Curriculum & Contents

IPG (MBA)

विश्वजीवनामृतं ज्ञानम्

ABV-Indian Institute of Information Technology & Management, Gwalior

June 2019

Semester wise Curriculum

Semester I				
S.No.	**Subject Code**	**Title of the course**	**L-T-P**	**Credits**
1.	IMAS-1101	Mathematics – I	3-1-0	4
2.	IMAS-1102	Engineering Physics	4-0-0	4
3.	IMIT-1101	Fundamental of CS	3-0-0	3
4.	IMIT-1102	Computer Programming	3-0-0	3
5.	IMHS-1101	Language & Technical Communication Skills	2-0-2	3
6.	IMIT-1103	Computer Programming Lab	0-0-4	2
7.	IMAS-1103	Engineering Physics Lab	0-0-2	1
8.	IMIT-1104	Fundamental of CS Lab	0-0-2	1
9.	ITHS-1105	Sports and Physical Education	1-0-2	2
		Total Credits		**23**

Semester II				
S.No.	**Subject Code**	**Title of the course**	**L-T-P**	**Credits**
1.	IMAS-1201	Mathematics – II*	3-1-0	4
2.	IMHS-1201	Human Values and Ethics	2-0-0	2
3.	IMIT-1201	Digital Electronics	3-0-0	3
4.	IMIT-1202	Data Structures	3-0-0	3
5.	IMIT-1203	ICT Workshop	0-0-4	2
6.	IMIT-1204	Object Oriented Programming	3-0-0	3
7.	IMIT-1205	OOPS Lab	0-0-4	2
8.	IMIT-1206	Digital Electronics Lab	0-0-2	1
9.	IMIT-1207	Data Structures Lab	0-0-2	1
		Total Credits		**21**

Semester III				
S.No.	**Subject Code**	**Title of the course**	**L-T-P**	**Credits**
1.	IMAS-2101	Mathematics – III	3-1-0	4
2.	IMIT-2101	Bio-Medical Engineering	3-0-0	3
3.	IMIT-2102	Computer Networks	3-0-0	3
4.	IMHS-2101	Principles and Practices of Management	3-0-0	3
5.	IMIT-2103	Computer Organization & Architecture	3-0-0	3
6.	IMIT-2104	Database Management Systems	3-0-0	3
7.	IMIT-2105	Computer Networks Lab	0-0-2	1
8.	IMIT-2106	Computer Organization & Architecture Lab	0-0-2	1
9.	IMIT-2107	DBMS Lab	0-0-2	1
		Total Credits		**22**

Semester IV				
S.No.	**Subject Code**	**Title of the course**	**L-T-P**	**Credits**
1.	IMAS-2201	Mathematics – IV	3-1-0	4
2.	IMIT-2201	Theory of Computation	3-0-0	3
3.	IMIT-2202	Software Engineering	3-0-0	3
4.	IMIT-2203	Design & Analysis of Algorithms	3-0-0	3
5.	IMIT-2204	Artificial Intelligence	3-0-0	3
6.	IMIT-2205	Operating Systems	3-0-0	3
7.	IMIT-2206	Design & Analysis of Algorithms Lab	0-0-2	1
8.	IMIT-2207	Operating Systems Lab	0-0-2	1
9.	IMIT-2208	Artificial Intelligence Programming Lab	0-0-2	1
10.	IMIT-2209	Software Engineering Lab	0-0-2	1
		Total Credits		**23**

S.No.	**Subject Code**	**Title of the course**	**Credits**
1.	IMIT-2999	Internship	3
		Total Credits	**3**

Internship: This will consist of 4 weeks training on AI simulation tools and techniques.

Semester V				
S.No.	**Subject Code**	**Title of the course**	**L-T-P**	**Credits**
1.	IMIT-3101	Embedded System Design	3-0-0	3
2.	IMIT-3102	Computer Graphics	3-0-0	3
3.	IMAS-3101/ IMHS-3101	Business Analytics	3-0-0	3
4.	IMIT-3103	Information System Security	3-0-0	3
5.	IMIT-3104	Signals & Systems	3-0-0	3
6.		Elective 1 **	3-0-0	3
7.	IMIT-3105	Computer Graphics Lab	0-0-2	1
8.	IMIT-3106	Embedded System Design Lab	0-0-2	1
		Total Credits		**20**

Semester VI				
S.No.	**Subject Code**	**Title of the course**	**L-T-P**	**Credits**
1.	IMIT-3201	Cloud Computing	3-0-0	3
2.	IMIT-3202	Wireless Communication Technologies	3-0-0	3
3.	IMAS-3201	Modelling & Simulation	3-0-0	3
4.	IMMG-3201	Mini Project (Business Policy Design & Analysis)	0-0-4	2
5.		Elective 1**	3-0-0	3
6.		Elective 2**	3-0-0	3
7.	IMAS-3202	M&S Lab	0-0-2	1
8.	IMIT-3203	Cloud Computing Lab	0-0-2	1
9.	IMIT-3204	Wireless Communication Technologies Lab	0-0-2	1
		Total Credits		**20**

S.No.	Subject Code	Title of the course	Credits
1.	IMIT-3999	B Tech Project (0-0-12)	6
		Total Credits	**6**

Semester VII				
S.No.	**Subject Code**	**Title of the course**	**L-T-P**	**Credits**
1.	IMMG-4101	Business Statistics	3-0-0	3
2.	IMMG-4102	Managerial Economics	3-0-0	3
3.	IMMG-4103	Business and Legal Environment	3-0-0	3
4.	IMMG-4104	Financial Reporting & Management Accounting	3-0-0	3
5.	IMMG-4105	Organizational Behavior	3-0-0	3
6.	IMMG-4106	Internet Technologies for Business	3-0-0	3
7.	IMMG-4107	Business Communication	2-0-2	3
8.	IMMG-4108	Business Process Management	3-0-0	3
		Total Credits		**24**

Semester VIII				
S.No.	**Subject Code**	**Title of the course**	**L-T-P**	**Credits**
1.	IMMG-4201	Human Resource Management	3-0-0	3
2.	IMMG-4202	Operations Management	3-0-0	3
3.	IMMG-4203	Marketing Management	3-0-0	3
4.	IMMG-4204	Decision Modeling	3-0-0	3
5.	IMMG-4205	Financial Management	3-0-0	3
6.	IMMG-4206	Decision Support and Expert System	3-0-0	3
7.	IMMG-4207	E-Governance	3-0-0	3
8.	IMMG-4208	Business Research Methods	3-0-0	3
		Total Credits		**24**

Summer Semester

S. No	Subject Code	Title of the course	Credits
1.	IMMG-4991	Online Learning Course-I	Audit
2.	IMMG-4992	Online Learning Course- II	Audit
3.	IMMG-4993	Colloquium based on Summer internship*	Audit

*** Summer Internship:** This will consist of internship of 8 weeks during summers (May-July).

Semester IX				
S.No.	**Subject Code**	**Title of the course**	**L-T-P**	**Credits**
1.	IMMG-5101	Strategic Management	3-0-0	3
2.	IMMG-5102	Project Management	3-0-0	3
3.		Elective- I	3-0-0	3
4.		Elective- II	3-0-0	3
5.		Elective- III	3-0-0	3
6.		Elective- IV	3-0-0	3
7.		Elective- V	3-0-0	3
8.	IMMG-5199	Major Project Part-I	0-0-10	5
		Total Credits		**26**

Semester X				
S.No.	**Subject Code**	**Title of the course**	**L.T-P**	**Credits**
1.	IMMG-5299	Major Project Part-II	0-0-30	15
		Total Credits		**15**

Indicative List of Electives

The following is Focus area wise list of electives. The list is flexible in spirit and electives can be offered as per the needs of industry, academia and students.

1. Marketing Management

S. No	Subject code	Title of the course	L-T-P	Credits
1	IMMG-9101	Product and Brand Management	3-0-0	3
2	IMMG-9102	E-marketing	3-0-0	3
3	IMMG-9103	Service Marketing	3-0-0	3
4	IMMG-9104	Advertising and Sales Promotion Management	3-0-0	3
5	IMMG-9105	Sales and Distribution	3-0-0	3
6	IMMG-9106	Strategic Marketing	3-0-0	3
7	IMMG-9107	Marketing Research	3-0-0	3
8	IMMG-9108	Social Marketing	3-0-0	3
9	IMMG-9109	Customer Relationship Management	3-0-0	3
10	IMMG-9110	International Marketing	3-0-0	3
11	IMMG-9111	Emerging Areas in Marketing	3-0-0	3

2. Technology and Operations Management

S. No	Subject code	Title of the course	L-T-P	Credits
1	IMMG-9201	Supply Chain Management	3-0-0	3
2	IMMG-9202	Service Operations Management	3-0-0	3
3	IMMG-9203	New Product and Service Development	3-0-0	3
4	IMMG-9204	Business Systems Simulation	3-0-0	3
5	IMMG-9205	Retail Management	3-0-0	3
6	IMMG-9206	Total Quality Management	3-0-0	3
7	IMMG-9207	Technology Management	3-0-0	3
8	IMMG-9208	Manufacturing System Design	3-0-0	3
9	IMMG-9209	Technology and Operations Strategy	3-0-0	3
10	IMMG-9210	Emerging Areas in Technology and Operations Management	3-0-0	3
11	IMMG-9211	Empirical Research Methods in Operations Management	3-0-0	3
12	IMMG-9213	Lean Six Sigma Processes	3-0-0	3
13	IMMG-9212	Multi- Criterion Decision Making Models	3-0-0	3

3. IT and Systems

S. No	Subject code	Title of the course	L-T-P	Credits
1	IMMG-9301	Software Project Management	3-0-0	3
2	IMMG-9302	IT and Strategy	3-0-0	3
3	IMMG-9303	Knowledge Management	3-0-0	3
4	IMMG-9304	Software Engineering	3-0-0	3
5	IMMG-9305	Decision Support System	3-0-0	3
6	IMMG-9306	Software Quality Management	3-0-0	3
7	IMMG-9307	Telecommunications Systems Management	3-0-0	3
8	IMMG-9308	Strategic Planning of Information Systems	3-0-0	3
9	IMMG-9309	Emerging Areas in IT and Systems	3-0-0	3

4. Finance

S. No	Subject code	Title of the course	L-T-P	Credits
1	IMMG-9401	Security Analysis and Portfolio Management	3-0-0	3
2	IMMG-9402	Financial Risk management	3-0-0	3
3	IMMG-9403	Corporate Tax Planning	3-0-0	3
4	IMMG-9404	International Finance	3-0-0	3
5	IMMG-9405	Personal Wealth Management	3-0-0	3
6	IMMG-9406	Project Appraisal and Finance	3-0-0	3
7	IMMG-9407	Corporate Restructuring	3-0-0	3
8	IMMG-9408	Management of Financial Services	3-0-0	3
9	IMMG-9409	Economic and Financial Modeling	3-0-0	3
10	IMMG-9410	Emerging Areas in Finance	3-0-0	3
11	IMMG-9411	Management of Financial Institutions	3-0-0	3
12	IMMG-9412	Entrepreneurial Finance	3-0-0	3

5. Human Resource Management

S. No	Subject code	Title of the course	L-T-P	Credits
1	IMMG-9501	Change Management	3-0-0	3
2	IMMG-9502	Organization Theory and Development	3-0-0	3
3	IMMG-9503	Corporate Social Responsibility	3-0-0	3
4	IMMG-9504	Leadership and Talent Management	3-0-0	3
5	IMMG-9505	Competency Management	3-0-0	3
6	IMMG-9506	Training and Development	3-0-0	3
7	IMMG-9507	Management of Employee Relation	3-0-0	3
8	IMMG-9508	Labour Laws	3-0-0	3
9	IMMG-9509	Emerging Areas in Human Resource Management	3-0-0	3
10	IMMG-9510	Empirical Research Methods in HR	3-0-0	3

6. Management of Social Sector

S. No	Subject code	Title of the course	L-T-P	Credits
1	IMMG-9601	Infrastructure Management	3-0-0	3
2	IMMG-9602	Public Private Partnerships	3-0-0	3
3	IMMG-9603	Public Policy and Processes	3-0-0	3
4	IMMG-9604	Management of Rural and Social Sector	3-0-0	3
5	IMMG-9605	Sustainable Development	3-0-0	3
6	IMMG-9606	Management of Non Formal Organization	3-0-0	3
7	IMMG-9607	Information Technology Enabled Services	3-0-0	3
8	IMMG-9608	Healthcare System Management	3-0-0	3
9	IMMG-9609	Emerging Areas in Management of Social Sector	3-0-0	3

7. Business Analytics

Members have discussed about trimming the number of electives offered for Business Analytics. The trimming of number of electives is under process and yet to be arrived at.

S. No	Subject code	Title of the course	L-T-P	Credits
1.	IMMG-9701	Accounting Analytics	3-0-0	3
2.	IMMG-9702	Business Analytics and Consulting	3-0-0	3
3.	IMMG-9703	Energy Analytics and Modeling	3-0-0	3
4.	IMMG-9704	Financial Analytics and Modeling	3-0-0	3
5.	IMMG-9705	Health Care Analytics	3-0-0	3
6.	IMMG-9706	Marketing Analytics and Research	3-0-0	3
7.	IMMG-9707	Multivariate Analysis	3-0-0	3
8.	IMMG-9708	Supply Chain Analytics	3-0-0	3
9.	IMMG-9709	Logistics Analytics	3-0-0	3
10.	IMMG-9710	Organizational Analytics and Research	3-0-0	3
11.	IMMG-9711	Behavioral Analytics	3-0-0	3
12.	IMMG-9712	HR Analytics	3-0-0	3
13.	IMMG-9713	Operations Analytics	3-0-0	3
14.	IMMG-9714	ERP Systems and Business Integration Analytics	3-0-0	3
15.	IMMG-9715	Data Mining with R	3-0-0	3
16.	IMMG-9716	Analytical Consulting for Financial Services	3-0-0	3
17.	IMMG-9717	Social Media and Network Analysis	3-0-0	3
18.	IMMG-9718	Text Analytics for Business	3-0-0	3
19.	IMMG-9719	Big Data Management and Analytics	3-0-0	3
20.	IMMG-9720	Artificial Intelligence	3-0-0	3
21.	IMMG-9721	Data Mining: Algorithms and Applications	3-0-0	3
22.	IMMG-9722	Analytical Design Thinking	3-0-0	3

Please note:

a) The course contents are indicative in nature. Actual contents followed may deviate based on students/faculty interests.

b) Typically the evaluation is based on various components such as Minors (In-semester tests), Major examination (End-semester test), assignments, term papers, quizzes, presentations and class participation. The weightages for these components will be decided by the respective course instructors.

Semester-I

1	**Code of the subject**	IMAS-1101
2	**Title of the subject**	Mathematics-I
3	**Any prerequisite**	-
4	**L-T-P**	3-1-0
5	**Name of the proposer**	Dr. Jeevaraj S
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	➢ To understand the basic concept of Matrices, Differential equations and their applications. ➢ To give an idea about the Mathematical Modeling of Real Life Problems/ Engineering Problems.
8	**Brief Contents (module wise)**	Matrices: Rank of a Matrix, Elementary transformations of Matrix, Gauss Jordon method for finding inverse, linear dependence and independence, consistency of linear system of equations, linear transformation, orthogonal transformations, types of matrices, Eigen values and Eigen vectors, properties of Eigen values, Cayley Hamilton theorem, Diagonalization, Canonical forms, Complex matrices and their properties. Differential Equations: Formation of DE and first order DE, linear differential equations, exact differential equations, reducible to exact differential equations and problems, higher order linear DE, method of variation and undetermined coefficients for finding P.I, reducible to linear DE, Partial Derivatives: partial derivatives, homogeneous equations, Euler's theorem and applications, total derivatives, change of variables, chain rules and problems, Taylor's theorem for functions of two variables and applications, Maxima and minima of functions of two variables, Lagrange's method of undetermined multipliers, Solid geometry, Integral calculus and applications
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1. **"**Higher Engineering Mathematics", fifth edition by B.S. Grewal. Publisher: Khanna Publishers. 2. "Advanced Engineering Mathematics" by Kresyzig, E., John Wiley and Sons. (Latest edition).

1	**Code of the subject**	IMAS-1102
2	**Title of the subject**	Engineering Physics
3	**Any prerequisite**	No
4	**LTP (Lecture-Tutorial-Practical) and Credits Structure**	4-0-0
5	**Name of the proposer**	Prof. Pankaj Srivastava
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	The connection of physics with information technology is threefold: it takes an information-theoretic approach at a fundamental level, focuses on areas of physics relevant to information technology, and uses examples from computing systems. A thorough understanding of quantum mechanics is necessary to engineer solid state devices such as transistors, without quantum mechanics, the "information age" (and much of modern science) would not exist today. Apart from this it will also introduce electrodynamics and physics of materials The course will also cover the principles & applications of LASERS and optical fibers.
8	**Brief Contents (module wise)**	**UNIT-I- Quantum Physics**: Black body radiation, Planck's hypothesis, wave particle duality, de-Broglie Hypothesis, Heisenberg uncertainty principle, photoelectric effect, Compton effect, phase and group velocity, wave function & its physical significance, Schrodinger's wave equation, Applications of Schroedinger equation. **UNIT-II- Electrodynamics**: Maxwell's equations: differential and integral forms, significance of Maxwell's equations, displacement current and correction in Ampere's law, electromagnetic wave propagation, transverse nature of EM waves, wave propagation in bounded system, applications. **UNIT-III- Physics of Materials**: Crystal structure, crystal systems, energy bands in solids, Brillouin zones, classification of solids, conductivity in metals and concepts of Fermi level, effective mass and holes, concept of phonons, electron distribution function, Fermi-Dirac distribution function, properties of bulk materials and nanomaterials. Synthesis and characterization techniques. Carbon materials, Graphene and 2D materials and its applications. **UNIT-IV- Laser and Fiber Optics**: Principles of lasers, Einstein Coefficients and their relations, Types of Lasers and their applications. Concept of optical fibers and types of optical fibers, modes of propagation, fiber optic communication, optical fiber sensors, connector and couplers.
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	• Engg. Physics- Kakani & Kakani, CBS Publications. • David J Griffith, Introduction to Quantum Mechanics,2nd ed. , PHI, 2013. (Text Book). • Avadhanulu, M. N, & Kshirsagar, S. G., A Textbook of Engineering Physics, S. Chand, 2014. (Text Book) • Neeraj Mehta, Applied Physics for Engineers, PHI Learning Pvt. Ltd., 2011. (Text Book) • Fiber optic communication- J Keiser (McGraw Hill) (Text Book) • David J Griffith, Introduction to Electrodynamics, 4th ed. , PHI, 2014. (Ref.). • Paul Dirac, Principles of Quantum Mechanics, 4th ed., Oxford Uni. Press, 2004. (Ref.) • Kittel, C., Introduction to Solid State Physics, 8th ed., Wiley, 2014. (Ref.)

1	**Code of the subject**	IMIT-1101
2	**Title of the subject**	Fundamental of Computer Science
3	**Any prerequisite**	No
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Prof. Pramod Kumar Singh
6	**Will this course require visiting**	No
7	**Learning Objectives of the subject (in about 50 words)**	➢ Assimilation with basics and fundamental concepts of computer and computer science as a discipline.
8	**Brief Contents (module wise)**	**Module I: Introduction, Data Storage, and Data Manipulation** Introduction; Brief History of Computing and Computers; Data Storage: Bits and Their Storage, Main Memory, Mass Storage, Representing Information as Bit Patterns; Data Manipulation: Computer Architecture, Machine Language, Program Execution. **Module II: Input and Output Devices** Input devices: keyboard, Mouse, Touch Pad, Touch Screen, MICR, OMR, Scanner, OCR, Bar code; Output devices: Display Unit, E-ink Display, Printers, Plotters. **Module III: Operating Systems** History; Architecture; Coordinating the Machine Activities, Handling Competition among processes. **Module IV: Networking and Internet** Network Fundamentals, Internet, World Wide Web, Internet protocols. **Module V: Algorithms** Basic Concepts, Representation, Discovery, Iterative Structures, Recursive Structures, Efficiency and Correctness. **Module VI: Programming Languages** Historical Perspective, Tradition Programming Concepts, Procedural Units, Language Implementation, Object-Oriented Programming. **Module VII: Software Engineering** Basics, Software Life Cycle, Software Engineering Methodologies, Modularity, Tools of the Trade, Quality Assurance, Documentation, Human-Machine Interface, Ownership and Liability. **Module VIII: Data Abstractions** Basic Data Structures, Related Concepts, Implementing Data Structures, Customized Data Types, Classes and Objects. **Module IX: Database Systems** Fundamentals, Relational Model, Data Mining, Social Impact of Database Technology. **Module X: Computer Graphics** Basics, Overview of 3D Graphics, Modeling, Rendering, Animation. **Module XI: Artificial Intelligence** Intelligence and Machines, Perception, Reasoning, Robotics, Additional Areas of research, Consequences.
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1. Computer Science: An Overview, J. Glenn Brookshear, and Dennis Brylow, Pearson. 2. Fundamentals of Computers, V. Rajaraman, and Neeharika Adabala, PHI.

1	**Code of the subject**	IMIT-1102
2	**Title of the subject**	Computer Programming
3	**Any prerequisite**	Fundamental of Mathematics
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr Saumya Bhadauria
6	**Will this course require visiting faculty**	NO
7	**Learning Objectives of the subject (in about 50 words)**	• To understand the basic principles of programming languages. • To provide design & development of C and Python programming skills. • To introduce problem solving methods and program development.
8	**Brief Contents** **(module wise)**	Module-I: Basics of Computer Languages C, Compilers, Interpreter, Programming Environments and Debugging: types of errors and debugging techniques. Module- I I : Programming features: Data types, Expressions and Operators, Control statements, Iterations. Module- I I I : Functions: Scope of variables, call by value, call by reference, Recursion, Pointers. Module- IV: Array, String, Structures and Unions. Module -V: File handling, File redirection, File pointers. Module- VI: Applications of C programming concepts in different data structures.
9	**Contents for lab**	
10	**List of text books/references**	• Kernighan, B.W. and D. M. Ritchie (1998): The C programming language, 2nd ed. Prentice Hall of India. • Kanetkar, Y (2016): Let us C, 15thed .BPB Publications. • King K.N (2008): C Programming: A Modern Approach. 2nd ed. W. W. Norton & Company.

1	**Code of the subject**	IMHS-1101
2	**Title of the subject**	Language and Technical Communication Skills
3	**Any prerequisite**	-
4	**L-T-P**	2-0-2
5	**Name of the proposer**	Dr. Q. Alam
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	➢ To make students understand the importance of communication skills ➢ To make students proficient in language and technical communication skills ➢ To make students capable of good verbal and written technical communication
8	**Brief Contents (module wise)**	Module I — The elements of Communication Module II — The sounds of English Module III — Grammar and Vocabulary Module IV — Technical writing Module V — Handling interviews and group discussions
9	**Contents for lab (If applicable)**	• The sounds of English • Grammar and Vocabulary
10	**List of text books/references**	1. Technical Communication by Meenakshi Raman and Sangeeta Sharma (Oxford University press, 2015) 2. Effective Technical Communication by Ashraf Rizvi (McGraw Hill, 2017) 3. High School English Grammar and Composition, Wren and Martin (2018)

1	**Code of the subject**	IMIT-1103
2	**Title of the subject**	Computer Programming Lab
3	**Any prerequisite**	Fundamentals of Mathematics
4	**L-T-P**	0-0-4
5	**Name of the proposer**	Dr Saumya Bhadauria
6	**Will this course require visiting faculty**	NO
7	**Learning Objectives of the subject (in about 50 words)**	• To develop ability to write programs and map scientific problems into computational frameworks. • To utilize the concepts of programming in application development. • To able to design, test and debug the programs.
8	**Brief Contents** **(module wise)**	
9	**Contents for lab (If applicable)**	Module I: Programming with C: Fundamentals of C programming, Control statements Module II: C programming with Functions (call by value and call by reference), parameter passing Module III: Programming via Recursion, Pointers. Module IV: Implementation of Array, String, Structures and Unions. Module 5: File handling, File redirection, File pointers in C and Python Module 6: Problem Solving
10	**List of text books/references**	• Kernighan, B.W. and D. M. Ritchie (1998): The C programming language, 2nd ed. Prentice Hall of India. • Kanetkar, Y (2016): Let us C, 15th ed .BPB Publications. • King, K.N (2008): C Programming: A Modern Approach, 2nd ed. W. W. Norton & Company. • Chun, W. J (2009): Core Python Programming, 3rd ed. Prentice Hall PTR. • Zelle, J(2002): Python Programming: An Introduction to Computer Science, 2nd ed. Franklin, Beedle& Associates Inc.

1	**Code of the subject**	IMAS-1103
2	**Title of the subject**	Engineering Physics Lab
3	**Any prerequisite**	Fundamental Concepts of Physics as per the course content of 12th Standard
4	**LTP (Lecture-Tutorial-Practical) and Credits Structure**	0-0-2
5	**Name of the proposer**	Prof. Pankaj Srivastava
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	The experiments have been introduced to visualize the fundamental concepts of Physics. Engg physics experiments are being introduced to make the students aware about new concepts and tools of modern physics. The experiments are based on the theory syllabus of Engg physics so that they can understand the concept practically. They include semiconductor physics, magnetism, quantum mechanics, solid state physics, lasers and fiber optics.
8	**Brief Contents (Experiments to be conducted)**	Study of Hall Effect, Resistivity and band gap of semiconductor by Four Probe Setup, Frank Hertz Experiment, Solar Energy Trainer, e/m by magnetron valve, numerical aperture &loss measurement of a given Optical Fiber , Investigation of B-H Curve, Lattice Dynamic, Fiber Optic Trainer, Forbidden Energy band gap measurement, Dielectric Constant measurement, Laser Trainer, Plank's Constant using LED, Laser Beam Parameters
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	• Practical Physics- G L Squires, latest edition • A text book of practical physics-William Watson, latest edition • Practical Physics- C L Arora, latest edition • Text Book of practical Physics- M N Srinivasan, latest edition • Engg. Physics Practical- Rao, Krishna, Rudramamba, latest edition

1	**Code of the subject**	IMIT-1104
2	**Title of the subject**	Fundamental of CS Lab
3	**Any prerequisite**	No
4	**L-T-P**	0-0-2
5	**Name of the proposer**	Prof. Pramod Kumar Singh
6	**Will this course require visiting**	No
7	**Learning Objectives of the subject (in about 50 words)**	➢ Assimilation of hardware components of computer and practical knowledge of programming in assembly language and high level language, e.g., C, C++.
8	**Brief Contents (module wise)**	
9	**Contents for lab (If applicable)**	Assimilation with Hardware Components of Computer, Assembly and Disassembly of Computer, Programming in Assembly and Higher Level Language, e.g., C, C++.
10	**List of text books/references**	1. Computer Science: An Overview, J. Glenn Brookshear, and Dennis Brylow, Pearson. Latest edition 2. Fundamentals of Computers, V. Rajaraman, and Neeharika Adabala, PHI. Latest edition 3. C Programming: A Modern Approach, K N King, W. W. Norton & Company. Latest edition 4. The C++ Programming Language, Bjarne Stroustrup, Addison Wesley. Latest edition

1	**Code of the subject**	ITHS-1105
2	**Title of the subject**	Sports and Physical Education
3	**Any prerequisite**	No
4	**L-T-P**	1-0-2
5	**Name of the proposer**	Prof. Anurag Srivastava
6	**Will this course require visiting faculty**	Yes. Experts/players from different sports and related areas will conduct the sessions
7	**Learning Objectives of the subject (in about 50 words)**	• Students will get knowledge and understanding of the facts, concepts and practice relating to a range of sports-both indoor and outdoor. • This will teach the students how to keep them fit, to increase his/her concentration, team coordination ability, which will help them as a professional. • This course will help students getting healthy, smarter, social and stress free.
8	**Brief Contents (module wise)**	The course will be taught in two components Theory • Sport History • Human Anatomy • Stress Management/ Meditation/Yoga • Important tournaments and its players • Rules and Field Requirements • Sport Equipment • Sports Psychology • Role of IT in sports
9	**Contents for Field**	Field Sessions Indoor/ Outdoor: Cricket/ Football/ Volleyball/ Basketball/ Badminton/ Table-Tennis/ Lawn-Tennis/ Athletics/ Yoga
10	**List of text books/references**	• Nation at Play: Ronojoy Sen • The Art of Captaincy: What Sports teaches us about Leadership by Mike Brearley • The Anatomy of Exercise and Movement for the Study of Dance, Pilates, Sports, and Yoga by Jo Ann Staugaard-Jones • Stress and Its Management by Yoga, by K.N. Udupa, R.C. Prasad • THE WINNING WAY: Learning from Sport for Managers by Anita Bhogle, Harsha Bhogle • Think Like a Champion by Webster, Rudi V. • Attitude is Everything, by Jeff Keller (latest editions for all books will follow)

Semester-II

1	**Code of the subject**	IMAS-1201
2	**Title of the subject**	Mathematics-II
3	**Any prerequisite**	Mathematics-I
4	**L-T-P**	3-1-0
5	**Name of the proposer**	Dr. Anuraj Singh
6	**Will this course require visiting faculty**	Yes
7	**Learning Objectives of the subject (in about 50 words)**	➢ Ability to comprehend mathematical principles and logic ➢ Ability to manipulate and analyzing data numerically and/or graphically using appropriate software ➢ Ability to solve real life problems, translating them one form to another, using appropriate mathematical and computational techniques ➢ Understanding of theoretical concepts and limits of computing
8	**Brief Contents (module wise)**	**Module-I** Laplace transform and Its properties, Laplace transform of Unit Step and Dirac-Delta functions, Laplace transform of periodic functions, Laplace transform for differentiation and integration, Inverse Laplace transform, Convolution theorem, Application of Laplace transform to solution of linear differential equations **Module-II** Introduction of Fourier series, half range Sine and Cosine series**,** Fourier series of function with an arbitrary period, Fourier integrals, Complex Fourier transforms, Fourier sine and cosine transform, Shifting theorem, Fourier transforms of derivatives, Convolution theorem **Module-III** Definition of exponential function, trigonometric, hyperbolic and logarithmic functions. Limit, Continuity, Differentiability of complex valued functions, Analytic function, Cauchy-Riemann Equations in Cartesian and Polar form, Necessary and sufficient conditions for a function to be analytic function, Harmonic functions and simple application to flow problems. **Module-IV** Line integration of complex valued functions, Cauchy theorem, Cauchy Integral formula, Generalized Cauchy Integral formula, Taylor's and Laurent's series, radius and circle of convergence, Zeroes and Singularities of complex valued functions, Residues, Residue theorem and its application in evaluation of real Integrals around unit and Semi Circle **Module-V** Solution of Partial differential equations using separation of variables, Application of PDE to solve one dimensional, two-dimensional Heat and Wave equations, Laplace Equations, D'Alembert Solution of Wave equation
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1. Greenberg, M., Advanced Engineering Mathematics, Prentice Hall, 1998. 2. Kreyszig, E., Advanced Engineering Mathematics, 9e, Wiley Publications, 2011. 3. Jain, R. K., Iyengar, S. R. K., Advanced Engineering Mathematics, Narosa Publications, 2002.

1	**Code of the subject**	IMHS-1201
2	**Title of the subject**	Human Values and Ethics
3	**Any prerequisite**	Nil
4	**L-T-P**	2-0-0
5	**Name of the proposer**	Dr. V.S.R. Krishnaiah
6	**Will this course require visiting**	Yes
7	**Learning Objectives of the subject (in about 50 words)**	The primary objective of this course is to create awareness on Ethics and Human Values among the students and make them understand the relevance of these ideas in their day to day personal and professional lives. The course will also sensitize students on social responsibility of ICT professionals. It further aims to instill moral and social values as well as professional code of conduct in students to make them good quality professionals so as to perform their professional responsibilities better in their future career.
8	**Brief Contents (module wise)**	**Module-I:** Definitions of Ethics, Engineering Ethics, and Morality. Categorization of Ethics, Differentiation of Morality and Ethics, Ten personal ethical behaviors which are globally acceptable, Definition of virtues, Elaboration of cardinal virtues, Definition of human values, Shalome H Shwartz value classification with examples, Learning from Moral Insights of Great Epics like Ramayan and Mahabharat **Module-II:** Definition of Profession and Professional, Responsibilities of professionals, the objectives of any one professional association, ACM Code of Ethics and Professional Conduct, IEEE Code of Ethics **Module-III:** Significance of ethics in ICT sector, Global Ethical Issues in ICT Sector with examples, Definitions of CSR, The stakeholders and their expectations from an organization, The Company Act 2013, Benefits of CSR in organization, Examples of CSR in ICT sector **Module-IV:** , Ethical Dilemmas, Main features of Whistle Blowing, Definition of Life Skills, Four Categories of Life Skills
9	**Contents for lab**	
10	**List of text books/references**	1.Professional Ethics by R.Subramanian, Oxford University Press, 2013 2. Professional Ethics and Human Values by R.S.Nagarazan, New Age International (P) Ltd,2006

1	**Code of the subject**	IMIT-1201
2	**Title of the subject**	Digital Electronics
3	**Any prerequisite**	
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Gaurav Kaushal
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	The objective of the Digital Electronics is to give the basic ideas to design and analyze the combinational and sequential circuits. The subject gives the platform to implement the digital circuits in FPGA boards using the Verilog Hardware Description Language.
8	**Brief Contents (module wise)**	Number Systems, Essential of Boolean Algebra; Expressing a logical problem as Boolean function; Logic realization using GATES; circuit minimization; combinational logic elements; Sequential logic elements; Finite State Machine Design, Designing and problems using OP-AMP, Designing and problems using Timer (555) circuits, Logic circuit design using Verilog Language
9	**Contents for lab (If applicable)**	.
10	**List of text books/references**	1) "*Digital Design*", by M. Morris Mano and Michael D. Ciletti, Publisher: Pearson, 5th Edition, 2013. 2) "Digital Circuits and Logic Design" by Lee S C Lee, Publisher: PHI, 1980. 3) "Digital Design Principles and Practices" by John F. Wakerly, Publisher: Pearson, Fifth Edition, 2018.

1	**Code of the subject**	IMIT-1202
2	**Title of the subject**	Data Structure
3	**Any prerequisite**	Mathematics-I, Computer Programming: Concepts and Practices
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Saumya Bhadauria
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	This course teaches the basic data structures and algorithms for performing operations on data structures, the use of data structures to provide software solutions that are efficient, and some algorithm paradigms for building efficient algorithms.
8	**Brief Contents (module wise)**	Module 1: Introduction to Abstract data types, linear and linked data structures – Arrays, Stacks, Queues, Linked List Module 2: Introduction to searching and sorting algorithms –Quick sort, Merge sort, Heap sort, linear time sorting; evaluation of infix/postfix expressions Module 3: Trees, binary search trees and basic operations, AVL trees, heaps, hash tables. Module 4: Algorithm analysis: time and space complexity, asymptotic behavior, estimating runtime, comparison of algorithms. Module 5: Graphs and basic algorithms on graphs: depth first and breadth first search, Dijkstra's algorithm. Module 6: Hash Tables
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein. 2009. Introduction to Algorithms, Third Edition (3rd ed.). The MIT Press. 2. Steven S. Skiena. 2008. The Algorithm Design Manual (2nd ed.). Springer Publishing Company, Incorporated.

