two variables and multi variables, BLUE property, general and confidence approach to hypothesis testing, partial effects and elasticity, goodness of fit, model evaluation, matrix approach to linear regression models

Module 2

Nonlinear relationships – transformation of variables – functional forms –three variable regression model – applications using excel

Module 3

General linear model– specification – OLS estimators – testing significance of individual and overall regression coefficients – restricted least squares – structural regression models – dummy variables – problems and application using excel.

Module 4

Violation of classical assumptions – multicollinearity – autocorrelation – heteroscedasticity – problems – causes – consequences – remedial measures – model specification and diagnostic testing-. Excel practical

Module 5

Introduction to time series: Components of time series- Tools of modern time series analysis – stochastic and stationary process – tests of stationary – trend vs difference stationery process –ARIMA. Excel practicals.

Recommended Books

1. Brooks, C. (2014). *Introductory econometrics for finance*. Cambridge university press.
2. Pattersson, K. (2000). An Introduction to Applied Econometrics: A Time series Approach, Palgrave McMillan.
3. Enders, W. (2010). *Applied econometric time series*. John Wiley & Sons.
4. Baltagi, B. (2010). *Econometric analysis of panel data*. John Wiley & Sons.
5. Baltagi, B.H. (2011), Econometrics, Springer, New York.
6. Dongherty, C. (2011), Introduction to Econometrics, Oxford University Press, New York.
7. Guarajti Damodar J. and Dawn C. Porter. (2009), Essentials of Econometrics. Fourth edition.
8. Koutsoyiannis, A. (2001), Theory of Econometrics (2nd ed.), Palgrave Macmillan Press Ltd., London
9. Maddala, G.S. (1998), Econometrics — An Introduction, New York:McGraw-Hill.
10. Wooldridge, J.M., (2013), Introductory Econometrics: A Modern Approach, NewDelhi: Cengage.

KBD 1405 PREDICTIVE MODELLING

Course Description

Upon completion of the course, students will be familiar with the concepts of a SAS Enterprise Miner project and explore data graphically. Students should be able to build predictive models and understand the working of such models and also learn to generate a score code and its uses.

Course Learning Outcomes

LO1	Understand the concepts of statistical models and modelling using SAS	Cognitive Level- Understand
LO2	Interpret data to visualize relationships among variables	Cognitive Level- Analyze
LO3	Choose and implement appropriate performance measures for predictive models	Cognitive Level- Apply
LO4	Evaluate specific statistical and regression analysis methods applicable to predictive analytics.	Cognitive Level- Evaluate
LO5	Develop predictive models to generate predictions for new data	Cognitive Level- Create

Mapping of course outcomes with programme outcomes: Low=1, medium=2, High=3

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
LO1	3						
LO2	3	2	3	2	2		
LO3	3		3		3		
LO4	2		3		2		
LO5	3		3	2			2

Module 1

Introduction to SAS Enterprise Miner - Accessing and Assaying Prepared Data - Creating a SAS Enterprise Miner project - library and diagram - Defining a data source - Exploring a data source.

Module 2

Cultivating decision trees - Optimizing the complexity of decision trees - Understanding additional diagnostic tools.

Module 3

Introduction to neural network models - Input selection - Stopped training - Other modelling tools.

Module 4

Model fit statistics - Statistical graphics - Adjusting for separate sampling - Profit matrices - Model Implementation - Internally scored dataset - Score code modules - Introduction to Pattern Discovery - Cluster analysis - Market basket analysis.

Module 5

Ensemble models - Variable selection - Categorical input consolidation - Surrogate models.

Recommended Books

1. Sarma, Kattamuri S. (2017) *Predictive Modeling with SAS Enterprise Miner: Practical Solutions for Business Applications,* Third Edition, SAS Institute
2. Simon Haykin (2010) *Neural Networks & Learning Machines,*Third edition, Prentice Hall India.
3. SAS Publishing (2011) *SAS Certification Prep Guide,* Third Edition, SAS Institute,
4. Elliott,Alan C. and Woodward,Wayne A. (2015) *SAS Essentials : Mastering SAS For Data Analytics,*Second Edition, John Wiley& Sons

SEMESTER V

Sl.No	Course No.	Name of the Course	Hours			Marks		Credit
			L	T	P	Internal	End semester	
1	KBD 1501	Entrepreneurship Development and Management of Startups	4	0	2	50	50	4
2	KBD 1502	Strategic Self Marketing & Personal Branding	5	2	0	50	50	4
3	KBD 1503	Digital marketing and social media analytics	5	3	0	50	50	4
4	KBD 1504	Big Data Analytics	2	0	4	50	50	4
5	KBD 1505	Text and Web Analytics	3	0	4	50	50	5
6	KBD 1506	Business Model Analysis	5	1	0	50	50	5
	KBD 1507	Elective 2	3	1	2	50	50	4
		Total	**700**					**30**

KBD 1501 ENTREPRENEURSHIP DEVELOPMENT AND MANAGEMENT OF Start-ups

Course Description

Upon completion of the course, the student will be able to demonstrate knowledge of the following topics: Understanding the dynamic role of entrepreneurship and small businesses; Organizing and Managing a Small Business; Startups- New Product or Service Development; Business Plan Creation; and Small Business Growth and Performance

Course Learning Outcomes

LO1	Understand entrepreneurial behaviours and entrepreneurial motivation	Cognitive Level- Understand
LO2	Understand managerial problems of new enterprises: production, financing and labour and marketing problems	Cognitive Level- Understand
LO3	Analyse the economic costs and benefits of start-ups	Cognitive Level- Analyze
LO4	Evaluate the process of becoming a start-up with current trends and Regulatory environment	Cognitive Level- Evaluate
LO5	Create a business plan for a business idea	Cognitive Level- Create

Mapping of course outcomes with programme outcomes: Low=1, medium=2, High=3

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
LO1		2	2	1		1	
LO2		3		3		2	1
LO3		3				2	
LO4		3		2	2	1	
LO5				2	2	2	3

Module 1

Entrepreneurial traits, types and significance, Definitions, characteristics of entrepreneurial types, qualities and functions of entrepreneurs, entrepreneurial behaviours and entrepreneurial motivation, Achievement and management success, Entrepreneurial success in rural area, Innovation and entrepreneur. Role of entrepreneurship in a developing economy.

Module 2

Mechanics of setting of new enterprises – size and location, industrial location factors determining the industrial location. Search for business idea, sources of ideas, idea processing, input requirements, Business plans: Components and Preparation of business plans, Sources of finance.

Module 3

Feasibility Studies: Technical, marketing and financial: managerial problems of new enterprises: production, financing and labor and marketing problems, Preparation of Feasibility reports and legal process and documentation, establishing entrepreneur systems.

Module 4

The new model of Entrepreneurship- Business incubators and startups, Start up's- Concepts, models, characteristics, startup communities, startup terminologies and funding options of start-up's. Startups in India: Profile, Causes, Effects, Process of becoming a startup, Current trends, Regulatory environment, Budget, Plans and Policies.

Module 5

Strategic planning and financial performance of start-ups, Economic costs and benefits of startups. Role of Business Planning in Startup's. Startup's- Key to unemployment or reason for future unemployed youth, impact of education and training, Resource constraints, Emerging, young and high potential start-ups. Government initiatives- assistance towards Startup's, women initiatives and other backward groups. Startup India program

Recommended Books

1. Barringer, Bruce R. (2015) Preparing Effective Business Plans : An Entrepreneurial Approach. Second edition, Pearson Education.
2. Barringer, Bruce R., and Ireland,R. Duane (2008) Entrepreneurship : Successfully Launching New Ventures, Second Edition, Pearson Education.
3. Blank, Steven G., and Dorf, Bob (2012). The Startup Owner's Manual: The Step-by-Step Guide for Building a Great Company.KetS Ranch, Inc.
4. Drucker, Peter Ferdinand (2007). Innovation and Entrepreneurship: Practice and Principles. Harper & Row.
5. Kuratko, Donald F., and Welsch, Harold P. (2004) Strategic Entrepreneurial Growth. , Second edition, Thomson/South-Western.
6. Kawasaki, G. (2004). The art of the start: The time-tested, battle-hardened guide for anyone starting anything. Penguin.
7. Christensen, C. M., &Christensen, C. M. (2003). The Innovator's Dilemma, HarperBusiness Essentials.
8. Baron, R. A. (2014). Essentials of Entrepreneurship: Evidence and Practice. Edward Elgar Publishing.
9. Kuratko, D. F. (2016). Entrepreneurship: Theory, Process, and Practice. Cengage Learning.
10. Blank, S., & Dorf, B. (2012). The Startup Owner's Manual: The step-by-step guide for building a great company; BookBaby.

KBD 1502 STRATEGIC SELF-MARKETING AND PERSONAL BRANDING

Course Description

The course aims to familiarize students with the use strategic marketing and personal branding techniques for enhancing and promoting professional image. Upon completion of the course, students should be able to create and project a professional image and attitude, demonstrate good interview and networking skills. The course also aims to familiarize the student with global business etiquettes and help them develop a personal brand to advance future career marketability.

Course Learning Outcomes

LO1	Understand the importance of marketing orientation and career development	Cognitive Level- Understand
LO2	Analyse strategies for creating personal brand	Cognitive Level- Analyse
LO3	Create personal branding statements, and integrate social networking into career branding;	Cognitive Level- Evaluate
LO4	Analyse self-marketing and personal branding related data for self-assessment of self-marketing and personal branding skills.	Cognitive Level- Create
LO5	Create a strategic self-marketing plan.	Cognitive Level- Create

M**apping of course outcomes with programme outcomes: Low=1, medium=2, High=3**

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
LO1						2	3
LO2						2	3
LO3						2	3
LO4						2	3
LO5						2	3

Module 1

Overview of personal branding - Crafting Personal Brand Profile - Business Cards - Resume writing - LinkedIn - Crafting personal brand - Knowing brand (Personal SWOT).

Module 2

Define branding and career goals - Understand how to position oneself - Define your message - Establish social media accounts - Create digital portfolio - Layout and develop a resume and cover letter

Module 3

Building a personal network - Personal branding in the work place - Writing personal brand - Communicating Brand Online - Social media marketing

Module 4

Determine a brand strategy - how to leverage current professional and personal relationships - Attending professional networking events.

Module 5

Build a brand action plan - Evaluate other successful personal brand campaigns - How to maintain branding efforts.

Recommended Books

1. Susan Chritton(2012) Personal Branding For Dummies; John Wiley & Sons,
2. William Arruda and Dixson, K (2007) Career Distinction: Stand Out by Building Your Brand; John Wiley & Sons.
3. Mobray, Kaplan (2009) The 10Ks of Personal Branding; iUniverse,
4. Michael Janda (2013) Burn Your Portfolio: Stuff They Don't Teach You in Design School, But Should; New Riders.
5. Erik Deckers and Kyle Lacy (2012) Branding Yourself: How to Use Social Media to Invent or Reinvent Yourself,Second edition; Que Publishing

KBD 1503 DIGITAL MARKETING AND SOCIAL MEDIA ANALYTICS

Course Description

To impart theory and practice of digital marketing and social media analytics in the age of big data; to give basic level understanding of paid media, predictive modeling for ad targeting and customer relationship management, measuring and managing product virality, viral product design, native advertising, and engaging the multichannel experience; and to expose to some of the theory and practice of randomized experimentation, AB testing and the importance of causal inference for marketing strategy.

Course Learning Outcomes

LO1	Understand digital marketing concepts, social media analytics and tools	Cognitive Leve-Understand
LO2	Examine social media CRM methods	Cognitive Level- Analyse
LO3	Evaluate digital marketing plans by identifying correct measures	Cognitive Level-Evaluate
LO4	Evaluate strategic options for boosting customer acquisition, conversion, and retention using digital marketing	Cognitive Level- Evaluate
LO5	Create a digital marketing plan and budget	Cognitive Level-Create

Mapping of course outcomes with programme outcomes: Low=1, medium=2, High=3

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
LO1		3	2		2		
LO2		2			3	2	1
LO3		3	3		3		1
LO4		3	3		3		1
LO5	2	3		3	3	1	2

Module 1

Social Media Analytics: Defining Analytics in Social Media and Types of Analytics Tools, Differences of Social Media Networks, The Analytics Process, Metrics, Dashboards, and Reports, Strategy of Marketing, Prescriptive Analytics, The Future of Social Media Analytics.

Module 2

Tools for Social Media Analytics: Identifying a Social Media Listening Tool, Understanding Social Media Engagement Software, Purchasing Social Media Engagement Tools, Tools: Social Media Listening, Search Analytics, Audience analysis, Modeling Social Media Programs, Search Analysis.

Module 3

CRM Strategy in the Age of Big Data and Digital Advertising: Defining Social CRM, Rolling Out a Social CRM Initiative, Identifying a Social CRM Solution**.** Mobile Analytics: Understanding the Current Mobile Market Landscape, Identifying What Is Next for Mobile Marketing, The Current State of Measuring Mobile, The Future State of Measuring Mobile Marketing**,** Earned vs Paid Media, Predictive Modeling for Ad Targeting

Module 4

Viral Product Design, the Multichannel Experience, Randomized Experimentation: Understanding the Conversation Audit, Identifying Online Influencers, Identifying Known Issues, Social Customer Service Models and Conflicts, Formulating Research Plan, Conduct of Report, Search analysis and ROI.

Module 5

AB Testing and Causal Inference in Marketing Strategy: Understanding Measurement Fundamentals, Developing Your Measurement Reporting Cadence, AB Testing**,** Collecting and Extracting Social Media Data form Twitter/ Flikr, Data Analysis, Visualization, and Exploration of Data, Case Study on Structured and Unstructured Data.

Activities Recommended:

1. Modeling Exercise of Digital Marketing and Reporting of for easy understanding and communication.

2. Case Study of Media Analytics in Twitter and Flickr.

Recommended Books

1. Noah Gray, Michael Fox, Social Media Marketing: Step by Step Instructions For Advertising Your Business on Facebook, Youtube, Instagram, Twitter, Pinterest, Linkedin and Various Other Platforms, 2nd Edition, 2018.

2. Chuck Hemann, Ken Burbary, Digital Marketing Analytics: Making Sense of Consumer Data in a Digital World, Que Publishing, 2013.

3. Raghav Bali, Dipanjan Sarkar, Tushar Sharma, Learning Social Media Analytics with R: Transform data from social media platforms into actionable business insights, Packt, 2017

4. Alex Gonçalves, Social Media Analytics Strategy: Using Data to Optimize Business Performance 1st ed. Edition, Apress, 2017.

5. Matthew Ganis, Avinash Kohirkar, Social Media Analytics: Techniques and Insights for Extracting Business Value Out of Social Media, IBM Press, 1st Edition, 2015
6. Matthew A. Russell, Mining the Social Web: Data Mining Facebook, Twitter, LinkedIn, Google+, GitHub, and More O'Reilly Media; Second edition, 2013.

Courses Recommended:

https://www.coursera.org/specializations/digital-marketing

https://www.coursera.org/learn/social-media-data-analytics

KBD 1504 BIG DATA ANALYTICS

Course Description

To introduce big data terminologies and concepts, MapReduce programming model and its applications. This course provides an overview of approaches facilitating data analytics on huge datasets. Different strategies are presented including sampling to make classical analytics tools amenable for big datasets, analytics tools that can be applied in the batch or the speed layer of a lambda architecture, stream analytics, and commercial attempts to make big data manageable in massively distributed or in-memory databases. Learners will be able to realistically assess the application of big data analytics technologies for different usage scenarios and start with their own experiments.

Course Learning Outcomes

LO1	Understand the fundamental concepts of big data analytics.	Cognitive Level- Understand
LO2	Understand the various search methods and visualization techniques.	Cognitive Level- Understand
LO3	Apply various techniques for mining data streams.	Cognitive Level- Apply
LO4	Optimize business decisions and create competitive advantage with Big Data Analytics	Cognitive Level- Create
LO5	Apply Map Reduce Concepts.	Cognitive Level- Create

Mapping of course outcomes with programme outcomes: Low=1, medium=2, High=3

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
LO1	3	2	3	2	2		
LO2	2			3	2		1
LO3			3		3		
LO4	3	3	3				
LO5		3	3		3		

Module 1

Introduction to big data: Big Data Overview, The Value of Big Data, State of the Practice in Analytics, Key Roles for the new Big Data Ecosystem, Characteristics of Big Data, Challenges for Big Data Analytics, Big Data Applications, Big Data Use Cases: Patterns for Big Data Deployment

Module 2

Big data analytics: Data Analytics Lifecycle-Discovery, Data Preparation, Model Planning, Model Building, Communicate Results, Operationalize, Case Study: Global Innovation Network And Analysis (GINA), Modern Data Analytic Tools, Intelligent data analysis, Analytic Processes and Tools,

Module 3

Big data technology and tools: analytics for Unstructured Data- Use Cases, MapReduce, Apache Hadoop, The Hadoop Ecosystem- Pig, Hive, HBase, Mahout, NoSQL, In-Database Analytics- SOL Essentials, In-Database Text Analysis, Advanced SOL, Data Analytic Methods Using R-Exploratory Data Analysis, Statistical Methods for Evaluation, Big Data Analytics with R and Hadoop

Case study: Installation and study of Apache Hadoop and implementation of a sample wordcount MapReduce program