1	**Code of the subject**	IMIT-1203
2	**Title of the subject**	ICT Workshop
3	**Any prerequisite**	
4	**L-T-P**	0-0-4
5	**Name of the proposer**	Dr. Somesh Kumar
6	**Will this course require visiting**	No
7	**Learning Objectives of the subject (in about 50 words)**	➢ Identifying and promoting appropriate applications of electronics and ICT in various sectors such as smart cities, industries, healthcare, education, agriculture, transportation, power, including social development sector.
8	**Brief Contents**	**M-I: Overview of basic Electronic Components:** PCB (Printed Circuit Board), Breadboard, Bipolar Junction Transistor (BJT), Resistor, Diode, LED, Thermistor, Jumper Wires, Potentiometer, Voltage Regulator. **M-II: IC Descriptions:** 78xx, 79xx,555 Timer IC etc. **M-III: Descriptions of Electronic Components:**USB Connector, Buzzer, PIR Sensor Module, 7 Segment Display, Relay, IR Sensor Module **M-IV:** Arduino Uno, ESP8266 Module, HC 05 Bluetooth Module. **M-V:** Rasberry Pi **M-VI:** Hardware Based Projects for smart city applications, industries, healthcare, education, agriculture, transportation, power, including social development sector etc.
9	**Contents for lab (If applicable)**	NA
10	**List of text books/references**	1. Digital Design, Morris Mano, Prentice Hall, 2002. 2. Digital Fundamentals,10thEd, Floyd T L, Prentice Hall, 2009. 3. Digital Design-Principles and Practices, 4thEd, J F Wakerly, Prentice Hall, 2006. 4. Modern Digital Electronics, 2nd Edition, R.P. Jain. Tata McGraw Hill Company Limited. 5. https://electronicsforu.com/ 6. https://electronicsforu.com/tag/mini-projects

1	**Code of the subject**	IMIT-1204
2	**Title of the subject**	Object Oriented Programming
3	**Any prerequisite**	
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Santosh Singh Rathore
6	**Will this course require visiting**	No
7	**Learning Objectives of the subject (in about 50 words)**	• To develop programming skill and to solve engineering related problems using Object Oriented Programming Concepts.
8	**Brief Contents (module wise)**	**Module I:** Object oriented thinking: Need for OOP Paradigm, Procedural programming vs object oriented programming, object oriented concepts. **Module II:** Class and object concepts: Difference between C structure and class, specifying a class, Defining members inside and outside class, etc. **Module III:** Constructor and destructor concepts, Operator overloading and Type Conversion, Inheritance and polymorphism concepts **Module IV:** Working with files: Classes for file stream operations, opening and closing files, File opening modes, file Pointers, Error handling during file operations, command line arguments. **Module V:** Templates: Class template, class template with parameter, function template, function template with parameter and Exception handling
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1. HM Deitel and PJ Deitel "C++ How to Program", Seventh Edition, 2010, Prentice Hall. 2. Brian W. Kernighan and Dennis M. Ritchie, "The C Programming Language", 2006, Prentice-Hall. 3. E Balagurusamy, "Object oriented Programming with C++", Third edition, 2006, Tata McGraw Hill. 4. Bjarne Stroustrup, "The C++ Programming language", Third edition, Pearson Education. 5. Horstmann "Computing Concepts with C++ Essentials", Third Edition,2003, John Wiley. 6. Robert Lafore, "Object Oriented Programming in C++", 2002, Pearson education.

1	**Code of the subject**	IMIT-1205
2	**Title of the subject**	OOPS Lab
3	**Any prerequisite**	
4	**L-T-P**	0-0-4
5	**Name of the proposer**	Dr. Santosh Singh Rathore
6	**Will this course require visiting**	No
7	**Learning Objectives of the subject (in about 50 words)**	• To gain understanding about the object oriented principles in construction of robust and maintainable programs. • To have a competence to design, write, compile, test and execute programs using high level language.
8	**Brief Contents (module wise)**	**Module I:** Demonstration of the use of basic C++ syntaxes and functions. **Module II:** Demonstration **of** the use of class and objects concepts. **Module III:** Demonstration of the concept of: Default constructor, Parameterized constructor, Copy constructor, Constructor overloading, destructor. **Module IV:** Demonstration of the concepts of inheritance: multiple inheritance, multilevel inheritance, hybrid inheritance, containership. **Module V:** Demonstration of the concepts of operator overloading: overload unary operator, overload binary operator **Module VI:** Demonstration of the concept of polymorphism (static and run-time) and virtual functions. **Module VII:** Demonstration of the use of template in object-oriented programming. **Module VIII:** Demonstration of the use of exception handling concepts in C++.
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1. HM Deitel and PJ Deitel "C++ How to Program", Seventh Edition, 2010, Prentice Hall. Education. 2. Robert Lafore, "Object Oriented Programming in C++", 2002, Pearson education. 3. Bruce Eckel, "Thinking in C++", vol 1, edition 2, President, MindView Inc., 1999.

1	**Code of the subject**	IMIT-1206
2	**Title of the subject**	Digital Electronics Lab
3	**Any prerequisite**	
4	**L-T-P**	0-0-2
5	**Name of the proposer**	Dr. Gaurav Kaushal
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	Being primarily a laboratory course, it would consist of series of assignments that would involve implementation of combinational and sequential circuits in brad boards as well as using the Verilog language. The students would use modern synthesis techniques to realize these designs on FPGA boards.
8	**Brief Contents (module wise)**	To design the logic building blocks (combinational and sequential circuits) using brad boards, Use of Verilog language to design and synthesis the combinational and sequential circuits. Implement a project.
9	**Contents for lab (If applicable)**	IC for different logic gates, MUX, J-K flip-flops, D flip-flops, LED, BCD to 7 Segment Decoder Driver IC, 555 Timer, different value of resistance, Capacitor, Breadboard, DC power supply, Connecting Wires, Function generators, Cathode Ray Oscilloscope, Potentiometer, vivado software
10	**List of text books/references**	1) "Advanced Digital Design with the Verilog HDL" by Michael D. Ciletti, Publisher: Pearson, 2010. 2) "Verilog HDL : A Guide to Digital Design and Synthesis" by "Samir Palnitkar" Publisher: Prentice Hall PTR, 2003.

1	**Code of the subject**	IMIT-1207
2	**Title of the subject**	Data Structure Lab
3	**Any prerequisite**	Mathematics-I, Computer Programming: Concepts and Practices 1
4	**L-T-P**	0-0-2
5	**Name of the proposer**	Dr. Saumya Bhadauria
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	• To develop skills to design and analyse simple linear and non-linear data structures. • To identify and apply the suitable data structure for the given real world problem.
8	**Brief Contents (module wise)**	
9	**Contents for lab (If applicable)**	Module I: Abstract data types, Big-Oh notation, Time and Space complexity; Module II: Programming of linear and linked data structures – Arrays, Stacks, Queues, Linked List; Module III: Programming of sorting algorithms–Quick sort, Merge sort, Heaps Priority queues, Heap sort, linear time sorting; Module IV: Implementing Trees, Dictionaries – Binary search trees, Balanced search trees, AVL trees; Module V: Programming to demonstrate Graph preliminaries, Graph algorithms-BFS, DFS; Problem Solving
10	**List of text books/references**	1. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein. 2009. Introduction to Algorithms, Third Edition (3rd ed.). The MIT Press. 2. Steven S. Skiena. 2008. The Algorithm Design Manual (2nd ed.). Springer Publishing Company, Incorporated.

1	**Code of the subject**	IMAS-2101
2	**Title of the subject**	Mathematics –III
3	**Any prerequisite**	Basic knowledge of mathematics
4	**L-T-P**	3-1-0
5	**Name of the proposer**	Dr Ajay Kumar
6	**Will this course require visiting**	NO
7	**Learning Objectives of the subject (in about 50 words)**	➢ To teach the basic concepts of Engineering mathematics and statistics.
8	**Brief Contents (module wise)**	Introduction, Measures of Central Tendency and Dispersion in Frequency Distributions, Arithmetic Mean, Weighted Mean, Geometric Mean, Median, Mode, Dispersion, Ranges, Coefficient of Variation. Probability, Basic terminology, Types of Probability, Probability rules, Bayes Theorem, Probability distribution, Binomial, Poisson, Negative-Binomial, Geometric, Hypergeometric, Uniform, Exponential, Normal distribution, log-normal, beta and gamma distributions. Sampling and Sampling Distribution, Random sampling, Design of Experiments, Sampling distribution, Relationship between sample size and standard error, estimation theory. Testing Hypotheses: One Sample Test, Basics to hypotheses – testing procedure, Testing hypotheses, Hypotheses testing of means, measuring the power of hypotheses test. Testing Hypotheses: Two Sample Test, Testing for differences between means and proportions, Testing differences between means with dependent samples, Probability values. Chi–Square distribution, Chi–Square as a test of independence, Testing the appropriateness of a distribution, Analysis of variance, Inference about a population variance. Simple Regression and Correlation: Estimation using the regression line, Correlation analysis, making inferences about population parameters. Multiple Regression: Multiple regression and correlation analysis, Finding multiple regression equation, Inferences about population parameters.
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1. Johnson, R. A., Miller & Freund's Probability and statistics for engineers, Pearson Education, 2000. 2. Hogg R. V., Craig A., Probability and Statistical Inference, 6th edition, Pearson Education. 3. Ross S. M., First Course in Probability, Pearson Education.

Semester-III

1	**Code of the subject**	IMIT-2101
2	**Title of the subject**	Bio-Medical Engineering
3	**Any prerequisite**	NO
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Pinku Ranjan
6	**Will this course require visiting faculty**	NO
7	**Learning Objectives of the subject (in about 50 words)**	• Appreciate the basic organization of organisms and living being. • Understand the machinery of the cell that is ultimately responsible for various daily activities. • Acquire knowledge about biological problems that requires engineering expertise to solve them.
8	**Brief Contents (module wise)**	***BASIC CELL BIOLOGY*** ➢ Introduction to Biology ➢ The cell: the basic unit of life ➢ Expression of genetic information - protein structure and function ➢ Cell metabolism; Cells respond to their external environments ➢ Cells grow and reproduce ➢ Cellular differentiation ***BIOCHEMISTRY AND MOLECULAR ASPECTS OF LIFE*** ➢ Biodiversity - Chemical bonds in Biochemistry; Biochemistry and Human biology ➢ Protein synthesis –DNA; RNA ➢ Transcription and translation factors play key roles in protein synthesis ➢ Differences between eukaryotic and prokaryotic protein Synthesis ➢ Stem cells and their applications ***ENZYMES AND INDUSTRIAL APPLICATIONS*** ➢ Enzymes – significance, factors ➢ Mechanism and effective catalysis – proteases, carbonic anhydrase ➢ Restriction Enzymes; Nucleoside Monophosphate Kinases ➢ Photosynthesis and carbon fixation; Biological energy production ➢ Metabolism-anabolism and catabolism ***MECHANOCHEMISTRY*** ➢ Protein motors convert chemical energy into mechanical work ➢ The bacterial flagellar motor ➢ ATP synthase structure ➢ Cytoskeleton ➢ Biosensors - types, applications ➢ Bioremediation ***NERVOUS SYSTEM, IMMUNE SYSTEM AND CELL SIGNALING*** ➢ Basics of nervous system and “neural networks" ➢ The cellular basis of immunity ➢ The functional properties and structure of antibodies

		➢ T cell receptors and subclasses ➢ General principles of cell signaling
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1.ThyagaRajan.S., Selvamurugan. N., Rajesh.M.P., Nazeer.R.A., Richard W. Thilagaraj, Barathi.S., and Jaganthan.M.K., "Biology for Engineers", Tata McGraw-Hill, New Delhi, 2012. 2.Jeremy M. Berg, John L. Tymoczko and Lubert Stryer, "Biochemistry", W.H. Freeman and Co. Ltd., 6th Ed., 2006. 3. Robert Weaver, "Molecular Biology", MCGraw-Hill, 5th Edition, 2012. 4. Jon Cooper, "Biosensors A Practical Approach", Bellwether Books, 2004. 5. Martin Alexander, "Biodegradation and Bioremediation", Academic Press, 1994. 6. Kenneth Murphy, "Janeway's Immunobiology", Garland Science; 8th edition, 2011. 7. Eric R. Kandel, James H. Schwartz, Thomas M. Jessell, "Principles of Neural Science", McGraw-Hill, 5th Edition, 2012.

1	**Code of the subject**	IMIT-2102
2	**Title of the subject**	Computer Networks
3	**Any prerequisite**	No
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. K. K. Pattanaik
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	The course will help understand the purpose and overview of the Internetworking technology, issues, and approaches using top-down philosophy.
8	**Brief Contents (module wise)**	Chapter 1 Computer Networks and the Internet A Nuts-and-Bolts Description of Internet, A Services Description, The Network Edge, Client and Server Programs, The Network Core, ISPs and Internet Backbones, Performance in Packet-Switched Networks, Protocol Layers and Their Service Models, The Development of Packet Switching, Proprietary Networks and Internetworking, The Internet Explosion, Recent Developments. Chapter 2 Application Layer Network Application Architectures, Processes Communication, Transport Services, Transport Services, Application-Layer Protocols, The Web and HTTP, User-Server Interaction: Cookies, Web Caching, Peer-to-Peer Applications, P2P File Distribution, Searching for Information in a P2P Community, Case Study: P2P Internet Telephony with Skype, Socket Programming with TCP and UDP Chapter 3 Transport Layer Relationship Between Transport and Network Layers Overview of the Transport Layer in the Internet, Principles of Reliable Data Transfer Building a Reliable Data Transfer Protocol, Pipelined Reliable Data Transfer Protocols, Round-Trip Time Estimation and Timeout, Principles of Congestion Control, The Causes and the Costs of Congestion, Approaches to Congestion Control, TCP Congestion Control, Fairness. Chapter 4 The Network Layer Network Service Models, Datagram Networks, Router architecture: Input Ports, Switching, Output Ports, Queuing. The Internet Protocol (IP),IP Security VPNs, Routing, Broadcast and Multicast Routing. Chapter 5 The Link Layer and Local Area Networks Link Layer Services, Multiple Access protocols, Link-Layer Addressing, Ethernet, Link-Layer, PPP: The Point-to-Point Protocol, Link Virtualization. Chapter 6 Wireless and Mobile Networks Wireless Links and Network Characteristics, WiFi: 802.11 Wireless LANs, Beyond 802.11: Bluetooth and WiMax, Cellular Internet Access, Mobile IP.
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	Computer Networking: A top-down approach featuring the Internet / James F. Kurose , Keith W. Ross., 7th edition, Pearson.

1	**Code of the subject**	IMHS 2101
2	**Title of the subject**	Principles & Practices of Management
3	**Any prerequisite**	None
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Prof. Manoj Patwardhan
6	**Will this course require visiting**	No
7	**Learning Objectives of the subject (in about 50 words)**	Element of Management is concerned with the way in which organizations manage their resources. The aim is to explore the concepts of management, managers, and organizations in today's dynamic business environment. This course outline illustrates the varied backgrounds, skills, and characteristics required for successful managers. It continues with an examination of the functions of management, managerial roles and diverse nature of modern business organizations, and rewards and challenges offered by a career in management.
8	**Brief Contents (module wise)**	**Module I** Explain what is meant by the term management Classify the three levels of managers and identify the primary responsibility of each group. Describe the difference between managers and operative employees. Explain the skills and roles manager. Describe the value of studying management. Identify the relevance of popular humanities and social science courses to management practices. **Module II** Define planning. Explain the potential benefits of planning. Distinguish between strategic and tactical plans. Define management by objectives and identify its common elements. Outline the steps in the strategic management process. Explain SWOT analysis. Describe the steps in the decision-making process. Identify the assumptions of the rational decision-making model. Define certainty, risk, and uncertainty as they relate to decision making. Identify the two types of decision problems and the two types of decisions that are used to solve them. Describe the advantages and disadvantages of group decisions. **Module III** Identify and define the six elements of organization structure. Contrast mechanistic and organic organizations. Summarize the effect of strategy, size, technology, and environment on organization structures. Contrast the divisional and functional structures. **Module IV** Define leader and explain the difference between managers and leaders. Describe the skills that visionary leader exhibit. Explain the styles and theories of leadership. Define Motivation at work. Techniques of Motivation. Theories of motivation. Explain what is meant by the term learning organization**.** **Module V** Define control. Describe three approaches to control. Explain why control is important. Describe the control process. Distinguish among the three types of control. Describe the qualities of an effective control system. Explain how controls can become dysfunctional.
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1. Management: International Edition, by Hitt, Black & Porter, latest edition 2. Fundamentals of Management: International Edition by Robbins & De Cenzo, latest edition 3. Management: Concepts & Practices by Hannagan, latest edition

1	**Code of the subject**	IMIT-2103
2	**Title of the subject**	Computer Organization and Architecture
3	**Any prerequisite**	
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Prasenjit Chanak
6	**Will this course require visiting faculty**	NA
7	**Learning Objectives of the subject (in about 50 words)**	This course will teach the fundamentals of Computer Organization and Architecture and elaborate on the Application Binary Interfaces described.
8	**Brief Contents (module wise)**	**Basic functional blocks of a computer:** CPU, memory, input-output subsystems, control unit. Instruction set architecture of a CPU - registers, instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set. Case study - instruction sets of some common CPUs. **Data representation:** signed number representation, fixed and floating point representations, character representation. Computer arithmetic - integer addition and subtraction, ripple carry adder, carry look-ahead adder, etc. multiplication - shift-and-add, Booth multiplier, carry save multiplier, etc. Division - non-restoring and restoring techniques, floating point arithmetic. **CPU control unit design:** hardwired and micro-programmed design approaches, Case study - design of a simple hypothetical CPU. **Memory system design:** semiconductor memory technologies, memory organization. **Peripheral devices and their characteristics:** Input-output subsystems, I/O transfers - program controlled, interrupt driven and DMA, privileged and non-privileged instructions, software interrupts and exceptions. Programs and processes - role of interrupts in process state transitions. **Performance enhancement techniques** **Pipelining:** Basic concepts of pipelining, throughput and speedup, pipeline hazards. Memory organization: Memory interleaving, concept of hierarchical memory organization, cache memory, cache size vs block size, mapping functions, replacement algorithms, write policy.
9	**Contents for lab (If applicable)**	**Lab Contents:** Digital Design using HDLs. Simple circuit designs: For e.g. Counter, Multiplexer, Arithmetic circuits etc. Design of a Simple Processor: Includes register file, ALU, data paths.
10	**List of text books/references**	1. Computer Organization and Design: The Hardware/Software Interface, David A Patterson, John L. Hennessy, 4th Edition, Morgan Kaufmann, 2009 2. Computer Architecture and Organization by William Stallings, PHI Pvt. Ltd., Eastern Economy Edition, Sixth Edition, 2003 3. Structured Computer Organization by Andrew S Tanenbaum, PHI/Pearson, 4th Edition 4. Computer Organization by V Carl Hamacher, Zvonks Vranesic, SafeaZaky, McGraw Hill, Vth Edition 5. Computer System Architecture by M Morris Mano, Prentice Hall of India, 2001 6. Computer Architecture and Organization by John P Hayes, 3rd Ed. McGraw Hill, 2002.

1	**Code of the subject**	BCS1202/ IMIT-2104/ITIT-2104
2	**Title of the subject**	Database Management Systems
3	**Any prerequisite**	No
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Neetesh Kumar
6	**Will this course require visiting faculty**	Yes/No
7	**Learning Objectives of the subject (in about 50 words)**	This is one of the fundamental subjects of computer science. Therefore, learning objective of this course is to understand about the Database design and perform appropriate modifications on database system logically and practically. Students certainly will use Database systems concept during the logical design of Database systems of future system developments.
8	**Brief Contents (module wise)**	**Module I:** • Introduction to Databases **Module II:** • Relational Data Model • Relational Algebra: Basic Operators • Relational Algebra: Additional Operators • Relational Algebra: Updates • Entity-Relationship Diagram **Module III:** • SQL: Creation and Basic Query Structure • SQL: Basic Operations • SQL: Aggregate and Grouping • SQL: Nested Subqueries and Sets • SQL: Updates and Joins • SQL: Views and Triggers **Module IV:** • Database Normalization: Functional Dependencies • Database Normalization: 1NF and 2NF • Database Normalization: 3NF • Database Normalization: BCNF • Database Normalization: Multi-valued Dependencies • Database Normalization:PJNF **Module V:** • Indexing: Basics and Hashing • Indexing: B-tree and B+-tree **Module VI:** • Database Transactions: Definition of Transactions • Database Transactions: Features of Transactions **Module VII:** • Recovery Systems: Types of Recovery Systems • Recovery Systems: Log-based Schemes **Module VIII:** • Transaction Schedules: Conflicts and Aborts • Transaction Schedules: Serializability • Transaction Schedules: Recoverability

		Module IX: • Concurrency Control Protocols: Two-phase Locking Protocols • Concurrency Control Protocols: Timestamp Ordering Protocol • Concurrency Control Protocols: Multiple Granularity Locks • Concurrency Control Protocols: Deadlock Prevention **Module X:** • Query Processing: Selection • Query Processing: Sorting • Query Processing: Basic Nested Loop Join • Query Processing: Block and Indexed Nested Loop Joins • Query Processing: Merge and Hash Joins • Query Optimization: Equivalent Expressions • Query Optimization: Joins • Query Optimization: Estimating Sizes
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1. Abraham Silberschatz, Henry Korth, and S. Sudarshan. 2005. Database Systems Concepts (5 ed.). McGraw-Hill, Inc., New York, NY, USA. 2. Ramez A. Elmasri, Shankrant B. Navathe. 1999. Fundamentals of Database Systems (3rd ed.). Carter Shanklin (Ed.). Addison-Wesley Longman Publishing Co., Inc., Boston, MA, USA. 3. Paul DuBois. 1999. Mysql. New Riders Publishing, Thousand Oaks, CA, USA. 4. C. J. Date. 2005. Database in Depth: Relational Theory for Practitioners. O'Reilly Media, Inc. 5. Bipin C. Desai. 1990. An Introduction to Database Systems. West Publishing Co., St. Paul, MN, USA.

1	**Code of the subject**	IMIT-2105
2	**Title of the subject**	Computer Network Lab
3	**Any prerequisite**	Fundamentals of Computer Networks
4	**L-T-P**	0-0-2
5	**Name of the proposer**	Dr. K. K. Pattanaik
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	The course will help gaining hands on experience about addressing, communicating among machines, application server configuration.
8	**Brief Contents (module wise)**	Experiment 1: Demonstration of basic concepts of network topology. Creating a small network topology by connecting end devices with switches and routers, configuring end devices and routers, Perform communication between end-devices Experiment 2: Realizing the concepts of IPv4 addressing, subnetting, and subnet masking Experiment 3: Demonstrating the functionality of a Hub and Switch. In addition, understanding the concept of DHCP server and its configuration. Experiment 4: Variable Length Subnet Masking (VLSM) + Static Routing Experiment 5: Demonstrating client-server model with different independent application servers. Experiment 6: Demonstrating client-server model with one multi-application (Email, FTP, HTTP, DNS, and DHCP) server. Experiment 7: Client-server model through Socket Programming in C.
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	

1	**Code of the subject**	IMIT-2106
2	**Title of the subject**	Computer Organization and Architecture Lab
3	**Any prerequisite**	Fundamentals of IT; Digital Electronics
4	**L-T-P**	0-0-2
5	**Name of the proposer**	Dr. Prasenjit Chanak
6	**Will this course require visiting faculty**	NA
7	**Learning Objectives of the subject (in about 50 words)**	This course will teach the fundamentals of Computer Organization and Architecture and elaborate on the Application Binary Interfaces described.
8	**Brief Contents (module wise)**	**Lab Contents:** a. Digital Design using HDLs. Simple circuit designs: For e.g. Counter, Multiplexer, Arithmetic circuits etc. Design of a Simple Processor: Includes register file, ALU, data paths. b. FPGA Programming Programming on Xilinx Spartan 3E (or equivalent) FPGA. Handling of Inputs: through slide switches, through push buttons. Handling of Outputs: 7-segment display, LED display, LCD display. The designs developed in Part-I can be used to program the FPGA. c. Assembly Language Programming: Programming in assembly language. The assignments should cover the following concepts: Registers; different type of instructions (load, store, arithmetic, logic, branch); operand addressing modes; memory addressing modes; conditions (codes/flags and conditional branches) stack manipulation; procedure calls; procedure call conventions (load/store of; arguments on stack, activation records);
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1. Computer Organization and Design: The Hardware/Software Interface, David A Patterson, John L. Hennessy, 4th Edition, Morgan Kaufmann, 2009 2. Computer Architecture and Organization by William Stallings, PHI Pvt. Ltd., Eastern Economy Edition, Sixth Edition, 2003 3. Structured Computer Organization by Andrew S Tanenbaum, PHI/Pearson, 4th Edition 4. Computer Organization by V Carl Hamacher, Zvonks Vranesic, SafeaZaky, McGraw Hill, Vth Edition 5. Computer System Architecture by M Morris Mano, Prentice Hall of India, 2001 6. Computer Architecture and Organization by John P Hayes, 3rd Ed. McGraw Hill, 2002.

1	**Code of the subject**	BCS1206/ IMIT-2107/ ITIT-2107
2	**Title of the subject**	DBMS Lab
3	**Any prerequisite**	No
4	**L-T-P**	0-0-2
5	**Name of the proposer**	Dr. Neetesh Kumar
6	**Will this course require visiting faculty**	Yes/No
7	**Learning Objectives of the subject (in about 50 words)**	This is one of the fundamental subjects of computer science. Therefore, learning objective of this course is to understand about the Database design and perform appropriate modifications on database system logically and practically. Students certainly will use Database systems concept during the logical design of Database systems of future system developments.
8	**Brief Contents (module wise)**	**Module I:** • Study of problem analysis techniques **Module II:** • Drawing of Entity-Relationship Diagram **Module III: Hands on SQL for the following:** • SQL: Creation and Basic Query Structure • SQL: Basic Operations • SQL: Aggregate and Grouping • SQL: Nested Subqueries and Sets • SQL: Updates and Joins • SQL: Views and Triggers **Module IV: Practical study on Normalization** • Database Normalization: Functional Dependencies • Database Normalization: 1NF and 2NF • Database Normalization: 3NF • Database Normalization: BCNF • Database Normalization: Multi-valued Dependencies • Database Normalization:PJNF **Module V:** • Coming up with the applying knowledge to implement a realistic project.
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1. Abraham Silberschatz, Henry Korth, and S. Sudarshan. 2005. Database Systems Concepts (5 ed.). McGraw-Hill, Inc., New York, NY, USA. Ramez A. Elmasri, Shankrant B. Navathe. 1999. Fundamentals of Database Systems (3rd ed.). Carter Shanklin (Ed.). Addison-Wesley Longman Publishing Co., Inc., Boston, MA, USA. 3. Paul DuBois. 1999. Mysql. New Riders Publishing, Thousand Oaks, CA, USA. 4. C. J. Date. 2005. Database in Depth: Relational Theory for Practitioners. O'Reilly Media, Inc. 5. Bipin C. Desai. 1990. An Introduction to Database Systems. West Publishing Co., St. Paul, MN, USA.

Semester-IV

1	**Code of the subject**	ITAS-2201
2	**Title of the subject**	Mathematics-IV
3	**Any prerequisite**	-
4	**L-T-P**	3-1-0
5	**Name of the proposer**	Jeevaraj S
6	**Will this course require visiting**	No
7	**Learning Objectives of the subject (in about 50 words)**	➢ To understand the meaning, purpose, and tools of Operations Research. ➢ To give an idea about the Mathematical Modeling of Real Life Problems/ Engineering Problems. ➢ To enrich the knowledge of students with advanced techniques of linear programming problem along with real life applications.
8	**Brief Contents (module wise)**	Linear Programming: Convex sets, Mathematical Model, Assumptions of Linear Programming, Graphical Method, Simplex Method, Big M Method, Two-Phase Method. Duality in Linear Programming: Dual Simplex Method, Revised Simplex Method, Sensitivity or Post-optimal analysis, Transportation problem, Assignment problem. Integer Linear Programming Problem: Cutting plane method, Gomary's cut method, Branch and Bound technique, Travelling Salesman Problem, Cargo-Loading Problem. Non-linear Programming: Quadratic forms and classical methods, Convex Functions and Kuhn-Tucker theory, Beale's method, Separable Programming. Dynamic Programming and Game Theory: Bellman's principle, Recursive relations, Solutions of LPP by dynamic programming, Forward and Backward Dynamic programming, Game theory: Games with mixed strategy.
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1. **"Operations Research", fifth edition** by H.A. Taha. Publisher: Prentice Hall Publication. 2. ***"Schaum's outlines- Operation Research", second edition*** by Richard Bronson and Govindasami Naadimuthu. Publisher: Tata McGraw-Hill. 3. **"Introduction to Optimization-Operations Research**" by J.C. Pant. Publisher: Jain Brothers**.**

1	**Code of the subject**	IMIT-2201
2	**Title of the subject**	Theory of Computation
3	**Any prerequisite**	
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. W. Wilfred Godfrey
6	**Will this course require visiting**	NO
7	**Learning Objectives of the subject (in about 50 words)**	➢ To introduce students to the mathematical foundations of computation including automata theory; the theory of formal languages and grammars; the notions of algorithm, decidability, complexity, and computability. ➢ To enhance/develop students' ability to understand and conduct mathematical proofs for computation and algorithms.
8	**Brief Contents (module wise)**	**Module I - Finite Automata:** Introduction- Basic Mathematical Notation and techniques- Finite State systems – Basic Definitions – Finite Automaton – DFA & NDFA – Finite Automaton with €- moves – Regular Languages- Regular Expression – Equivalence of NFA and DFA – Equivalence of NDFA‟s with and without €-moves – Equivalence of finite Automaton and regular expressions – Minimization of DFA- – Pumping Lemma for Regular sets – Problems based on Pumping Lemma. **Module II – Grammars:** Grammar Introduction– Types of Grammar – Context Free Grammars and Languages– Derivations and Languages – Ambiguity- Relationship between derivation and derivation trees – Simplification of CFG – Elimination of Useless symbols – Unit productions – Null productions – Greiback Normal form – Chomsky normal form – Problems related to CNF and GNF. **Module III -Pushdown Automata:** Pushdown Automata- Definitions – Moves – Instantaneous descriptions – Deterministic pushdown automata – Equivalence of Pushdown automata and CFL – pumping lemma for CFL – problems based on pumping Lemma. **Module IV - Turing Machines:** Definitions of Turing machines – Models – Computable languages and functions – Techniques for Turing machine construction – Multi head and Multi tape Turing Machines – The Halting problem – Partial Solvability – Problems about Turing machine- Chomskian hierarchy of languages. **Module V - Unsolvable Problems and Computable functions:** Unsolvable Problems and Computable Functions – Primitive recursive functions – Recursive and recursively enumerable languages – Universal Turing machine. Measuring and
9	**Contents for lab (If applicable)**	Nil
10	**List of text books/references**	**TEXTBOOKS** 1. Hopcroft J.E., Motwani R. and Ullman J.D, “Introduction to Automata Theory, Languages and Computations”, Second Edition, Pearson Education, 2008. 2. John C Martin, “Introduction to Languages and the Theory of Computation”, Third Edition, Tata McGraw Hill Publishing Company, New Delhi, 2007. **REFERENCES** 1.Mishra K L P and Chandrasekaran N, “Theory of Computer Science – Automata, Languages and Computation”, Third Edition, Prentice Hall of India, 2004. 2.Harry R Lewis and Christos H Papadimitriou, “Elements of the Theory of Computation”, Second Edition, Prentice Hall of India, Pearson Education, New Delhi, 2003. 3.Peter Linz, “An Introduction to Formal Language and Automata”, Third Edition, Narosa Publishers, New Delhi, 2002. 4.Kamala Krithivasan and Rama. R, “Introduction to Formal Languages,

1	**Code of the subject**	IMIT-2202/ IMMG-9304
2	**Title of the subject**	Software Engineering
3	**Any prerequisite**	NIL
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr Ajay Kumar
6	**Will this course require visiting**	NO
7	**Learning Objectives of the subject (in about 50 words)**	➢ To impart software engineering concepts.
8	**Brief Contents (module wise)**	Introduction: Software engineering approach to solve problems of software industry. Software processes: software development process, project management process. Software requirement Analysis and specification: Software requirements, Problem analysis, requirement specification and validation. Software planning: Cost estimation, COCOMO model, staffing and personnel planning, software configuration and management plan, quality assurance plan, monitoring plans. Software design: design concepts, abstraction, modularity, structure, concurrency, information hiding, coupling and cohesion. Detailed design considerations, verification. Complexity, metrics. Implementation issues: standards and guidelines. Verification and validation techniques: Quality assurance, static analysis, Symbolic execution, unit testing , metrics Testing Fundamentals, Functional testing , Testing Process. Software quality and reliability. The need for system software reliability, software-related problems, software reliability engineering, future problems in the twenty-first century System Reliability Concepts: Reliability measures, common distribution functions (Binominal, Poisson, Exponential, memorylessness, Normal, log-normal, Weibull, Gama, Beta, Parato, and Rayleigh), Poisson process and NHPP.
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1. Pham, Hoang. System software reliability. Springer Science & Business Media, 2007. 2. Jalote Pankaj, An Integrated Approach to Software Engineering, Narosa Publishing House 3. Pressman, Roger S., Software Engineering : A practitioner's Approach, McGraw-Hill, Inc.

1	**Code of the subject**	IMIT-2203
2	**Title of the subject**	Design and Analysis of Algorithms
3	**Any prerequisite**	Data Structure, and Discrete Mathematics
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Prof. K. V. Arya
6	**Will this course require visiting**	NO
7	**Learning Objectives of the subject (in about 50 words)**	Learn about definition of algorithm, correctness of the algorithm, learn about various algorithm design techniques and their application to solve real life problems
8	**Brief Contents (module wise)**	Module-I: Introduction Module-II: Algorithm Correctness proof and analysis Module-III: Algorithm design Techniques-I Module-IV: Design techniques for graph problems Module-V: Introduction to NP-Completeness
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1. T. H. Cormen, C. E. Leiserson and R. L. Rivest, Introduction to Algorithms, PHI 2. A. v. Aho, J. E. Hopcroft and J. D. Ullnam, Design and Analysis of Algorithms, Parson Education 3. J. Kleinberg and E. Tardos, Algorithm Design, Addison Wesley

1	**Code of the subject**	IMIT-2204/ IMIT-2208
2	**Title of the subject**	Artificial Intelligence
3	**Any prerequisite**	Algorithm and Data Structures
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Ritu Tiwari
6	**Will this course require visiting**	
7	**Learning Objectives of the subject (in about 50 words)**	There are many cognitive tasks that people can do easily and almost unconsciously but that have proven extremely difficult to program on a computer.Artificial intelligence involves the development of compute r systems that can carry out these tasks.We will focus on three central areas in AI: Problem Solving & Game Playing, representation and reasoning, natural language processing,
8	**Brief Contents (module wise)**	**Introduction to AI and intelligent agents**. **Problem Solving:** Solving Problems by Searching, heuristic search techniques, constraint satisfaction problems, stochastic search methods. **State Space Search:** Depth First Search, Breadth First Search **Heuristic Search:** Best First Search, Hill Climbing **Finding Optimal Paths:** Branch and Bound, A*, IDA* **Game Playing**: minimax, alpha-beta pruning. **Knowledge and Reasoning**: Building a Knowledge Base: Propositional logic, first order logic, situation calculus. Theorem Proving in First Order Logic.Planning, partial order planning. Uncertain Knowledge and Reasoning, Probabilities, Bayesian Networks. **Learning**: Overview of different forms of learning, Learning Decision Trees, Artificial Neural Networks and Fuzzy Approaches. **Introduction to Natural Language Processing.**
9	**Contents for lab (If applicable)**	1. Write a program to implement Tic-Tac-Toe game problem 2. Write a program to implement BFS (for 8 puzzle problem or Water Jug problem or any AI search problem) 3. Write a program to implement DFS (for 8puzzle problem or Water Jug problem or any AI search problem) 4. Write a program to implement Single Player Game (Using Heuristic Function). 5. Write a program to Implement A* Algorithm. 6. Write a program to solve N-Queens problem. 7. Write a program for tower of Hanoi problem. 8. Write a program to solve travelling salesman problem. 9. Write a program that will take as input two Web page URLs and find a path of links from one to the other. What is an appropriate search strategy? 10. Implement a performance-measuring environment simulator for the vacuum-cleaner World. Your implementation should be modular so that the sensors, actuators, and environment characteristics (size, shape, dirt placement, etc.) can be changed easily. 11. Implement a simple reflex agent for the vacuum environment in above experiment. Run the environment with this agent for all

		possible initial dirt configurations and agent locations.Record the performance score for each configuration and the overall average score.
10	**List of text books/references**	**Text Books:** 1. S. Russell and P. Norvig, Artificial Intelligence: A Modern Approach, 2nd Ed, Prentice Hall, 2003 2. Elaine Rich and Kevin Knight. Artificial Intelligence, Tata McGraw Hill **Reference Books:** 1. Patrick Henary Winston, Artificial Intelligence, Pearson publication 2. Deepak Khemani. A First Course in Artificial Intelligence, McGraw Hill Education (India) 3. Eugene Charnaik and Drew McDermott, Introduction to Artificial Intelligence, Pearson publication 4. Nils John Nilsson, The Quest for Artificial Intelligence: A History of Ideas and Achievements, Morgan Kaufman Publication 5. Dennis Rothman, Artificial Intelligence by Example,

1	**Code of the subject**	IMIT-2205
2	**Title of the subject**	Operating Systems
3	**Any prerequisite**	Computer Organization; Data Structures and Computer Programming
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Prof. Shashikala Tapaswi
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	The course aims to explore the importance of the operating system and its function. The different techniques of the operating system to achieve its goals as resource manager. Application interaction with the operating system and the operating systems interaction with the machine. Also, the course throws light on the existing operating systems and the concepts of Operating Systems are applied in these systems. Introduction and history of Operating systems, structure and operations; processes and files; Processor management: inter process communication, process scheduling and algorithms, critical sections, threads, multithreading; Memory management: contiguous memory allocation, virtual memory, paging, page table structure, demand paging, page replacement policies, thrashing, segmentation, case study; Deadlock: Shared resources, resource allocation and scheduling, resource graph models, deadlock detection, deadlock avoidance, deadlock prevention algorithms, mutual exclusion, semaphores, wait and signal procedures; Device management: devices and their characteristics, device drivers, device handling, disk scheduling algorithms and policies, File management: file concept, types and structures, directory structure, cases studies, access methods and matrices, file security, user authentication; UNIX operating system as a case study. By the end of this course the student will be able to understand: 1. The importance of the operating systems. 2. The application interaction with the operating system as it works as intermediary program between the machine and the application. 3. The way operating systems transport the application requests to the hardware. 4. The way operating systems managing resources such as processors, memory and I/O. 5. The advantages and drawbacks of the different techniques used by some operating systems.
8	**Brief Contents (module wise)**	Topics to be covered: Introduction and history of Operating systems:- structure and operations; processes and files; Computer system organization (Computer Hardware) consists of : Device, Device controller, Interrupt, Device and CPU interaction, Bootstrap program I/O structure:- Polling, interrupt, and DMA, resolve interrupt through interrupt vector, Computer System Architecture, Single Processor System, Multiple Processors System, advantages of using multiple processor system, Operating System Structure and Operations, Dual Modes operation, Timer, Process management, Storage management Processes **:-** Processor management: inter process communication, mutual exclusion, semaphores, wait and signal procedures, process scheduling and algorithms, critical sections, threads, multithreading; Process concept, PCB, Process state, Process scheduling (long, medium and short term schedulers), Process operations, Interprocess

		communication , Techniques of Intercrosses communication, Message passing, Shared memory, Client server CPU scheduling :- Preemptive and non-preemptive scheduling, scheduling criteria, algorithms: FCFS, SJF + Prediction of next burst of SJF, Priority Scheduling, Round Robin, Multilevel Queues, Multilevel feedback. Process Synchronization : Introduction and background, Critical section (C.S.) problem, Condition for the solutions of C.S., Algorithms: Peterson, Hardware solutions, Semaphores, Monitors Main Memory Management:- Memory management: contiguous memory allocation, Basic Hardware for managing Memory, Address binding, Contiguous allocation (based on fixed and variable partitions), Relocation and protection problems, Fragmentation, Non-contiguous allocation. Virtual memory, paging, paging + hardware support page table structure, demand paging, page replacement policies, thrashing, Segmentation, Paging with Segmentation. Deadlock:- Shared resources, resource allocation and scheduling, resource graph models, deadlock detection, deadlock avoidance, deadlock prevention algorithms Device management:- devices and their characteristics, device drivers, device handling, disk scheduling algorithms and policies File management:- file concept, types and structures, directory structure, cases studies, access methods and matrices, file security, user authentication; File Systems:- File system structure, Implementation, Partition and mounting, Allocation methods: Contiguous, Linked, Indexed Free space Management: Bit vector, Linked list Case Studies:- UNIX and Linux operating systems as case studies; Mobile OS
9	**Contents for lab (If applicable)**	-
10	**List of text books/references**	***References:*** 1. A. Silberschatz & P.B. Galvin, 'Operating System concepts and principles', Wiley India, 8th ed., 2009. 2. A. Tanenbaum, 'Modern Operating Systems', Prentice Hall India, 2003. 3. W. Stallings, 'Operating Systems: Internals and design Principles', Pearson Ed., LPE, 6th Ed., 2009. 4. M.J. Bach, 'Design of Unix Operating system', Prentice Hall, 1986. ***Additional Reading:*** 1. D.M. Dhamdere, 'Operating Systems: a concept based approach', Tata McGraw-Hill Pubs., 2nd ed., 2006. 2. G. Glass, 'Unix for programmers and users-a complete guide', Pearson Ed., 3rd ed., 2005.

1	**Code of the subject**	IMIT-2206
2	**Title of the subject**	Design and Analysis of Algorithms Lab
3	**Any prerequisite**	Data Structure, and C/C++ programming
4	**L-T-P**	0-0-2
5	**Name of the proposer**	Prof. K. V. Arya
6	**Will this course require visiting**	NO
7	**Learning Objectives of the subject (in about 50 words)**	Learn about implementation of various data structures, Use of data Structure in implementing the algorithms and compute the running time of the algorithm using the inbuilt compiler commands
8	**Brief Contents (module wise)**	Module-I: Basic data structures Module-II: Advanced data structures Module-III: Solving problems using Divide-and-conquer, Dynamic Programming Module-IV: Solving problems using Greedy approach and backtracking Module-V: Solving graph problems
9	**Contents for lab (If applicable)**	NA
10	**List of text books/references**	**1.** M. A. Weiss, Data structures and Algorithm Analysis in C++, Pearson Education 2. Kurt Mehlhorn, Algorithms and Data Structures: The Basic Toolbox, Springer

1	**Code of the subject**	IMIT-2207
2	**Title of the subject**	Operating Systems Lab
3	**Any prerequisite**	Computer Organization and Architecture; Data Structure;
4	**L-T-P**	0-0-2
5	**Name of the proposer**	Prof. Shashikala Tapaswi
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	**The lab sessions aim to make student to develop :** 1. Ability to develop application programs using system calls in Linux/Unix. 2. Ability to implement interprocess communication between two processes. 3. Ability to design and solve synchronization problems. 4. Ability to simulate and implement operating system concepts such as scheduling, deadlock management, file management, and memory management.
8	**Brief Contents (module wise)**	**Use Linux operating system and GNU C compiler.** 1. To write programs in Linux environment using system calls. 2. To understand basics of Linux/Unix commands; Shell Programming. 3. To write C programs to simulate the following File organization techniques: a) Single level directory b) Two level c) Hierarchical. 4. To implement the scheduling algorithms such as FCFS, Round Robin, SJF, Priority. 5. To implement file allocation methods: a)Contiguous b)Linked c)Indexed 6. To implement an algorithm for Dead Lock Detection , Bankers algorithm for Dead Lock Avoidance 7. To implement paging /segmentation/page replacement algorithms 8. To implement concepts of Threading 9. To implement and develop solutions for synchronization problems using semaphores etc 10. To understand and implement IPC mechanism using named and unnamed pipes.
9	**Contents for lab (If applicable)**	Mentioned at point 9
10	**List of text books/references**	**REFERENCE BOOKS:** 1. An Introduction to Operating Systems, P.C.P Bhatt, 2nd edition, PHI. 2. Unix System Programming Using C++, Terrence Chan, PHI/Pearson. 3. Modern Operating Systems, Andrew S Tanenbaum, 3rd Edition, PHI

1	**Code of the subject**	IMIT-2208
2	**Title of the subject**	Artificial Intelligence Programming Lab
3	**Any prerequisite**	Algorithm and Data Structures
4	**L-T-P**	0-0-2
5	**Name of the proposer**	Dr. Ritu Tiwari
6	**Will this course require visiting**	NA
7	**Learning Objectives of the subject (in about 50 words)**	There are many cognitive tasks that people can do easily and almost unconsciously but that have proven extremely difficult to program on a computer. Artificial intelligence involves the development of compute r systems that can carry out these tasks. We will focus on three central areas in AI: Problem Solving & Game Playing, representation and reasoning, natural language processing,
8	**Contents for lab (If applicable)**	1. Write a program to implement Tic-Tac-Toe game problem 2. Write a program to implement BFS (for 8 puzzle problem or Water Jug problem or any AI search problem) 3. Write a program to implement DFS (for 8puzzle problem or Water Jug problem or any AI search problem) 4. Write a program to implement Single Player Game (Using Heuristic Function). 5. Write a program to Implement A* Algorithm. 6. Write a program to solve N-Queens problem. 7. Write a program for tower of Hanoi problem. 8. Write a program to solve travelling salesman problem. 9. Write a program that will take as input two Web page URLs and find a path of links from one to the other. What is an appropriate search strategy? 10. Implement a performance-measuring environment simulator for the vacuum-cleaner World. Your implementation should be modular so that the sensors, actuators, and environment characteristics (size, shape, dirt placement, etc.) can be changed easily. 11. Implement a simple reflex agent for the vacuum environment in above experiment. Run the environment with this agent for all possible initial dirt configurations and agent locations.Record the performance score for each configuration and the overall average score.
9	**List of text books/references**	**Text Books:** 1. S. Russell and P. Norvig, Artificial Intelligence: A Modern Approach, 2nd Ed, Prentice Hall, 2003 2. Elaine Rich and Kevin Knight. Artificial Intelligence, Tata McGraw Hill **Reference Books:** 1. Patrick Henary Winston, Artificial Intelligence, Pearson publication 2. Deepak Khemani. A First Course in Artificial Intelligence, McGraw Hill Education (India) 3. Eugene Charnaik and Drew McDermott, Introduction to Artificial Intelligence, Pearson publication 4. Nils John Nilsson, The Quest for Artificial Intelligence: A History of Ideas and Achievements, Morgan Kaufman Publication 5. Dennis Rothman, Artificial Intelligence by Example

1	**Code of the subject**	IMIT-2209
2	**Title of the subject**	Software Engineering Lab
3	**Any prerequisite**	NIL
4	**L-T-P**	0-0-2
5	**Name of the proposer**	Dr Ajay Kumar
6	**Will this course require visiting**	NO
7	**Learning Objectives of the subject (in about 50 words)**	➢ To impart software engineering concepts.
8	**Brief Contents (module wise)**	a) Student Result Management System b) Library management system c) Inventory control system d) Accounting system e) Fast food billing system f) Bank loan system g) Blood bank system h) Railway reservation system i) Automatic teller machine j) Video library management system k) Hotel management system l) Hostel management system m) E-ticking n) Share online trading o) Hostel management system p) Resource management system q) Court case management system
9	**Contents for lab (If applicable)**	Written above
10	**List of text books/references**	1. Pham, Hoang. System software reliability. Springer Science & Business Media, 2007. 2. Jalote Pankaj, An Integrated Approach to Software Engineering, Narosa Publishing House 3. Pressman, Roger S., Software Engineering : A practitioner's Approach, McGraw-Hill, Inc.

1	**Code of the subject**	IMIT-2999
2	**Title of the subject**	Internship
3	**Any prerequisite**	-
4	**L-T-P**	3
5	**Name of the proposer**	Dr. Yash Daultani
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	➢ To develop an understanding of AI simulation tools and techniques ➢ To acquaint the students with business process modeling ➢ To explore the recent trends in the AI simulation
8	**Brief Contents (module wise)**	Module 1: Introduction to AI simulation tools and techniques Module 2: MATLAB, introduction and applications Module 3: Spreadsheet modeling, introduction and applications Module 4: SPSS, introduction and applications
9	**Contents for lab (If applicable)**	Simulation exercises
10	**List of text books/references**	1. MATLAB Programming for Engineers, 4th Edition by Stephen J. Chapman (Cengage) 2. Spreadsheet Modeling & Decision Analysis: A Practical Introduction to Management Science, 6th Edition by Ragsdale 3. Artificial Intelligence 3e: A Modern Approach by Russell (Pearson)

Semester-V

1	**Code of the subject**	IMIT-3101
2	**Title of the subject**	Embedded System Design
3	**Any prerequisite**	Fundamentals of Microelectronic devices and circuits, Digital Electronics, and Microprocessor
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Prof. Manisha Pattanaik
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	The course will provide adequate understanding of embedded system, the basic understanding for 8051 microcontroller and Interfacing with peripheral for real time applications. After completing this course, students will have a broad and fundamental understanding of Embedded System. Topics range from an overview of basics of Embedded System to design and development of Real Time Embedded System
8	**Brief Contents (module wise)**	An introduction to hardware software co design of embedded computer systems. Structured programming techniques for high and low level programs. Hardware interfacing strategies for sensors, actuators and displays. Detailed study of Intel and Motorola based microcomputers as applied to embedded system development. Micro controller based design of a system, Real time control using micro controllers. Interfacing with peripheral devices, Peripheral Controllers, Bus concepts, Bus Standards, Introduction to Co-processors, DSP Processors, Graphic Processors and their applications and ARM Processor's introduction. Hardware and simulation laboratory exercises with various application development boards.
9	**Contents for lab (If applicable)**	NIL
10	**List of text books/references**	Embedded System Design: A Unified Hardware/Software Approach by Frank Vahid and Tony Givargis, John Wiley & Sons. Embedded Systems Architecture Programming and Design by Raj Kamal, Second Edition, Tata MC Graw-Hill, 2008. Designing Embedded Systems with PIC Microcontrollers: principles and applications by Tim Wilmshurst, Elsevier, 2005. Embedded Systems Design by Steve Heath, Second Edition, Newnes, 2002.

1	**Code of the subject**	IMIT-3102
2	**Title of the subject**	Computer Graphics
3	**Any prerequisite**	
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Prof. Mahua Bhattacharya
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	Computer Graphics is the illustration field of Computer Science. Its use today spans virtually all scientific fields and is utilized for design, presentation, education and training. Computer Graphics and its derivative, *visualization*, have become the primary tools by which the flood of information from Computational Science is analyzed.
8	**Brief Contents (module wise)**	I. Introduction of computer graphics, Graphic Displays- Random scan displays, Raster scan displays, Points and lines, Line drawing algorithms, Circle generating algorithms, Mid-point circle generating algorithm, and parallel version of these algorithms. II. Three Dimensional: 3-D Geometric Primitives, 3-D Object representation, 3-D Transformation, 3-D viewing, projections, 3-D Clipping. III. Transformations: Basic transformation, Matrix representations and homogenous coordinates, Composite transformations, IV. Windowing and Clipping: Viewing pipeline, Viewing transformations, 2-D Clipping algorithms- Cohen Sutherland line clipping algorithm, Liang Barsky algorithm, Line clipping against non-rectangular clip windows; Weiler and Atherton polygon clipping, Curve clipping, Text clipping V. Hidden Lines and Surfaces: Back Face Detection algorithm, Depth buffer method
9	**Contents for lab (If applicable)**	Graphic Displays, viewing, projections, 3-D Clipping. : Basic transformation, Matrix representations and homogenous coordinates, Composite transformations , 2-D Clipping algorithms- Cohen Sutherland line clipping algorithm
10	**List of text books/references**	1. Computer Graphics, C Version Donald D Hearn, M. Pauline Baker 2. Computer Graphics: Principles and Practice by James D. Foley, Andries van Dam , Steven K. Feiner

1	**Code of the subject**	MBMG-7104/ ITHS-2202/ IMAS-3101/ IMHS-3101
2	**Title of the subject**	Business Analytics
3	**Any prerequisite**	Basic knowledge of business statistics
4	**L-T-P**	L-T-P
5	**Name of the proposer**	Prof. Naval Bajpai
6	**Will this course require visiting**	No
7	**Learning Objectives of the subject (in about 50 words)**	➢ To identify, evaluate, and capture business analytical opportunities that create value. ➢ To understand about analytical methods and techniques ➢ To understand about how to use data to develop insights and make decisions for a business projects
8	**Brief Contents (module wise)**	**Module I: Foundations of Business Analytics** Introduction to business analytics, analytics on spreadsheets **Module II: Descriptive Analytics** Visualizing and exploring data, descriptive statistical measures, probability distributions and data modelling, sampling and estimation, statistical inference **Module III: Predictive Analytics** Trendlines and regression analysis, forecasting techniques, introduction to data mining, Spreadsheet modelling and analysis, Monte Carlo simulation and risk analysis **Module IV: Prescriptive Analytics** Linear optimization, applications of linear optimization, integer optimization, decision analysis
9	**Contents for lab (If applicable)**	**Module I: Descriptive Analytics** Visualizing and exploring data, descriptive statistical measures, probability distributions and data modelling, sampling and estimation, statistical inference **Module II: Predictive Analytics** Trendlines and regression analysis, forecasting techniques, introduction to data mining, Spreadsheet modelling and analysis, monte carlo simulation and risk analysis **Module III: Prescriptive Analytics** Linear optimization, applications of linear optimization, integer optimization, decision analysis
10	**List of text books/references**	1. Evans, J. R., Business Analytics: Methods, models and decisions, 2nd ed. Pearson education 2. Laursen, G. H. N., & Thorlund, J, Business Analytics for managers: Taking business intelligence beyond reporting, Wiley & SAS Business Series 3. Albright, S. C., & Winston, W. L. (2015). Business Analytics: Data Analytics and Decision Making, Cengage learning

1	**Code of the subject**	IMIT-3103
2	**Title of the subject**	Information System Security
3	**Any prerequisite**	Computer Architecture, C/C++ Programming, Operating Systems Concepts, Computer Networks
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Saumya Bhadauria
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	• This course provides a deep and comprehensive study of the security principles and practices of information systems. • To understand what the foundational theory is behind computer security and what are the common threats
8	**Brief Contents (module wise)**	Module I: Overview of Information Security: confidentiality, integrity, and availability, User authentication, Information Security for Server Systems, Information Security for Client devices Module II: Understanding the Threats: Malicious software (Viruses, trojans, rootkits, worms, botnets), Memory exploits (buffer overflow, heap overflow, integer overflow, format string) Module III: Network Security: Network Intrusion detection and prevention systems, Firewalls, DNS security issues and defences, TLS/SSL, Internet Security Protocols and Standards Module IV: Information Security and Cryptography, Mathematics of Cryptography, Ciphers: Substitution and Transposition, Symmetric Encryption and Message Confidentiality, Integrity of Data, Hash Function, Digital Signature Module V: Presentation and Discussion
9	**Contents for lab (If applicable)**	NIL
10	**List of text books/references**	• William Stallings and Lawrie Brown. 2014. *Computer Security: Principles and Practice* (3rd ed.). Prentice Hall Press, Upper Saddle River, NJ, USA. • Behrouz A. Forouzan. 2007. *Cryptography &Amp; Network Security* (1 ed.). McGraw-Hill, Inc., New York, NY, USA. • M. Stamp, “Information Security: Principles and Practice,” 2st Edition, Wiley, ISBN: 0470626399, 2011. • M. E. Whitman and H. J. Mattord, “Principles of Information Security,” 4st Edition, Course Technology, ISBN: 1111138214, 2011.

1	**Code of the subject**	IMIT-3104
2	**Title of the subject**	Signals & Systems
3	**Any prerequisite**	NA
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Prasenjit Chanak
6	**Will this course require visiting faculty**	NA
7	**Learning Objectives of the subject (in about 50 words)**	This course is suitable for all UG/PG students and practicing engineers/ managers who are looking to build a solid grasp of the fundamental concepts of signals and systems.
8	**Brief Contents (module wise)**	Introduction to Signals, Signal Classification, Continuous Discrete Time Signals; Definition and Classification of Systems, Linear Time Invariant (LTI) Systems; Properties of LTI Systems, Impulse Response, Convolution, Causality, Stability; Impulse Response of Discrete Time Systems, Discrete Time Convolution, Difference Equations and Analysis; Laplace Transform, Properties of Laplace Transform, Inverse Laplace Transform; Introduction to z-Transform, Properties of z-Transform, Region of Convergence, Inverse z- Transform; Introduction to Fourier Analysis, Fourier Series for Periodic Signals, Properties of Fourier Series; Introduction to Fourier Transform, Properties of Fourier Transform, Frequency Response of Continuous Time Systems, Examples of Frequency Response; Fourier Analysis of Discrete Signals, Discrete Time Fourier Transform (DTFT), Properties of DTFT, Examples of DTFT; Frequency Response of Discrete Time Systems, Discrete Fourier Transform (DFT), Properties of DFT, Examples of DFT; - IIR FIR Filters, Direct Form Realization, Cascade and Parallel Form Realization, Problem Solving; Concept of State, State Space Analysis, State Space Representation of Continuous Time Systems, Solution of State Equations for Continuous Systems
9	**Contents for lab (If applicable)**	NA
10	**List of text books/references**	1. A.V. Oppenheim, A.S. Willsky and I.T. Young, "Signals and Systems", Prentice Hall, 1983. 2. R.F. Ziemer, W.H. Tranter and D.R. Fannin, "Signals and Systems - Continuous and Discrete", 4th edition, Prentice Hall, 1998. 3. A. Papoulis, "Circuits and Systems: A Modern Approach", HRW, 1980. 4. B.P. Lathi, "Signal Processing and Linear Systems", Oxford University Press, c1998. 5. Douglas K. Lindner, "Introduction to Signals and Systems", Mc-Graw Hill International Edition: c1999. 6. Simon Haykin, Barry van Veen, "Signals and Systems", John Wiley and Sons (Asia) Private Limited, c1998. 7. Robert A. Gabel, Richard A. Roberts, "Signals and Linear Systems", John Wiley and Sons (SEA) Private Limited, c1995. 8. M. J. Roberts, "Signals and Systems - Analysis using Transform methods and MATLAB", Tata Mc Graw Hill Edition, 2003. 9. I. J. Nagrath, S. N. Sharan, R. Ranjan, S. Kumar, "Signals and Systems", Tata Mc Graw Hill Publishing Company Ltd., New Delhi, 2001.

1	**Code of the subject**	ITIT-3107
2	**Title of the subject**	Computer Graphics Lab
3	**Any prerequisite**	N/A
4	**L-T-P**	0-0-2
5	**Name of the proposer**	Prof. Mahua Bhattacharya
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	• Understand the need of developing graphics application. • Learn algorithmic development of graphics primitives like: line, circle, polygon etc. • Learn the representation and transformation of graphical images and pictures.
8	**Brief Contents (module wise)**	1. Digital Differential Analyzer Algorithm. 2. Bresenham's Line Drawing Algorithm. 3. Midpoint Circle Generation Algorithm. 4. Ellipse Generation Algorithm. 5. Creating various types of texts and fonts. 6. Creating two dimensional objects. 7. Two Dimensional Transformations. 8. Coloring the Pictures. 9. Three Dimensional Transformations. 10. Curve Generation. 11. Simple Animations using transformations. 12. Key Frame Animation.
9	**Contents for lab (If applicable)**	N/A
10	**List of text books/references**	1. "Computer Graphics", Udit Agarwal, *Katson Books*. 2. "Essential Computer Graphics Techniques for Modeling, Animating, and Rendering Biomolecules and Cells: A Guide for the Scientist and Artist", Giorgio Luciano, *CRC Press*.

1	**Code of the subject**	IMIT-3106
2	**Title of the subject**	Embedded System Design Lab
3	**Any prerequisite**	NIL
4	**L-T-P**	0-0-2
5	**Name of the proposer**	Prof. Manisha Pattanaik
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	The course will provide hands-on exposure and the students will explore different aspects of Real time Embedded System through simulations experiments.
8	**Brief Contents (module wise)**	8051 Assembly language programming, I/O port programming, Arithmetic and logic instructions and programs, 8051 programming in C, 8051 Hardware connection and Hex File, 8051 Timer/ counter programming in Assembly and C, Serial port programming in Assembly and C, Interrupts programming in Assembly and C, 8051 Interfacing to external Memory, 8051 Real world interfacing: LCD, ADC and Sensors, and LCD and Keyboard Interfacing. **Few List of Experiments are listed below:** Digital FIR filter design and simulation Fixed point Implementation of Digital FIR Filter Interfacing of ADC and data transfer ADC triggering through timer(On Chip Timer) Interrupt driven data transfer from ADC Implementation of Digital FIR Filter on 8051 Microcontroller LCD - MCU interfacing and displaying a string Keyboard-MCU interfacing take a input from keypad and display on LCD Stepper Motor Control Using Microcontroller Interface a LED matrix and display a number on the matrix. Interfacing 4x4 switch matrix with the microcontroller Serial Communication between micro controller and PC
9	**Contents for lab (If applicable)**	NIL
10	**List of text books/references**	The 8051 Microcontroller and Embedded Systems using Assembly and C, M. Ali Mazidi, J G Mazidi, and Rolin D. Mckinlay, Second Edition, Prentice Hall. Embedded System Design: A Unified Hardware/Software Approach, Frank Vahid and Tony Givargis, John Wiley & Sons. Designing Embedded Systems with PIC Microcontrollers: principles and applications, Tim Wilmshurst, Elsevier, 2005. Embedded Systems Design, Steve Heath, Second Edition, Newnes, 2002.

Semester-VI

1	**Code of the subject**	ITIT-3201/BCCS-3203/ IMIT-3201
2	**Title of the subject**	Cloud Computing
3	**Any prerequisite**	No
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Neetesh Kumar
6	**Will this course require visiting faculty**	Yes/No
7	**Learning Objectives of the subject (in about 50 words)**	Cloud computing is a scalable services consumption and delivery platform that provides on-demand computing service for shared pool of resources, namely servers, storage, networking, software, database, applications etc., over the Internet. It is a model for enabling ubiquitous, on-demand access to a shared pool of configurable computing resources, which can be rapidly provisioned and released with minimal management effort. This course will introduce various aspects of cloud computing, including fundamentals, management issues, security challenges and future research trends. This will help students (both UG and PG levels) and researchers to use and explore the cloud computing platforms.
8	**Brief Contents (module wise)**	Module I: Introduction to Cloud Computing Module II: Introduction to Parallel and Distributed Computing Module III: Cloud Computing Architecture Module IV: Service Management in Cloud Computing Module V: Data Management in Cloud Computing Module VI: Virtualization & Resource Management in Cloud Module VII: Cloud Security Module VIII: Open Source and Commercial Clouds, Cloud Simulator Module IX: Research trend in Cloud Computing, Fog Computing
9	**Contents for lab (If applicable)**	NIL
10	**List of text books/references**	1. Cloud Computing: Principles and Paradigms, Editors: Rajkumar Buyya, James Broberg, Andrzej M. Goscinski, Wiley,2011 2. Enterprise Cloud Computing - Technology, Architecture, Applications, Gautam Shroff, Cambridge University Press, 2010 3. Cloud Computing Bible, Barrie Sosinsky, Wiley-India, 2010 4. Cloud Security: A Comprehensive Guide to Secure Cloud Computing, Ronald L. Krutz, Russell Dean Vines, Wiley- India,2010 5. Mastering in Cloud Computing, Editors: Rajkumar Buyya et. al.

1	**Code of the subject**	ITIT-3202/IMIT-3202
2	**Title of the subject**	Wireless Communication Technologies
3	**Any prerequisite**	Student should have basic knowledge of communication/data communication.
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Prof. Aditya Trivedi
6	**Will this course require visiting**	NO.
7	**Learning Objectives of the subject (in about 50 words)**	This course introduces the concepts of wireless / mobile communication using cellular technologies. It helps students to know about the various modulation techniques, propagation methods, multi access techniques used in the mobile communication. It provides detail idea about path loss and shadow fading and how to solve such problems and also various types of diversity and their outage probability.
8	**Brief Contents (module wise)**	**I. Fundamentals of Communication:** Fundamentals of Wireless Communication, Advantages, Limitations and Applications, Multiple access technique: TDMA, CDMA, FDMA, CSMA, OFDMA, Frequency spectrum. **II. Wireless Technology:** The cellular concepts: Frequency Reuse, Channel assignment strategies, Handoff strategies Interference and System Capacity, Evolution of cellular networks 1G, 2G, 3G, 4G ,GSM and CDMA System Architecture. **III. Path Loss and Shadowing:** Transmit and Receive Signal Models, Free-Space Path Loss, Fading channels, Shadow fading, Outage Probability under Path Loss and Shadowing, Cell Coverage Area. **IV. Diversity:** Receiver Diversity, Transmitter Diversity, Multi-antenna Maximal Ratio Combiner, BER with Diversity, Spatial Diversity and Diversity Order. **V. Wireless local area networks (WLAN):** Introduction, WLAN Equipment, WLAN topologies and Technologies, IEEE 802.11 WLAN : Architecture, Physical Layer, Data Link Layer and MAC Layer.
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1. Andrea Goldsmith, "Wireless communication", Cambridge University Press, 2005. 2. Roy Blake, "Wireless communication technologies", Leo Chartland, Delmar Cengage Learning, 1st edition, 2000. 3. Modern Wireless Communications by Simon O. Haykin and Michael Moher, Pearson, 1st edition (March 4, 2004)

1	**Code of the subject**	IMAS-3201
2	**Title of the subject**	Modeling and Simulation
3	**Any prerequisite**	Engineering Mathematics and Probability & Statistics
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr Ajay Kumar
6	**Will this course require visiting**	NO
7	**Learning Objectives of the subject (in about 50 words)**	➢ To teach the application of mathematics and statistics in real life problems.
8	**Brief Contents (module wise)**	Introduction: Concept of a system, System Environment, Modeling and Simulation of Real world problems, Classification of Models and examples, Static and Dynamic models, Principles used in modeling System Studies: Subsystems, A Corporate models, Block diagram of modeling and simulation, System Analysis, System Design Mathematical Models: Mathematical models in population dynamics, Epidemic Models, some mathematical modeling in Biology and Medicine Innovation diffusion models in marketing System Simulation: The technique of simulation, the Monte Carlo Method, Types of system simulation, Continuous and Discrete time Simulation, Probability Concepts in Simulation: Stochastic variables, Discrete and continuous probability distributions, Measures of probability functions, Random numbers generation, Stochastic Processes: Poisson Process, Markov Process, Queuing Theory, Reliability. Linear programming in Simulation: Introduction, Transportation problem, Assignment problem and other simulation techniques in Operation research. Software in System Simulation: Numerical computation technique for continuous and discrete models (MATLAB)
9	**Contents for lab (If applicable)**	Given separately.
10	**List of text books/references**	1. Banks, J., Carson, I. I., Nelson, B. L., & Nicol, D. M. (2005). Discrete-event system simulation. Pearson. 2. Kishor S Trivedi, Probability & Statistics With Reliability, Queuing And Computer Science Applications, 2nd Ed, Wiley. 3. Geoffrey Gordon, System Simulation, Prentice-Hall.

1	**Code of the subject**	IMMG-3201
2	**Title of the subject**	Mini Project (Business Policy Design & Analysis)
3	**Any prerequisite**	Statistics and Mathematics
4	**L-T-P**	0-0-4 (2 credit course)
5	**Name of the proposer**	Dr. W. Wilfred Godfrey
6	**Will this course require visiting**	NO
7	**Learning Objectives of the subject (in about 50 words)**	➢ Systems Thinking and Business Dynamics : Learn the relevance of taking a wider system perspective in examining challenges and understand why decisions and responses change naturally over time and learn to examine the possible impacts of policy changes and technological innovations on business environment ➢ Tools for System Dynamics Modeling : Develop skills in the use of simple mapping and spreadsheets to elicit mental models of system structures, and be able to anticipate from their structures, the dynamic behavior of simple closed-loop systems and learn quantitative approaches for simulation business policy ➢ Simulating Complex Business Systems : Be able to model and simulate multi-looped systems by using system dynamics software and simulate possible future scenarios of real-world business, government, community and global challenges and learn modeling software such as VensimPLE.
8	**Brief Contents (module wise)**	Introduction of System thinking approach Principles of Dynamic Modelling and Sustainable Policy Design System Dynamics Tools Part 1: Building a model with causal loop diagrams System Dynamics Tools Part 2: Mapping the stock and flow structure of systems linking with feedback Result analysis of System Dynamics Modeling Growth Strategies: Network externalities, complementarities, and path dependence Model Validation and Verification approaches Policy Design and Experimentation
9	**Contents for lab (If applicable)**	lectures (both live and video), computer modeling assignments, in-class 'thought experiments', and case studies requiring a model-based policy analysis, an interactive learning environment, and a presentation
10	**List of text books/references**	

1	**Code of the subject**	IMAS-3202
2	**Title of the subject**	Modeling and Simulation Lab
3	**Any prerequisite**	Basic knowledge of Mathematics, statistics, excel
4	**L-T-P**	0-0-2
5	**Name of the proposer**	Dr Ajay Kumar
6	**Will this course require visiting**	NO
7	**Learning Objectives of the subject (in about 50 words)**	➢ To teach the applications of mathematics and statistics
8	**Brief Contents (module wise)**	Monte Carlo simulation a) Finding value of pi b) Area under the curve c) Double integration d) Multiple integration e) Area of irregular shaped body Discrete Event simulation a) Tossing a coin/dice simulation b) Singer server queue c) Multiple server queues d) Inventory problems Other Tools a) Computer Generation of Random Numbers b) Testing Random Number Generators c) Fitting a statistical distribution d) Chi-square goodness-of-fit test e) One-sample Kolmogorov-Smirnov test f) Test for Standard Normal Distribution
9	**Contents for lab (If applicable)**	Written above
10	**List of text books/references**	1. Banks, J., Carson, I. I., Nelson, B. L., & Nicol, D. M. (2005). Discrete-event system simulation. Pearson. 2. Kishor S Trivedi, Probability & Statistics with Reliability, Queuing and Computer Science Applications, 2nd Ed, Wiley. 3. Geoffrey Gordon, System Simulation, Prentice-Hall.