Module 4

Apache Hadoop: apache Hadoop and the Hadoop Ecosystem- The Hadoop Distributed File System, Components of Hadoop, Analyzing the Data with Hadoop, Hadoop I/O, Setting up a Hadoop Cluster, Hadoop Configuration, Security in Hadoop, Hadoop benchmarks, Hadoop Ecosystem-Yarn, Pig, HBase, Mahout, Zookeper, Oozie, Flume, Sqoop

Module 5

MapReduce programming**:** Map-Reduce Implementation with Hadoop, How Map Reduce Works, Anatomy of a Map Reduce Job, MapReduce Execution Pipeline, Designing MapReduce Implementation, Map Reduce Types and Formats- Map Reduce Features

Case Study- IBM InfoSphere

Case studies focussing on clustering application for recommendation systems

Recommended Books

1. Clifton, B. (2010). *Advanced web metrics mit Google Analytics: Praxis-Handbuch*. MITP-Verlags GmbH & Co. KG.
2. Prajapati, V. (2013). Big data analytics with R and Hadoop. Packt Publishing Ltd..
3. Marconi, K., & Lehmann, H. (Eds.). (2014). *Big data and health analytics*. CRC Press.
4. Warden, P. (2011). *Big data glossary*. O'Reilly Media, Inc.
5. Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing andPresenting Data, EMC Education Services, WILEY, 2015
6. Elayidom, M. S. (2015). Datamining and Warehousing. *Cengage Learning India Pvt Ltd*.
7. Berthold, M. R., & Hand, D. J. (Eds.). (2007). *Intelligent data analysis: an introduction*. Springer.
8. Plunkett, T., Macdonald, B., Nelson, B., Hornick, M., Sun, H., Mohiuddin, K., ... & Segleau, D. (2014). *Oracle big data handbook*. McGraw-Hill Education.
9. White, T. (2012). *Hadoop: The definitive guide*. " O'Reilly Media, Inc.
10. Zikopoulos, P., & Eaton, C. (2011). *Understanding big data: Analytics for enterprise class hadoop and streaming data*. McGraw-Hill Osborne Media.

KBD 1505 TEXT AND WEB ANALYTICS

Course Description

The aim of this course is to be a primer for text analytics theory and practice. After taking this course, students will have an understanding of how to independently obtain, parse, and analyse textual information for organizations that want to extract valuable insights. The course provides understanding of Twitter mining cases, webscrapers, crawlers.

Course Learning Outcomes

LO1	Understand Entity extraction, text categorization and text clustering	Cognitive Level- Understand
LO2	Execute document summarisation	Cognitive Level- Apply
LO3	Apply Topic modelling and latent semantic analysis	Cognitive Level- Apply
LO4	Develop Customer behaviour and access pattern mining	Cognitive Level- Create
LO5	Create Customer profiling and segmentation	Cognitive Level- Create

Mapping of course outcomes with programme outcomes: Low=1, medium=2, High=3

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
LO1	3		3		3		
LO2		3			2		3
LO3			3		3		
LO4	2			2	3	2	
LO5	2	3		2	3	1	

Module 1

Text and web analytics: Text Analytics- Text Analysis Steps, Collecting Raw Text, Representing Text, Term Frequency-Inverse Document Frequency (TFIDF), word 2 vector.

Module 2

Topic models; CSI; PLSA; LDA; Topic-based document index; Concept of ontology.

Module 3

Sentiment analysis, Senti WordNet, polarity computation

Module 4

Introduction data streams, opportunities and challenges, data stream, twitter mining-case study.

Module 5

Introduction to XML, XSLT, XPath, web mining, web scrapers, crawlers. Parser.

Recommended Books

1. Zhai, C.X. & Massung, S. (2016). *Text data management and analysis: a practical introduction to information retrieval and text mining.* Acm Books.
2. Miner, G., Elder IV, J., & Hill, T. (2012). *Practical text mining and statistical analysis for non-structured text data applications*. Academic Press.
3. Struhl, S. (2015). *Practical Text Analytics: Interpreting Text and Unstructured Data for business intelligence*,
4. Silge, J. & Robinson, D. (2017). *Text mining with r: a tidy approach*, O'Reilly Media, Inc.
5. Kaushik, A. (2007). *Web analytics: An hour a day (W/Cd)*. John Wiley & Sons.
6. Clifton, B. (2012). *Advanced web metrics with Google Analytics*. John Wiley & Sons.
7. Kelly, N. (2012). How to measure social media: A step-by-step guide to developing and assessing social media ROI. Que Publishing.

KBD 1506 BUSINESS MODEL ANALYSIS

Course Description

To equip the students to apply various conceptual frameworks to understand and analyse business models in diverse markets. The course introduces the concepts, tools, and principles of business model design aligned with the theories of strategic management. The main emphasis will be on understanding how firm's unique resources and capabilities should serve as a basis on which business model can be designed. In addition, throughout the course we will touch up upon the requirements set by the business environments and the theories that explain how companies are creating and maintaining competitive advantage.

Course Learning Outcomes

LO1	Explain the importance of business models in value creation	Cognitive Level- Understand
LO2	Interpret business models used by actual ventures	Cognitive Level- Apply
LO3	Examine different business model frameworks	Cognitive Level- Analyse
LO4	Construct and present a business model for an innovative and viable new venture	Cognitive Level- Create
LO5	Design and conduct tests for different business model building blocks	Cognitive Level- Create

Mapping of course outcomes with programme outcomes: Low=1, medium=2, High=3

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
LO1		3	3	2			
LO2		3	3	3			
LO3		3				3	
LO4			2		2	2	1
LO5	1	2		2	2		

Module 1

Business model – conceptual definitions and scope; difference between business model and strategy; Need and relevance of business models; the concept of value: creating, delivering and capturing value. Tool for designing and analysing business models: Business Model Canvas; Four box model, business model wheel.

Module 2

Business Model Patterns; Designing business models; business model innovation; Market segmentation, targeting and positioning. Identifying markets and assessing market attractiveness; blue ocean strategy.

Module 3

Building and managing revenue models: Assessing competition and market structure; Analysing cost structure and gross margin models.

Resource based view of the firm, Core competence, Competitive advantage and Competitive strategy: role and relevance in business models.

Module 4

Designing Business Models from entry into incubation, Risk Management using business model portfolios; Lean Start-ups. Product development and customer development for startups.

Module 5

Practical examples of Business models; Sustainable business practices and business models.

Recommended Books

1. Osterwalder, A., & Pigneur, Y. (2010). *Business model generation: a handbook for visionaries, game changers, and challengers*. John Wiley & Sons.
2. Bernd, W. W. (2011). Business model management: Design-instruments-success factors.
3. Afuah, A. (2014). *Business model innovation: concepts, analysis, and cases*. Routledge.
4. Blank, S., & Dorf, B. (2012). *The startup owner's manual: The step-by-step guide for building a great company*. BookBaby.
5. Ries, E. (2011). *The lean startup: How today's entrepreneurs use continuous innovation to create radically successful businesses*. Crown Books.
6. Blank, S. (2013). *The four steps to the epiphany: successful strategies for products that win*. BookBaby.
7. Kaplan, S. (2012). *The business model innovation factory: How to stay relevant when the world is changing*. John Wiley & Sons.

LIST OF ELECTIVES

E-1 Practical Accounting in Business Organisations

E-2 Computational Finance

E-3 Investment Analysis and Portfolio Management

E-4 HR Analytics

E-5 Introduction to Machine Learning

E-6 Digital Marketing and Social Media Analytics

E-1 PRACTICAL ACCOUNTING IN BUSINESS ORGANIZATIONS

Course Description

Develop accounts maintenance and finalization skills by associating the process with the Tally Accounting Package. This course is designed to impart knowledge regarding concepts of Financial Accounting Tally is an accounting package which is used for learning to maintain accounts. As this course is useful for Commerce students to get placements in different offices as well as companies in Accounts departments.

Course Learning Outcomes

LO1	Do Voucher Entries and Inventory Records	Cognitive Level- Apply
LO2	Process and record the business transactions and manage the accounts information	Cognitive Level- Apply
LO3	Understand the concepts of GST	Cognitive Level- Analyse
LO4	Employ payroll accounting using software package	Cognitive Level- Create
LO5	Implement statutory filing through identified software package	Cognitive Level- Create

Mapping of course outcomes with programme outcomes: Low=1, medium=2, High=3

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
LO1	3	3				1	1
LO2	3	3				1	1
LO3	3	3				1	1
LO4	3	3				1	1
LO5	3	3				1	1

Module 1

Fundamentals of Tally.Erp 9

Introduction of Tally.ERP 9-History of Tally-Versions of Tally-Company Features-Configuration- Getting functions with Tally.ERP9-Creation/setting up of Company in Tally.ERP9-Chart of Groups-Groups-Multiple Groups-Ledgers-Multiple Ledgers-Stock Groups-Multiple Stock Groups-Stock Categories-Multiple Stock Categories-Units of Measure-Godowns-Stock Items.