1	**Code of the subject**	ITIT-3204/ BCCS-3205/ IMIT-3203
2	**Title of the subject**	Cloud Computing Lab
3	**Any prerequisite**	No
4	**L-T-P**	0-0-2
5	**Name of the proposer**	Dr. Neetesh Kumar
6	**Will this course require visiting faculty**	Yes/No
7	**Learning Objectives of the subject (in about 50 words)**	Cloud computing is a scalable services consumption and delivery platform that provides on-demand computing service for shared pool of resources, namely servers, storage, networking, software, database, applications etc., over the Internet. It is a model for enabling ubiquitous, on-demand access to a shared pool of configurable computing resources, which can be rapidly provisioned and released with minimal management effort. This course will introduce various aspects of cloud computing, including fundamentals, management issues, security challenges and future research trends. This will help students (both UG and PG levels) and researchers to use and explore the cloud computing platforms.
8	**Brief Contents (module wise)**	Module I: A Case Study on Amazon EC2 Module II: A Case Study on Google Cloud Module III: A Case Study on Microsoft Assure Module IV: A Case Study on IBM Cloud Module V: A Case Study on Open Source CLoudSim Simulator and Hands on Module VI: A Case Study on Open Source FogSim Simulator and Hands on Module VII: A Case Study on Commercial Cloud Aneka. Module VIII: A Case Study on Current/emerging Research Topics
9	**Contents for lab (If applicable)**	NI
10	**List of text books/references**	1. Cloud Computing: Principles and Paradigms, Editors: Rajkumar Buyya, James Broberg, Andrzej M. Goscinski, Wiley,2011 2. Enterprise Cloud Computing - Technology, Architecture, Applications, Gautam Shroff, Cambridge University Press, 2010 3. Cloud Computing Bible, Barrie Sosinsky, Wiley-India, 2010 4. Cloud Security: A Comprehensive Guide to Secure Cloud Computing, Ronald L. Krutz, Russell Dean Vines, Wiley- India,2010 5. Mastering in Cloud Computing, Editors: Rajkumar Buyya et. al.

1	**Code of the subject**	ITIT-3205/ IMIT-3204
2	**Title of the subject**	Wireless Communication Technologies Lab
3	**Any prerequisite**	
4	**L-T-P**	0-0-2
5	**Name of the proposer**	Prof. Aditya Trivedi
6	**Will this course require visiting**	No
7	**Learning Objectives of the subject (in about 50 words)**	In this lab students will learn how to generate signals for different modulation techniques through computer experiments.
8	**Brief Contents (module wise)**	To perform amplitude modulation, Frequency modulation, phase modulation and also perform ASK, FSK and PSK in Sci-Lab. To plot CDF of Rayleigh distribution with histogram and to study about Walsh code generator.
9	**Contents for lab (If applicable)**	I. Amplitude modulation. II. Frequency and phase modulation. III. ASK FSK and PSK. IV. Plot the CDF of Rayleigh and racial with histogram. V. Determine spectrum efficiency, frame efficiency, number of channels per frame in a TDMA system. VI. Write the Sci-lab code for the encoder of (n,k) cylic hamming code. VII. Design a cellular network with 3 base stations and 10 users using Poisson point process. VIII. Channel capacity of Rayleigh fading channel. IX. Adaptive equalization using LMS filter. X. Walsh code generation and spreading and dispreading using Walsh code.
10	**List of text books/references**	1. Andrea Goldsmith, "Wireless communication", Cambridge University Press, 2005. 2. Roy Blake, "Wireless communication technologies", Leo Chartland, Delmar Cengage Learning, 1st edition, 2000. 3. Modern Wireless Communications by Simon O. Haykin and Michael Moher, Pearson, 1st edition (March 4, 2004)

1	**Code of the subject**	IMIT-3999
2	**Title of the subject**	B. Tech. Project
3	**Any prerequisite**	Theoretical and practical understanding and skillset of the area/subject of study
4	**L-T-P**	0-0-12 (6 credit course)
5	**Name of the proposer**	Dr. W. Wilfred Godfrey
6	**Will this course require visiting**	NO
7	**Learning Objectives of the subject (in about 50 words)**	➢ To enable the students to understand the system level details of the technology, issues, and approaches on subjects within the scope of computer science/IT/ programme of study etc. ➢ To enable the students to study, to identify gaps and help them develop solutions which could solve issues within the context of the subjects in programme of study.
8	**Brief Contents (module wise)**	At the end of their thesis work, the students should demonstrate: • Considerably more in-depth knowledge of the major subject/field of study, including deeper insight into current research and development work. • Deeper knowledge of methods in the major subject/field of study. • A capability to contribute to research and development work. • The capability to to create, analyse and critically evaluate different technical/architectural solutions. • The capability to clearly present the problem and discuss the conclusions as well as the knowledge and arguments that form the basis for these findings in written and spoken English. • A consciousness of the ethical aspects of research and development work.
9	**Contents for lab (If applicable)**	Nil
10	**List of text books/references**	

Semester-VII

1	**Code of the subject**	IMMG-4101/ MBMG-6102
2	**Title of the subject**	Business Statistics
3	**Any prerequisite**	Basic knowledge of mathematics and statistics
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Prof. Naval Bajpai
6	**Will this course require visiting**	Yes
7	**Learning Objectives of the subject (in about 50 words)**	➢ To understand the role of statistics in the field of business management ➢ To understand the process associated with statistical decisions, defining and formulating problems, analysing the data, and using the results in decision making.
8	**Brief Contents (module wise)**	Module I: Introduction to Statistics Module II: Charts and Graphs Module III: Measures of central tendency Module IV: Measures of dispersion Module V: Probability Module VI: Discrete probability distribution Module VII: Continuous probability distribution Module VIII: Sampling and sampling distributions Module IX: Statistical inference: Estimation for single populations Module X : Statistical inference: Hypothesis testing for single population Module XI : Statistical inference: Hypothesis testing for two populations Module XII: Analysis of variance and Experimental designs Module XIII: Hypothesis testing for categorical data (chi-square test) Module XIV: Simple linear regression analysis Module XV: Multiple regression analysis Module XVI: Time series and Index numbers Module XVII: Statistical quality control Module XVIII: Non-parametric statistics Module IX: Statistical decision theory
9	**Contents for lab (If applicable)**	Application of statistical software
10	**List of text books/references**	1. Bajpai, N. , Business Statistics, 2nd ed., Pearson Education 2. Gupta, S. P. , Statistical Methods, S. Chand Publication 3. Sharma, J. K., Business Statistics, 2nd ed., Pearson Education

1	**Code of the subject**	IMMG-4102/MBMG-6103
2	**Title of the subject**	Managerial Economics
3	**Any prerequisite**	-
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Arun Kumar
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	➢ To examine the nature and scope of managerial economics ➢ To understand the reasons for the existence of firm, its environment and market forces of demand and supply ➢ To examine various economic forecasting techniques used by managers ➢ To analyze production, cost and profit maximization ➢ Understanding different markets and the behavior of the firm ➢ Formulating appropriate strategies for revenue and profit maximization
8	**Brief Contents (module wise)**	➢ Introduction to Economics ➢ Theory of the firm and Demand Analysis - I ➢ Demand Analysis – II and Elasticities ➢ Economic Forecasting ➢ Production function ➢ Production Analysis ➢ Cost of Production ➢ Profit and Revenue Maximization ➢ Perfect Competition and Monopoly ➢ Monopolistic Competition ➢ Oligopoly Model ➢ Games, Information and Strategy ➢ Pricing and Profit Analysis ➢ Factor Market Analysis ➢ Employment and Unemployment in India ➢ Understanding macroeconomic aggregates and variables ➢ Market Failure
9	**Contents for lab (If applicable)**	-
10	**List of text books/references**	1. Samuelson & Nordhus, Economics, McGraw-Hill, 19th edition, 2017. 2. Truett & Truett, Managerial Economics, John Wiley & Sons, 8th edition, Singapore, 2004 3. Mark Hirschey and Eric Bentzen, Managerial Economics, Cengage Learning, 14th edition, 2016

1	**Code of the subject**	IMMG-4103
2	**Title of the subject**	Business and Legal Environment
3	**Any prerequisite**	NIL
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Rajesh Rajagopal
6	**Will this course require visiting**	N.A.
7	**Learning Objectives of the subject (in about 50 words)**	➢ Understand the legal environment for corporates and to make students aware of various corporate laws for successful businesses.
8	**Brief Contents (module wise)**	**Module I:** Advanced Company Law: The Companies Act 2013- Formation and related procedures of various types of companies- Procedure for inter-corporate loans-investments- guarantee and security – Registration modification and satisfaction of charge- Declaration and payment of dividend Maintenance of Books of Accounts - statutory financial audit- cost audit and secretarial audit – Board meetings and procedures. Other Corporate Laws: Limited Liability Partnership Act, 2008: Concept-formation- membership- functioning and Dissolution - Conversion of LLPs into Private Limited Companies and vice versa. The insolvency and bankruptcy code 2016: Insolvency Professionals - Liquidation Process – Insolvency and Bankruptcy Board of India. **Module II**: Economic Laws: FDI Policy – Foreign Direct Investment in India and abroad – External Commercial Borrowing (ECB) Formalities – Establishment of Branch Office of a foreign entity in India, Foreign Trade Policy – Opportunities of commerce/finance professional in foreign trade – Procedure of import and export – Export promotion schemes and initiatives. c. Competition Commission of India – Compliance of competition law. **Module III**: Industrial and Labour laws: Overview of Industrial Policy of Govt. of India– Regulatory Mechanism under IDRA – MSME Development Act – Advantages of MSMEs and their role and significance in economic development – Central and State Schemes for MSME Promotion –Udyog Aadhar. Foreign Exchange Management Act - Features and Application- Opportunities for Indian Business -Challenges-Foreign Contribution (Regulation) Act 2010.
9	**Contents for lab (If applicable)**	NA
10	**List of text books/references**	1. Whalley, M. and Guzelian, C. (2016). The Legal Risk Management Handbook, Kogan Page, UK. 2. Padhi, P. K. (2013). Legal Aspects of Business, PHI- Learning, India. 3. Kuchhal, M. C. and Kuchhal, V. (2014). Business Legislation for Management, Vikas Publishing, India.

1	**Code of the subject**	IMMG-4104
2	**Title of the subject**	Financial Reporting & Management Accounting
3	**Any prerequisite**	
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Vishal Vyas
6	**Will this course require visiting faculty**	
7	**Learning Objectives of the subject (in about 50 words)**	• To acquire the ability to integrate and solve problems in practical scenarios on Accounting Standards, Guidance Notes and Indian Accounting Standards for deciding the appropriate accounting treatment and formulating suitable accounting policies. • To develop an understanding of the various forms of reporting (other than financial statements) and accounting for special transactions, and apply such knowledge in problem solving. • To acquire knowledge and understanding of the concepts, techniques and practices of management accounting and to develop skills for decision making.
8	**Brief Contents (module wise)**	**MODULE I** The conceptual and regulatory framework for financial reporting 1. The need for a conceptual framework and the characteristics of useful information 2. Recognition and measurement 3. Regulatory framework 4. The concepts and principles of groups and consolidated financial statements **MODULE II** Accounting for transactions in financial statements 1. Tangible non-current assets 2. Intangible assets 3. Impairment of assets 4. Inventory and biological assets 5. Financial instruments 6. Leasing 7. Provisions and events after the reporting period 8. Taxation 9. Reporting financial performance 10. Revenue 11. Government grants 12. Foreign currency transactions **MODULE III** Analysing and interpreting the financial statements of single entities and groups 1. Limitations of financial statements 2. Calculation and interpretation of accounting ratios and trends to address users' and stakeholders' needs 3. Limitations of interpretation techniques 4. Specialised, not-for-profit, and public sector entities **MODULE IV** Preparation of financial statements 1. Preparation of single entity financial statements 2. Preparation of consolidated financial statements including an associate. Introduction to Management Accounting, Financial Statement Analysis: Understanding Cost: Introduction, Meaning of Cost, Objective of Costing, Methods of Costing, Technique of Costing, Classification of Cost, Elements of Cost, Statement of Cost Sheet, Marginal Costing and Break Even Analysis, Budgetary Control, Standard Costing
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1. Financial Accounting & Analysis, Narender L. Ahuja & Varun Dawar, Taxmann, 1/e 2. Essentials of Financial Accounting, Asish K. Bhattacharya, PHI, Latest Edition 3. Financial Accounting: A Managerial Perspective, 5e, Narayanaswamy, R., PHI Essentials of Financial Accounting, Asish K. Bhattacharya, PHI, Latest Edition

1	**Code of the subject**	ITHS 2101/IMMG-4105/ MBMG-6106
2	**Title of the subject**	Organizational Behavior
3	**Any prerequisite**	General Understanding of Management Functioning
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Prof. Naval Bajpai
6	**Will this course require visiting**	No
7	**Learning Objectives of the subject (in about 50 words)**	➢ To provide a comprehensive analysis of individual and group behaviour in the organizations. ➢ To provide an understanding of how organizations can be managed more effectively and at the same time enhancing the quality of employees work life.
8	**Brief Contents (module wise)**	**Module I: Introduction** What is organizational behavior?, OB as an interdisciplinary subject **Module II: The Individual** Diversity in the organizations, attitudes and job satisfaction, emotions and moods, personality and values, perception and individual decision making, motivation concepts, motivation: from concepts to applications **Module III: The Group** Foundations of group behaviour, understanding work teams, communication, leadership, power and politics, conflict and negotiations, foundations of organization structure **Module IV: The Organization system** Organizational culture, human resource policies and practices, organizational change and stress management
9	**Contents for lab (If applicable)**	NA
10	**List of text books/references**	1. Robbins, S. P., Judge, T. A. & Vohra, N., Organizational Behaviour, 18th ed., Pearson Education. 2. Rao, V. S. P., Organisational behaviour, Excel books 3. Singh, K., Organizational behaviour: Text and cases, 3rd ed., Vikas Publishing house 4. Khanka, S. S., Organisational behaviour: Text and cases, S. Chand Publication

1	**Code of the subject**	IMMG-4106
2	**Title of the subject**	Internet Technologies for Business
3	**Any prerequisite**	Nil
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr Vinay Singh
6	**Will this course require visiting faculty**	Not Required
7	**Learning Objectives of the subject (in about 50 words)**	Course is designed to have fundamental understanding on the role of Information Technology empowering competitive advantages to the business entities. The focus of the course enables learners to have fundamental understanding of IT use in business, understanding of IT and advancement, development of IT solution, its adoption by business entities, and understanding its impact over business and vice-versa.
8	**Brief Contents (module wise)**	Alignment of Information System with Business- Introduction of different business perspectives, development of alignment Balance Scorecard, aligning Information System to the firms. Fundamental of Information Technology- Genesis of Information and communication Technology and its present status; understanding Information Agents, Service Oriented Architecture of Information System; Understanding of Cloud environment and its business importance. Information Management: Introduction of Data and Database Management, Data warehousing, Information Science. Internet of Things: Introduction of stakeholders and agents of IoT, Principles of agent interaction in IoT environment, Application of IoT in Business; Case based impact analysis of IoT in Business.
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1. Introduction to Information Technology by V. Rajaraman, PHI publication 2.Internet of the Things A to Z:Technology and Application, by Qusay Hassan, John Wiley & Sons Publication 3. Database System Concepts, by A. Silberrschatz, H. Korth and S. Sudharshan, McGraw Hill Publication

1	**Code of the subject**	IMMG-4107
2	**Title of the subject**	Business Communication
3	**Any prerequisite**	-
4	**L-T-P**	2-0-2
5	**Name of the proposer**	Dr. Yash Daultani
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	➢ To make students understand the importance and effective use of verbal and non-verbal communication ➢ To make the learner proficient in public speaking and presentation skills ➢ To guide students to utilize the principles of professional business and technical writing for effective communication in the global world ➢ To make the learner capable of creating official content in today's world driven by digital and social media communication
8	**Brief Contents (module wise)**	Module I — Communication Theory, Concept and Meaning Module II — Business Correspondence Module III — Grammar and Vocabulary Module IV — Technical writing Module V — Information Communication Technology (ICT) enabled communication media Module VI — Effective Public speaking Module VII — Social media communication
9	**Contents for lab (If applicable)**	The following contents will be covered by using ICT tools and world-class training and learning software available in Communication lab. Module I Listening and Speaking Skills Module II Reading and Writing Skills (including grammar) Module III English for National and International Examinations Module IV Soft Skills
10	**List of text books/references**	1. Business Communication Essentials: Fundamental Skills for the Mobile-Digital-Social Workplace, 8th Edition by Bovee and Thill (Pearson) 2. Business Correspondence and Report Writing, 5th Edition by R C Sharma and Krishna Mohan (McGraw-Hill) 3. Essentials of Business Communication, 11th Edition by Guffey and Loewy (Cengage)

1	**Code of the subject**	IMMG-4108
2	**Title of the subject**	Business Process Management
3	**Any prerequisite**	Operations Management and MIS
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Gyan Prakash
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	– To understand basic operational, tactical and strategic applications of information in today's agile organizations. – To learn and appreciate the importance of enterprise planning systems in today's dynamic business environment.
8	**Brief Contents (module wise)**	**Module I: Appreciation for processes** Role of Information, Role of Information Systems in Dynamic Business Environment, enhancing decision making, understanding enterprise resource planning systems, re-engineering and enterprise resource planning systems **Module II: Enablement of processes** Business process modelling methods and tools: BPMN and EPC, Business process modelling, business rules and ERP systems implementation ERP modules, open source ERP, implementation of enterprise resource planning systems, maintenance of enterprise resource planning systems managing an ERP project **Module III: Processes and the organization** Organizational strategy and process architecture, BPM technology, BPM frameworks
9	**Contents for lab (If applicable)**	Yes
10	**List of text books/references**	1. Mary Sumner, Enterprise Resource Planning, Pearson Education, 2011. 2. Mathias Weske, Business Process Management: Concepts, Languages, Architectures, Springer, 2005

Semester-VIII

1	**Code of the subject**	IMMG 4201
2	**Title of the subject**	Human Resource Management
3	**Any prerequisite**	None
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Manoj Patwardhan
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	Human Resource Management (HRM) is concerned with the way in which organizations manage their people. The aim is to chart some of the broad terrain of a rapidly developing field of study in order to prepare the students for the more finely grained treatment of specific HRM topics. This course outline examines the recent rise of HRM, the effects of the changing context of work on HRM, what it involves, and the strategic nature of HRM practice, its impact on organizational performance and the changing role of HRM function.
8	**Brief Contents (module wise)**	**Module I** Define HRM. Describe the Nature, Feature and Scope of HRM.Describe the major activities of HRM. Explain the skills and roles of Human Resource manager. Why HRM is important to All Managers. List the challenges and opportunities of HR manager. **Module II** Define Job Analysis. Explain types of Job analysis Understand Job Analysis Process. Describe the basic methods of collecting the Job analysis information. Define HR planning. Describe the need and objectives of HR planning. Understand the HR planning model. Explain the factors affecting HR planning. **Module III** Define Recruitment. Explain essential steps for Recruitment Planning. Understand Recruitment Model. Describe Sources of Recruitment. Explain the Pros and Cons of recruitment. Define selection. Steps / process of selection. **Module IV** Define Employee Training Explain need and objectives of training. Differentiate between training and Development. Describe the principles, areas and benefits of training. Understand the Training Methods. Describe Training System Model. Understand levels of Training Evaluation. **Module V** Define Career and its related terms. Understand stages of growth and career. Describe Career-planning process and its responsibility. Understand the benefits of Career development system. Know the career program for special target groups. Explain the Model or Designing Organizational career development**.** **Module VI** Define Performance Appraisal. Explain why it is important to effectively appraise performance. Understand features, purposes and objectives of Performance appraisal. Describe the methods of Performance appraisal. List the criticism of Performance Appraisal.
9	**Contents for lab (If applicable)**	NA
10	**List of text books/references**	1. Human Resource Management: International Edition by Desseler. 2. Human Resource Management: International Edition by Gomez- Mejia, Balkin & Cardy. 3. Human Resource Management by Foot & Hook 4. Human Resource Management by VSP Rao & Narayan

1	**Code of the subject**	IMMG-4202
2	**Title of the subject**	Operations Management
3	**Any prerequisite**	-
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Yash Daultani
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	➢ To provide an integrative perspective for viewing the operations of every kind of organization in terms of an overall, logical structure ➢ To emphasize and bring out the strategic role of operations ➢ To highlight the interface of the operations function with the other functional areas like finance, marketing and personnel ➢ To learn using quantitative tools for Operations Analytics
8	**Brief Contents (module wise)**	The course will be based on lectures, cases, simulation, discussion, presentation and exercises. Students are expected to use relevant computer software throughout the course. Brief contents are as following. ➢ Introduction ➢ Operations Strategy in a Global Environment ➢ Process Analysis ➢ Demand Management and Forecasting ➢ Strategic Capacity Management ➢ Facility Location and Layout ➢ Project Management ➢ Aggregate Planning and Master Production Scheduling ➢ Operations Scheduling ➢ Inventory Control ➢ Supply Chain Management ➢ Material Requirements Planning ➢ Just in Time Manufacturing ➢ Managing for Quality ➢ Process Control and Process Improvement ➢ Operations Analytics and Business Applications ➢ Contemporary issues in Operations management
9	**Contents for lab (If applicable)**	Simulation modeling exercises
10	**List of text books/references**	1. Operations Management, 11th edition, Jay Heizer and Barry Render - Pearson 2. Operations and Supply Chain Management, 14th edition, Richard B. Chase, Ravi Shankar and F. Robert Jacobs, Special Indian Edition– McGraw Hill Education 3. Operations Management: Strategy & Analysis: Processes and Supply Chains, 9th edition, Lee J. Krajewski, Larry P. Ritzman, Manoj K. Malhotra, and Samir K. Srivastava, Indian Adaptation, – Pearson 4. Production and Operation Management Concepts, Models and Behavior, 5th edition, Everette E. Adam, Jr., Ronald J. Ebert, Prentice- Hall

1	**Code of the subject**	IMMG-4203/MBMG-6203
2	**Title of the subject**	Marketing Management
3	**Any prerequisite**	-
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Arun Kumar
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	➢ To develop an understanding of the marketing systems and processes. ➢ To acquaint the students with major decision variables and environment. ➢ To enable them to develop marketing plan and strategies in the given situations. ➢ To explore the recent trends in the marketing environment.
8	**Brief Contents (module wise)**	➢ Introduction to marketing concepts, Marketing system and marketing environment ➢ Marketing Mix (4P's and 7 P's) ➢ Marketing Plan ➢ Market Segmentation, Targeting and Positioning ➢ Consumer Behavior ➢ Marketing Information System ➢ Marketing Research ➢ Product Management- Product Policy, PLC and Product Mix ➢ New Product Development- Process and Strategies ➢ Pricing- Price Policy considerations and strategy ➢ Promotion Mix-advertising, Public Relations, Sales Promotion, Personal selling, Direct Marketing ➢ Channel management: SCM, Channel Selection and management. ➢ Marketing implementation and control ➢ Strategic Marketing, Services Marketing ➢ Brand Management
9	**Contents for lab (If applicable)**	Simulation exercises may be conducted in lab.
10	**List of text books/references**	1. Kotler and Keller, Marketing Management, Pearson, 15th edition, 2016. 2. Kotler and Keller, A Framework for Marketing Management, Pearson, 6th edition, 2016. 3. Geoffrey Lancaster and Lester Massingham, Essentials of Marketing Management, Routledge, 2nd edition, 2017 4. Berend Wierenga, Ralf van der Lans, Handbook of Marketing Decision Models, Springer, 2017

1	**Code of the subject**	IMMG-4204
2	**Title of the subject**	Decision Modeling
3	**Any prerequisite**	-
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Yash Daultani
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	➢ To provide an integrative perspective to develop operational research models for real life business systems ➢ To learn critical aspects of optimization tools and techniques ➢ To develop analytics report that describes the model and the solving technique, analyse the results and propose recommendations in language understandable to the decision-makers.
8	**Brief Contents (module wise)**	The course will be based on lectures, cases, simulation, discussion, and exercises. Students are expected to use relevant computer software throughout the course. Brief contents are as following. ➢ Introduction to Operations Research ➢ Linear programming ➢ Transportation problems including transshipment problems ➢ Assignment problems including traveling salesman's problem ➢ PERT/CPM ➢ Network models ➢ Decision theory including Bayesian analysis ➢ Game theory ➢ Queuing theory ➢ Simulation with applications ➢ Advanced inventory control methods ➢ Metaheuristics and their applications ➢ Business analytics and applications
9	**Contents for lab (If applicable)**	Simulation modeling exercises
10	**List of text books/references**	1. Introduction to Operations Research, 10th Edition, by Frederick S Hillier (McGraw Hill) 2. Operations Research: An Introduction, 10th Edition, by Hamdy A. Taha (Pearson) 3. Advances in Business, Operations, and Product Analytics by Matthew J. Drake (Pearson)

1	**Code of the subject**	IMMG-4205
2	**Title of the subject**	Financial Management
3	**Any prerequisite**	
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Prof. Rajendra Sahu
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	• Apply the fundamental concepts and tools of finance. • Apply financial management concepts and tools to the decisions faced by a manager in investment decisions. • Apply financial management concepts and tools to the financing decisions and dividend decisions faced by the firm. • Evaluate the corporate governance structure of firms and examine the interactions, from a governance perspective, between firm management, financial markets and stakeholders. • Appraise the risk profile of firms; specifically, estimate the costs of capital, including debt and equity capital, using financial data. • Discuss the operations of three distinct capital markets: the equity market, the bond market and the derivatives market, and the financial assets traded in each of these markets. • Explain the global financial environment and the globalization process experienced by multinational corporations
8	**Brief Contents (module wise)**	The major objectives of the course are to provide an understanding of the role of financial management in business firms. Students would be able to apply the concept of the time value of money, capital budgeting, the theories of capital structure to assess a firm's leverage and the cost of capital. It also provides an understanding of the operation of financial security markets. Module I: Introduction to Financial Management Module II: Time Value of Money Module III: Valuation of Bonds and Shares Module IV: Capital Budgeting Module V: Risk and Return Module VI: Cost of Capital Module VII: Leverage & Types of Leverage Module VIII: Capital Structure Module IX: Risk Analysis in Capital Budgeting Module X: Working Capital Management Module XI: Cash Management Module XII: Inventory Management Module XIII: Receivable Management; Module XIV: Dividend Decisions
9	**Contents for lab (If applicable)**	N/A
10	**List of text books/references**	**Text Books** 1. Pandey, I.M (2015): Financial Management, 11th edition Vikas Publishing House, Delhi 2. Khan MY, Jain PK: Financial Management; Tata McGraw Hill, New Delhi **Reference Books** 3. Chandra, Prasanna (2007): Financial Management, 7th edition, Tata Mc Graw Hill, Delhi 4. Hampton , John: Financial Management, Vikas Publishing House, Delhi 5. Van Horne, J.C. and J.M Wachowicz Jr (2008).: Fundamentals of Financial Management, 13th edition, Prentice – Hall, Delhi 6. Briham & Ehrhardt: Financial Management- Text & Cases (2011) :, CENGAGE Learning India (P) Ltd., New Delhi

1	**Code of the subject**	IMMG-4206
2	**Title of the subject**	Decision Support and Expert System
3	**Any prerequisite**	Nil
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr Vinay Singh
6	**Will this course require visiting faculty**	Not Required
7	**Learning Objectives of the subject (in about 50 words)**	The main objective of this course is to provide the students with an understanding of the principles of Decision Making and; design and development, planning, and management of an expert system
8	**Brief Contents (module wise)**	The course is broadly covering two aspects: The first part focuses on understand how management uses computer technologies. Learn basic concepts of decision-making, Understands decision support systems. Recognize different types of decision support systems used in the workplace. The second part of this course is devoted to the practical application of the concepts: The students, under the guidance of the professor, will learn to develop mini-expert systems of their choice that will incorporate the concepts of expert systems and the techniques of knowledge engineering to assist practitioners in different fields (e.g. auto mechanic, medical doctors, etc.) in diagnosing malfunctions and/or projecting potential solutions to problem
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1. Decision Support Systems for Business Intelligence, by V.L Sauter Published by Wiley **2.** Decision Support System in Agriculture, Food and the Environment-Trends, Applications and Advances by B Manos, K Paparrizos, N Matsatsinis and J Papathanasioum Information Science Reference Publications NY

1	**Code of the subject**	IMMG-4207/MBMG-6207
2	**Title of the subject**	E-Governance
3	**Any prerequisite**	-
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Arun Kumar
6	**Will this course require visiting faculty**	Yes
7	**Learning Objectives of the subject (in about 50 words)**	➢ To gain an understanding of the planning and execution of e-governance projects in Indian context ➢ To explore the major variables influencing the performance of e-governance projects. ➢ To develop broad framework for effective planning and implementation of e-governance initiatives.
8	**Brief Contents (module wise)**	➢ Introduction to e-governance ➢ E-governance in India ➢ Meaning of development ➢ Linking Governance and Development ➢ e-Governance for Development ➢ Measuring e-governance performance ➢ Conceptualization of performance variables ➢ Strategic framework for improving e-governance performance ➢ Strategic planning ➢ Strategy implementation ➢ Effective E-Governance Through Strategic Alliances ➢ Effective E-Governance: The Way Forward ➢ Case studies on Indian states active in e-seva, Kisan call centre, DACNET, Computerized registration of pesticides, Integrated fertilizers Management Information System
9	**Contents for lab (If applicable)**	-
10	**List of text books/references**	1. P.K. Puri and Sushil, Strategic Planning and Implementation of e-governance, Springer, 2017 2. Shirin Madon, E-governance for Development: A Focus on Rural India, Palgrave Macmillan, 2009 3. M.P. Gupta, Promise of E- Governance: Operational Challenges, McGraw Hill, 2004

1	**Code of the subject**	IMMG-4208/ MBMG-6208
2	**Title of the subject**	Business Research Methods
3	**Any prerequisite**	Basic knowledge of business statistics
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Prof. Naval Bajpai
6	**Will this course require visiting**	No
7	**Learning Objectives of the subject (in about 50 words)**	➢ To design and execute a basic survey research project. ➢ To understand the research tools and techniques for executing a business project and decision making.
8	**Brief Contents (module wise)**	**Module I: Introduction to business research** Business research methods: An introduction, business research process design **Module II: Research design formulation** Measurement and scaling, questionnaire design, sampling and sampling distributions **Module III: Sources and collection of data** Secondary data sources, data collection: survey and observations, experimentation, fieldwork and data preparation **Module IV: Data analysis and presentation** Statistical inference: hypothesis testing for single population, hypothesis testing for two populations, analysis of variance and experimental designs, hypothesis testing for categorical data (chi-square test), non-parametric statistics, Correlation and simple linear regression analysis, Multivariate analyses (Multiple regression analysis, discriminant analysis, conjoint analysis, factor analysis, cluster analysis, multi-dimensional scaling, correspondence analysis) **Module V: Result presentation** Presentation of results, report writing
9	**Contents for lab (If applicable)**	**Data analysis and presentation** Statistical inference: hypothesis testing for single population, hypothesis testing for two populations, analysis of variance and experimental designs, hypothesis testing for categorical data (chi-square test), non-parametric statistics, Correlation and simple linear regression analysis, Multivariate analyses (Multiple regression analysis, discriminant analysis, conjoint analysis, factor analysis, cluster analysis, multi-dimensional scaling, correspondence analysis)
10	**List of text books/references**	1. Bajpai, N., Business research methods, 2nd edition, Pearson education 2. Cooper, D. R., Schindler, P. S., & Sharma, J. K., Business research methods, 12ed., Tata McGraw Hill Education. 3. Hair Jr., J. F., Celsi, M. W., Money, A. H., Samouel, P., & Page, M. J., Essentials of Business research methods, 2nd ed., Routledge, Taylor & Francis Group.

Summer Semester

1	**Code of the subject**	IMMG-4991
2	**Title of the subject**	Online learning course 1: Management of inventory systems
3	**Any prerequisite**	NIL
4	**L-T-P**	Audit
5	**Name of the proposer**	Rajesh Rajagopal
6	**Will this course require visiting**	N. A.
7	**Learning Objectives of the subject (in about 50 words)**	➢ Introduction to the management of material inventory, various static and dynamic inventory problems under certainty, risk, and uncertainty.
8	**Brief Contents (module wise)**	**Module I** Introduction to inventory materials and management (Lecture 1 to 5) Inventory problems and selective inventory (Lecture 6-10) **Module II** Static inventory problem under risk (Lecture 11-15) Static inventory problem under uncertainty (Lecture 16-20) **Module III** Dynamic inventory problem under certainty (Lectures 21-25) Dynamic inventory problem under risk (Lectures 26-30)
9	**Contents for lab (If applicable)**	NA
10	**List of text books/references**	1. https://nptel.ac.in/courses/110105095/57 1. Muller, M. (2011). Essentials of Inventory Management. AMACOM, US. 2. Mercado, C. (2007). Hands-On Inventory Management, Auerbach Publications, US.

1	**Code of the subject**	IMMG-4992/MBMG-6992
2	**Title of the subject**	Online Learning Course- II (Introduction to Data Analytics)
3	**Any prerequisite**	-
4	**L-T-P**	Audit
5	**Name of the proposer**	Dr. Arun Kumar
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	➢ To understand the fundamentals of data analytics ➢ To gain insights about statistics and machine learning
8	**Brief Contents (module wise)**	➢ Course overview and descriptive statistics ➢ Probability distributions and inferential statistics ➢ Inferential statistics ➢ Machine learning ➢ Supervised learning ➢ Regression and classification Techniques-I & II ➢ Association rule mining and Big Data ➢ Clustering analysis and predictive analytics
9	**Contents for lab (If applicable)**	-
10	**List of text books/references**	1. https://nptel.ac.in/courses/110106064/ 2. https://www.coursehero.com/sitemap/schools/2679-University-of- Technology-Sydney/courses/1917014-IT31250/ 3. https://www.mooc-list.com/course/introduction-data-analytics-business- coursera

1	**Code of the subject**	IMMG-4993
2	**Title of the subject**	Colloquium based on Summer internship
3	**Any prerequisite**	-
4	**L-T-P**	Audit
5	**Name of the proposer**	Dr. Yash Daultani
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	➢ To develop an understanding of student learning during summer internship ➢ To acquaint the students with peer-learning process ➢ To guide students about future potential of their work and application
8	**Brief Contents (module wise)**	This colloquium will require a comprehensive evaluation of students' learnings and contributions made during summer internship. The evaluation panel will consist of academicians and persons of repute from industry. The students are expected to be acquainted with peer learning and to explore new applications and technology-based solutions for live industrial problems.
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	

Semester-IX

1	**Code of the subject**	IMMG-5101
2	**Title of the subject**	Strategic Management
3	**Any prerequisite**	
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Vishal Vyas
6	**Will this course require visiting faculty**	
7	**Learning Objectives of the subject (in about 50 words)**	➢ To develop ability to understand the organization and the environment in which it functions and competes. The student should be able to integrate acquired knowledge of other functional areas with the body of the knowledge of strategic management and be able to deploy all as a unified tool to analyze and formulate the actions that shall deliver the intended results. ➢ To meet course objectives, the instructor shall use combination of activities that will comprise of case studies, class lectures, presentations, quizzes, assignments, projects, group and individual exercises, role playing and simulation games.
8	**Brief Contents (module wise)**	1. Introduction to Strategic Management, Concept of Corporate Strategy, Strategic Management Process, The 7-S Framework, Corporate Policy and Planning in India 2. Environmental Scanning, Industry Analysis, The synthesis of External Factors, External Factors Analysis Summary (EFAS), Internal Scanning, Value Chain Analysis, Synthesis of Internal Factors, Internal Factors Analysis Summary (IFAS) 3. Strategy Implementation, Organization Structure, Corporate Culture, Diversification, Mergers and Acquisitions 4. Evaluation and Control, Strategic Information Systems 5. Other Strategic Issues, Small and Medium Enterprises, Non- Profit Organizations
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1. Hill, C. W., & Jones, G. R. (2012). Strategic management cases: an integrated approach. Cengage Learning. 2. R Srinivasan, Strategic Management - The Indian Context, 3rd Edition, PHI, 2008.

1	**Code of the subject**	IMMG-5102
2	**Title of the subject**	Project Management
3	**Any prerequisite**	
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Prof. Rajendra Sahu
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	• Understand to manage the scope, cost, timing, and quality of the project, as defined by project stakeholders. • Align the project to the organization's strategic plans and business justification throughout its lifecycle. • Identify project goals, constraints, deliverables, performance criteria, control needs, and resource requirements in consultation with stakeholders. • Implement project management knowledge, processes, lifecycle and the embodied concepts, tools and techniques in order to achieve project success. • Apply project management practices to the launch of new programs, products, and services
8	**Brief Contents (module wise)**	Project management theory, terms and concepts are introduced in this course. Students will discover the project life cycle and learn how to build a successful project from pre-implementation to completion. The course, by focusing on various stages of planning, designing and managing projects, would prepare the students to adapt themselves to the constantly emerging demands of the industry. A major strength of the course lies in the takeaways including appropriate skills, knowledge, tools and techniques that later help candidates in mastering the projects with a clear focus on time, budget, and quality Module I: Course Introduction and Project Life Cycle Overview Module II: Project Goals and Scope Module III: Getting to Know Stakeholders and Resources Module IV: Resource Leveling and Allocation in Projects Module V: Project Management Tools, Network Techniques and Timelines Module VI: Crashing of Projects: Time vs. Cost Trade-Off Module VII: Assessing and Managing Costs and Gains Module VIII: Earned Value Method Module IX: Probabilistic Aspects of Projects Module X: Project Risk Management Module XI: Critical Chain Project Management
9	**Contents for lab (If applicable)**	N/A
10	**List of text books/references**	**Text Books:** 1. Chandra, P. (2009) 7th edition. Projects Planning, Analysis, Selection, Financing, Implementation and Review. New Delhi: Tata McGraw-Hill. 2. Gray F.Clifford, L. W. (2011) 5th edition. Project Management Th e Managerial Process. McGraw Hill **Reference Books:** 3. Desai, V.(2013), Project Management.

1	**Code of the subject**	IMMG-5199
2	**Title of the subject**	Major Project Part-I
3	**Any prerequisite**	-
4	**L-T-P**	0-0-10
5	**Name of the proposer**	Dr. Yash Daultani
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	➢ To take on live industry problems and understand the nuances and challenges involved in industry ➢ To develop technology based solutions for complex industrial problems ➢ To explore and device innovative solutions for managerial problems ➢ To explore and develop policy roadmap for complex business and economic situations
8	**Brief Contents (module wise)**	Major project requires student to take on challenging managerial issues and exploring technology based / analytical / managerial solutions best suited for live industrial problems. There will be a comprehensive evaluation of students' learnings and contributions made during their project. The evaluation panel will consist of academicians and persons of repute from industry. In Major Project Part-I, the evaluation will focus especially on problem selection and its relevance for industry and academia. In Major Project Part-II, the evaluation will focus on the proposed solution approach and quality of analytical approach / managerial implications of the work.
9	**Contents for lab (If applicable)**	Business analytics tools and techniques
10	**List of text books/references**	

Semester-X

1	**Code of the subject**	IMMG-5299
2	**Title of the subject**	Major Project Part-II
3	**Any prerequisite**	IMMG-5199
4	**L-T-P**	0-0-30
5	**Name of the proposer**	Dr. Yash Daultani
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	➢ To take on live industry problems and understand the nuances and challenges involved in industry ➢ To develop technology based solutions for complex industrial problems ➢ To explore and device innovative solutions for managerial problems ➢ To explore and develop policy roadmap for complex business and economic situations
8	**Brief Contents (module wise)**	Major project requires student to take on challenging managerial issues and exploring technology based / analytical / managerial solutions best suited for live industrial problems. There will be a comprehensive evaluation of students' learnings and contributions made during their project. The evaluation panel will consist of academicians and persons of repute from industry. In Major Project Part-I, the evaluation will focus especially on problem selection and its relevance for industry and academia. In Major Project Part-II, the evaluation will focus on the proposed solution approach and quality of analytical approach / managerial implications of the work.
9	**Contents for lab (If applicable)**	Business analytics tools and techniques
10	**List of text books/references**	

Electives: Marketing Management

1	**Code of the subject**	IMMG-9101
2	**Title of the subject**	Product and Brand Management
3	**Any prerequisite**	Marketing Management (IMMG-4203)
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Arun Kumar
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	➢ To develop an understanding of the Brands and products concepts ➢ To enable the students to analyses and develop Branding strategies in different making environment ➢ To explore recent trends in Brand Management
8	**Brief Contents (module wise)**	➢ Product Concept ➢ Product Life Cycle ➢ Strategic New Product Development ➢ Introduction to Brands, Developing New Ideas to Products and Brands ➢ Elements of Brand Management ➢ Brand Identity ➢ Brand Image: Customer's Perception of Brand Identity ➢ Brand Personality: Carrier of Brand Identity ➢ Brand Communication ➢ Brand Positioning ➢ Brand Equity ➢ Brand Extension ➢ Ethical Brand Positioning: A New tool for Distinctive Positioning, Global Brands in Cross-Cultural Environment ➢ Case studies of Nokia, Nike, Toyota, Sony, Amul, Nirma etc.
9	**Contents for lab (If applicable)**	-
10	**List of text books/references**	1. Jean-Noel Kapferer , The new strategic brand management : advanced insights and strategic thinking, KoganPage, 5th edition, 2012 2. Kevin Lane Keller, Strategic Brand Management: Building, Measuring, and Managing Brand Equity, Prentice Hall, 4th edition, 2012 3. Paul Trott, Innovation Management and New Product Development, Pearson, 6th edition, 2017 4. Mahim Sagar, Deepali Singh and D.P. Agrawal, Brand Management, Ane Books Pvt. Ltd, 2009

1	**Code of the subject**	IMMG-9102
2	**Title of the subject**	E-marketing
3	**Any prerequisite**	Marketing Management (IMMG-4203)
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Arun Kumar
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	➢ To develop an understanding of dealing with problems relating to management of e-Business technology infrastructure ➢ To get familiarize with internet business models ➢ To gain an understanding of various payment and security mechanisms, to explore recent trends and challenges, ➢ To maintain relationship with customers in e -environment ➢ To understand the role of social media in e-environment
8	**Brief Contents (module wise)**	➢ Imperatives of e-marketing ➢ Digital Age and Markets ➢ Marketing Planning for e-Environment ➢ Marketing Mix for e- Environment ➢ Marketing Research in e- Environment ➢ Product Strategies in e- Environment ➢ Pricing Strategies in e- Environment ➢ Marketing Communications in e-Environment ➢ Distribution Strategies in e- Environment ➢ Retailing in e- Environment ➢ Managing Customers in e- Environment ➢ Social media marketing ➢ Emerging Trends in Marketing ➢ Case studies on Pinterest, Amazon, Alibaba, Hertz etc.
9	**Contents for lab (If applicable)**	-
10	**List of text books/references**	1. Laudon K. & Traver C. , E- Commerce : Business , Technology, Society, Pearson Education , 12th edition, 2016 2. Turban , Outland, King, Lee, Liang & Turban, Electronic Commerce 2018 : A Managerial and Social Networks Perspective, Springer, 9th edition, 2018 3. Kalakota, R. and Robinson, M., e-Business 2.0: Roadmap for Success, Pearson Education, 2nd edition, 2004

1	**Code of the subject**	IMMG-9103/MBMG-9103
2	**Title of the subject**	Service Marketing
3	**Any prerequisite**	Basic knowledge of Marketing Management
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Prof. Naval Bajpai
6	**Will this course require visiting**	No
7	**Learning Objectives of the subject (in about 50 words)**	➢ To provide an in-depth appreciation and understanding of the unique challenges inherent in managing and delivering quality services. ➢ To develop an understanding of the 'state of the art' of service management thinking. ➢ To understand the marketing concepts in the perspectives of services.
8	**Brief Contents (module wise)**	**Module I: Service Marketing: Introduction** Meaning and nature of services, classifications of services, Introduction to service marketing, Evolution of service marketing **Module II: Service marketing mix and Gaps model** 7Ps of service marketing, service gaps framework, perceived service quality, model of service marketing **Module III: Service design and service delivery** Introduction to service design and service delivery, service delivery process, service encounters and moments of truth, employee role in service delivery, role of service provider, intermediaries involved in service process and delivery, managing demand and supply of service **Module IV: STP strategy for Services** Need for segmentation of services, bases of service segmentation, segmentation strategies in service marketing, need for targeting and positioning strategies for services **Module V: Consumer behaviour in service marketing** Customer expectations in services, Service costs experienced by consumer, the role of consumer in service delivery, customer responses in services, customer delight, service failure and recovery **Module VI: Emerging issues in Service marketing** Strategic approach in service marketing, Service marketing in e-commerce and e-marketing, Telemarketing services
9	**Contents for lab (If applicable)**	NA
10	**List of text books/references**	1. Zeithaml, V. A., Bitner, M. J., Gremler, D. D. & Pandit, A., Service Marketing: Integrating customer focus across the firm, Tata McGraw Hill Education 2. Hoffman, K. D. & Bateson, J. E. G., Services Marketing: Concepts, Strategies, & Cases, 4^{th} ed., Cengage learnings. 3. Rao, K. R. M., Services Marketing, 2^{nd} ed., Pearson education.

1	**Code of the subject**	IMMG-9104
2	**Title of the subject**	Advertising and Sales Promotion Management
3	**Any prerequisite**	Marketing Management (IMMG-4203)
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Arun Kumar
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	➢ To develop an understanding of the role of integrated marketing communications (IMC) ➢ To enable the students to assess the effectiveness of advertising and sales promotions ➢ To explore the role of digital media and IT in marketing communications
8	**Brief Contents (module wise)**	➢ Introduction to IMC ➢ Role of advertising in different types of organizations such as business, not-for profit etc. ➢ Role of advertising for consumers and society at large ➢ Role of sales promotion ➢ Media planning models ➢ Message planning ➢ New Digital and Social Media Perspective ➢ IMC Perspective on targeting Millennials ➢ Changing role of advertising agencies ➢ Neuromarketing ➢ Use of Virtual Reality ➢ Future of traditional media ➢ Out of home advertising ➢ Mobile coupons ➢ Ethical perspective on promotion ➢ Role of IT tools in personal selling ➢ Case studies of Maggi, Amul, HUL, Mahindra, Southwest airlines etc.
9	**Contents for lab (If applicable)**	-
10	**List of text books/references**	1. Belch George Belch Michel, Advertising and Promotion, Tata McGraw Hill 11th 2017 2. Chunawala SA, Advertising Sales and Promotion Management, Himalaya Publication 3rd Revised Edition 2008 3. Batra , Myers and Aaker , Adverting Management, Pearson, 2nd Reprint 2003

1	**Code of the subject**	IMMG-9105
2	**Title of the subject**	Sales and Distribution
3	**Any prerequisite**	Marketing Management (IMMG-4203)
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Arun Kumar
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	➢ To get familiarized with the roles of marketing and selling strategies. ➢ Understanding the importance of customer-centric approach in sales and distribution ➢ Help in making strategic and operational decisions by keeping in mind the key stakeholders namely customers, channel partners and sales force. ➢ To gain an understanding of behavioral transactions
8	**Brief Contents (module wise)**	➢ Consumer Decision Process ➢ Economic Development and Selling Environment ➢ Shopping Environment in India ➢ Retail Profiling ➢ Retail Management Practices ➢ Selling Strategy-Interface between Advertising ➢ Sales Force and Channel ➢ Channel Design ➢ Internet as an Alternate Channel ➢ Selling Style and Service Orientation ➢ Channel Member Selection and Appointment ➢ Channel Commitment ➢ Appraisal of Channel Members ➢ Channel Conflict ➢ Channel Management System ➢ Channel Evaluation ➢ Sales Force Recruitment ➢ Territory Design ➢ Sales Force Motivation ➢ Sales Force Targets and Appraisal ➢ Behavioral aspects of sales force and channel partners ➢ Case studies of Elex Motors, AG Refrigerators, CG Engineering Company, Swishflow Ltd. Etc.
9	**Contents for lab (If applicable)**	-
10	**List of text books/references**	1. Pingali Venugopal, Sales and Distribution Management: An Indian Perspective, SAGE, 2008 2. Krishna K Havaldar and Vasant M Cavale, Sales and Distribution Management: Text and Cases, McGraw Hill, 2nd edition, 2011

1	**Code of the subject**	IMMG-9106
2	**Title of the subject**	STRATEGIC MARKETING
3	**Any prerequisite**	
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Vishal Vyas
6	**Will this course require visiting faculty**	
7	**Learning Objectives of the subject (in about 50 words)**	➢ Provide a capstone class for undergraduate students with prior background in marketing to integrate their learning in marketing ("pull it all together"). Help students learn to think strategically when making and implementing marketing decisions ("strategic decision making"). ➢ Help students learn to apply specific analytical approaches and tools for understanding customers, competition, and markets ("applications of marketing data and information") Help students to develop an appreciation for the relationship between marketing and the other functional areas of business.
8	**Brief Contents (module wise)**	**Module I :** Foundation concepts on Strategy, Marketing and Strategic Marketing Foundation concepts from Finance for Marketing Decisions, Marketing implications of Corporate strategy decisions ,Competitive strategies of Strategic Business Units & Marketing implications, Identifying Market opportunities External & Internal Analysis, **Module I I :** Assessing Market Opportunities Forecasting & Scenario Building for strategic flexibility, Understanding Customers, Segmentation, Targeting, Differentiation & Positioning ,Pricing Strategy & Management, **Module III :** Entrepreneurial Marketing & New Product -Service Marketing Strategies, Strategies for Growth Markets – Defenders & Prospectors Strategies for Matured Markets and during decline, **Module IV :** Marketing Ethics, Sustainable Marketing, Green Marketing & Developmental Marketing, Brand management and integrated approach to Marketing Communication across marketing channels, Information and Communication Technologies and New Economy Marketing, **Module V :** Strategic Approach to Marketing & Sales Organization, Measuring Marketing Performance, Global – Local Markets, Diffusing boundaries Marketing Strategy Dynamics
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1. 1. Marketing Strategies, A contemporary approach by Ranchod & Gurau, Pearson India, 2012. 2. Strategic Marketing by Xavier, Response Books, 2010. 3. Marketing: Planning, Implementation, Control by Pride and Ferrell, Cengage, 2010. 4. Strategic marketing problems: Cases & Comments by Kerin & Peterson, Pearson 2012

1	**Code of the subject**	IMMG-9107
2	**Title of the subject**	Marketing research
3	**Any prerequisite**	Basic knowledge of statistics and research methodology
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Prof. Naval Bajpai
6	**Will this course require visiting**	Yes
7	**Learning Objectives of the subject (in about 50 words)**	➢ To understand the formulation of marketing problem into a feasible research question. ➢ To design and execute a basic survey research project. ➢ To understand the research tools and techniques for executing a marketing project and decision making.
8	**Brief Contents (module wise)**	**Module I: Introduction to Marketing Research** Marketing research: an introduction, marketing research process design, **Module II: Research design formulation** Measurement and scaling, questionnaire designing, sampling and sampling distributions. **Module III: Sources and collection of data** Secondary data sources, Data collection: survey and observation, experimentation, fieldwork and data preparation. **Module IV: Descriptive statistics and data analysis** Measures of central tendency, measures of dispersion, hypothesis testing for single population and two populations, ANOVA and Experimental designs, hypothesis testing for categorical data (chi-square test), correlation and simple linear regression analysis, Multivariate analyses (multiple regression analysis, discriminant analysis, conjoint analysis, factor analysis, cluster analysis, multidimensional scaling and correspondence analysis **Module V: Result presentation** Presentation of results, report writing **Module VI: Applications of marketing research** Marketing mix research: Product, price, place and promotion research
9	**Contents for lab (If applicable)**	**Descriptive statistics and data analysis** Measures of central tendency, measures of dispersion, hypothesis testing for single population and two populations, ANOVA and Experimental designs, hypothesis testing for categorical data (chi-square test), correlation and simple linear regression analysis, Multivariate analyses (multiple regression analysis, discriminant analysis, conjoint analysis, factor analysis, cluster analysis, multidimensional scaling and correspondence analysis
10	**List of text books/references**	1. Bajpai, N. (2015). Marketing Research: An Indian Perspective, Pearson Education 2. Malhotra, N. K. & Dash, S., Marketing Research: An applied orientation, Pearson Education 3. Zikmund, W. G. (2003). Exploring Marketing research, 8th ed., Thomson/South- Western.

1	**Code of the subject**	IMMG-9108
2	**Title of the subject**	Social Marketing
3	**Any prerequisite**	Marketing Management (IMMG-4203)
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Arun Kumar
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	➢ To get familiarized with the role of social marketing for communities at large ➢ Exploring the prevailing and futuristic social issues ➢ To understand the Strategic Social Marketing Planning Model ➢ To design and implement effective social marketing campaigns
8	**Brief Contents (module wise)**	➢ Defining and Distinguishing Social Marketing ➢ What Social issues Can Benefit ➢ Marketing Planning: Process and Influences ➢ Research Options ➢ Behavior Change Theories, Models, and Frameworks ➢ Social Issue, Purpose, Focus, Situation Analysis ➢ Selecting Priority Audiences ➢ Behavior Objectives and Target Goals ➢ Audience Insights ➢ Crafting a Desired Positioning ➢ Develop the Social Marketing Product Platform ➢ Determine Incentives and Disincentives ➢ Develop Place Strategy ➢ Develop a Promotion Strategy ➢ Monitoring and Evaluation ➢ Budget and Funding Plans ➢ Implementation and Sustaining Behaviors Plans ➢ Behavioral dimensions of social marketing ➢ Case studies of Volkswagen, Zika Virus Infection, Child Marriage etc.
9	**Contents for lab (If applicable)**	-
10	**List of text books/references**	1. Nancy R. Lee and Philip Kotler, Social Marketing: Behavior Change for Social Good, Sage, 6th Edition, 2019 2. Rob Donovan and Nadine Henley, Principles and Practice of social Marketing: An International Perspective, Cambridge University Press, 2nd edition, 2010

1	**Code of the subject**	IMMG-9109/ MBMG-9109
2	**Title of the subject**	Customer Relationship Management
3	**Any prerequisite**	Marketing Management (IMMG-4203/MBMG-6203)
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Arun Kumar
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	➢ To develop an understanding of the importance of customer centric Strategies ➢ To assist in recognizing the value of electronic marketing resources and describe how to integrate these electronic tools in managing customers. ➢ To give an insight into the customer centric strategies to win customers. ➢ To familiarize with new IT tools & techniques and use in relationship marketing, one to one marketing and learning relationships with customers.
8	**Brief Contents (module wise)**	➢ Introduction: Current Business Environment, Emerging IT Environment, Global Competitiveness, Customer focus organizations, ➢ Changing face of Marketing: From Transactional to Customer centric Marketing ➢ Relationship Marketing, models, issues ➢ Total Relationship Marketing ➢ Customer Relationship Management ➢ Strategic CRM ➢ Operational CRM ➢ Analytical CRM ➢ E-CRM ➢ CRM Packages ➢ Sales force Automation ➢ Marketing Automation ➢ Dynamics of Call Centre ➢ Managing E –Customers ➢ Case studies on Facebook, BMW, Fair & Lovely etc.
9	**Contents for lab (If applicable)**	-
10	**List of text books/references**	1. V. Kumar and Werner Reinartz , Customer Relationship Management, Springer, 3rd Edition, 2018 2. Francis Buttle and Stan Maklan, Customer Relationship Management: Concepts and Technologies, Routledge, 3rd edition, 2015 3. Vimi Jham and Sandeep Puri, Cases on Consumer-Centric Marketing Management, IGI Global, 2013

1	**Code of the subject**	IMMG-9110
2	**Title of the subject**	INTERNATIONAL MARKETING
3	**Any prerequisite**	
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Vishal Vyas
6	**Learning Objectives of the subject (in about 50 words)**	The course participants will become more familiar with the nature and practices of international marketing. They should feel equally confident to be able to distinguish international marketing mechanics from the domestic marketing models and approaches. They would be far more equipped to design and participate in designing an international marketing strategy. The spin-off benefits to the participants should be to develop in them a right attitude, inject enthusiasm and hone their interactive ability as they address the issues and challenges of operating in the international markets.
7	**Brief Contents (module wise)**	• *Introduction to International Marketing* Introduction, Scope of International Marketing, International Marketing vs. Domestic Marketing, Principles of International Marketing, Customer value and the value equation, Competitive or differential advantage, Management Orientations, MNCs and TNCs, Benefits of international marketing • *International Marketing Environment* Introduction, Political Environment, Political systems, legal and Regulatory Environment, Socio-cultural Environment, Economic Environment, Technological Environment, Challenges in Global Marketing. • *International Trade Environment* Introduction, classical trade theories, modern trade theories, trade barriers, quotas, Implications of Tariffs, Types of Agreements, General Agreement on Tariffs and Trade (GATT), Functions and Objectives of WTO, Implication of WTO on International Marketing, India's Role in International Trade Theories. • *International Market Entry Strategies* Introduction, Different Entry Modes and Market Entry Strategies, joint Ventures, Strategic Alliances, Direct Investment, Manufacturing and Franchising. • *International Pricing Policy:* Introduction, Price and Non-Price Factors, Methods of Pricing, International Pricing Strategies, Dumping and Price Distortion, Counter Trade • *International Distribution and Logistics Planning* Introduction, International Logistics Planning, Distribution – Definition and Importance, Direct and Indirect Channels, factors Involved in Distribution Systems, Modes of Transportation, International Packaging • *Foreign Markets and Export Marketing Process* Introduction, choosing appropriate mode of operations, Issues Related to Exports, processing an Export Order, Entering into export contract, Export Pricing and Costing, Export-Import (EXIM) Policy • *Foreign Trade Policy* Introduction, export Promotion Capital Goods Scheme, Duty Exemption/Remission Schemes, gem and Jewellery Promotion Scheme, Diamond import licence, Special Economic Zones (SEZS), Free Trade Warehousing Zones (FTWZ), Star Export Houses,
8	**Contents for lab (If applicable)**	
9	**List of text books/references**	1. International Marketing with Power Web by Philip R. Cateora, John Graham, Hardcover, Publisher: McGraw-Hill/Irwin. 2. International Marketing by Michael R. Czinkota, Illka A. Ronkainen, Hardcover: 736 pages, Publisher: South-Western College 3. Global Marketing: Foreign Entry, Local Marketing, and Global Management by Johny K. Johansson, Hardcover: 672 pages, Publisher: McGraw-Hill/Irwin

1	**Code of the subject**	IMMG-9111/MBMG-9111
2	**Title of the subject**	Emerging Areas in Marketing
3	**Any prerequisite**	Basic Knowledge of Marketing concepts and Consumer behaviour
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Prof. Naval Bajpai
6	**Will this course require visiting**	Yes
7	**Learning Objectives of the subject (in about 50 words)**	➢ To understand the emerging issues and trends in the field of Marketing. ➢ To understand how the emerging areas will shape the future of Marketing.
8	**Brief Contents (module wise)**	**Module I: Marketing Strategy** Concept of strategic marketing, functions of marketing strategy, utility of marketing strategy for gaining competitive and sustainable advantage **Module II: Relationship Marketing** Introduction to relationship marketing, consumer psychology, customer life cycle, customer lifetime value, ethics and relationship **Module III: Rural Marketing** Evolution and introduction of rural marketing, rural consumer behaviour, rural marketing mix, agricultural marketing **Module IV: Digital and Social Media Marketing** Introduction to digital and social media marketing, online advertising, search engine optimization, social media optimization, search engine marketing, e-mail marketing, mobile marketing, web-marketing, micro-blogging, digital marketing strategy **Module V: Green Marketing** Introduction to green marketing, green marketing concepts, environmental consciousness, consumer behaviour for green products **Module VI: Data Analytics for Marketing Decisions** Understanding marketing analytics and its importance, An introduction of widely used data analytics tools in the field of marketing management.
9	**Contents for lab (If applicable)**	NA
10	**List of text books/references**	1. George S. Day & Christine Moorman (2010). Strategy from the Outside In: Profiting from Customer Value, McGraw Hill, New York. 2. Gummesson, E (2002). Total relationship marketing: Rethinking Marketing Management. 2nd edition. Elsevier, Oxford, USA 3. Dogra B. & Ghuman K. (2010), Rural Marketing Concepts and Practices, Tata McGraw-Hill. 4. Dodson, I. (2016). The art of digital marketing: The definitive guide to creating strategic, targeted and measurable online campaigns, Wiley. 5. Esakki & Thangasamy (2017). Green marketing and environment responsibility in modern corporations, IGI Global 6. Winston, W. L. (2014). Marketing Analytics, Wiley.

Electives: Technology and Operations Management

1	**Code of the subject**	IMMG-9201
2	**Title of the subject**	Supply Chain Management
3	**Any prerequisite**	NIL
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Rajesh Rajagopal
6	**Will this course require visiting**	N.A
7	**Learning Objectives of the subject (in about 50 words)**	➢ Introduce the students to the concept of supply chain management. Equip them understand the course through theory and practice through elaborating various case studies.
8	**Brief Contents (module wise)**	**Module I:** Supply Chain definition – Objectives – Types – Various definitions – Drivers – Need for SCM – SCM decisions and skills – Strategy formulation in SCM – Value in Supply Chain – Tradeoffs – CRM Strategy relationship matrix. Sourcing: Strategic Sourcing – Source evaluation – collaborative perspective – Buyer-Supplier Relationship – Partner Selection – develop of Partnership – importance of inventory – imbalances – uncertainties – inventory costs – inventory turnover ratio. **Module II:** Transportation Selection – Tradeoff – modes of transportation – models for transportation and distribution – factors affecting network effectiveness – 3 PL advantages – Indian transport infrastructure – IT solutions – EDI, e-Commerce, e-procurement – Bar Coding and RFID technology. Information: Critical business processes and information systems – DBMS – benefits of ERP –information system and bull whip effect – SCM software packages – modeling concepts – Vendor analysis model – Coordinated SCM . **Module III:** Simulation modeling-Reverse Vs. forward supply chain – types of reverse flows – collaborative SCM's and CPFR – agile systems – sources of variability – characteristics – supplier interface – internal processes, Supply Chain Management and profitability – quality management – mass customization and globalization – ethical Supply Chains – e-business and SCM – Balanced Score Card – Benchmarking, Performance measurement.
9	**Contents for lab (If applicable)**	NA
10	**List of text books/references**	1. Chopra, S. and Meindl, P. (2007). Supply Chain Management. Strategy, Planning & Operation. Prentice-Hall, US. 2. Shah, J. (2009). Supply Chain Management: Text and Cases, Pearson Education, India. 3. Mohanty, R. P. and Deshmukh, S. G. (2005). Supply Chain Management (Theories and Practices), Biztantra, India.

1	**Code of the subject**	IMMG-9202
2	**Title of the subject**	Service Operations Management
3	**Any prerequisite**	Operations Management
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Gyan Prakash
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	– Understanding increasing roles of services in driving economies. – Understanding underlying concepts of service management and developing ability to design service delivery systems to fulfill needs of various customers. – Developing perspectives of services across variety of contexts.
8	**Brief Contents (module wise)**	**Module I: Understanding Services** Global trends in services sector, changing services - manufacturing continuum Recent trends in manufacturing, increased role of services in manufacturing **Module II: Service Strategy** Developing an overall vision for the service system Developing a service strategy Service positioning and implications for service delivery design Service enhancement using information technology Pricing strategies in services Performance issues in service systems **Module III: Designing Service Delivery System** Design of service delivery design, Queueing theory applications in service systems Simulation applications for design of services The services supply chain **Module IV: ICT Application in Service Delivery** Services management in IT/ITES sectors Services management in financial services
9	**Contents for lab (If applicable)**	No
10	**List of text books/references**	3. Fitzsimmons, J.A. and Fitzsimmons, M.J. (2014), Service Management: Operations, Strategy, Information Technology, 7th, McGraw-Hill: New Delhi 4. Metters, R., Metters, K.K. and Pullman, M. (2008), Service Operations Management, Cengage Learning: New Delhi.

1	**Code of the subject**	IMMG-9203
2	**Title of the subject**	New product and Service Development
3	**Any prerequisite**	NIL
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Rajesh Rajagopal
6	**Will this course require visiting**	N.A.
7	**Learning Objectives of the subject (in about 50 words)**	➢ Enable the students to understand the various types of product and service development, its stages involving design and lifecycle management.
8	**Brief Contents (module wise)**	**Module I:** Definition of a product- Types of product- levels of product- New product development, product-market mix-New product development (NPD)- process- Idea generation methods- Creativity-Creative attitude- creative design process- Morphological analysis- analysis of interconnected decision areas- brain storming synectics. Product life cycle: The challenges of product development- product analysis- product characteristics- economic considerations- production and marketing aspects- Characteristics of successful product development. Phases of a generic product development process. **Module II:** Product design- definition-Design by evolution- design by innovation- design by imitation - factors affecting product design. Standards of performance and environmental factors: decision making and iteration - Morphology of design (different phases) -role of aesthetics in design- Introduction to optimization in design- economic factors in design- design for safety and reliability- Role of computers in design - modeling and simulation- the role of models in engineering design- mathematical modeling-similitude and scale models- Concurrent design- Six sigma and design for six sigma. **Module III:** Introduction to optimization in design- economic factors and financial feasibility in design- Design for manufacturing- Rapid proto typing (RP) - application of RP in product design- Product Development versus Design. Design of simple products dealing with various aspects of product development- design starting from need to manufacture of the product. Service: Service Architecture- Service Development- Service Design- Life cycle Management. Elements: Service Offering- Service Roadmap- Service Delivery Model- Service Structure.
9	**Contents for lab (If applicable)**	NA
10	**List of text books/references**	1. Annacchino, M. (2007). The Pursuit of New Product Development: The Business Development Process, Elsevier, US. 2. Kaynak. E., Mills. N., and Brooke, M. Z. (2016) New Product Development: Successful Innovation in the Marketplace, Routledge, US. 3. Annacchino, M. (2003). New Product Development: From Initial Idea to Product Management, Elsevier, US.

1	**Code of the subject**	IMMG-9204
2	**Title of the subject**	Business Systems simulation
3	**Any prerequisite**	All functional areas of management
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Gyan Prakash
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	1. Understand the definition of simulation and how to develop and analyze a simulation model 2. Understand the fundamental logic, structure, components and management of simulation modeling 3. Build a simulation model with basic operations and inputs
8	**Brief Contents (module wise)**	**Module I: Philosophy of simulation modeling** Simulation philosophy and methodologies, The nature of simulation systems, models and simulation **Module II: Mathematical formulation** Review of Basic probability and statistics, random number generation, programming considerations, languages and data structures, verification and validation, simulation languages, animation, design and execution of simulation experiments, **Module III: Simulation applications** Cash flow and risk analysis by simulation using spreadsheets, simulation of production system inventories, queues and production scheduling.
9	**Contents for lab (If applicable)**	Yes
10	**List of text books/references**	1. Manuel Laguna, Johan Marklund, Business Process Modeling, Simulation and Design, Pearson Education, New Delhi 2. Kelton, W. David, Sadowski, Randall P., and Swets, Nancy B. (2010). Simulation with Arena, Fifth Edition. McGraw-Hill, New Delhi

1	**Code of the subject**	IMMG-9205
2	**Title of the subject**	Retail Management
3	**Any prerequisite**	IMMG-4203
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Yash Daultani
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	➢ To evaluate current retailing trends based on consumer preferences and business environment ➢ To distinguish and highlight the factors and analytics tools that retailers consider and use when developing their merchandise mix ➢ To assess current Indian retail practices and their ability to respond to changing customer preferences
8	**Brief Contents (module wise)**	➢ Contemporary issues and trends in Indian retail ➢ Merchandise and expense planning ➢ Buying, handling and inventory management ➢ Retail pricing strategy ➢ Retailing research ➢ Store design, store layout and merchandise presentation ➢ Store location ➢ Retail advertising, sales promotion and publicity ➢ Managing employees ➢ Evaluation and control of merchandise and expense planning ➢ Performance evaluation ➢ Contemporary issues in Retail management
9	**Contents for lab (If applicable)**	Simulation modeling exercises
10	**List of text books/references**	1. Retailing Management, 6th Edition by Levy, Pandit and Weitz (McGraw Hill) 2. Retail Management: a strategic approach, 11th Edition by Berman Barry (Pearson) 3. Retail Management, 5th Edition by Gibson (Pearson)

1	**Code of the subject**	IMMG-9206
2	**Title of the subject**	Total Quality Management
3	**Any prerequisite**	IMMG-4202
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Yash Daultani
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	➢ To evaluate and explore the principles of quality management within quality management systems ➢ To select and apply relevant tools and techniques for controlling, improving and measuring quality ➢ To critically analyse the strategic issues in quality management, including current issues and developments, and to devise and evaluate quality implementation plans
8	**Brief Contents (module wise)**	➢ Introduction to quality control ➢ Quality gurus ➢ Statistical quality control ➢ Reliability engineering ➢ Value engineering and value analysis ➢ Defect diagnosis and prevention ➢ Recent techniques of quality improvements ➢ Quality management system and total quality control ➢ Section of ISO model and implementation of ISO 9000 ➢ Human resource development and quality circles ➢ Benchmarking ➢ Principles of Six Sigma and Lean systems ➢ Environmental management system and total quality control
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1. Dale H. Besterfield, Pearson, Total quality Management, Pearson Education 2. Evans's. James, Lindsay M. William, The Management and Control of Quality, Cengage Learning 3. Bounds Greg, McGraw, Beyond Total Quality Management

1	**Code of the subject**	IMMG-9207
2	**Title of the subject**	Technology Management
3	**Any prerequisite**	Nil
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr Vinay Singh
6	**Will this course require visiting faculty**	Not Required
7	**Learning Objectives of the subject (in about 50 words)**	The course focus on how to acquire, develop, diffuse and assimilate existing and new technologies in organizational sustainability and competitive advantage
8	**Brief Contents (module wise)**	Technology Management Definitions, concepts, core technologies and characteristics; technology development and acquisitions, forecasting, generation and development. Technology absorptions and diffusions. Selection and implementation of new technology and automation decision. Strategic decision models. Managing new generation technologies, knowledge based techniques, competitive advantages through new technologies, product development, from scientific breakthrough to marketable products, mechanism for technology transfer and acquisitions.
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1. Technology Management-Developing and Implementing Effective Licensing Program, R.C. Megantz published by John Wiley and Sons Inc. 2. Management of Technology and Innovation for competitive advantage by VK Khurana and A Saini published by Ane Books Pvt Ltd 3. Handbook of Technology and Innovation Management ,by S Shane published by John Wiley and Sons.