Module 2

Voucher Entries and Inventory Records in Tally.Erp9

Introduction-Types of Vouchers-Chart of Vouchers-Accounting Vouchers-Inventory Vouchers-Invoicing-Bill wise details-Cost centers and Cost Categories-Multiple currencies-Interest calculations- Budget and controls-Scenario management-Bank Reconciliation-Order Processing-Recorder Levels-Batch-wise details-Bill of Materials-Batch-Wise Details-Different Actual and Billed Quantities-Price Lists-Zero Valued Entries-Additional cost details-POS.

Module 3

GST in Tally.ERP9

GST-GST Repots-CGST-CGST Repots-TDS-TDS Repots-TCS-TCS Repots-Creating Tax Ledgers-Transferring Tax Credits of VAT-Excise and Service Tax to GST-Recording GST Sales and Printing- Invoices-Recording GST Interstate Salesand Printing Invoices-Recording an Advance to Supplier-under GST-

Module 4

Payroll Accounting in Tally.Erp9 and Technological Advantage of Tally.Erp9

Payroll Accounting-Payroll Report-Tally vault-Security controls-Tally audit-Backup and restore-Split company data-Import and export of data-Printing Reports and Cheques-Create Company Logo.

Module 5

Generation of Reports in Tally.Erp9

Financial Statements-Trading Account-Profit & Loss Account-Balance Sheet-Accounts Books and Reports-Inventory Books and Reports-Exception Reports-Statutory Reports- Trail balance-Day Books-List of Accounts-Stock Summary.

Note: 1. Fully practical classes with sufficient examples

2. Essential Software – Tally.Erp9

Reference:

Tally.ERP9 Reference Book

E-2 COMPUTATIONAL FINANCE

Course Description

The computational finance program produces quantitative analysts who design and implement financial models used by banks and investment companies to generate profits and reduce risk. Computational finance support other industries and business functions that reach beyond banking and finance. The program is designed for students interested in computational or quantitative finance careers in banking, finance, and a growing number of industries. The course intends to develop the financial analytical skills by associating the tools and techniques available with Excel for financial data analytics.

Course Learning Outcomes

LO1	Examine the construction of computational algorithms in solving financial problems	Cognitive Level-Understand
LO2	Understand the similarities and differences in efficiency, convergence rate and complexity for the methods	Cognitive Level- Understand
LO3	Interpret computational results both orally and in a written report	Cognitive Level- Analyse
LO4	Develop solvers for analysing financial derivatives	Cognitive Level- Create
LO5	Use advanced software for pricing of financial derivatives	Cognitive Level- Create

Mapping of course outcomes with programme outcomes: Low=1, medium=2, High=3

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
LO1	2	3	2		1		
LO2	2	3	2		1		
LO3	3	3			3		2
LO4			3	2	3		
LO5			2		3		

Module 1

Introduction to Data Analysis: Analysis and Interpretation; Types of Data Analysis - Data Mining-Business Intelligence-Statistical Analysis-Predictive Analytics-Text Analytics; Data Analysis with Excel-Ranges and Tables-Data Cleaning with Text Functions, Containing Date Values and Containing Time Values; Conditional Formatting; Sorting and Filtering; Subtotals with Ranges; PivotTable; Quick Analysis; Lookup Functions; Data Visualization-Band Chart,

Thermometer Chart, Gantt chart, Waterfall Chart, Sparklines and Pivot Charts; Formula Auditing; Inquire; MS Excel.

Module 2

Financial Data Analysis: Time value of money-Annuity-Present Value of a series of Future Payments (PV);Computation of EMI-Monthly Payment of Principal and Interest on a Loan-Calculating interest and term of loan; Decisions on Investments-Cash Flows at the Beginning, middle and end of the Year-NPV-XNPV IRR-MIRR-XIRR; Data Consolidation; What-if-Analysis with Data Tables, Scenario Manager, Goal Seek; Key Performance Indicators (KIP).

Module 3

Time Series Regression Analysis: Annual Growth Rate (AGR) Compounded Annual Growth Rate (CAGR); Time series plot-Sales and share price forecast using regression-Trend Setting.

Module 4

Financial Market Risk Analysis: Risk-Systematic- Unsystematic; Computation of Beta of securities-computation of Risk Adjusted Rate using CAPM.

Module 5

Financial Statement Analysis: Comparative Statements, Common size Statements-Trend Projection-Profitability Ratios-Debt to Equity Ratio-Fixed Assets to Total Assets Ratio-Current Assets to Total Assets Ratio;

Note: 1. Fully practical classes with sufficient examples

2. Essential Software – MS Excel

Recommended Books

1. https://www.tutorialspoint.com/excel_data_analysis/excel_data_analysis_financial.htm
2. Excel 2016: QuickStart Guide for Beginners (2016), My Ebook Publishing House
3. Walkenbach,John (2016) Microsoft Excel 2016 Bible: The Comprehensive Tutorial Resource
4. Winston,Wayne L.(2016) Microsoft Excel 2016 - Data Analysis and Business Modeling, Microsoft Press.
5. Makridakis, Spyros and Wheelwright,Steven C(1998), Forecasting: Methods and Applications, Third Edition, John Wiley & Sons.

E-3 INVESTMENT ANALYSIS AND PORTFOLIO MANAGEMENT

Course Description

The focus of this course is on the examination and valuation of the major investment vehicles and strategies popular today. In particular, we will consider how investors allocate their financial assets by forming, managing, and evaluating portfolios containing instruments. This course aims at developing an understanding of the changing domestic and global investment scenario in general and Indian capital market in particular with reference to availability of various financial products and operations of stock exchanges. It aims at providing an in-depth knowledge of the theory and practice of portfolio management. Important theories, techniques, regulations and certain advancements in theory of investment will be covered with an aim of helping the participants make sound investment decisions in the context of portfolio investment.

Course Learning Outcomes

LO1	Familiarize with the theory and practice of investment analysis and portfolio management	Cognitive Level-Understand
LO2	Understand the working of Securities Market	Cognitive Level-Understand
LO3	Analyse the relationship between risk and return.	Cognitive Level- Analyse
LO4	Evaluate strategies followed by various portfolio managers	Cognitive Level- Evaluate
LO5	Valuation of equities and bonds.	Cognitive Level- Create

Mapping of course outcomes with programme outcomes: Low=1, medium=2, High=3

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
LO1		3		3			
LO2	3	2		1	2		
LO3	2	2	2	1	1		1
LO4	1		2		2	1	1
LO5	2	2	3		2		

Module 1: Introduction to Investment

Investment: Nature and Scope, Objectives, Investment and Speculation, Types of Financial Investments, Sources of Investment Information.

Module 2: Securities Market

Indian Securities Market: Meaning, Functions, Role of Primary Market, Methods of Floatation of Capital, Problems of New Issues Market, Recent Trends in Primary Market. Secondary Market: Meaning, Nature and Functions of Stock Exchanges, Listing of Securities, Overview of Regulatory Framework for Securities Market.

Module 3: Return and Risk Analysis

Return: Concept of Return, Computation of Return. Risk: Concept of Risk, Systematic and Unsystematic Risk, Sources of Investment Risk, Measurement of Risk

Module 4: Securities Analysis

Fundamental Analysis: Analysis of Economy, Tools for Economic Analysis. Industry Analysis: Different Stages of Industry Life-cycle, Key Factors in Industry Analysis. Company Analysis: Tools for Profitability and Financial Soundness.

Technical Analysis: Theories of Technical Analysis: Dow Theory, Elliot Wave Theory. Charting Tools.

Module 5: Portfolio Management

Introduction to Portfolio Management: Portfolio Management Process, Selection of Securities. Portfolio Theory: Efficient Market Theory, Markowitz Model, Sharpe's Single Index Model.

Recommended Books

1. Fisher,Donal E., Jordan, Ronald J.(1995)*Security Analysis and Portfolio Management*, Pearson.
2. Reilly, Frank R, Keith C. Brown(2012) Investment Analysis and Portfolio Management (Indian Edition), Thomson – South Western.
3. Bodie, Zvie, Alex Kane, Alan J. Marcus, Pitabas Mohanty (2015), *Investments*, Tenth Edition,McGraw-Hill, New Delhi
4. Chandra, Prasanna (2012)*Investment Analysis and Portfolio Management*, Fourth edition, McGraw-Hill.
5. Bhalla V. K.(2013)*Investment Management – Security Analysis and Portfolio Management*, Nineteeenth Edition, S. Chand and Company., New Delhi
6. Khatri, Dhanesh (2017)*Security Analysis and Portfolio Management*, McGrawHill
7. Ranganatham R., Madhumathi R. (2012)*Security Analysis and Portfolio Management*, Pearson Dorling Kindersley (India) Pvt. Ltd.

E-4 HR ANALYTICS

Course Description

The course offers a strategic view of organization's use of HR data and its measurement systems. It helps to understand the characteristics and importance of high-quality data and equips you to find and collect that data, inside or away from the environment of organization. This course intends to increase students' awareness of the usefulness of HRM metrics and analytics and equip in using them at the workplace.

Course Learning Outcomes

LO1	Understand modern HR measurement methods & models	Cognitive Level-Understand
LO2	Interpret HR data to make insightful business decisions	Cognitive Level-Apply
LO3	Apply HR Modeling for Root cause analysis	Cognitive Level- Apply
LO4	Develop predictive management capability for firms using the modern tools of HR analytics	Cognitive Level- Create
LO5	Develop HR metrics considering effectiveness measures	Cognitive Level- Create

Mapping of course outcomes with programme outcomes: Low=1, medium=2, High=3

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
LO1	3	3	3			1	
LO2	3	3	3	2	3		
LO3	2	3	3		3		
LO4	2		2		3	1	1
LO5	2		2		3	1	1

Module 1:

HR Measurement Models: Evolution of HR Analytics- Concepts- HR Analytics Maturity Model- HR Analytics framework- LAMP, HCM: 21, Ethical issues in Analytics

Module 2:

Quantitative HRM and Applications: DCOVA- Defining the objectives- Collecting the data- Organising the data- Data Visualization- Data Analysis-Descriptive Statistics

Module 3

HR Reporting: HR Metrics: HR Metrices in recruitment, training and compensation, FTE, Utilization ratio, HR Score card, Dashboard creation (Practicals/Workshop mode)

Module 4

HR Effectiveness Measures: Linking HR measures to business results- Identifying and using the key HR Metrics- Association and Causation (Practicals/ Workshop mode)

Module 5

HR Modeling: Root cause analysis of HR issues, Using historical data, Scenario Planning ((Practicals/ Workshop mode)

Recommended Books

1. Becker,B E ., Huafelid,M.A. &Ulrich.D(2001).*The HR Scorecard: Linking people, strategy, and performance*. Harvard Business Review Press.
2. Bhattacharyya, D.K. (2017). *HR Analytics: Understanding Theories and Applications.Sage Publications.*
3. Sullivan, J (2010). *HR metrics*. Kennedy Information.
4. Gregory, l E (2013).*HR Metrics: Practical Measurement Tools for People Management.*Knowledge Resources. (ISBN: 9781869221690)
5. Bucknall. H., Wei Z (2007). Magic Numbers for Human resource Management. Wiley India.
6. Valerie, P., &Andreasson R. HR metrics: Bench marking human resources
7. Christman, W (2012) *HR Metrics That Matter. HR smart*
8. *HR Metrics standards & glossary published by the HR metrics service*. Version 8.0/December 2012
9. *HR metrics service, HR metrics Intrepretation guide published by BC HRMA version 3.4* / December 2012.

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E-5 INTRODUCTION TO MACHINE LEARNING

Course Description

The course will give the student the basic ideas and intuition behind modern machine learning methods as well as a bit more formal understanding of how, why, and when they work. It aims to introduce methods for learning from data;

Course Learning Outcomes

LO1	Understand basic concepts and techniques of Machine Learning.	Cognitive Level-Understand
LO2	Evaluate the performance of a machine learning system	Cognitive Level-Evaluate
LO3	Evaluate popular machine learning models	Cognitive Level- Evaluate
LO4	Devise solutions to practical problems using machine learning	Cognitive Level- Create
LO5	Develop improved machine learning models	Cognitive Level- Create

Mapping of course outcomes with programme outcomes: Low=1, medium=2, High=3

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
LO1	3		2		2		
LO2		3	3				1
LO3		3	3				
LO4	2	2	3		2		1
LO5	2	1	3	3	3		1

Module 1 Machine Learning Basics

Definition of machine learning, Introduction to learning: supervised and unsupervised learning, classification, clustering, regression - Python for Machine Learning: scikit-learn, Essential Libraries and Tools: Jupyter notebook, NumPy, SciPy, matplotlib, pandas, mglearn – Python exercise on classifying Iris Species

Module 2 Supervised learning I

Generalization, Overfitting, and Underfitting, model complexity – Machine learning models for classification and regression: K Nearest Neighbour classifier, k-neighbors regression, Linear models: Linear regression, Logistic regression, Ridge regression, Linear models for classification, multiclass classification – Python excercise on Linear regression, KNN

Module 3 Supervised learning II

Probabilistic classification: Naive Bayes Classifiers, parameter estimation, maximum likelihood method – Decision Trees: Building decision trees, feature importance – Neural networks: Neural network model, tuning neural networks, basic idea of deep neural networks – Python exercise on Decision Trees, Naive Bayes, neural networks

Module 4 Unsupervised learning

Types of unsupervised learning, Challenges, Preprocessing and scaling: Different kinds of preprocessing, applying data transformations – Dimensionality reduction: Pricipal Component Ananlysis (PCA), Non-Negative Matrix Factorization (NMF) – Clustering: K-means clustering, Case study: Comparing image reconstructions using k- means, PCA and NMF – Python exercise on PCA, K-means clustering

Module 5 Model Evaluation and Improvement

Cross validation: Benefits of cross validation, Stratified k-Fold Cross-Validation and Other Strategies – Evaluation metrics and scoring: Metrics for Binary classification- Confusion matrices, precision, recall and f-score - Metrics for Multiclass Classification, Regression metrics

Suggested Projects:

- Apply/Develop a machine learning method to solve a specific problem:
- A machine learning approach to classifying emails
- Predict stock prices based on past price variation
- Predict how people would rate movies, books, etc.
- Sentiment Analysis of Movie Reviews
- Cluster gene expression data, how to modify existing methods to solve the problem better

Recommended Books

1. Andreas C. Müller & Sarah Guido, Introduction to Machine Learning with Python: A Guide for Data Scientists, O'Reilly, 20172. Fritz Matt, Machine Learning: Mastering the Basics; an In-depth Look at Machine Learning, Createspace Independent, 2017
2. Peter Harrington, Machine Learning in Action, Dreamtech Press, 2012.
3. Ian H. Witten, Eibe Frank and Mark A. Hall, Data Mining: Practical Machine Learning Tools and Techniques, 3 e., 2018.
4. Yaser S. Abu-Mostafa, Malik Magdon-Ismail and Hsuan-Tien Lin, Learning From Data, AMLBook, 2012
5. Stephen Marsland, Machine Learning: An Algorithmic Perspective, Chapman and Hall/CRC, 2014
6. T. Hastie, R. Tibshirani, J. Friedman. The Elements of Statistical Learning,2e., Springer Series, 2017.
7. Christopher Bishop. Pattern Recognition and Machine Learning. 2e., Springer-verlag, 2011

Online Courses:

1. Prof. Ravindran, Introduction to machine learning, http://nptel.ac.in
2. Prof. S. Sarkar, Introduction to machine learning, http://nptel.ac.in
3. MIT OCW on Machine Learning, https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-867-machine-learning-fall-2006/index.htm

E-6 CASE DEVELOPMENT SKILLS FOR ANALYSTS

Course Description

The course focuses on developing skills in building cases from client requirement analysis and documentation & reporting involved in an analyst job. To provide understanding of the process of developing cases from a client perspective and to develop writing skills for preparing and delivering effective reports including informational reports, problem-solving reports, and formal analytical reports. The delivery of this course is mostly through practical assignments and group and individual tasks.

Course Learning Outcomes

LO1	Demonstrate skills in understanding client requirement and identifying relevant variables related to decision problem/Case	Cognitive Level- Apply
LO2	Apply skills in data gathering for analysing the various dimensions of the given business situation	Cognitive Level- Apply
LO3	Analyse alternatives, risks and returns associated	Cognitive Level- Analyse
LO4	Document and report business case	Cognitive Level- Create

Mapping of course outcomes with programme outcomes: Low=1, medium=2, High=3

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
LO1		3	1	2		1	1
LO2		2	1	2		1	
LO3		2	1	2		1	2
LO4		1		3			3

Module 1

Scoping the case- Identifying client requirements – Know the stake holders & key decision makers; Understand the objectives of the client; Understand the strategic context; critical success factors- Indicative costs- Time framework- Expected deliverables; Case Development framework–6D framework

Module 2

Building the case - Identification of pain points/problems, developing the problem statement, identify objectives; assigning metrics to objectives; Data gathering – Field Research Vs Desk Research; Identifying sources of information- Developing instruments – Interview /survey protocols; Case study Investigator skills & training; drafting the case – testing and refining case.

Module 3

Analysing risk and returns/ cost and benefits –evaluate alternatives against metrics- creating a framework for alternatives –selecting a course of action – accounting of risks; Presentation of the case – Identification and justification of the case- methodology- assumptions-Alternatives – pros & cons - lessons learned.