1	**Code of the subject**	IMMG-9208
2	**Title of the subject**	Manufacturing System Design
3	**Any prerequisite**	NIL
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Rajesh Rajagopal
6	**Will this course require visiting**	N.A.
7	**Learning Objectives of the subject (in about 50 words)**	➢ Understand the methodologies for the design of manufacturing systems and introduce the concept and practice of various manufacturing systems.
8	**Brief Contents (module wise)**	**Module I:** An introduction to the procedures and methodologies for designing manufacturing systems: paradigms of manufacturing- building blocks of manufacturing systems- numerical control and robotics- task allocation and line balancing- system configurations- performance of manufacturing systems- quality- productivity- responsiveness- economic models and optimization of manufacturing systems- launch and reconfiguration of manufacturing systems- Lean manufacturing. **Module II:** Group Technology: GT – concept- definition- need- scope- benefits. Production layout-types- features and applications, GT Layout –concept- need- benefits- comparison with conventional layout with examples. GT- codification systems- types- method of coding and examples. Part features- concept, types and examples. Part family- concept- method to form- approach to form cell using part families- Types and comparison of cell: manual and automatic cell- assembly cell- Steps of cell design and cell layout. **Module III:** Flexible Manufacturing Systems (FMS): Flexible Manufacturing System (FMS) – concept- definition and comparison with other manufacturing systems. Major elements of FMS and their functioning- Tool handling system- Material handling system- Automated guided vehicles (AGV)- Automated storage and retrieval system (AS/RS)- Main frame computer- FMS layout - concept, types and applications- Data required developing an FMS layout- Signal flow diagram and line balancing in FMS- FMS layout. Computer Integrated Manufacturing (CIM): need- block diagram- functional areas covered and their importance- Protocols in CIM- their features- functions and applications.
9	**Contents for lab (If applicable)**	NA
10	**List of text books/references**	1. Wu, B. (2012). Manufacturing Systems Design and Analysis, Springer, UK. 2. Singh, N. and Rajamani, D. (2011). Cellular Manufacturing Systems: Design, planning and control, Springer, US. 3. Sodhi, R. S. (1994). Advances in Manufacturing Systems: Design, Modeling, and Analysis, Elsevier, UK.

1	**Code of the subject**	IMMG-9209
2	**Title of the subject**	Technology and Operations Strategy
3	**Any prerequisite**	Nil
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr Vinay Singh
6	**Will this course require visiting faculty**	Not Required
7	**Learning Objectives of the subject (in about 50 words)**	Strategic role of Operations: To appreciate the linkage between different decision areas in operations, and operations and other areas; to explore the process of formulating and implementing operations policies consistent with objectives; to understand the importance and method of building capabilities in Operations.
8	**Brief Contents (module wise)**	The Broad contents of the course are: Concepts of operation strategy, capacity and facilities strategy; Products and process development and Technology strategy; Manufacturing organizations and workforce issues; Service Operation Strategy; Building operations capabilities and managing improvement strategy; and competing through operations.
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1. Handbook of Technology and Innovation Management ,by S Shane published by John Wiley and Sons. 2. Technology Management-Developing and Implementing Effective Licensing Program, R.C. Megantz published by John Wiley and Sons Inc. 3. Management of Technology and Innovation for competitive advantage by VK Khurana and A Saini published by Ane Books Pvt Ltd

1	**Code of the subject**	IMMG-9210
2	**Title of the subject**	Emerging Areas in Technology and Operations Management
3	**Any prerequisite**	IMMG-4202, IMMG-4204
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Yash Daultani
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	➢ To provide an integrative perspective for viewing the operations of every kind of organization in terms of an overall, logical structure ➢ To model and solve integrated business problems in interface of the operations function with the other functional areas like finance, marketing and personnel ➢ To learn using quantitative tools for Operations Analytics and develop live industrial cases
8	**Brief Contents (module wise)**	The course will aim at introducing student to some of the areas of current interest in Technology and Operations Management. This course is especially focused on applications. This will be of relevance to both practitioners and to academicians. The exact contents might vary based on the current trends in the industry. Some of the brief contents are as following. ➢ Operations and Supply Chain Analytics ➢ Process Analysis and Improvement ➢ Forecasting ➢ Demand and Capacity Management ➢ Project Management ➢ Production Scheduling ➢ Inventory Control ➢ Supply Chain Management ➢ Game theoretic modeling ➢ Simulation ➢ Lean Six Sigma ➢ Operations Analytics and Business Applications ➢ Contemporary issues in Operations management ➢ ERP systems ➢ System Dynamics ➢ Managing risk in Operations Management ➢ Sustainability
9	**Contents for lab (If applicable)**	Simulation modeling exercises, Analytics cases
10	**List of text books/references**	1. Operations and Supply Chain Management, 14th edition, Richard B. Chase, Ravi Shankar and F. Robert Jacobs, Special Indian Edition– McGraw Hill Education 2. Production and Operation Management Concepts, Models and Behavior, 5th edition, Everette E. Adam, Jr., Ronald J. Ebert, Prentice- Hall 3. Quantitative Models in Operations and Supply Chain Management by G. Srinivasan, PHI

1	**Code of the subject**	IMMG-9211
2	**Title of the subject**	Empirical research methods in operations management
3	**Any prerequisite**	NIL
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Rajesh Rajagopal
6	**Will this course require visiting**	N. A.
7	**Learning Objectives of the subject (in about 50 words)**	➢ Introduction to various tools and techniques for conducting empirical studies in operations management including descriptive, predictive, and prescriptive methods for data analysis.
8	**Brief Contents (module wise)**	**Module I:** Methodology of empirical research: Descriptive statistics- measure of central tendencies- basic understanding of distribution- various estimators- various t-tests- ANOVA- ANCOVA- MANOVA- simple regression- Basic regression analysis- Advanced regression analysis- Multiple regression (OLS, Logistic, multinomial)- interaction effects. **Module II:** Times series and panel data methods- q-methodology- p* models- Exponential Random Graph Models- polynomial regression- response surface- survival analysis- meta-analysis- conjoint- discrete choice- max-diff. Data envelopment analysis- AHP- ANP- TOPSIS. **Module III:** Qualitative research- Multivariate statistics: factor analysis- path analysis- cluster analysis- EFA- CFA- MDC- Path models- SEM (Covariance- and component-based models)- Mediated moderation- moderated mediation- latent moderated structural equations- Multivariate statistics: analysis of variance- Survey-based research in OM- Multilevel Modeling- Experimental design- simulation- goodness of fit tests- Latent growth models- latent class analysis.
9	**Contents for lab (If applicable)**	NA
10	**List of text books/references**	1. Spicer, J. (2005). Making Sense of Multivariate Data Analysis: An Intuitive Approach, Sage, US. 2. Hair, J. F., Black, W. C., Babin, B. J., and Anderson, R. E. (2013). Multivariate Data Analysis, Pearson, US. 3. Jobson, J. D. (1999). Applied Multivariate Data Analysis: Regression and Experimental Design, Springer, US.

1	**Code of the subject**	IMMG-9213
2	**Title of the subject**	Lean Six Sigma Processes
3	**Any prerequisite**	
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Vishal Vyas
6	**Will this course require visiting faculty**	
7	**Learning Objectives of the subject (in about 50 words)**	• Develop a broad understanding of Lean/Six Sigma principles and practices • Build capability to implement Lean/Six Sigma initiatives in manufacturing operations
8	**Brief Contents (module wise)**	• Part I: Foundations • Part II: Stability • Part III: Flow • Part IV: Pull • Part V: Enterprise
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	Dennis, Pascal. Lean Production Simplified: A Plain-Language Guide to the World's Most Powerful Production System. New York: Productivity Press, 2002. ISBN: 1563272628.

1	**Code of the subject**	IMMG-9212
2	**Title of the subject**	Multi- Criterion Decision Making Models
3	**Any prerequisite**	IMMG-4202, IMMG-4204
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Yash Daultani
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	➢ To emphasize and bring out the need of MCDM tools ➢ To learn various MCDM tools and techniques ➢ Exploring industry applications
8	**Brief Contents (module wise)**	➢ Multi-Criteria Decision Making Methods ➢ Quantification of Qualitative Data for MCDM Problems ➢ Decomposition approaches ➢ Sensitivity analysis ➢ Fuzzy Sets and Their Operations ➢ Fuzzy MCDM methods ➢ Pareto Optimality ➢ Multi–Objective Decision Making (MODM)
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1. Multi-criteria Decision Making Methods: A Comparative Study by Triantaphyllou, Springer 2. Multi Criteria Decision Making in Inventory Models by Fuzzy Approaches by Kumar Pavan, Scholar's Press 3. Journal articles as selected by the instructor

Electives: IT and Systems

1	**Code of the subject**	IMMG-9301
2	**Title of the subject**	Software Project Management
3	**Any prerequisite**	NIL
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Rajesh Rajagopal
6	**Will this course require visiting faculty**	Yes
7	**Learning Objectives of the subject (in about 50 words)**	➢ Understand software project management and concepts focusing on the models used in software development and the tools, which improve the productivity and quality of the development process.
8	**Brief Contents (module wise)**	**Module I** Software project management- project initiation- product characteristics- project planning- components- project monitoring- software functionality-project initiation management- project charter- project scope- project objectives- project size- project schedule- quality planning. **Module II** Effort and cost estimation- function point analysis- wide band Delphi, COCOMO-waterfall model based planning- cost factor analysis- activity based cost estimation-iterations based planning- resource estimation- cost estimates. **Module III** Risk management- budget risks- resource risks- quality risks- technology risks- risk analysis- project risk management- practical considerations- configuration management- project planning- resource allocation- scope management- effort estimate.
9	**Contents for lab (If applicable)**	NA
10	**List of text books/references**	1. Ahmed, A. (2012). Software Project Management: A Process-Driven Approach, CRC press, US. 2. Stellman, A. and Greene, J. (2010). Applied Software Project Management, Oreilly, US. 3. Wysocki, R. K. (2006). Effective Software Project Management, Wiley, Canada.

1	**Code of the subject**	IMMG-9302
2	**Title of the subject**	IT and Strategy
3	**Any prerequisite**	Nil
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr Vinay Singh
6	**Will this course require visiting faculty**	Not Required
7	**Learning Objectives of the subject (in about 50 words)**	Course focuses on IT application supporting to organizational strategy along with strategy of IT solution/services development helping to organization in achieving excellence
8	**Brief Contents (module wise)**	Role of Information and communication technologies for achieving competitive advantages. Linkage of IT strategy and Business Strategy. Strategizing IT Designing and development. Exploring organizational and IT implementation constraints towards shared organizational and IT strategy.
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1. IT Strategy: A 3-Dimensional Framework to Plan Your Digital Transformation and Deliver Value to Your Enterprise, BY Jim Maholic, Independently Published (2019) 2. IT Strategy for Non-IT Managers: Becoming an Engaged Contributor to Corporate IT Decisions By Amrit Tiwana, published by The MIT Press

1	**Code of the subject**	IMMG-9303
2	**Title of the subject**	Knowledge Management
3	**Any prerequisite**	NIL
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Rajesh Rajagopal
6	**Will this course require visiting**	N.A
7	**Learning Objectives of the subject (in about 50 words)**	➢ Introduce the students to the theory and advanced practices in knowledge management. Also, enable them to understand the key challenges, various decision- support systems and its practical applications.
8	**Brief Contents (module wise)**	**Module I:** Introduction to Knowledge Management - The foundations of knowledge management- including cultural issues- technology applications organizational concepts and processes- management aspects- and decision support systems. The Evolution of Knowledge management: From Information Management to Knowledge Management - Key Challenges Facing the Evolution of Knowledge Management - Ethics for Knowledge Management. **Module II:** Creating the Culture of Learning and Knowledge Sharing: Organization and Knowledge Management-Building the Learning Organization. Knowledge Markets- Cooperation among Distributed Technical Specialists – Tacit Knowledge and Quality Assurance, Knowledge Management Tools: Telecommunications and Networks in Knowledge Management - Internet Search Engines and knowledge Management - Information Technology in Support of Knowledge Management – Knowledge Management and Vocabulary Control - Information Mapping in Information Retrieval - Information Coding in the Internet Environment - Repackaging Information. **Module III:** Knowledge Management Application: Components of a Knowledge Strategy - Case Studies (From Library to Knowledge Center, Knowledge Management in the Health Sciences, Knowledge Management in Developing Countries), Future trends and Cases: Advanced topics and case studies in knowledge management - Development of a knowledge management map/plan that is integrated with an organization's strategic and business plan - A case study on Corporate Memories for supporting various aspects in the process life -cycles of an organization.
9	**Contents for lab (If applicable)**	NA
10	**List of text books/references**	1. Awad, E. M., Ghaziri, H. M. (2008). Knowledge Management, Pearson Ed., India. 2. Barnes, S. (2002). Knowledge Management Systems: Theory and Practice, Thomson Learning, UK. 3. Becerra-Fernandez, I. and Leidner, D. E. (2008). Knowledge Management: An Evolutionary View, M.E. Sharp Inc., UK.

1	**Code of the subject**	IMIT-2202/ IMMG-9304
2	**Title of the subject**	Software Engineering
3	**Any prerequisite**	NIL
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr Ajay Kumar
6	**Will this course require visiting**	NO
7	**Learning Objectives of the subject (in about 50 words)**	➢ To impart software engineering concepts.
8	**Brief Contents (module wise)**	Introduction: Software engineering approach to solve problems of software industry. Software processes: software development process, project management process. Software requirement Analysis and specification: Software requirements, Problem analysis, requirement specification and validation. Software planning: Cost estimation, COCOMO model, staffing and personnel planning, software configuration and management plan, quality assurance plan, monitoring plans. Software design: design concepts, abstraction, modularity, structure, concurrency, information hiding, coupling and cohesion. Detailed design considerations, verification. Complexity, metrics. Implementation issues: standards and guidelines. Verification and validation techniques: Quality assurance, static analysis, Symbolic execution, unit testing , metrics Testing Fundamentals, Functional testing , Testing Process. Software quality and reliability. The need for system software reliability, software-related problems, software reliability engineering, future problems in the twenty-first century System Reliability Concepts: Reliability measures, common distribution functions (Binominal, Poisson, Exponential, memorylessness, Normal, log-normal, Weibull, Gama, Beta, Parato, and Rayleigh), Poisson process and NHPP.
9	**Contents for lab (If applicable)**	Yes
10	**List of text books/references**	1. Pham, Hoang. System software reliability. Springer Science & Business Media, 2007. 2. Jalote Pankaj, An Integrated Approach to Software Engineering, Narosa Publishing House 3. Pressman, Roger S., Software Engineering : A practitioner's Approach, McGraw-Hill, Inc.

1	**Code of the subject**	IMMG-9305
2	**Title of the subject**	Decision Support System
3	**Any prerequisite**	Nil
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr Vinay Singh
6	**Will this course require visiting faculty**	Not Required
7	**Learning Objectives of the subject (in about 50 words)**	Students shall learn the use IT and IT enabled services as a tool at different stages of management decision making process. Along with this they might have understanding of designing and developing such DSS for organizational use.
8	**Brief Contents (module wise)**	Decision Support System Introduction: Characteristics of DSS, Decision Making process, Anatomy of DSS, knowledge based system, Architecture of DSS, Hardware, Software and User interface for DSS, expert system for decision support, Group decision making and support system, Enterprise support system. Data warehouse: Need for data warehousing, data warehouse components, development of data warehouse, database for data warehouse, data warehouse architecture, maintenance issues, data mining, tools for data mining, online analytical processing
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1. Foundations of Decision Support Systems by Andrew B. Whinston, Clyde W. Holsapple, Robert H. Bonczek, 2. Building the data warehouse by W.H. Inmon, Wiley Publication. 3. Decision Support System in Agriculture, Food and the Environment-Trends, Applications and Advances byB Manos, K Paparrizos, N Matsatsinis and J Papathanasioum Information Science Reference Publications NY

1	**Code of the subject**	IMMG-9306
2	**Title of the subject**	Software Quality Management
3	**Any prerequisite**	-
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Yash Daultani
6	**Will this course require visiting faculty**	Yes
7	**Learning Objectives of the subject (in about 50 words)**	➢ To evaluate and explore the principles of software quality management ➢ To select and apply relevant tools and techniques for software quality assurance, quality planning, and quality control ➢ To critically analyse the strategic issues in quality management, including current issues and developments, and to devise and evaluate quality implementation plans in software industry
8	**Brief Contents (module wise)**	Module I Introduction to software quality & metrics Module II Software quality assurance Module III Quality control and reliability Module IV Quality management system Module V Quality standards Module VI Software Validation and Verification
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1. Software Quality Engineering: Testing, Quality Assurance and Quantifiable Improvement by Jeff Tian, Wiley 2. Software Engineering a Practitioner's approach – Roger S Pressman, McGraw Hill 3. Introduction to Software Project Management & Quality Assurance – Ince, Dorrel, Helen Sharp & Mark Woodman

1	**Code of the subject**	IMMG-9307
2	**Title of the subject**	Telecommunications Systems Management
3	**Any prerequisite**	Nil
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr Vinay Singh
6	**Will this course require visiting faculty**	Not Required
7	**Learning Objectives of the subject (in about 50 words)**	The course is focused to impart specialized knowledge and understanding about telecommunication based organization to the students.
8	**Brief Contents (module wise)**	Introduction to telecom technologies. Concepts of accounting, finance, operations, human resource management, organization, marketing, and computation science in design of telecommunication systems, Market and regulatory issues.
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1. Core study materials from Strategy, operation, Marketing, finance and HR Management. 2. Case based application of the core Management concepts applied in Telecom organizations.

1	**Code of the subject**	IMMG-9308
2	**Title of the subject**	Strategic Planning of Information Systems
3	**Any prerequisite**	
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Vishal Vyas
6	**Will this course require visiting faculty**	
7	**Learning Objectives of the subject (in about 50 words)**	The strategic use of information systems as a means for acquiring competitive advantage. Integration of concepts and methodologies with skills acquired in the field of information systems and technology in the development of a comprehensive information systems prototype. Measurable benefits in the alignment of business processes with information systems solutions. The course provides students with the opportunity to apply systems concepts and techniques in the design of an information system.
8	**Brief Contents (module wise)**	• Introduction to strategic information systems , Business environment issues , The process of strategic information systems , Current business situation analysis , Identify an opportunity , The role of business information systems , Information systems strategies , Strategic information systems management • Organization of the information systems technologies , Software , Hardware, Database , Communications ,Networking , Evaluation of possible IS solutions • Project Management, Cost Benefit Analysis, Functional requirement, System specifications , Information systems benefits , Strategic information management , Managing the information resource
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1. Ward J.& Peppard J. Strategic Planning for Information Systems , Wiley Series in Information Systems, latest edition Cassidy A. A Practical Guide to Information Systems Strategic Planning. Auerbach Publications; 2nd Ed. 2. Glen P. et al, Leading Geeks: How to Manage and Lead the People Who Deliver Technology, Jossey-Bass; 1 edition. 3. Earl, M. J. (1993). Experiences in Strategic Information System Planning. MIS Quarterly

1	**Code of the subject**	IMMG-9309
2	**Title of the subject**	Emerging Areas in IT and Systems
3	**Any prerequisite**	Nil
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr Vinay Singh
6	**Will this course require visiting faculty**	Not Required
7	**Learning Objectives of the subject (in about 50 words)**	The course aims at introducing students to some of the areas of current interest in IT and Systems.
8	**Brief Contents (module wise)**	The contents shall be relevance to both practiceners and academicians need over a period of time as practices, research and theories emerges. The exact contents might vary based on the current trends in industries and research.
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	Open learning through research articles, publications, practices, guidance and interactions.

Electives: Finance

1	**Code of the subject**	IMMG-9401
2	**Title of the subject**	Security Analysis and Portfolio Management
3	**Any prerequisite**	
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Vishal Vyas
6	**Will this course require visiting faculty**	
7	**Learning Objectives of the subject (in about 50 words)**	➢ The focus of Security Analysis is on how others analyse your company's securities on their own. Whereas, that of Portfolio Management is on how investors analyse your company's securities in comparison with others' on the security market. The course is designed with a view:) ➢ To acquaint the students with the working of security market and principles of security analysis; and) ➢ To develop the skills required for portfolio management so as to be able to judge the competitive position of firms in capital market and review the related business decisions.
8	**Brief Contents (module wise)**	• **Module I**: The Role of Security Markets in Economy, The Organisation and Mechanics of Indian Security Markets ,Various Securities and their Characteristics ,Objective of the Security Analysis ,Functions of an Organised Security Market • **Module II:** Mechanics of Security Trading , Various Types of Security Markets and their Functions , Stock Exchanges , OTCEI , Depository , Role of SEBI with regard to Secondary Markets , The Role and Functions of Various Players and Agencies in the Secondary Market • **Module III:** Risk and Return , Utility Theory , Portfolio Theory , CAPM , APT , Multi-factor Models , Options and Futures • **Module IV:** Security Analysis , Fundamental Analysis (Internal Value and Market Value of Various Securities; Internal Value and Market Value of Firm ,Pricing of Security (IPOs and Seasoned Equity Open), Financial Statement Analysis , Projecting Earnings under Stable as well as Dynamic Conditions, including Risk and Inflation Factors , The Risk Factors, including Internal Risk), Technical Analysis of Security Pricing, Market Efficiency and Behavioral Finance • **Module V:** Portfolio Management , Portfolio Theory (Portfolio Criteria , Efficient Set, Portfolio Selection and Diversification) The Shape and the Risk Function (including CAPM Model Technical Analysis, Random Walk and Martingale Model) , Portfolio Management , Portfolio Objective ,Size of Portfolio ,Selection Basis and Readjustment , Timings of Disinvestment Market Microstructure
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1. Investment Analysis and Portfolio Management by Reilly and Brown, Cengage Learning, India Ed. 2. Investment Analysis and Portfolio Management by Prasanna Chandra 3. Investments by Zvi Bodie, Alex Kane, Alan Marcus and Pitabas Mohanty

1	**Code of the subject**	IMMG-9402
2	**Title of the subject**	Financial Risk Management
3	**Any prerequisite**	NIL
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Rajesh Rajagopal
6	**Will this course require visiting**	N.A
7	**Learning Objectives of the subject (in about 50 words)**	➢ Introduce the students to the concept, theory and practice of financial risk management covering the foundations of risk identification, risk analysis, and risk management.
8	**Brief Contents (module wise)**	**Module I:** Basics will cover the foundations of risk management including: Interest Rate/Market Risk- Credit risk premia-basic hedging- Forwards/Futures- Options Caps/Floor- Black Scholes and Binomial Lattice- Swaps- Beginning VAR. Risk introduction and concepts-What Is Financial Risk?, Steps to Risk Identification- Top-Down and Building-Block Approaches to Risk Management- Risk and the management of the firm: The Pervasiveness of Risk, Why Manage Risk?, Taxes-Agency and Other Costs- Business Performance-Financial Risk and Financial Distress-The Costs of Risk Management. **Module II:** Capital Adequacy- Credit VAR- Credit Metrics- Regulation- Securitization-Mock Securitization- Hedging. Market mechanism and efficiency: Market Efficiency-Market Liquidity- The Role of Financial Intermediaries- Systematic Risk and Non-Systematic Risk- Managing Market Risks- Effect of Credit Risk. Interest rate risks: Introduction- Interest Rate Risk,-The Term Structure of Interest Rates Analysing Yield Curve Behavior- the Money Markets Term Instruments. **Module III:** Currency risk: Foreign Exchange Rate Risk- Foreign Exchange Exposure-Equity and commodity price risk: Equity Market Risks- Commodity Price Risk-Controlling risks: Introduction- The Top-Down Approach to Risk Assessment- The Building-Block Approach to Risk Assessment- Reporting and Controlling Risk- A Note of Warning. Quantifying financial risks: Introduction- Statistical Analysis of Financial Risk- The Significance of the Normal Distribution- Understanding the Risk Measures- Measuring the Relationship between Assets- Portfolio Expected Return and Risk- Practical Considerations in Measuring Risk- Estimating Portfolio Value at Risk.
9	**Contents for lab (If applicable)**	NA
10	**List of text books/references**	1. Phadmis, A. and Dutta, B. (2008), Dun & Bradsheet- Tata McGraw-Hill Education, India. 2. Brown, A. (2016). Financial Risk Management for Dummies, Wiley, UK. 3. Allen, S. L. (2013). Financial Risk Management: A Practitioner's Guide to Managing Market and Credit Risk, Wiley, US.

1	**Code of the subject**	IMMG-9403
2	**Title of the subject**	Corporate Tax Planning
3	**Any prerequisite**	
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Vishal Vyas
6	**Will this course require visiting faculty**	
7	**Learning Objectives of the subject (in about 50 words)**	The course intends to equip students with the ability to apply corporate tax provisions and financial planning tools to corporate world. Corporate Taxation and financial planning are discussed in terms of to provide necessary inputs to the students for handling real life business problems efficiently using appropriate concepts of taxation laws. Students are appraised with the recent developments in tax structure in India unlike other countries. At the end of the course, they are expected to have learnt the tax provisions, financial planning & tax management.
8	**Brief Contents (module wise)**	• Introduction: Income Tax Basic Definitions Under Income Tax Act, Determination of Residential status & Incidence of tax – Individual, HUF, Firm & Company, Incomes exempt from tax, Basic understanding of the five heads of Income & Tax Computation for Individuals (Slab System) & Company, Income under the head "Salary" and Employee Remuneration Planning. • Business - Profession Income under the head " Profits and gains of business or profession" and its computation Basis of charge, Methods of Accounting, Specific Deductions, Specific Disallowances, Deemed Profit and its computation, Undisclosed Income & Investments, Section 43 C, 44 AD, 44AE, 44 AF, Problems of computation of Income from Business / Profession (Specific focus to company). • Capital Gain & Taxation of Companies Income under the head "Capital gains", Clubbing of Income, Set off and carry forward of losses, Deductions from gross total income. Computation of tax liability of companies, Minimum Alternate Tax on companies, Tax deduction/ collection at source, Double Taxation Avoidance Agreement Concept. • Tax & Financial Planning I - Concept of Tax planning, Tax Avoidance, Tax Evasion & Tax Management, Tax planning with respect to Setting up a new business, Tax planning with respect to location and nature of business, Tax planning with amalgamation, Tax planning with forms of business organization. • Tax & Financial Planning II –Tax planning with respect to Financial management – Capital Structure Issues & Issues of Bonus Shares, Tax Planning with managerial decisions like make or buy, own or lease, capital budgeting
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1. Dr. Vinod K. Singhania &Dr. Kapil Singhania Direct Taxes – Law & Practice Taxmann Latest Edition 2. Girish Ahuja & Ravi Gupta Corporate Tax Planning & Management Bharat Law House Latest Edition 3. Paolo M. Panteghini Corporate Taxation in a Dynamic World Springer Latest Edition

1	**Code of the subject**	IMMG-9404
2	**Title of the subject**	International Finance
3	**Any prerequisite**	
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Prof. Rajendra Sahu
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	The course aims to make students • Understand the importance of international finance and various mechanisms being practiced in international finance and trade. • Exchange Rates: Assess exchange rates, exchange rate mechanisms, determination of exchange rates, theories of movement of exchange rates, forex markets, forex transactions and arbitrage conditions. • Determine the long- and short-run links between prices, inflation, the money supply, real income, and interest rates. • Appraise the benefits and costs stemming from financial openness.
8	**Brief Contents (module wise)**	**Module I: Introduction to International Finance:** Introduction to importance of international trade and investment, need for currency exchanges **Module II: Forex Markets:** Nature and Characteristics of forex markets **Module III: Exchange Rates:** determination of exchange rates, theories of exchange rate movement and determination, exchange rate mechanisms, **Module IV: Forex Risk Management:** foreign currency investing and arbitrage relations in forex markets **Module V: Macro-Economics and Exchange Rate Movements:** Determine the long- and short-run links between prices, inflation, the money supply, real income, and interest rates. **Module VI: Currency and Interest Rate Derivatives:** forwards, options, and swaps), International Stock and Bond Portfolios **Module VII: Cryptocurrencies**
9	**Contents for lab (If applicable)**	N/A
10	**List of text books/references**	**Text Books:** 1. Avadhani, V.A (2017), International Finance, 8th edition, Himalaya Publishing House New Delhi, 5th edition 2. Apte P.G (2011), International Financial Management, 6th edition, Tata McGraw-Hill 3. Madura (2010), International Corporate Finance, 10th edition, Thomas Learning, Singapore **Reference Books:** 4. Sharan, V. (2012), International Financial Management, 6th edition, (PHI Learning Private Limited, New Delhi, 5. Madura (2006) International Corporate Finance, 8th edition, Thomas Learning, Singapore

1	**Code of the subject**	IMMG-9405
2	**Title of the subject**	Personal Wealth Management
3	**Any prerequisite**	
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Vishal Vyas
6	**Will this course require visiting faculty**	
7	**Learning Objectives of the subject (in about 50 words)**	• To attain the skills, knowledge, mindset and the morals necessary to perform ethically and responsibly in the highly regulated financial services industry • To be able to respond to the challenges brought about by the altering nature of the Financial Services Sector. • To learn about the essential terms, concepts, theories and principles of Wealth management
8	**Brief Contents (module wise)**	• **Module I :** Introduction to Financial Planning, Wealth Management and Economy • **Module II :** Investment and Risk Management-Equity, Investment and Risk Management-Debt, Investing in Gold & Real Estate, Investment Products and Services, Investment Evaluation Framework • **Module III :**Risk Profiling and Asset Allocation ,Risk Management through Insurance • **Module IV :** Elements of Taxation , Taxation of Investment products • **Module V :** Estate Planning
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1. The New Wealth Management: The Financial Advisor's Guide to Managing and Investing Client Assets, by Harold Evensky, Stephen M. Horan, Thomas R. Robinson, John Wiley & Sons, Latest edition 2. Wealth Engine: Indian Financial Planning and Wealth Management, S Sankaran, Vision Books (2012). 3. Maginn, J. L., Tuttle, D. L., McLeavey, D. W., & Pinto, J. E. (Eds.), Managing investment portfolios: a dynamic process, John Wiley & Sons, Latest edition

1	Code of the subject	IMMG-9406
2	Title of the subject	Project Appraisal and Finance
3	Any prerequisite	Nil
4	L-T-P	3-0-0
5	Name of the proposer	Dr Vinay Singh
6	Will this course require visiting faculty	Not Required
7	Learning Objectives of the subject (in about 50 words)	Students will learn the procedure of managing and handling live projects from project planning, selection and managing all aspects of project life cycle.
8	Brief Contents (module wise)	Project Planning and analysis overview, Generation and screening of project ideas, financial analysis, type and measure of risk, social cost benefit analysis, multiple projects and constraints, project financing I India, project management concepts.
9	Contents for lab (If applicable)	
10	List of text books/references	1. Engineering Project Appraisal by Martin Rogers and Aidan Duffy published by Wiley-Blackwell 2. Project Finance in Theory and Practice: Designing, Structuring, and Financing Private and Public Projects By Stefano Gatti published by Academic Press

1	**Code of the subject**	IMMG-9407
2	**Title of the subject**	Corporate Restructuring
3	**Any prerequisite**	Financial Reporting & Management Accounting (IMMG-4104/ MBMG-6105)/Financial Management (IMMG-4205/ MBMG-6205)
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Arun Kumar
6	**Will this course require visiting faculty**	Yes
7	**Learning Objectives of the subject (in about 50 words)**	➢ To understand the importance of corporate restructuring to achieve better performance ➢ To get familiarize with major corporate restructuring strategies ➢ To get an understanding of valuation and analytical tools
8	**Brief Contents (module wise)**	➢ Restructuring: A General Overview ➢ Diagnosing the Problem ➢ Setting Restructuring Goals and Reverse Engineering a Company ➢ Steps in Restructuring ➢ Operating Restructuring ➢ Financial Restructuring ➢ Valuation in Distress ➢ Evaluation of Businesses, Divisions, Facilities, and Dealerships ➢ Evaluation of Products, Customers and Contracts ➢ Revenue Growth and New Products ➢ Markets and Pricing ➢ Cost Analysis and Finding Waste ➢ Financing the Turnaround ➢ Restructuring timeline ➢ Case studies of Kmart, Continental Airlines, USX Corporation etc.
9	**Contents for lab (If applicable)**	-
10	**List of text books/references**	1. Francisco J. Lopez Lubian, The Executive Guide to Corporate Restructuring, Palgrave Macmillan, 2014 2. David Vance, Corporate Restructuring: From Cause Analysis to Execution, Springer, 2010 3. Stuart C. Gilson, Edward I. Altman, Creating Value Through Corporate Restructuring: Case Studies in Bankruptcies, Buyouts, and Breakups, Wiley, 2010 4. Andrew J. Sherman, Mergers and Acquisitions from A to Z, AMACOM, 2018

1	**Code of the subject**	IMMG-9408
2	**Title of the subject**	Management of Financial Services
3	**Any prerequisite**	
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Vishal Vyas
6	**Will this course require visiting faculty**	
7	**Learning Objectives of the subject (in about 50 words)**	To enable participants understand intricacies of financial services in order to equip them with working knowledge applicable to the industry.
8	**Brief Contents (module wise)**	**Unit – I:** Service Sector in India: overview of Financial Services in India-Nature Scope and Types of Financial Services: fund based and non-fund based financial services. Venture capital: concept and types, regulatory framework How Venture Capitalists Evaluate Potential Venture Opportunities-- Managing Risk and Reward in the Entrepreneurial Venture- New Venture Financing -Risk & Return in venture capital: Theory **Unit – II:** Merchant Banking Issue: Management, SEBI Guidelines, Institutional & Operational Framework, Regulation of Merchant Banking Activities, Obligations of Merchant Bankers. Factoring: concept, types, delivery network, comparison and contrast with other similar services, Financial and Service charges, Growth and Trend of factoring service in India, Case of SBI factors. Forfeiting: concepts and delivery network, forfeiting and risk management, forfeiting and export finance, forfeiting in India. Venture capital - concepts and characteristics of venture capital, venture capital in India, guidelines for venture capital. **Unit – III:** NBFC: introduction, RBI act framework-asset-liability management system Housing Finance: introductions, housing finance system, Mortgage-based securitization, Guidelines for extending equity support to housing finance companies. Loan Syndication and Loan Consortium: Domestic and External Investment banking: difference between investment bank and traditional banks, structure of an investment bank- Functions investment banks - types of groups within the investment banking division- hierarchy within the investment bank do? **Unit – IV:** Lease and Hire purchase: Meaning and Types of leasing – Legislative-frameworks – Matters on Depreciation and Tax – Problems on leasing – Hire Purchasing- Concepts and features – Tax and Depreciation implications –Problems on Hire Purchasing. Credit rating and Securitization : Definition and meaning- Process of-credit rating of financial instruments- Rating methodology-Rating agencies –Rating symbols of different companies, Securitization of debt- Meaning-Features- Special Purpose Vehicle- Pass Through Certificate & mechanism –Benefits of Securitization – Issues in Securitization Stock Broking: introduction, bodies Regulating Stock Broking Firms-Functions of Stock Broking Firms, Mutual fund: Types Mutual Funds – Advantages of mutual funds - Exchange Traded Funds – Hedge funds- Regulations on mutual funds, Plastic Money - Concept and different forms of plastic money - credit and debit cards, pros and cons. Credit process followed by credit card organisations. Factors affecting utilisation of plastic money in India.
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1. Khan, M. Y. Financial Services, New Delhi: Tata McGraw-Hill, 4th edition 2008. 2. V.K. Bhalla, Management of Financial Services, New Delhi, Anmol Publication, 2nd edition 2005 3. Payne, Adrian. The Essence of Services Marketing,. New Delhi: Prentice Hall of India, 1993

1	**Code of the subject**	IMMG-9409
2	**Title of the subject**	Economic and Financial Modeling
3	**Any prerequisite**	
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Vishal Vyas
6	**Will this course require visiting faculty**	
7	**Learning Objectives of the subject (in about 50 words)**	To equip the learner with framing skills for modelling the finance and economy; and to develop learners' problem solving abilities in the context of both macroeconomics and microeconomics
8	**Brief Contents (module wise)**	**Economic Modelling:** A basic classical model of national income The distribution of national income to the households How fiscal policy influences the allocation of resources between consumption, investment and government purchases. Modelling economic growth Modelling inflation, Net exports, capital flows and exchange rates in the long run The Mundell Fleming model of business cycle, Robinson-Crusoe economy. Robinson-Crusoe and Man Friday economy. The Edgeworth-Bowley box and the production possibility curve. Application to international trade. **Financial Modelling** Basic Excel for Financial Modeling, Financial Statement Analysis ,Introduction to Financial Statement Analysis, Financial Reporting Mechanics, , Understanding Income Statement, Balance Sheet, Cash Flow Statement, Financial Analysis Techniques, Inventories, Long Lived Assets, Non Current Liabilities, Financial Statement Application, Financial Ratios Ratio analysis of industries Du point Analysis Peer to peer analysis Preparation of Financial Analysis report on an industry, Financial Management & Corporate Finance Time value of money , Long term financing , cash flow waterfall & resolve circular reference problem in interest during construction. Equity Research Modeling, Prepare an Income Statement, Balance sheet, Cash Flow Statement, Geographic Revenue Sheet, Segment Revenue Sheet, Cost Statement, Debt Sheet, Analyze Revenue Drivers Forecast Geographic & Segment Revenues, Cost Statement, Debt, Income Statement, Balance Sheet.
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1. Financial Analysis and Modeling Using Excel and VBA by Chandan Sengupta 2. Financial Modeling, Fourth Edition, Simon Benninga, MIT Press 3. Joseph F. Hair, Jr, William C. Black, Barry J. Babin and Rolph E. Anderson, Multivariate Data Analysis, 7th Edition, Pearson Education India, 2014.