Module 4

Case interview- Concept- types of case interviews- Skills for cracking a case interview -Case Interview Frameworks – Common myths and misconceptions. Technical Research: Conducting Technical Research, Researching at Work, Finding & Documenting Primary and Secondary data, Evaluating Sources

Module 5

Writing Process: Drafting, Revising, Editing, Copyediting and Publishing, Document Design and Graphics: Designing the document, ABC's of Print Document Design, Page Design, Designing Graphics, Constructing Graphics, Tables, Figures, Using Visuals Ethically.

Recommended Books

1. Chaturvedi, P.D & Chaturvedi, M (2017) *The Art and Science of Business Communication*, 4e, Pearson.
2. Cosentino Marc P**,**(2016),*Case in Point 9: Complete Case Interview Preparation*,9e, Burgee Press.
3. *Developing a Business Case (2010), Pocket Mentor series, Harvard Business Review Press*
4. Garner, B. A. (2012*), HBR Guide to Better Business Writing: Engage Readers Tighten and Brighten Make Your Case* ,Harvard Business Review Press
5. Houp,K.W., Pearsall,T & Elizabeth Tebeaux (2005) *Reporting Technical Information*,11e,Oxford University Press.
6. Kolin,P.C (2009) *Successful Writing at Work*,2e, Houghton Mifflin Harcourt.
7. Netzley, M & Snow,Craig (2016) *Guide to Report Writing*, Pearson.
8. Peter O.(2016),*Consulting Frameworks: Use on your next startup, in an existing small business, or to ace the case interview (Business Success*) (Volume 7)
9. Raman, Meenakshi & Singh, Prakash (2012) *Business Communication*, 2e, Oxford University Press.
10. Raymond, S. &Amy, G. (2015), *HBR Guide to Building Your Business Case,* ,HBR Guide Series.
11. Smith-Worthington, D & Jefferson,S (2008) *Technical Writing for Succes*,3e,South Western Cengage Learning.
12. Stephen,P.(2014), *Case Interviews For Beginners*, Create Space Independent Publishing Platform
13. Tom, R. (2011) *Case interview success, 2e, Create Space Independent Publishing Platform*
14. Victor C., (012) *Case interview Secrets, Innovation* Press
15. William, N. and Margaret, N.(2006), *The Art and Craft of Case Writing*, M.E. Sharpe N.Y

Group III & IV
WORKSHOPS AND PROJECTS

KBD 1107: WORKSHOP ON BUSINESS COMMUNICATION SKILLS (DURATION: 5 DAYS)

Course Description

This workshop will help to create dynamic and professional presentations, organizing their content for maximum impact, and creating a stronger connection with the audience. Participants will learn to get important points across quickly in their business writing, examining how best to target readers, select and organize information, use clear language, be strategic, and achieve a stronger business tone. This workshop will provide participants with easy to apply tools and strategies that can be implemented immediately, resulting in more effective business communication.

Course Learning Outcomes

LO1	To understand the communication process for interpersonal communication	Cognitive Level- Understand
LO2	To apply communication techniques for effective public speaking	Cognitive Level- Apply
LO3	To collate data for presentations and reports	Cognitive Level- Analyse
LO4	To decide on presentation formats based on communication requirements	Cognitive Level- Evaluate
LO5	To prepare effective Business reports	Cognitive Level- Create

Mapping of course outcomes with programme outcomes: Low=1, medium=2, High=3

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
LO1						1	3
LO2	1			2			3
LO3	1						3
LO4				2	2		3
LO5	3			2	2	1	3

KBD 1307- WORKSHOP ON PERSONAL PRODUCTIVITY IMPROVEMENT (DURATION: 5 DAYS)

Course Description

This workshop focusses on increasing productivity by controlling priorities, improving leadership skills to empower others effectively, enhance communication skills, develop a positive attitude and become leader in team development and the increased productivity that comes through collaboration.

Course Learning Outcomes

LO1	To understand the concepts of time management, goal setting, personal productivity	Cognitive Level- Understand
LO2	To apply modern time management techniques	Cognitive Level- Apply
LO3	To analyse one's strength and weakness	Cognitive Level- Analyse
LO4	To evaluate goals in the context of teams	Cognitive Level- Evaluate
LO5	To develop a personal growth plan	Cognitive Level- Create

Mapping of course outcomes with programme outcomes: Low=1, medium=2, High=3

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
LO1					3	2	3
LO2				2	3	2	3
LO3					3	2	3
LO4					3	2	3
LO5					3	2	3

KBD 1602- WORKSHOP ON CAREER BUILDING
(DURATION: 10 DAYS)

Course Learning Outcomes

LO1	To Understand the possibilities of digital self-branding for career success	Cognitive Level- Understand
LO2	To apply digital marketing techniques in developing online professional identity	Cognitive Level- Apply
LO3	To analyse alternate career pathways	Cognitive Level- Analyse
LO4	To evaluate professional development plans	Cognitive Level- Evaluate
LO5	To develop career growth strategy	Cognitive Level- Create

Mapping of course outcomes with programme outcomes: Low=1, medium=2, High=3

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
LO1					3	2	3
LO2				2	3	2	3
LO3				3	3	2	3
LO4				2	3	2	3
LO5				2	3	2	3

PROJECT I -ORGANIZATIONAL STUDY

(DURATION: 15 WORKING DAYS)

Course Description

This study aims to understand organizational structures, processes, and practices. The study needs to cover the structure, function and process of various departments. The Study will try to analyse the business environment and the performance of organization and also interpret the findings.

Course Learning Outcomes

LO1	To understand the organizational structure and functions of departments	Cognitive Level- Understand
LO2	To understand the application of principles of management in real organizations	Cognitive Level- Understand
LO3	To analyse the business environment of the firm	Cognitive Level- Analyse
LO4	To interpret the findings from business environment analysis	Cognitive Level- Evaluate

Mapping of course outcomes with programme outcomes: Low=1, medium=2, High=3

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
LO1				1		2	3
LO2				1		2	3
LO3				3		2	3
LO4				3		2	3

(50 marks for continuous assessment and 50 marks for written report after completion of the project)

PROJECT II -BUSINESS PROCESS MAPPING

(DURATION: 15 WORKING DAYS)

Course Description

The purpose of this project is to develop business process map using process mapping software. The project will present who and what is involved in business processes and will reveal areas where processes should be improved.

Course Learning Outcomes

LO1	Understand the business processes in an organization	Cognitive level-Understand
LO2	Apply process discovery methods in a business organization.	Cognitive level- Apply
LO3	Analyse identified business processes using the tools of BPM	Cognitive level- Analyze
LO4	Evaluate the As-Is process using necessary frameworks	Cognitive level-Evaluate
LO5	Create models of the business processes using representation tools like swimlane diagrams	Cognitive level- Create

Mapping of course outcomes with programme outcomes: Low=1, medium=2, High=3

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
LO1		1					
LO2	1	1					2
LO3					1	2	2
LO4		2		1	1	1	2
LO5	1	2	2	1	3	1	3

Evaluation scheme will comprise of:

i) 50 Marks for continuous assessment
ii) 50 marks for a written report after the completion of the project

PROJECT III - MAIN PROJECT & VIVA-VOCE

(DURATION–80 DAYS)

Course Description

The objective of Major Project is to provide students with practical exposure to the real world of analytics whereby they get an opportunity to apply the knowledge and skill acquired through the course. The students are required to undertake this project in a Business Analytics firm. The project will be of 80 working days duration. Each student will be allotted to a faculty guide for the project.

Course Learning Outcomes

Learning Outcomes		**Cognitive Level**
CLO1	Apply essential career skills including communication skills, time management and resource management skills	Apply
CLO2	Apply analytical thinking and methodological approaches based on previous course inputs on research methods.	Apply
CLO3	Use theoretical analytics methods and models in solving business analytics problems	Apply
CLO4	Design organizational interventions integrating management, statistical and analytics concepts and real-world requirements of organizations	Analyse
CLO5	Prepare a comprehensive project report complying with standard analytics project reporting norms learned from associated courses and present it for expert evaluation	Create

Mapping of course outcomes with programme outcomes: Low=1, medium=2, High=3

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
LO1	2	2	3	3	3	1	2
LO2	2	2	3	3	3	1	2
LO3	2	2	3	3	3	1	2
LO4	2	2	3	3	3	1	2
LO5	2	2	3	3	3	1	2

Evaluation scheme will comprise of:

i) Continuous assessment–100 marks

ii) Final report – 100 marks

iii) Viva-Voce–100 marks

COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY

(Abstract)

Deen Dayal Upadhyaya Kaushal Kendra (DDUKK) – B Voc in Business Process and Data Analytics – Modification in Regulation – Action taken by the Vice-Chancellor – Ratification of – Orders issued.

CONFERENCE SECTION

No. Conf.II/2941/2/2019 (5) Dated, Kochi-22, 02.11.2019.

Read: Item No.II (38) of the Minutes of the meeting of the Academic Council held on 21.08.2019.

ORDER

The Academic Council at its meeting held on 21.08.2019 along with the Standing Committee of the Academic Council resolved vide Item read above to ratify the action taken by the Vice-Chancellor in effecting the modifications in the Regulation of B.Voc in Business Process and Data Analytics offered at DDUKK as follows:

1. **The Course number and maximum marks assigned in the syllabus as shown below:**

Semester	Course No.	Name of the Course	Maximum Marks
I	KBD 1107	5 Days Workshop Program	50
III	KBD 1307	5 Days Workshop Program	50
VI	KBD 1602	10 Days Workshop Program	100

2. **The marks shall be awarded by the Faculty in charge of the workshop based on the level of participation of the students in the workshop and evaluation of the report submitted by the students after the completion of the workshop.**

Orders are issued accordingly.

Dr. K.AJITHA
REGISTRAR

To

1. The Director, DDUKK, CUSAT, Kochi-22
2. PA to Controller of Examinations/Joint Registrar (Exams/Academic)/Assistant Registrar (Academic)
3. Academic 'A, C'/Exam. E/Exam. Y/Exam. Confidential Sections/ARIS LAB
4. Day file/Stock file/File copy

Copy to
① Syllabus file
② Dr. Regini George, Nuclear
③ R.O. file

Asd 13

Regulations for B Voc in Business Process and Data Analytics Programme offered in DDU KAUSHAL Kendra under the Faculty of Social Sciences from the Academic year 2018-19

……

I. Introduction

The **Bachelor of Vocation (B.Voc)** programme has been launched by the UGC to promote vocational education at higher education institutions to produce industry ready, employable graduates under the National Skill Qualification Framework (NSQF) with multiple entry/exit options during the programme. The contents of the vocational courses are to be designed by providing a judicious mix of skill component relating to a profession (60%) and appropriate content of General education (40%) to ensure that the students are getting equipped in terms of knowledge and skills to be employable at each exit point of the programme.

B.Voc in Business Process and Data Analytics is a vocational graduate programme designed to be offered under the DDU KAUSHAL Kendra, CUSAT and designed according to the UGC guide lines based on NSQF with multiple entry/exit options, leading to various job roles at each level of exit. Course contents shall be aligned with the norms of the concerned Sector Skill Councils (SSC) for enabling the students to obtain skill certifications from SSC concerned at various exit points.

II. Duration and Nature of the Course

B Voc in Business Process and Data Analytics is a Bachelor level vocational programme which spans over a period of six semesters (three years) with multiple entry and exit options. Multiple entry and exit options imply that the students have exit options at the end of each year of the course and are eligible for varying certifications as shown below and such candidates who exit the course can rejoin to the course on a later stage and can complete the course.

1. Students who successfully complete the first two semesters and take exit option will be eligible for **Diploma in Business Process and Data Analytics**
2. Students those who successfully complete the first four semesters and take exit option will be eligible for **Advanced Diploma in Business Process and Data Analytics** and
3. Students who successfully complete all six semesters will be eligible for Bachelor of Vocation (B.Voc.) **Degree in Business Process and Data Analytics.**

Such students with Diploma/Advanced Diploma will be eligible for lateral entry to the third/fifth semester of B Voc Programme later if they wish to do so. Students with Diploma in Business Process and Data Analytics will be eligible for lateral entry to third semester and those with Advanced Diploma in Business Process and Data Analytics will be eligible for lateral entry to the fifth semester of this course. In such cases the students must surrender their Diploma/Advanced Diploma for obtaining the Advance Diploma/B Voc Degree certificate as they are not eligible for multiple certifications and such lateral entry shall be permitted only within five years of their original admission to the B Voc programme.

III. Centre and Faculty

B Voc in Business Process and Data Analytics shall be offered at DDU KAUSHAL KENDRA and the degree shall be awarded under the Faculty of Social Sciences.

IV. Eligibility for Admission

For 2018 Admission

"Students with a total of 75% marks (or equivalent CGPA) in Plus Two or any equivalent examination conducted by recognised boards with Mathematics/Statistics as one of the subjects. Relaxation in percentage of marks shall be given to the candidates belonging to reservation communities as per rules".

For 2019 admission onwards

"Students with a total of 65% marks (or equivalent CGPA) in Plus Two or any equivalent examination conducted by recognised boards with Mathematics/Statistics as one of the subjects. Relaxation in percentage of marks shall be given to the candidates belonging to reservation communities as per rules".

While calculating the percentage of mark for plus two, the marks of mathematics/statistics shall necessarily be included in case the student has studied additional subjects.

V. Selection and Intake of the Programme

5.1 Selection of candidates will be based on the following criteria:

For 2018 Admission

The eligible students shall be admitted to the course from a rank list prepared by the university based on the marks secured by candidate in an Aptitude Test (CAT) conducted by the university and the marks scored for the qualifying examination. 50% weightage

shall be given for the marks scored in CAT and 50% weightage shall be given to the aggregate marks scored by the candidate for the qualifying examination plus the marks scored for the Mathematics or Statistics (If both subjects are studied, only marks for the mathematics will be considered).

For 2019 admission onwards

The eligible students shall be admitted to the course from a rank list prepared by the university based on the marks secured by candidate in an Aptitude Test (CAT) conducted by the university.

5.2 Intake of the programme shall be as per the decision of the university from time to time, taking into consideration the facilities available in the centre offering the programme. Seats are reserved for SC/ST and Other Backward Communities as per Government of Kerala rules in this regard.

VI. Programme structure

6.1 Since the Programme is vocational in character, the curriculum is designed in such a way that 60 per cent of the subjects are in the vocational domains (Business Process and Data Analytics) and 40 per cent in the general domains such as English language, communication skills, professional skills, IT skills, entrepreneurship and Functional Management. The curriculum has been designed to meet the requirements laid out in the UGC Guidelines for curriculum design for B Voc programmes under the National Skill Qualification Framework (NSQF). The total credit requirements for the course is 180 out of which skill components will carry 108 and general education components will carry 72 credits. The credit distribution will be in the following pattern:

	NSQF Level	Skill Component Credits	General Education Credits
Year I Diploma	5	36	24
Year II Advanced Diploma	6	36	24
Year III B Voc	7	36	24
Total		108	72

6.2 The number of credits (total) in I, II, III, IV, V and VI semesters shall be 30, 30, 30, 30, 34 and 26 respectively. The total number of credits required for a pass in the programme shall be 180, in which minimum credit required for the core courses and electives shall be 172 and 8 respectively.

6.3 Students shall have the freedom to opt for one elective each in semester IV and semester V of the programme.

6.4 Students will have to undertake an Organisational study of minimum 15 working days as part of their Project-I at the end of semester II. Project II at the end of Semester IV will be of 15 working days on Business Process Mapping. Semester VI is fully devoted for Project III – (Main Project) of not less than 80 working days and the same will be on a data analytics project in any organisation. Each student shall be assigned to a faculty guide for all the projects. A written report must be submitted at the end of the Project-I, II and III in a format prescribed by the Centre.

6.5 Students are required to attend single/multiple Training Programme/s with the total duration of which shall amount to 5 days each in Semester I and Semester III and 10 days in Semester VI. These training programmes shall be in the general domain to improve the personal effectiveness, professional skills and career planning of the students. The ten days workshop programme proposed in fourth semester will help students to build personal branding and to prepare career planning along with building awareness about current trends and developments in Industry and Economy. Students shall be encouraged to participate in training programmes organized by state/national level institutes/Centres or Departments of Universities including DDUKK/Professional bodies such as AIMA or ISTD, etc. to satisfy the requirements for acquiring credits for the aforementioned training programmes in various semesters.

In order to attend such training programmes, students have to obtain prior permission from the Centre by submitting the details of the institution offering the training programme and the proposed course. The credits for the participation in such training programme shall be awarded only based on the evaluation of the report submitted by the students along with the participation Certificates.

VII. Method of Teaching and Training

The teaching and training for the B Voc programme shall focus on developing skills and enhancing employability of the students so as to make them industry-ready graduates. Hence the teaching and training pedagogy of the programme will be mostly through "Activity oriented Class Room (AOC)", and the same will comprise of case studies, games, simulation techniques, presentations, Industry internships, training labs, both individual and group projects, interaction with industry experts, etc. Live analytics projects and internship training in organisations shall also form part of the training for the programme.

VIII. Mode of Evaluation and Eligibility for Pass

8.1 Mode of Evaluation will be 100 per cent internal for all papers out of which 50 % marks are for continuous assessment throughout the semester and 50 % marks are for End-semester examination. In the case of the following subject namely Managerial Skills Development and Design Thinking (Semester III), the entire 100 marks will be awarded through continuous assessment by the teachers through case analysis, group discussion, team building tasks, leadership role, problem solving exercises, personal improvement, report writing, presentations etc.