1	**Code of the subject**	IMMG-9410
2	**Title of the subject**	Emerging Areas in Finance
3	**Any prerequisite**	
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Vishal Vyas
6	**Will this course require visiting faculty**	
7	**Learning Objectives of the subject (in about 50 words)**	This is an introductory course on emerging markets finance. The objective is to provide students with limited previous exposure to the subject with a basic conceptual framework and practical knowledge regarding finance and investments in emerging markets. The course covers the essential elements of investment decisions in emerging markets as well as basic institutional and macro policy issues affecting emerging markets
8	**Brief Contents (module wise)**	• Economic history Development economics International macroeconomics , International finance Portfolio theory International relations and politics Common sense, • Initial Public Offerings, Seasoned Equity Issues, Financial Crises, Contemporary Issues in Corporate Governance: International Corporate Governance; Institutions and Shareholder Activism, Private equity and Venture Capital
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1. Wall Street Journal 2. Harvard Business Review

1	**Code of the subject**	IMMG-9411
2	**Title of the subject**	Management of Financial Institutions
3	**Any prerequisite**	IMMG-4104, IMMG-4205
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Yash Daultani
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	➢ To make students understand the working of financial institutions ➢ To guide students to utilize the principles of economics and finance to understand complex financial policies and steps
8	**Brief Contents (module wise)**	Module I — The nature and role of financial system Module II — Regulatory and promotional institutions Module III — Banking institutions Module IV — Non-banking financial intermediaries Module V — Statutory financial organizations Module VI — Markets Module VII — Interest rates
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1. Financial Markets and Institutions Paperback by Frederic S. Mishkin (Pearson) 2. Financial Markets and Institutions, 6th Edition by Anthony Saunders and Marcia Cornett (McGraw Hill) 3. Risk Management and Financial Institutions, 4th edition by John C. Hull (Wiley)

1	**Code of the subject**	MBMG-9412
2	**Title of the subject**	Entrepreneurial Finance
3	**Any prerequisite**	
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Vishal Vyas
6	**Will this course require visiting faculty**	
7	**Learning Objectives of the subject (in about 50 words)**	➢ This course will use a combination of case discussions and lectures to study entrepreneurial finance. The course is targeted to budding entrepreneurs and venture capitalists. There are five main areas of focus: ➢ *Business Evaluation and Valuation*: Here we will give you some tools to valuate early stage business opportunity. We will also review the standard tools of valuation applied to start-up situations and introduce the venture capital method and the real options approach to valuation. ➢ *Financing*: In this module, we will highlight the main ways that entrepreneurs are financed and analyse the role of financial contracts in addressing information and incentive problems in uncertain environments. ➢ *Venture Capital Funds*: We will look at the structure of venture capital funds and their fund-raising process. This module will include issues of corporate venture capital and private equity funds in emerging market economies. ➢ *Employment*: We will study the issues of attracting and compensating employees in start-ups. ➢ *Exit*: We will discuss how founders should exit. Should they sell to another company, take it public, or continue independently as a private company?
8	**Brief Contents (module wise)**	• Organizing and financing a new venture, considerations and choices, • Venture capital, angel investors, debt financing, • Project evaluation, real options and risk assessment, • Measuring and evaluating financial performance, • Financial strategy and capital structure, • Governance, incentives and deal structure, • Valuing early stage ventures, venture capital methods, • Exit strategies and harvesting, valuation of an enterprise, • Turnaround strategies for troubled ventures.
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1. Entrepreneurial Finance (Fourth Edition), Leach and Melicher 2. Entrepreneurial Finance: Strategy, Valuation and Deal Structure, Smith, Smith and Bliss 3. Levin, Jack S. *Structuring Venture Capital, Private Equity, and Entrepreneurial Transactions*. Aspen Publishers, 2009. ISBN: 9780735581609. 4. Metrick, Andrew, and Ayako Yasuda. *Venture Capital and the Finance of Innovation*. Wiley, 2010. ISBN: 9780470454701.

Electives: Human Resource Management

1	**Code of the subject**	IMMG 9501
2	**Title of the subject**	Change Management
3	**Any prerequisite**	None
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Manoj Patwardhan
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	Effective management of human resources within organizations requires an understanding of various behavior and processes. Managers need to know why people behave as they do in relation to their jobs, their work groups and their organizations. This knowledge of individuals' perceptions, motivational attitudes and behavior will enable managers to not only understand themselves better, but also to adopt appropriate managerial policies and leadership styles to increase their effectiveness. The major objective of this course is to provide students with a better understanding of behavioral processes and thereby enable them to function more effectively in their present or future roles as managers of human resources.
8	**Brief Contents (module wise)**	**Module I** Definition of Organization Development (OD) OD and planned change from other forms of organization change Describe the historical development of OD Describe and compare three major perspectives on changing organizations. Introduce a General Model of Planned Change Describe how planned change can be adopted to fit different kinds of conditions. **Module II** Understand the essential character of OD practitioners. Understand the necessary competencies required of an effective OD practitioner. Understand the roles and ethical conflicts that face OD practitioners. Reinforce the definition of an OD practitioner as anyone who is helping a system to make planned change. **Module III** Describe the steps associated with starting a planned change process. Equip students with a general framework of diagnostic tools from a systematic perspective. Define diagnosis and to explain how the diagnostic process provides a practical understanding of problems at the organizational level of analysis. **Module IV** Discuss criteria for effective interventions Discuss issues, considerations, constraints, ingredients, and processes associated with intervention design Give an overview of the various interventions. Understand the issues associated with evaluating OD interventions Understand the process of institutionalizing OD interventions and the factors that contribute to it. **Module V** Understand the importance of data feedback in the OD process Describe the desired characteristics of feedback content Describe the desired characteristics of the feedback process.
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1. Organizational Theory, Design and Change by Gareth Jones 2. Organizational development by French and Bell

1	**Code of the subject**	IMMG-9502
2	**Title of the subject**	Organizational Theory & Development
3	**Any prerequisite**	Basic knowledge of principles of management and human resource management
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Prof. Naval Bajpai
6	**Will this course require visiting**	Yes
7	**Learning Objectives of the subject (in about 50 words)**	➢ To understand the organizational theories and principles of organizational management. ➢ To understand the key concepts and issues in managing organizational change and development.
8	**Brief Contents (module wise)**	**Module I: Organizational Theories** Introduction to organizational management, Theory and majors schools of thought and framework of organizational analysis, Systems contingency approach to organization theory and practice; techniques of organizational diagnosis, Theory of organizational structures – nature and consequence of structure. **Module II: Impact of structure and organizational change** Socio-culture dimension of work and behaviour, Impact of Environment and cultural variables on organization structure & style, organization change and its impact. **Module III: Organizational Development** Introduction to organizational development, process of organizational development, power, politics and ethics in organizational development, Evaluating change and future of organizational development. **Module IV: Intervention strategy** Types and process of OD interventions, Intervention strategies for organization development - Individual, Group & Interpersonal Interventions, Total System Intervention & stabilizing change, MBO. **Module V: Environment Analysis & Impact: Automation, Interdependence & Evaluation Issues** Nature of Organizational Processes, Environmental analysis Techniques & impact for organizational growth, Issues of Mechanization, Automation & Computerization, Organization Interdependence, and Organization Evaluation. **Module VI: Perspectives of Organizational Management** Learning organisation, Organisational design and work culture, organisation restructuring, Knowledge management and OD, IT and OD, TQM and OD, Organisational creativity, OD in International context.
9	**Contents for lab (If applicable)**	NA
10	**List of text books/references**	1. Robbins, S. P. & Mathew, M. (2009). Organization Theory: Structure Design & Applications, Pearson Education. 2. Gareth, R. J. & Mathew, M. (2017), Organizational Theory, Design & Change, 7th ed., Pearson Education.

1	**Code of the subject**	IMMG-9503
2	**Title of the subject**	Corporate Social Responsibility
3	**Any prerequisite**	NIL
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Rajesh Rajagopal
6	**Will this course require visiting**	N.A
7	**Learning Objectives of the subject (in about 50 words)**	➢ Understanding the meaning and importance of Corporate Social Responsibility and allied practices. Understand the role of CSR practices for achieving competitive advantage for firms.
8	**Brief Contents (module wise)**	**Module I** The meaning and importance of Corporate Social Responsibility: Evolution of CSR - Primaries of CSR- CSR and law of e-economics - CSR and social legitimacy-CSR Expectations in rich and poor societies-The evolving role of stakeholders -The iron role of social responsibility-Moral and economic arguments for CSR. **Module II** The Role of stakeholders in CSR-Stakeholders advocacy-The role of business in society-Consumers awareness and willingness to pay for socially responsible corporate behavior-Globalization and CSR-Different stakeholder's different perspective-Success and failure with CSR initiatives-Corporate response to citizen demands via CSR -The five stages of organizational growth with CSR. **Module III** The strategic importance of CSR implementation- CSR a balance between organizational means and end-The strategic lens, vision, mission strategy and tactics- Environmental and other global forces propelling CSR- Impact of globalization and communication technologies- The strategic CSR model- The business level CSR threshold- Implementing CSR- CSR as a competitive advantage.
9	**Contents for lab (If applicable)**	NA
10	**List of text books/references**	1. Schwartz, M. S. (2011). Corporate Social Responsibility: An Ethical Approach, Broadview press, Canada. 2. Mallin C.A. (2009). Corporate Social Responsibility: A Case Study Approach, Edward Elgar Publishing, UK. 3. Kotler. P. and Lee, N. (2005).Corporate Social Responsibility: Doing the Most Good for Your Company, Wiley, U.S.

1	**Code of the subject**	IMMG 9504
2	**Title of the subject**	Leadership & Talent Management
3	**Any prerequisite**	None
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Manoj Patwardhan
6	**Will this course require visiting**	IMMG 9504
7	**Learning Objectives of the subject (in about 50 words)**	➢ Leadership and Talent Management primarily focus on managerial leadership as opposed to parliamentary leadership or emergent leadership in informal groups. The objective of this module is to present the theory and research on leadership and talent management in formal group.
8	**Brief Contents (module wise)**	**Module I** Define leader and explain the difference between managers and leaders. Summarize the conclusions of trait theories of leadership. **Module II** Describe the Fiedler contingency model. Summarize the path goal model of leadership. Explain situational leadership. **Module III** Identify the qualities that characterize charismatic leaders and authentic leaders. **Module IV** Meaning of Talent. Talent or Human Capital of an Organization. **Module V** Why Talent/Human Capital management? Functions of Talent Management.
9	**Contents for lab (If applicable)**	NA
10	**List of text books/references**	1. Leadership in Organizations by Gary Yukl. 2. Organizational behavior by Stephens Robbins. 3. Developing Leadership Abilities by Bell & Smith

1	**Code of the subject**	IMMG-9505
2	**Title of the subject**	Competency Management
3	**Any prerequisite**	Human Resource Management (IMMG-4201/MBMG-6201)
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Arun Kumar
6	**Will this course require visiting faculty**	Yes
7	**Learning Objectives of the subject (in about 50 words)**	➢ To understand human capabilities and its alignment with organizational performance ➢ To learn managing human resources through a competency-based system ➢ To get familiarize with the methods for implementing competency-based human resource management
8	**Brief Contents (module wise)**	➢ Introduction of Competency-Based HR Management Practices ➢ Need for Implementing Competency-Based HR Management ➢ Competency-Based HR Planning ➢ Competency-Based Employee Recruitment and Selection ➢ Competency-Based Employee Training ➢ Competency-Based Performance Management ➢ Competency-Based Employee Rewards ➢ Competency-Based Employee Development ➢ The Transformation to Competency-Based HR Management ➢ Competency-Based HR Management: The Next Steps ➢ Exercises on Life-Career Assessment ➢ Case studies on competency evaluation, Ericsson, HRSG
9	**Contents for lab (If applicable)**	-
10	**List of text books/references**	1. David D. Dubois William J. Rothwell, Competency-Based Human Resource Management, Davies-Black Publishing, 2004 2. Barbara A. Brunt, MA, MN, RN-BC, Evidence-Based Competency Management for the Emergency Department, HCPro, Second Edition, 2008

1	**Code of the subject**	IMMG-9506
2	**Title of the subject**	Training and Development
3	**Any prerequisite**	IMMG-4105, IMMG-4201
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Yash Daultani
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	➢ To make students understand the need and importance of training and development ➢ To enable students to develop their technical and soft skills ➢ To explore different tools and techniques used by HR managers for various training and development programs and processes
8	**Brief Contents (module wise)**	➢ Training concept and rationale ➢ Training process of stakeholders in training programme ➢ Organization and management of training function ➢ Training needs assessment-organization analysis ➢ Training climate and pedagogy ➢ Inspirational techniques ➢ Evaluation of training-need for evaluation ➢ Emerging trends in training and development ➢ New perspectives on training
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1. Training and Development: Theories and Applications: Theory and Applications by Dipak Kumar Bhattacharyya (Sage) 2. Employee Training & Development by Raymond Noe (McGraw Hill) 3. Training and Development Methods by Rishipal (S Chand)

1	**Code of the subject**	IMMG 9507
2	**Title of the subject**	Management of Employee Relations
3	**Any prerequisite**	None
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Manoj Patwardhan
6	**Will this course require visiting**	No
7	**Learning Objectives of the subject (in about 50 words)**	To develop an understanding of the interaction pattern among labour, management and the State .To build awareness of certain important and critical issues in Industrial Relations .To impart basic knowledge of the Indian Industrial Relations System and its distinctive features.
8	**Brief Contents (module wise)**	**Module I** The evolution of Industrial relations, understand the scope and objectives of Industrial relations. Essential of Industrial relations, participants of Industrial relations and dynamics of their participation, perspective and approach. **Module II** The system of industrial relation in India, the historical perspective of Industrial relations. Describe the trends in Industrial relations management. **Module III** The changing characteristics of Industry and workforce in India, Describe the demand for labour, The challenges to industrial relations. **Module IV** Labour Laws pertaining to Industrial relations viz Trade Union act, Industrial dispute act, Factories act. **Module V** A paradigm shift from Industrial relations to Employee Relations. Understand the Employee relations management. Describe the differences in perspective of employee relations and industrial relations.
9	**Contents for lab (If applicable)**	NA
10	**List of text books/references**	1. Employee Relations Management by P.N. Singh and Neeraj Kumar 2. Industrial Relations & Labour Laws by Arun Monappa,Ranjeet Nabudiri & Patturaja Selvaraj 3. Industrial Relations & Labour Laws by Piyali Ghosh & Shefali Nandan

1	**Code of the subject**	IMMG 9508
2	**Title of the subject**	Labour Laws
3	**Any prerequisite**	None
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Manoj Patwardhan
6	**Will this course require visiting**	No
7	**Learning Objectives of the subject (in about 50 words)**	The labour force or the workmen constitute an important segment of the society and play a vital role in the development and progress of the Country. Due to the fast pace of industrialization there is a need to regulate and control the relation between the employer and employees. This has led to the evolution and development of labour laws all over the world. After the Independence the Government of India has enacted numerous legislations for the regulation of labour relations and their welfare. An understanding of Labour Laws is very essential for students because of the fact that the scope and ambit of these is very wide and is touching the lives of millions of people in the country.
8	**Brief Contents (module wise)**	**Module I** Labour Laws –Origin and Development –Nature and Need – Objectives and Principles of Labour Laws –Development of Labour Laws in India–Pre and Post Independence Period-Indian Constitution and Labour Laws. Labour Welfare in India -Impact of Liberalization and Globalization – Labour Policy of India **Module II** Payments of Wages act 1936 – Minimum wages act 1948, Payment of Bonus 1965. -Concept, features, objectives and provisions. **Module III** Workmen Compensation Act 1923 – definition – provisions regarding compensation – doctrine of national extension, doctrine of added peril, doctrine of contributory negligence. **Module IV** ESI Act 1948, Maternity benefit Act, Provident Fund Act 1952 and Gratuity Act 1972.
9	**Contents for lab (If applicable)**	NA
10	**List of text books/references**	1. Labour Law for Managers by B D Singh 2. Industrial Relations and Labour Laws by S C Srivastava 3. Labour and Industrial Laws by S N Mishra

1	**Code of the subject**	IMMG 9509
2	**Title of the subject**	Emerging Areas in Human Resource Management
3	**Any prerequisite**	None
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Manoj Patwardhan
6	**Will this course require visiting**	Yes
7	**Learning Objectives of the subject (in about 50 words)**	Human resource management (HRM) consists of an organization's policies, practices, and systems that influence employee behavior, attitude, and performance. Human resource management is an ever changing system as it responds to an ever-changing business environment. This course looks at human resource management areas related to government regulation, staffing demands, and improved technology.
8	**Brief Contents (module wise)**	1. Technology Leads the Trends 2. Generations in the Workplace 3. Greater Role in Culture 4. Rise in healthcare costs 5. Focus on domestic security 6. Use of technology to communicate 7. Complexity of legal compliance 8. Use of technology to perform HR functions 9. Focus on global security 10. Preparing for next wave of retirement 11. Use and development of e-learning 12. Exploring of jobs to developing countries 13. Changing definition of family 14. Dealing with millennial
9	**Contents for lab (If applicable)**	NA
10	**List of text books/references**	1. Emerging Trends in HRM: Sectoral Experiences: by Mrudula E , V V Ramani 2. The HR Answer Book: An Indispensable Guide for Managers and Human Resources Professionals by Shawn Smith , Rebecca Mazin

1	**Code of the subject**	IMMG-9510
2	**Title of the subject**	Empirical research methods in HR
3	**Any prerequisite**	Basic knowledge of statistics and research methodology
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Prof. Naval Bajpai
6	**Will this course require visiting**	Yes
7	**Learning Objectives of the subject (in about 50 words)**	➢ To understand the role of research methods in human resource management ➢ To understand about the research and analysis for appropriate internal and external human resource metrics, benchmarks, and indicators. ➢ To understand various empirical tools and techniques for using in the field of human resource management
8	**Brief Contents (module wise)**	**Module I: Principles of HR research** Introduction to HR research, different approaches to HR research, Literature review on HR research, Model Building in HR research, Selection of area of research **Module II: Sampling and survey for HR research** Sampling for HR research, Questionnaire and survey, data collection and preparation **Module III: Data analysis for HR research** Using appropriate statistical test for HR research, hypotheses formulation and testing, performing data analysis for HR research **Module IV: Empirical methods for HR research** HR research tools and techniques, Parametric and Non-parametric tests, Applications of multivariate statistics in HR research **Module V: Applications of empirical research in HR** Human resource planning research, compensation research, research on employee motivation, training and development research, performance management research, research on organizational culture and development, Human resource accounting and audit research **Module VI: Report preparation and writing** Ethical issues in HR research, presentation of HR reports
9	**Contents for lab (If applicable)**	**Empirical methods for HR research** HR research tools and techniques, Parametric and Non-parametric tests, Applications of multivariate statistics in HR research
10	**List of text books/references**	1. Bhattacharyya, D. K., Human Resource Research Methods. Oxford University Press. 2. Sanders, K., Cogin, J. A., and Bainbridge, H. T. J. (2014), Research methods for Human Resource Management. Routledge, Taylor & Francis Group. 3. Bajpai, N. (2017). Business Research Method, 2nd ed., Pearson Education, India

Electives: Management of Social Sector

1	**Code of the subject**	IMMG-9601
2	**Title of the subject**	Infrastructure Management
3	**Any prerequisite**	IMMG-4103
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Yash Daultani
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	➢ To evaluate current infrastructural trends in Indian business environment ➢ To distinguish and highlight the factors and analytics tools that are used by infrastructural project managers ➢ To assess current Indian infrastructural policies and future roadmap
8	**Brief Contents (module wise)**	➢ Introduction to infrastructure management ➢ Overview of infrastructure needs ➢ Indian Infrastructure policies ➢ Infrastructure economics ➢ Marketing and infrastructure services ➢ Strategy and competition for infrastructure ➢ Integrated infrastructure management system ➢ Information system for infrastructure management ➢ Infrastructure project management ➢ Legal aspects of infrastructure management ➢ Regulatory issues in infrastructure management ➢ Rural infrastructure management ➢ Technology change management in infrastructure sectors ➢ Sustainable infrastructure management
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1. Project and Infrastructure Finance: Corporate Banking Perspective by Vikas Srivastava and V Rajaraman (Oxford university press) 2. Financing Cities in India: Municipal Reforms, Fiscal Accountability and Urban Infrastructure Hardcover by Prasanna K. Mohanty (2016)

1	**Code of the subject**	IMMG-9602
2	**Title of the subject**	Public Private Partnerships
3	**Any prerequisite**	-
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Arun Kumar
6	**Will this course require visiting faculty**	Yes
7	**Learning Objectives of the subject (in about 50 words)**	➢ To get an understanding of public private partnerships (PPP) ➢ To learn the challenges of public private partnerships in Indian context ➢ To get familiarize with different ways of financing and structuring public private partnerships
8	**Brief Contents (module wise)**	➢ Infrastructure and Public–Private Partnerships: Overview and Key Issues ➢ Infrastructure PPPs—Concepts and Evidence ➢ Financing Infrastructure ➢ Public-Private Partnership (PPP) Concepts ➢ The PPP Framework ➢ Models of PPP—Taxonomy and Issues ➢ Sectoral Distribution and Sector-Specific Issues for Infrastructure PPPs ➢ Designing and Structuring PPP Transactions ➢ PPPs in India ➢ Basics of Management Control in Public-Private Partnerships ➢ Critical Success Factors ➢ Case studies on Dar es Salaam Water and Sewerage Services, Mexican Toll Roads, Dabhol Power Project, Delhi Power Distribution PPP, Delhi International Airport Ltd
9	**Contents for lab (If applicable)**	-
10	**List of text books/references**	1. Kumar V. Pratap and Rajesh Chakrabarti, Public-Private Partnerships in Infrastructure, Springer, 2017 2. Julian Teicher, Bernadine Van Gramberg, Marius Profiroiu and Cristina Neesham, Sharing Concerns: Country Case Studies in Public-Private Partnerships, Cambridge Scholars Publishing, 2013 3. Stefano Caselli, Guido Corbetta, Veronica Vecchi, Public Private Partnerships for Infrastructure and Business Development: Principles, Practices, and Perspectives, Palgrave Macmillan, 2015

1	**Code of the subject**	IMMG-9603
2	**Title of the subject**	Public Policy and Processes
3	**Any prerequisite**	-
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Arun Kumar
6	**Will this course require visiting faculty**	Yes
7	**Learning Objectives of the subject (in about 50 words)**	➢ To understand the role of public policy ➢ To get familiarize with the impact of public policies on communities at large and policy process ➢ To critically analyze different public policies
8	**Brief Contents (module wise)**	➢ Introduction to public policy ➢ Public policy: causes and consequences ➢ Elements of the policy making systems ➢ Models for policy analysis ➢ The policy making process ➢ Policy evaluation ➢ Criminal justice ➢ Welfare ➢ Healthcare ➢ Education ➢ Economic policy ➢ Budgeting and taxation ➢ International trade and immigration ➢ Energy and the environment ➢ Civil rights ➢ Administrative Reform and Technology ➢ The Political Context of Public Administration ➢ The Future of the Public Service ➢ Decision making and policy analysis ➢ Policy implementation, failure and learning ➢ Case studies on Participatory Scientific Watershed Management in Gujarat State, Monitoring of The Mid Day Meal Scheme in Uttar Pradesh, SAMARPAN: Early Identification and Intervention to check Disability, MGNREGA etc.
9	**Contents for lab (If applicable)**	-
10	**List of text books/references**	1. R. B. Denhardt, J. V. Denhardt, Public Administration, Cengage Learning, 2010 2. Thomas R. Dye, Understanding Public Policy, Pearson, 14th edition, 2012 3. Thomas A. Brikland, an Introduction to the Policy Process, Routledge, 4th edition, 2016 4. Department of Administrative Reforms and Public Grievances, https://darpg.gov.in/relatedlinks/case-studies

1	**Code of the subject**	IMMG-9604
2	**Title of the subject**	Management of Rural and Social Sector
3	**Any prerequisite**	-
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Arun Kumar
6	**Will this course require visiting faculty**	Yes
7	**Learning Objectives of the subject (in about 50 words)**	➢ To understand the importance of rural and social sector ➢ To get an understanding about the principles, policies and management of rural and social sector ➢ To get familiarize with social sector organizations and their leaders
8	**Brief Contents (module wise)**	➢ Rural Economy of India ➢ Measures of Development ➢ Determinants of Rural Development ➢ Rural Development Policies ➢ Strategies for Sustainable Development ➢ Policy Instruments of Rural Development ➢ Equity-oriented and Growth-oriented Programmes ➢ Natural Resources and Infrastructure Development Programmes ➢ Planning, organizing and financing rural development ➢ Implementation, monitoring and evaluation ➢ Leading Social Innovation ➢ Role of NGOs ➢ Social Entrepreneurship ➢ Engaging Meaningfully in the Complex Social Context ➢ Fostering Organization Resilience ➢ Leading in Social Sector Organizations ➢ Measuring Success ➢ Case study of Srishti
9	**Contents for lab (If applicable)**	-
10	**List of text books/references**	1. Katar Singh, Rural Development Principles, Policies and Management, Sage Publication, 3rd edition, 2009 2. S. Aqeel Tirmizi, John D. Vogelsang, Leading and Managing in the Social Sector, Springer, 2017

1	**Code of the subject**	IMMG-9605
2	**Title of the subject**	Sustainable Development
3	**Any prerequisite**	-
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Arun Kumar
6	**Will this course require visiting faculty**	Yes
7	**Learning Objectives of the subject (in about 50 words)**	➢ To get an understanding of sustainable development and sustainable development goals ➢ To get familiarity with natural world and the human social world ➢ Understanding linkage between economy, society and environment ➢ To learn sustainable ways of producing, consuming and investing
8	**Brief Contents (module wise)**	➢ Introduction to sustainable development ➢ Ecological paradigm ➢ Science and sustainability ➢ 3 P's framework ➢ Social and environmental justice ➢ Sustainable development and governance ➢ Conservation ➢ Tools, systems and innovations for sustainability ➢ Communication and learning for sustainability ➢ Leading the sustainability process ➢ Challenges of Sustainable Development ➢ Sustainable Development Indicators ➢ Environmental Assessment ➢ Natural Resource Accounting ➢ The Role of International Financial Institutions ➢ Sustainable Development: Crisis, Conflict, and Compromise ➢ Role of communities in inclusive development
9	**Contents for lab (If applicable)**	-
10	**List of text books/references**	1. John Blewitt, Understanding Sustainable Development, Routledge Publication, 3rd edition, 2018. 2. Peter P. Rogers, Kazi F. Jalal and John A. Boyd, An introduction to sustainable development, Earthscan Publications, 2007 3. Pradip Swarnakar, Stephen Zavestoski and Binay Kumar Pattnaik, 'Bottom-up' Approaches in Governance and Adaptation for Sustainable Development: Case Studies from India and Bangladesh, Sage, 2017

1	**Code of the subject**	IMMG-9606
2	**Title of the subject**	Management of Non Formal Organization
3	**Any prerequisite**	-
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Arun Kumar
6	**Will this course require visiting faculty**	Yes
7	**Learning Objectives of the subject (in about 50 words)**	➢ To understand the role of non-formal human relationships and its possible integration with formal structures and systems for performance enhancement ➢ To understand the strategic goals achievement through non-formal organization ➢ To get familiarize with the tool for assessing organizational quotient
8	**Brief Contents (module wise)**	➢ Introduction to non-formal organizations **Using the Non-formal to Enhance the Formal** ➢ The Logic of the Formal; the Magic of the Non-Formal ➢ When the Balance Shifts ➢ Jumping Together **Motivating Individual Performance** ➢ It's All About the Work ➢ Values Driven, Not Values Displayed ➢ It's Still About Performance **Mobilizing Organizational Change** ➢ Setting the Fast Zebras Free ➢ Melting the Frozen Tundra ➢ Mobilizing: A Different Kind of Managing ➢ What to Do A Diagnostic Tool: Assessing Your Organizational Quotient
9	**Contents for lab (If applicable)**	-
10	**List of text books/references**	Text Book 1. Jon R. Katzenbach, Zia Khan, Leading Outside the Lines: How to Mobilize the Informal Organization, Energize Your Team, and Get Better Results, Wiley, 2010 Articles 1. Perceptions of the Formal and the Informal Organizations: Objective Measurement through the Semantic Differential Technique, Academy of Management 2. Managing the Chaos and Complexities of Informal Organizations for the Effectiveness of Schools as Formal Organizations, IGI Global 3. Managing the informal organization: conceptual model, Emerald 4. The key roles in the informal organization: a network analysis perspective, Emerald

1	**Code of the subject**	IMMG-9607
2	**Title of the subject**	Information Technology Enabled Services
3	**Any prerequisite**	NIL
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Rajesh Rajagopal
6	**Will this course require visiting faculty**	Yes
7	**Learning Objectives of the subject (in about 50 words)**	➢ Understand the business strategy and business implications for strategic IT planning. Equip students to understanding the concepts of IT infrastructure library and services
8	**Brief Contents (module wise)**	**Module I:** Business Strategy: Challenges- Opportunities- Interconnection- Establish Principles before Practice- IT Strategy- Application Strategy- Technology Strategy for IT- IT Management Strategy- Developing IT Strategy for Competitive Advantage- Stages of IT Strategy Development and Implementation- Challenges of IT and Business Strategy Alignment- Inhibitors of Business and IT Strategy Alignment- Three-D Framework for Business and IT Strategy Alignment. **Module II:** Business Implications for IT Strategy and Planning- Strategic IT Planning- Motivations- SITP Process: Prevalent Planning Approaches- Difficulties- Best Practices for Achieving Good SITP- SITP Approaches: Prevalent Researches- Defining EITA- Contents of a Typical Enterprise IT Architecture- Standard for Enterprise IT Architecture- Technology Management strategy Framework- Prevalent Technology- Reference Architectures Framework and Standards- Program Management- Benefits of PMO- Desired Qualities of a Program Office Manager- Maturity of PMO-Implementation of PMO Strategy- Measuring PMO Performance- Success Factors for PMO- Project Scope Management- PMO Dashboard and Reporting. **Module III:** Information Technology Infrastructure Library (ITIL)- ITIL Overview- ITIL Service- Support Processes- Incident Management- Problem Management- Service Delivery- Service Level Management- Financial Management- Capacity Management- IT Service Continuity Management (ITSCM)- Availability Management- Imperatives for Outsourcing- IT Management Layers- Variants of Outsourcing- Business Process Outsourcing- Insourcing.
9	**Contents for lab (If applicable)**	NA
10	**List of text books/references**	1. Treebhoohun, N. (2011). Promoting IT Enabled Services, Commonwealth Secretariat. UK. 2. Uesugi, S. (2013). IT Enabled Services, Springer, US. 3. Spath, D. and Fähnrich, K.P. (2007). Advances in Services Innovations, Springer, US.

1	**Code of the subject**	IMMG-9608
2	**Title of the subject**	Healthcare System Management
3	**Any prerequisite**	-
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Arun Kumar
6	**Will this course require visiting faculty**	Yes
7	**Learning Objectives of the subject (in about 50 words)**	➢ To understand the concepts, principles, and approaches of healthcare management ➢ To get familiarize with healthcare delivery organizations ➢ To learn quality and safety quality and safety in healthcare using systems approach
8	**Brief Contents (module wise)**	➢ An Overview of Healthcare Management ➢ Strategic Planning ➢ Healthcare marketing ➢ Quality improvement basics ➢ Information technology ➢ Financing healthcare and health insurance ➢ Managing costs and revenues ➢ Managing healthcare professionals ➢ Ethics, fraud and abuse ➢ The systems approach ➢ Systems models for healthcare managers ➢ Expanding the boundaries of the system ➢ Systematic structure ➢ Case studies on Medication error, Surgical site infection, Changing physician role etc.
9	**Contents for lab (If applicable)**	-
10	**List of text books/references**	1. Sharon B. Buchbinder , Nancy H. Shanks and Bobbie Kite, Introduction To Health Care Management, Jones and Bartlett Publishers, 4th edition, 2019 2. Diane L. Kelly, Applying Quality Management in Healthcare: A systems Approach, Health Administration Press, 2nd edition, 2007 3. Sharon Bell Buchbinder, Nancy H. Shanks, Dale Buchbinder, Cases in Health Care Management, Jones & Bartlett Publishers, 2013

1	**Code of the subject**	IMMG-9609
2	**Title of the subject**	Emerging Areas in Management of Social Sector
3	**Any prerequisite**	Nil
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr Vinay Singh
6	**Will this course require visiting faculty**	Not Required
7	**Learning Objectives of the subject (in about 50 words)**	The social sector is currently in a vibrant, dynamic, and exciting stage. The number and types of social sector organizations have increased exponentially around the world and are offering extraordinary and much needed contributions toward an array of social issues. At the same time, the emerging organizational forms under the social entrepreneurship umbrella are providing new momentum and excitement within and outside of the social sector. Thus the course focuses on providing the fundamental understanding about social entrepreneurship, encouraging social engineering and innovation, following trend of larger social sector and dynamics of promoting and creating "hybrid" and emergent social organization forms which cross and combine the traditional non-profit and for-profit domains.
8	**Brief Contents (module wise)**	Introduction of what is Unique about Social Sector? Using term of Social Sector, Social Entrepreneurship, Opportunity; Leading Innovation in the Social Sector: understanding the dynamics of innovation basics); Lessons from social organization cases; Social Entrepreneurship: A call for collective action; exploring the real work of social change: seven questions that keep us awake
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1. Leading and Managing in the Social Sector, Strategies for Advancing Human Dignity and Social Justice Tirmiz**i**, S. Aqeel, Vogelsang, John D. (Eds.), Springer Publication 2. Entrepreneurship in Social Sector by Sage Publication

Electives: Business Analytics

1	**Code of the subject**	IMMG-9701
2	**Title of the subject**	Accounting Analytics
3	**Any prerequisite**	Knowledge of statistics and analytical techniques
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Prof Naval Bajpai
6	**Will this course require visiting**	Yes
7	**Learning Objectives of the subject (in about 50 words)**	➢ Accounting Analytics explores how financial statement data and non-financial metrics can be linked to financial performance. While many accounting and financial organizations deliver data, accounting analytics deploys that data to deliver insight, and this course will explore the many areas in which accounting data provides insight into other business areas including consumer behavior predictions, corporate strategy, risk management, optimization, and more. This course has been designed to help student make better business decisions about the emerging roles of accounting analytics, so that, they can apply what they have learned to make business decisions and create strategy using financial data.
8	**Brief Contents (module wise)**	**Module I: Ratios and Forecasting:** Financial ratios: - Profitability Ratios, Turnover Ratios and Liquidity Ratios. Analysis of Financial Statements and these ratios for financial statement forecasting. Introduction to DuPont Analysis. **Module II: Earnings Management :** Overview of Earnings Management .Revenue Recognition: Revenue Before Cash Collection and Revenue After Cash Collection .Expense Recognition: Capitalizing vs. expensing and Reserve Accounts Write-Offs. **Module III: Big Data and Prediction Models:** Discretionary Accruals: Model and Cases. Discretionary Expenditures: Models, Refinements and Cases. Fraud Prediction Models. Benford's Law. **Module IV: Linking Non-financial Metrics to Financial Performance :** Introduction: Connecting Numbers to Non-financial Performance Measures .Linking Non-financial Metrics to Financial Performance: Overview. Steps to Linking Non-financial Metrics to Financial Performance, Incorporating Analysis Results in Financial Models.
9	**Contents for lab (If applicable)**	Application of softwares
10	**List of text books/references**	1. Data Analytics for Accounting. Book by Katie L. Terrell, Ryan Teeter, and Vernon Richardson 2. Forensic Analytics: Methods and Techniques for Forensic Accounting Investigations. Book by Mark J. Nigrini 3. Analytics and Big Data for Accountants. Book by Jim Lindell

1	**Code of the subject**	IMMG-9702
2	**Title of the subject**	Business Analytics and Consulting
3	**Any prerequisite**	Basic knowledge of business statistics
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Prof. Naval Bajpai
6	**Will this course require visiting**	No
7	**Learning Objectives of the subject (in about 50 words)**	➢ To identify, evaluate, and capture business analytical opportunities ➢ To understand about analytical methods and techniques used in consulting ➢ To understand about how to use data to develop insights and make decisions for business consulting projects ➢ To gain exposure to a variety of processes and interventions involved in the management consulting arena
8	**Brief Contents (module wise)**	**All modules will have special focus on applications in business consulting domain.** **Module I: Foundations of Business Analytics** Introduction to business analytics, analytics on spreadsheets **Module II: Descriptive Analytics** Visualizing and exploring data, descriptive statistical measures, probability distributions and data modelling, sampling and estimation, statistical inference **Module III: Predictive Analytics** Trendlines and regression analysis, forecasting techniques, introduction to data mining, Spreadsheet modelling and analysis, Monte Carlo simulation and risk analysis **Module IV: Prescriptive Analytics** Linear optimization, applications of linear optimization, integer optimization, decision analysis **Module V: Consulting to Global Clients** Diverse issues related to globalization consulting, Managing consulting projects
9	**Contents for lab (If applicable)**	**Module I: Descriptive Analytics** Visualizing and exploring data, descriptive statistical measures, probability distributions and data modelling, sampling and estimation, statistical inference **Module II: Predictive Analytics** Trendlines and regression analysis, forecasting techniques, introduction to data mining, Spreadsheet modelling and analysis, monte carlo simulation and risk analysis **Module III: Prescriptive Analytics** Linear optimization, applications of linear optimization, integer optimization, decision analysis
10	**List of text books/references**	1. Evans, J. R., Business Analytics: Methods, models and decisions, 2nd ed. Pearson education 2. Laursen, G. H. N., & Thorlund, J, Business Analytics for managers: Taking business intelligence beyond reporting, Wiley & SAS Business Series 3. Albright, S. C., & Winston, W. L. (2015). Business Analytics: Data Analytics and Decision Making, Cengage learning 4. Block, Peter. Flawless Consulting, latest edition. University Associates, La Jolla.

1	**Code of the subject**	IMMG-9703
2	**Title of the subject**	Energy Analytics and Modelling
3	**Any prerequisite**	NIL
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Rajesh Rajagopal
6	**Will this course require visiting**	N. A.
7	**Learning Objectives of the subject (in about 50 words)**	➢ Introduction to topics of energy analytics, tools and techniques for energy analytics, and building energy standards and energy management for business.
8	**Brief Contents (module wise)**	**Module I:** Energy Crisis- Codes & Milestones- Global trends- Peak Oil 2020- building energy use & challenges-History & definitions of energy standards-codes and protocols-Energy policies- Need for Building Energy Evaluation-Importance of energy evaluation- Terminology & metrics -Approach to new & existing buildings- Building Energy Analysis (BEA)-Introduction to Building Energy Analysis -BEA as a tool for decision- making- BEA as a process-oriented approach- Optimization methods-Energy performance analysis- Data Envelopment Analysis- Stochastic frontier analysis. **Module II:** Energy Analysis Tools, Types & Capabilities- System sizing tools & system performance evaluation tools- Macroscopic & Microscopic analysis tools-Calculation methodologies- tools availability & capability- Predictive Model Controls-Component based Modeling- Energy Standards- Protocols & Rating System-Strategic planning- demand response –stochastic programming **Module III:** Pattern based energy consumption- analysis- principal component analysis-logistic regression- environmental regulation- energy management process for business- parameter estimation methods- design of experiments for energy modelling-Statistical data analysis-tools.
9	**Contents for lab (If applicable)**	NA
10	**List of text books/references**	1. Seog-Chan, O. and Hildreth, A. J. (2016). Analytics for Smart Energy Management: Tools and Applications for Sustainable Manufacturing, Springer, Switzerland. 2. Giannakidis, G., Labriet, M., Gallachóir, B, and Tosato, G. C. (2016). Informing Energy and Climate Policies Using Energy Systems Models: Insights from Scenario Analysis, Springer, Switzerland. 3. Reddy, T. A. (2011). Applied Data Analysis and Modeling for Energy Engineers and Scientists, Springer, US.

1	**Code of the subject**	IMMG-9704
2	**Title of the subject**	Financial Analytics and Modeling
3	**Any prerequisite**	NIL
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Rajesh Rajagopal
6	**Will this course require visiting faculty**	Yes
7	**Learning Objectives of the subject (in about 50 words)**	➢ Understand various tools and techniques for financial analytics and modelling. Introduce the students into concepts of time series modelling and forecasts in the finance industry.
8	**Brief Contents (module wise)**	**Module I** Time series modelling in the finance industry- forecasting- characteristics- challenges- good vs. bad forecast- time series and finance industry- managing customer loyalty- survival modelling- survival analysis. **Module II** Forecasting stock prices- portfolio decisions- portfolio forecasting- portfolio demand decisions- visualization- multicollinearity- autocorrelation- ARIMA- validation- Credit risk management- Discounted cash flow analysis- comparable company analysis. **Module III** Transforming time series- Market basket analysis- segmentation- overview- clustering- methodology- modelling.
9	**Contents for lab (If applicable)**	NA
10	**List of text books/references**	1. Gulati, H. (2018). SAS for Finance: Forecasting and data analysis techniques with real-world examples, Packt publishing, UK. 2. Ryzhov, P. (2018). Haskell Financial Data Modeling and Predictive Analytics, Packt publishing, UK. 3. Pignataro, P. (2018). Financial Modeling and Valuation: A Practical Guide to Investment Banking and Private Equity, Wiley, UK.

1	**Code of the subject**	IMMG-9705
2	**Title of the subject**	Health Care Analytics
3	**Any prerequisite**	-
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Arun Kumar
6	**Will this course require visiting faculty**	Yes
7	**Learning Objectives of the subject (in about 50 words)**	➢ To understand the applications of data analytics and business intelligence in healthcare ➢ To familiarize with health data visualization such as graphs, infographics, and dashboards ➢ To explore future directions in healthcare analytics
8	**Brief Contents (module wise)**	➢ Introduction to Healthcare, Data Analytics, and Business Intelligence ➢ The Four Enterprise Disciplines of Health Analytics ➢ Descriptive, Predictive, and Prescriptive Analytics ➢ Healthcare Analytics Applications ➢ Data Visualization ➢ Best Care, First Time, Every Time ➢ Financial Performance and Reimbursement ➢ Health Outcomes Analysis ➢ Health Value and Cost ➢ The New Behavioral Health ➢ Customer Insights ➢ Risk Management ➢ Quality and Safety
9	**Contents for lab (If applicable)**	-
10	**List of text books/references**	1. Jason Bruke, Health Analytics: Gaining the insights to transform healthcare, Wiley, 2013 2. Christo El Morr and Hossam Ali-Hassan, Analytics in Healthcare: A Practical Introduction, Springer, 2019 3. Rajendra Sahu, Manoj Dash and Anil Kumar, Applying Predictive Analytics Within the Service Sector (Advances in Business Information Systems and Analytics), IGI Global, 2017

1	**Code of the subject**	IMMG-9706
2	**Title of the subject**	Marketing Analytics and Research
3	**Any prerequisite**	IMMG-4203
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Yash Daultani
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	➢ To emphasize and bring out the strategic role of Marketing Analytics ➢ To learn using tools and techniques of Marketing Analytics ➢ Understanding the state of the art and contemporary research issues
8	**Brief Contents (module wise)**	Module I: Data collection and analysis Module II: Pricing Module III: Forecasting Module IV: Customer preferences Module V: Customer value Module VI: Market segmentation Module VII: Forecasting New Product Sales Module VIII: Retailing Module IX: Advertising Module X: Marketing research tools
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1. Marketing Research, 7/e Paperback by Malhotra/Dash (Pearson, 2015) 2. Marketing Data Science - Modeling Techniques in Predictive Analytics with R and Python by Thomas W. Miller (2018) 3. Marketing Analytics: Strategic Models and Metrics by Stephan Sorger (2013)

1	**Code of the subject**	IMMG-9707
2	**Title of the subject**	Multivariate Analysis
3	**Any prerequisite**	Basic knowledge of statistics
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Prof. Naval Bajpai
6	**Will this course require visiting**	Yes
7	**Learning Objectives of the subject (in about 50 words)**	➢ To understand about analytical methods and techniques for multivariate analysis ➢ To understand about how to use data to develop insights and make decisions for a project
8	**Brief Contents (module wise)**	**Module I: Preparing for a Multivariate analysis** Introduction to Multivariate analysis, Utility, Prerequisites and Objectives of Multivariate analysis, Types of data, Examine your data **Module II: Interdependence techniques** Factor analysis, Cluster analysis, Multidimensional scaling, Correspondence analysis **Module III: Dependence techniques** Multiple regression analysis, Multiple discriminant analysis, Logistic regression, Multivariate analysis of variance, Conjoint analysis **Module IV: Moving beyond basic techniques** Structural equation modelling (SEM): An Introduction, SEM: Confirmatory factor analysis, SEM: Testing a structural modelling
9	**Contents for lab (If applicable)**	**Module I: Interdependence techniques** Factor analysis, Cluster analysis, Multidimensional scaling, Correspondence analysis **Module II: Dependence techniques** Multiple regression analysis, Multiple discriminant analysis, Logistic regression, Multivariate analysis of variance, Conjoint analysis **Module III: Moving beyond basic techniques** Structural equation modelling (SEM): An Introduction, SEM: Confirmatory factor analysis, SEM: Testing a structural modelling
10	**List of text books/references**	1. Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L., Multivariate Data Analysis, Pearson Education 2. Bajpai, N., Business Research Methods, 2nd ed., Pearson Education 3. Malhotra, N. K. & Dash, S., Marketing Research: An applied orientation, Pearson Education

1	**Code of the subject**	IMMG-9708
2	**Title of the subject**	Supply Chain Analytics
3	**Any prerequisite**	Supply chain Management (IMMG-9201/MBMG-9201) / Competence in Excel/R/Python is expected
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Arun Kumar
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	➢ To understand the role of analytics in optimizing supply chain ➢ To get an understanding of supply chain data and decision making ➢ To get an understanding of risk concepts in supply chain ➢ To get familiarize with optimization approaches for supply chain risk mitigation
8	**Brief Contents (module wise)**	➢ Introduction to supply chain analytics ➢ A Review of Optimization Methods ➢ Forecasting ➢ Planning and Scheduling ➢ Inventory Control ➢ Location Theory and Distribution Management: Role of Analytics ➢ Predictive Maintenance: A World of Zero Unplanned Downtime ➢ The Genesis of Supply Chain Risk ➢ Supply Chain Risk Analytics ➢ Simulation for Supply Chain Analysis ➢ Design, Metamodeling, and Analysis of Simulation Experiments ➢ Strategic Supply Chain Risk Mitigation – Optimization Approaches
9	**Contents for lab (If applicable)**	-
10	**List of text books/references**	1. Iris Heckmann, Towards Supply Chain Risk Analytics, Springer, 2016 2. Ioannis T. Christou, Quantitative Methods in Supply Chain Management, Springer, 2012

1	**Code of the subject**	IMMG-9709
2	**Title of the subject**	Logistics Analytics
3	**Any prerequisite**	IMMG-4202, IMMG-4204
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Yash Daultani
6	**Will this course require visiting faculty**	No
7	**Learning Objectives of the subject (in about 50 words)**	➢ To identify logistics network structures and their associated logistics benefits and costs, service quality, and management concerns ➢ To analyze distribution decisions and analysis of distribution systems. ➢ To learn using quantitative tools for Logistics Analytics
8	**Brief Contents (module wise)**	The course will be based on lectures, cases, simulation, discussion, presentation and exercises. Students are expected to use relevant computer software throughout the course. Brief contents are as following. ➢ Introduction and Overview of Logistics ➢ Supply chain management challenges ➢ Distribution management problems ➢ Inventory management practices ➢ Transportation modeling ➢ International logistics networks ➢ Sustainable Supply Chains ➢ Supply chain finance ➢ Issues in outsourcing logistics ➢ IT tools for logistics ➢ Applied Logistics data analytics
9	**Contents for lab (If applicable)**	
10	**List of text books/references**	1. Logistics, Supply Chain and Financial Predictive Analytics: Theory and Practices (Asset Analytics) 1st Edition, by Kusum Deep, Madhu Jain & Said Salhi, Springer 2. Supply Chain Analytics: A Multipart Case in Sourcing, Logistics, Warehouse Location, and Inventory Planning by F. Robert Jacobs 3. Supply Chain Management: Strategy, Planning, and Operation, 6th Edition by Sunil Chopra & Peter Meindl, Pearson

1	**Code of the subject**	IMMG-9710
2	**Title of the subject**	Organizational Analytics and Research
3	**Any prerequisite**	Basic knowledge of statistics and research methods
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Prof Naval Bajpai
6	**Will this course require visiting**	No
7	**Learning Objectives of the subject (in about 50 words)**	To become familiar with a series of real-world organizational phenomena; to learn different theoretical perspectives that can elucidate these phenomena; and to apply these different ways of "seeing" and managing organizations to cases. In such a fashion, the course is designed to actively bridge theory and practice, exposing students to a variety of conceptual tools and ways to negotiate novel situations.
8	**Brief Contents (module wise)**	**Module I: Introduction to organization** Introduction to Organizations. Introduction to Organizations - Analytic .Features of Organizations. Multiunit Organizations .Social Movements and Temporary Organizing. Leaders. Resistance to Change .Open Organizations. **Module II: Decisions by Rational and Rule-based Procedures** Rational Actor .Superstitions in organization. Decision Theory: Introduction and applications. Culture and Intuition. **Module III: Decisions by Dominant Coalitions** Exchange and Coalitions. Exchange and Coalitions. Lobbying Coalitions. Coalition Leaders .Invisible Resistance. **Module IV: Organizational Learning** Organizational Learning. Learning from Failure. Strong Culture as Obstacle to Adaptation. Managing Resistance to Organizational Learning. Forgetting and Radical Change. Remembering and Promoting Learning. **Module V: Resource Dependency Theory** Resource Dependency Theory. Powerful Resources. Outsourcing.5Qs.
9	**Contents for lab (If applicable)**	General research techniques for dealing organizational issues
10	**List of text books/references**	1. Data-driven Organization Design: Sustaining the Competitive Edge Through Organizational Analytics, Book by Rupert Morrison 2. Big Data and Analytics: Strategic and Organizational Impacts, Book by Vincenzo Morabito 3. Strategic Analytics: Advancing Strategy Execution and Organizational Effectiveness, Book by Alec Robert Levenson

1	**Code of the subject**	IMMG-9711
2	**Title of the subject**	Behavioral Analytics
3	**Any prerequisite**	Basic knowledge of business statistics, analytics and research
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Prof Naval Bajpai
6	**Will this course require visiting**	No
7	**Learning Objectives of the subject (in about 50 words)**	➢ Data can be used to describe our past buying behaviors, predict future ones, and prescribe new ways to influence future purchasing decisions. This course will provide an overview of key areas of behavioral analytics: descriptive analytics, predictive analytics, prescriptive analytics, and their application to real-world business.
8	**Brief Contents (module wise)**	**Module I: Introduction to Behavioural Analytics** Behavioral Analytics: overview and applications .Behavioral Analytics models. **Module II: Descriptive Analytics** Descriptive Analytics: overview and applications. Descriptive Data Collection: Survey Overview. Descriptive Data Collection: Net Promoter Score and Self-Reports. Descriptive Data. Collection: Survey Design. Passive Data Collection. Media Planning. Causal Data Collection and Summary. **Module III: Predictive Analytics** Introduction to Predictive Analytics. Regression Analysis: The Demand Curve and Making Predictions. Making Predictions using a Data Set. Data Set Predictions. Probability Models. Implementation of the Probability models. **Module IV: Prescriptive Analytics** What is Prescriptive Analytics? Using the Data to Maximize Revenue. Market Structure. Competition and Online Advertising Models.
9	**Contents for lab (If applicable)**	General application of statistical software
10	**List of text books/references**	1. Applied Behavior Analysis by John O. Cooper 2. Science and Human Behavior by B.F. Skinner 3. Applied Behavior Analysis by William L. Hewar

1	**Code of the subject**	IMMG 9712
2	**Title of the subject**	HR Analytics
3	**Any prerequisite**	None
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Manoj Patwardhan
6	**Will this course require visiting**	Yes
7	**Learning Objectives of the subject (in about 50 words)**	➢ Research and analyze appropriate internal and external human resource metrics, benchmarks, and indicators. Operate and make recommendations regarding the appropriate analytics to meet organization's human resource needs. Employ appropriate software to record, maintain, retrieve and analyze human resources information. Apply quantitative and qualitative analysis to understand trends and indicators in human resource data; understand and apply various statistical analysis methods. Manage information technology to enhance the efficiency and effectiveness of human resource functions within the organization
8	**Brief Contents (module wise)**	**Module I** HR Analytics and the Analytics Process Model, How Do We Make Decisions? Overview of HR Analytics, Exercise: Decision Making Process, The Analytics Process Model (APM) and Its Phases. **Module II** Excel Quantitative Techniques, Key Systems of Record for HR Data, Software Tools, Metrics, Benchmarks, and Other Indicators, Using tools for HR Analytics **Module III** HR Regulations and Reporting Requirements,HR Policies, Procedures, and Guidelines, Connecting Missions or Goals to HR Benchmarks and Metrics. **Module IV** Effectively Presenting HR Data, Assessing stakeholders, Drafting the Report, Effectively Presenting HR Data.
9	**Contents for lab (If applicable)**	NA
10	**List of text books/references**	1. Data-Driven HR: How to Use Analytics and Metrics to Drive Performance by Bernard Marr 2. The Basic Principles of People Analytics by Erik van Vulpen 3. Winning on HR Analytics Leveraging Data for Competitive Advantage by Ramesh Soundararajan, Kuldeep Singh

1	**Code of the subject**	IMMG-9713
2	**Title of the subject**	Operations Analytics
3	**Any prerequisite**	NIL
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Rajesh Rajagopal
6	**Will this course require visiting**	N.A
7	**Learning Objectives of the subject (in about 50 words)**	➢ Efficient and effective operations/supply chain management forms the key functional area in defining an organization's success in today's competitive global environment. The course focuses on the role of analytics in operations /supply chain management, particularly for decision-making.
8	**Brief Contents (module wise)**	**Module I** Data analytics- academic perspectives- service and manufacturing industry perspectives- forecasting- planning- replenishment models- smart operations- data analytics for predictive maintenance strategies. **Module II** Data driven inventory management- transportation- RFID in supply chain and operations- crowdsourcing- IOT applications. **Module III** Data modelling for operations: Regression models- evaluating and comparing regression models-flexible models- interaction terms- model fit statistics- predictive power- non-parametric regression- regression trees.
9	**Contents for lab (If applicable)**	NA
10	**List of text books/references**	1. Manish, K. (2017). Applied Big Data Analytics in Operations Management, IGI Global, India. 2. Jank, W. (2011). Business Analytics for Managers, Springer, US. 3. Kai, C. H., Nachiappan, S., and Abdulrahman, M. D. A. (2017). Supply Chain Management in the Big Data Era, IGI Global, US.

1	**Code of the subject**	IMMG-9714
2	**Title of the subject**	ERP Systems and Business Integration Analytics
3	**Any prerequisite**	Operations Management (IMMG-4202/ MBMG-6202)
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Arun Kumar
6	**Will this course require visiting faculty**	Yes
7	**Learning Objectives of the subject (in about 50 words)**	➢ To understand the fundamental principles of enterprise resource planning (ERP) to meet organizations needs ➢ To get familiar with the usage of ERP for monitoring and controlling business processes ➢ To get an insight about business integration and business intelligence
8	**Brief Contents (module wise)**	➢ ERP as a Business Enabler ➢ Justifying BI ➢ Defining Requirements—Business, Data, and Quality ➢ Architectures such as information architecture, data architecture, technology and product architecture ➢ Foundational Data Modeling ➢ Advanced Dimensional Modeling ➢ BI Dimensional Modeling ➢ Data Integration Design and Development ➢ Data Integration Processes ➢ BI Design and Development ➢ Advanced Analytics ➢ Data Shadow Systems
9	**Contents for lab (If applicable)**	-
10	**List of text books/references**	1. K. Ganesh, Sanjay Mohapatra, S. P. Anbuudayasankar, P. Sivakumar, Enterprise Resource Planning: Fundamentals of Design and Implementation, Springer, 2014 2. Rick Sherman, Business Intelligence Guidebook: From Data Integration to Analytics, Elsevier, 2015

1	**Code of the subject**	IMMG-9715
2	**Title of the subject**	Data Mining with R
3	**Any prerequisite**	-
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Jeevaraj S
6	**Will this course require visiting**	Yes
7	**Learning Objectives of the subject (in about 50 words)**	➢ Objective of this course is to impart knowledge on use of data mining techniques for deriving business intelligence to achieve organizational goals. ➢ Use of R (statistical computing software) to build, assess, and compare models based on real datasets and cases with an easy-to-follow learning curve.
8	**Brief Contents (module wise)**	Introduction to Data Mining Feature Extraction Summarization The data mining process- Crisp DM Text Mining: Information Retrieval Boolean Information Retrieval Fuzzy Information Retrieval Statistics: Statistics and datamining Statistics and Machine Learning Introduction to R Statistics and R Market Basket Analysis using various algorithms The Spade algorithm Basic Statistics Partitioning Process Visualization Techniques Dimension Reduction Techniques Performance Metrics Prediction Performance Multiple Linear Regression Ensemble Methods using various algorithms K Nearest Neighbors (K-NN) Conditional Probability, Naïve Bayes Classification and Regression Trees Pruning Process, Regression Trees Classifying Microarray samples Detection Fraudulent Transactions
9	**Contents for lab (If applicable)**	NA
10	**List of text books/references**	1. Bater Makhabel, “Learning Data Mining with R”, Packt Publishing, 2015. 2. Luis Torgo, “Data Mining with R: Learning with case studies”, Chapman and Hall/ CRC, 2011.

1	**Code of the subject**	IMMG-9716
2	**Title of the subject**	Analytical Consulting for Financial Services
3	**Any prerequisite**	NIL
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Rajesh Rajagopal
6	**Will this course require visiting faculty**	Yes
7	**Learning Objectives of the subject (in about 50 words)**	➢ Understand the basics of consulting for financial services. Expose the students into the practice of consulting, risk analysis, and financial planning.
8	**Brief Contents (module wise)**	**Module I** Consultants and consultancy- client centric consulting- process consulting- facilitation- Financial risk identification- tools- scenario identification- risk definition- taxonomy- risk connectivity- risk networks- risk control- risk appetite. **Module II** Performance consulting- client relationship- ethical dimension- resources for consulting- scenario assessment- regulatory capital- modelling- risk mitigation- operational risk governance- root cause analysis- risk reporting **Module III** Financial planning- harmony with client- manage investments- analytical performance managers- asset allocation analysis- broker-dealer connections- trade association- risk monitoring- incident data collection- risk reporting.
9	**Contents for lab (If applicable)**	NA
10	**List of text books/references**	1. Ainsworth, J. H. (2004). How to Become a Successful Financial Consultant: Making a Living Investing Other People's Money, Wiley, UK. 2. Newton, R. (2007). The Management Consultant: Mastering the Art of Consultancy, Prentice Hall, US. 3. Chapelle, A. (2018). Operational Risk Management: Best Practices in the Financial Services Industry, Wiley, UK.

1	**Code of the subject**	IMMG-9717
2	**Title of the subject**	Social Media and Network Analysis
3	**Any prerequisite**	NIL
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Rajesh Rajagopal
6	**Will this course require visiting**	Yes
7	**Learning Objectives of the subject (in about 50 words)**	➢ Understand the tools and techniques used for social media and network analysis. Introduce the methods and various algorithms for measuring influences and interaction in social media and networks.
8	**Brief Contents (module wise)**	**Module I** Social Networks : An Introduction Types of Networks-General Random Networks- Small World Networks- Scale-Free Networks- Examples of Information Networks- Network Centrality Measures- Strong and Weak ties- Homophily Walks Random walk-based proximity measures- Other graph-based proximity measures- Clustering with random-walk based measures- Community Detection Algorithms for Community Detection. **Module II** The Kernighan-Lin algorithm- Agglomerative/Divisive algorithms- Spectral Algorithms- Multi-level Graph partitioning- Markov Clustering- Community Discovery in Directed Networks- Community Discovery in Dynamic Networks- Community Discovery in Heterogeneous Networks- Evolution of Community. Link Prediction Feature based Link Prediction- Bayesian Probabilistic Models- Probabilistic Relational Models. **Module III** Linear Algebraic Methods: Network Evolution based Probabilistic Model- Hierarchical Probabilistic Model- Relational Bayesian Network- Relational Markov Network- Event Detection Classification of Text Streams- Event Detection and Tracking: Bag of Words- Temporal, location, ontology based algorithms- Evolution Analysis in Text Streams- Sentiment analysis. Social Influence Analysis Influence measures- Social Similarity- Measuring Influence, Influencing actions and interactions- Influence maximization.
9	**Contents for lab (If applicable)**	NA
10	**List of text books/references**	1. Newman, M. E. J. (2012). Networks : An Introduction, Oxford University Press, UK. 2. Aggarwal, C, C. (2011). Network Data Analytics, Springer, US. 3. Wasserman, S. (1994). Faust Social Network Analysis: Methods and Applications, Cambridge Univ Press. UK.

1	**Code of the subject**	IMMG-9718
2	**Title of the subject**	Text analytics for Business
3	**Any prerequisite**	Basic knowledge of research methodology
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Prof. Naval Bajpai
6	**Will this course require visiting**	Yes
7	**Learning Objectives of the subject (in about 50 words)**	➢ To demonstrate the types of information, this can be extracted from text, and the applications of these types. ➢ To examine the tools which support various types of text processing and analysis and apply them to address information needs, questions, and issues.
8	**Brief Contents (module wise)**	**Module I: Introduction** Overview of text analytics, Importance of text analytics in business **Module II: Methods and approaches** Content analysis, Natural language process, Clustering and Topic detection, Simple predictive modelling **Module III: Applications of text analytics** Sentiment analysis, Emotion detection, Scholarly communication, visualization
9	**Contents for lab (If applicable)**	NA
10	**List of text books/references**	1. Feldman, R. & Sanger, J., The text mining handbook: Advanced approach in analyzing unstructured data, Cambridge University Press. 2. Jurafsky, D. & Martin, J. H., Speech and language processing. Pearson education 3. Liu, B., Sentiment analysis: Mining opinions, sentiments, and emotions. Cambridge University Press.

1	**Code of the subject**	IMMG-9719
2	**Title of the subject**	Big Data Management and Analytics
3	**Any prerequisite**	Statistics for management
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Debanjan Sadhya
6	**Will this course require visiting**	Yes
7	**Learning Objectives of the subject (in about 50 words)**	• Apply the concepts of big data analytics and statistical applications to varied aspects of managerial decision making. • Understand how big data technologies and data mining techniques enable data driven decisions. • Apply popular and contemporary technologies in big data ecosystem and statistical packages for applications such as predictive analytics, social network analytics, sentiment analytics, and market segmentation.
8	**Brief Contents (module wise)**	**Module I**: Introduction to Big data and analytics, Basics of R. **Module II**: Prediction & Regression, Segmentation & Clustering, Classification. **Module III**: Multi-layered models & Ensemble Methods, Forecasting & Time Series Analysis, Market Basket Analysis & Association Rule. **Module IV**: Social Network Analytics, Social Networks & Online Communities. **Module V**: Text Analytics, Text Analytics Application, Sentiment Analysis, Topic Modeling & Document Clustering. **Module VI**: Data Visualization & Visual Analytics, Handling Big Data & Technologies for Big Data, Data Discovery & Exploratory Analysis.
9	**Contents for lab (If applicable)**	N/A
10	**List of text books/references**	1. “Statistics for Management", I. Levin Richard, H. Siddiqui Masood, S. Rubin David, Rastogi Sanjay, *Pearson*. 2. "Big Data and Analytics", Subhashini Chellappan, Seema Acharya, *Wiley*. 3. "Big Data Analytics”, M. Vijayalakshmi, Radha Shankarmani, *Wiley*.

1	**Code of the subject**	IMMG-9720
2	**Title of the subject**	Artificial Intelligence
3	**Any prerequisite**	Introductory courses on probability theory and linear algebra. Knowledge of basic programming languages such as Python and Matlab
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Dr. Sunil Kumar
6	**Will this course require visiting**	No
7	**Learning Objectives of the subject (in about 50 words)**	• After successful completion of this course, students will able to relate/understand/solve several day-to-day real-time with machine learning algorithms. The objective of this course is to familiarize the students with different machine learning algorithms ranging basic linear classifier/regression modelling problems to non-linear classification problem using artificial intelligence network.
8	**Brief Contents (module wise)**	Module-I-Introduction to the course of Artificial Intelligence (AI): What and Why? AI vs Human Brain. Relation among AI, Machine learning and Deep learning. Introduction to classification and re- gression problems, Prerequisites of AI. Module-II Linear classifier and classification problem, Gradient descent algorithm, Under-fitting vs Over-fitting problem, Training, Testing and Validation Process. Module-III Supervised vs unsupervised classification, Bayesian clas- sifier: decision boundaries; nearest neighbour methods, and support vector machine (SVM); Unsupervised learning: k-means and hier- archical clustering Module-IV Feature extraction and feature selection; Dimensionality reduction techniques: PCA, LDA and ICA. Module-V Introduction to Neural Networks: Modelling and applica- tions to logic gates. Back-propagation learning algorithm: training and testing Module-VI Introduction to Convolution neural network (CNN): AlexNet, VGG architectures.
9	**Contents for lab (If applicable)**	Mentioned in separate lab course for this subject
10	**List of text books/references**	1. Christopher Bishop. Pattern Recognition and Machine Learning, Second Edition 2. Ethem Alpaydin, Introduction to Machine Learning, Second Edition 3. T. Hastie, R. Tibshirani, J. Friedman. The Elements of Statistical Learning, 2e, 2008. 4. Russell and Norvig, Artificial Intelligence: A Modern Approach, 2010

1	**Code of the subject**	IMMG-9721
2	**Title of the subject**	Data Mining: Algorithms and Applications
3	**Any prerequisite**	N/A
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Debanjan Sadhya
6	**Will this course require visiting**	No
7	**Learning Objectives of the subject (in about 50 words)**	• Explain the basic algorithms like data pre-processing, association rules, classification, clustering, sequence mining and visualization • Explain implementations in open source software. • Demonstrate case studies on industrial problems.
8	**Brief Contents (module wise)**	**Module I**: Introduction, Data Preprocessing. **Module II**: Association Rule Mining, Classification Basics. **Module III**: Decision Tree, Bayes Classifier, K nearest neighbor. **Module IV**: Support Vector Machine, Kernel Machine, Artificial Neural Network. **Module V**: Clustering, Outlier detection. **Module VI**: Regression, Dimensionality reduction. **Module VII**: Sequence mining, Evaluation, Visualization. **Module VIII**: Case studies.
9	**Contents for lab (If applicable)**	N/A
10	**List of text books/references**	1. "Introduction to Data Mining", Steinbach Tan and Vipin Kumar, *Pearson Education*. 2. "Data Mining: Concepts and Techniques", Pei, Han and Kamber, *Elsevier*. 3. "Data Mining (NPTEL Course)", Pabitra Mitra, (https://nptel.ac.in/syllabus/106105174/)

1	**Code of the subject**	IMMG 9722
2	**Title of the subject**	Analytical Design Thinking
3	**Any prerequisite**	Basic understanding of business management functions.
4	**L-T-P**	3-0-0
5	**Name of the proposer**	Manoj Patwardhan
6	**Will this course require visiting**	Yes
7	**Learning Objectives of the subject (in about 50 words)**	• Understand and use Design Thinking as a methodology for complex problem solving and innovation inspired by people. Develop an ability to see problems from new perspectives. Understand the Principles and Process of Design Thinking. Understand the Principles of Innovation and develop strategy for organizational innovation, Develop Creative Confidence as a Design Thinker in an organization.
8	**Brief Contents (module wise)**	**Module I** Approach to Overcome Complexity and Uncertainty Describe Design Thinking as a problem solving framework and approach to Innovation inspired by understanding human needs. **Module II** Essential concepts of Designing Thinking, understand Knowing their needs and challenges by observation, empathy, interview and interacting with them by using scenario. Design Thinking aims to create innovation that meets users' needs, technically feasible and financially viable for the company. **Module III** Creating successful innovation in Market place. Incremental / radical Innovation. Mindsets, skills, process and culture of an organization. Leaders developing innovation as a strategic capability for long-term success of the organization. **Module IV** Case study
9	**Contents for lab (If applicable)**	NA
10	**List of text books/references**	1. The Design of Business by Roger Martin 2. Design Thinking for the Greater Good : Innovation in the Social Sector by Jeanne Liedtka,Randy Salzman Daisy Azer

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