For Project I and Project II, 50 % marks will be awarded through continuous assessment and 50% marks will be awarded based on the evaluation of the report submitted by the student. In case of the Project III (Main Project) 100 marks each will be awarded for Continuous Assessment, Project Report and Viva Voce. Viva-Voce examination at the end of the sixth semester shall be carried out by a board with at least three examiners.

Evaluation for programming-based subjects in various semesters shall be in practical mode.

8.2 A minimum of 75% attendance is compulsory for each student to appear for End-Semester examination and also to progress to the subsequent semester. But the Vice-Chancellor shall have the power to condone the shortage of attendance up to 10% on medical grounds on the recommendations of the HOD. However, such condonation for shortage of attendance shall be given to a particular student only once during the entire programme of study.

8.3 Internal marks will be awarded on the basis of class tests, assignments, viva-voce, practical assignments, term-papers, mini-projects etc. as decided by the teacher concerned, considering the relevance of each component with respect to the paper he/she handles. However, the student shall be evaluated continuously throughout the semester and marks shall be awarded as per the following guidelines:

a) A minimum of 50 per cent weightage shall be given for internal tests/lab exams/practical assignments

b) A maximum of 20 per cent weightage shall be given for written assignments

c) A maximum of 20 per cent weightage shall be given for class room presentations, Viva –voce and mini projects

d) A maximum of 20 per cent weightage shall be given for other items such as attendance or activities that the teacher of the concerned course believes as relevant for the course and assigned to the students.

The total Internal Marks awarded will be 50.

However, Department/Centre Council can change the guidelines for the distribution of internal marks given above, as and when required.

8.4 The question paper for the End-Semester examination shall be set by the concerned teacher in advance which shall be scrutinized by the respective Centre/Department Council or by a committee consisting of the HOD and faculty members offering courses in that semester to ensure that questions are within the scope of the syllabus and that the entire syllabus of the course is fairly covered in the question papers. Modifications can be suggested by the council if necessary and such suggestions shall be incorporated in the final version of the question paper.

There shall be only a single evaluation for the End-Semester examination. Immediately after the examination is over, the Head of the Department/Centre shall make arrangements to complete the evaluation and finalise the results within 10 working days after the last examination. In case of Semester II, Semester IV and Semester VI where Projects are included, the results shall be finalised within seven working days after the submission of the report/ conduct of Viva-Voce examination, which ever applicable as the case may be. The marks and grade in all courses obtained by the students will be

displayed in the notice board and the answer scripts can be shown to the students for scrutiny on written request by the student addressed to the Director of the Centre. (Viva-voce marks are exempted from this clause as it is awarded by a board of examiners).

8.5 For each course there shall be a separate passing minimum of 45% marks for the End-Semester examination and the student has to secure an aggregate of 50% when End-Semester examination and Internal Marks are taken together for every course in all the semesters for passing the programme. In case of the course Managerial Skills Development and Design Thinking in Semester III, students should acquire a minimum of 50% marks in Continuous Assessment. In case of Projects, candidate has to acquire aggregate 50% marks in each projects- Project I, II and III, for the successful completion.

8.6 The department shall publish the marks obtained by the students, in the continuous assessment and End-Semester examination. If the student has any grievance, he/she can approach the concerned teacher and submit his/her grievance with supporting documents/arguments. The teacher and the HOD will examine the case and decide on his/her grievance. If the student is not convinced with the decision, he/she can approach the appellate authority, which is the department council, in writing and the council shall examine the same and take a final decision which has to be intimated to the student. The decision of the appellate authority shall be final.

8.7 The final marks and grades obtained by the students shall be published in the notice board. Those who could not obtain at least Grade D in total for a course will be declared as failed in that course.

8.8 For Semester I, III, and V, the results of the examinations shall be finalized and published within 30 working days from the date of last end semester by the centre/department council, which will act as the passing board and the minutes shall be sent to the Controller of Examinations of the university for the issue of grade cards. In case of Semester II, Semester IV and Semester VI where Project I, II and III are included respectively, the results shall be finalized and published within ten working days after the submission of the report/ conduct of Viva-Voce examination, which ever applicable as the case may be.

8.9 A student shall complete his/her B Voc programme within six years from the date of admission by acquiring the total credit requirements as specified for the award of the degree. In case of candidates who take lateral entry to Semester III or V of the course

shall complete his/her B Voc programme within five years or four years respectively from the date of admission.

8.10 For Diploma in Business Process and Data Analytics, a student shall complete the passing requirements within three years of securing admission to the course. And the same will be four years in the case of Advanced Diploma.

8.11 For Advanced Diploma in Business Process and Data Analytics, a student shall complete the passing requirements within five years of securing admission to the course

IX. Grading and Classification

The following grading system is adopted for all the courses. The following grades will be awarded based on the overall performance in each course.

Range of marks	**Grades**	**Weightage**
90% and above	S-Outstanding	10
(80-89)	A-Excellent	9
(70-79)	B-Very Good	8
(60-69)	C-Good	7
(50-59)	D-Satisfactory	6
Below 50%	F-Failed	0

Decimal percentages shall be rounded to the next higher number if it is greater than or equal to 0.5.

Overall performance at the end of the semester will be indicated by Grade Point average (GPA) calculated as follows:

GPA = (G1C1+G2C2+G3C3+.....+GnCn) / (C1+C2+C3+ ….+Cn)

Where ‘G’ refers to the grade weightage and ‘C’ refers to the credit value of corresponding course undergone by the student.

At the end of the final semester, Cumulative Grade Point Average (CGPA) will be calculated based on the above formula.

Classification for the Degree diploma will be as follows:

Classification	**CGPA**
First class with Distinction	8 and above
First class	6.5 and above
Second class	6 and above

X. Revision of Regulations and Curriculum

The University may from time to time, revise, amend or change the Regulations, Schemes of Examinations and Syllabus. The date of effect of such changes will be as decided by the university.

XI. Structure of the Question Paper of End-Semester Examinations

The End-Semester question paper shall have three parts (except for practical examinations), namely Part-A, Part-B and Part C. The maximum marks for End-Semester Examinations will be 50.

In Part A, there will be 10 compulsory questions which will be of the type *‘Fill in the blanks/one-word answer’*. Each question in Part A carries one mark.

Part-B will consist of six questions out of which students must answer four questions. Each question will carry five marks in this part.

In Part-C, student will answer two questions of 10 marks each from a group of three questions. One case study would be preferred among the three questions in this section.

In case of practical exams, this pattern need not be followed. The number of questions can be varied according to the nature of the subject and the same will be decided by the examiners concerned based on the norms set by the Centre/Department council.

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COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY

COCHIN UNIVERSITY P.O.
COCHIN - 682022
KERALA, S. INDIA

No. Conf. II/2941/2/2018 (3)

Date: 28.01.2019

NOTIFICATION

In exercise of the powers conferred by Section 24 (ii) read with Section 42 (1) of the CUSAT Act 1986, the Academic Council at its meeting held on 03.08.2018 resolved to approve the following:

1. The revised Regulation and Course Structure M.Voc. in Technology and Management Consulting under Faculty of Social Sciences offered by Deen Dayal Upadyaya Kaushal Kendra (DDUKK) with effect from 2018 admissions as in **Appendix I.**
2. The Regulation and Course Structure for one year Executive Post Graduate Diploma in Management Consulting under Faculty of Social Sciences, to be offered at Deen Dayal Upadyaya Kaushal Kendra (DDUKK) with effect from 03.08.2018, the date of meeting of the Academic Council as in **Appendix II**.
3. The Regulation and Course Structure for B.Voc in Business Process and Data Analytics under Faculty of Social Sciences with effect from 2018 admissions as in **Appendix III**.
4. The change in the first Para of Clause iv of the Regulation [Eligibility Criteria] for B. Voc in Business Process and Data Analytics under Faculty of Social Sciences with effect from 2019-2020 Academic Year onwards as give below:
"Students with a total of 65% mark or equivalent CGPA in Plus Two or any equivalent examination conducted by recognized Boards with Mathematics/Statistics as one of the Subjects. Relaxation in percentage of marks shall be given to the candidates belonging to reservation communities as per rules in force from time to time".

The Syndicate at its Meeting held on 27.12.2018 and 05.01.2019 vide item 657.11 considered and approved the above resolution of the Academic Council.

REGISTRAR

To:

1. Dr. Sunil K. Narayanankutty, Dean, Faculty of Technology and Controller of Examinations.
2. The Director, Deen Dayal Upadyaya Kaushal Kendra (DDUKK), CUSAT, Kochi - 22.
3. The Controller of Examinations/Joint Registrar (Academic)/Assistant Registrar (Academic).
4. Academic 'A'/Exam. 'D'/'E'/'Y'/Exam. Confidential Sections.
5. Day file/Stock file/File copy.

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