Jaypee Institute of Information Technology

Integrated M.Tech. Biotechnology

Semester VIII

Course Descriptions

Detailed Syllabus

Lecture-wise Breakup

Course Code	17M12BT127	**Semester :** Even	**Semester:** II **Session:** 2018 -2019 **Month from:** January to June
Course Name	Nutraceuticals		
Credits	3	**Contact Hours**	3

Faculty (Names)	**Coordinator(s)**	Dr. Smriti Gaur
	Teacher(s) (Alphabetically)	Dr. Smriti Gaur

COURSE OUTCOMES		**COGNITIVE LEVELS**
CO1	Compare the traditional and modern trends in the nutraceutical Industry.	**(C2)**
CO2	Evaluate the mechanism of action of micronutrients and phytochemicals in prevention of chronic diseases.	**(C3)**
CO3	Explain the health benefits of microbial and algal nutraceuticals	**(C2)**
CO4	Compare nutraceuticals and health food products in Indian and international market.	**(C4)**

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	**Nutraceuticals and Functional Food: An Introduction**	Historical perspective, classification, scope & future prospects. Applied aspects of the Nutraceutical Science. Sources of Nutraceuticals, The link between nutrition and medicine.	**3**

2.	**Nutrient Components of Food**	Bioactive Carbohydrates: Polysaccharides, Soluble Fibers, Insoluble Fiber, Resistant Starch, Prebiotics, Slowly Digestible Starch. Bioactive Lipids: MUFA, PUFA, Omega 3 and 6 Fatty Acid, Conjugated Linoleic Acid(CLA). Bioactive Peptides: Sources, Isolation and Purification methods. Antihypertensive, Antioxidant, Antimicrobial, Anticancer and immunomodulating Peptides. Polyphenols: Specific polyphenolic products Caratenoids : Lycopene	**10**
3.	**Nutraceuticals of Plant Origin**	Plant secondary metabolites, classification and sub-classification – alkaloids, phenols, Terpenoids Extraction and purification, applications with specific examples with reference to skin, hair, eye, bone, muscle, heart, brain, liver, kidney, general health and stimulants. Concept of cosmoceuticals and aquaceuticals.	**5**
4.	**Nutraceuticals of Animal Origin**	Animal metabolites - Sources and extraction of nutraceuticals of animal origin. Examples: chitin, chitosan, glucosamine, chondroitin sulphate and other polysaccharides of animal origin, uses and applications in preventive medicine and treatment	**5**
5.	**Microbial and Algal Nutraceuticals**	Concept of probiotics - principle, mechanism, production and technology involved, applications - examples of bacteria used as probiotics, use of prebiotics in maintaining the useful microflora - extraction from plant sources. Synbiotics for maintaining good health. Algae as source of omega - 3 fatty acids, antioxidants and minerals - extraction and enrichment	**4**
6.	**Nutraceuticlas**	Preventive role of nutraceutical in cardiovascular diseases, Metabol;ic disorders, Cancer, Bone health, skin diseases	**8**

	and Diseases	etc.	
7.	**Product development and clinical trials**	Activity screening, formulations, toxicology, bioavailability, bioequivalence; use of animal models and pre-clinical and clinical trials involved	**3**
8.	**Nutraceutical Industry and Market Information**	Nutraceutical industries in India and abroad (study of 5 reputed Indian and International industries involved in production and development of nutraceuticals and functional foods).	**4**
		Total number of Lectures	**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Assignment, report and viva)
Total	**100**

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	Wildman, R.E.C. ed. Handbook of Nutraceuticals and Functional Foods, CRCPress, Boca Raton, 2000.
2.	R. E. Aluko, Functional foods and Nutraceuticals, Springer, 2012
3.	Yashwant V Pathak, Handbook of Nutraceuticals, CRC Press, 2010
4.	Shibamoto T. Functional food and health, Oxford University Press, 2008.
5.	Goldberg, I. Functional Foods: Designer Foods, Pharma foods, Nutraceuticals, Chapman & Hall, 1994.
6.	Robert E.C. Handbook of Nutraceuticals and Functional Foods. 2nd Ed. Wildman, 2006.

Detailed Syllabus

Lecture-wise Breakup

Course Code	**17M11BT114**	**Semester** Even	**Semester** VIII (Integrated) / II Sem (M.Tech) **Session** 2018 -2019 **Month from** January to June
Course Name	**Diseases and Healthcare**		
Credits	3	**Contact Hours**	3

Faculty (Names)	**Coordinator(s)**	Dr. ReemaGabrani
	Teacher(s) (Alphabetically)	Dr. ReemaGabrani

COURSE OUTCOMES		**COGNITIVE LEVELS**
CO1	Explain the etiology, pathogenesis of infectious diseases and genetic disorders.	Understand Level (C2)
CO2	Choose and apply the strategies of different diagnostic tests.	Apply Level (C3)
CO3	Utilise expression systems and mutagenesis techniques for biopharmaceuticals production	Apply Level (C3)
CO4	Appraise biotechnology principles for production of recombinant proteins and nucleic acids as therapeutic agents	Evaluate Level (C5)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Introduction to diseases	Infectious diseases caused by bacteria, viruses, opportunistic fungi and parasites; pathology	2
2.	Genetic diseases	Medical genetics; Genetic mechanisms leading to diseases such as thalassemia, cancer	4
3.	Diagnosis of bacteria and virus	Challenges of pathogen detection; Pathogen Detection	8

		using Cytological, biochemical and molecular methods; Molecular cytogenetics, PCR variants	
4.	Immunodiagnostics	Immuno-diagnostics: immunofluorescence, Chemiluminescence, Microparticle Enzyme immunoassay, Fluorescence polarization immunoassay Applications in bacteriology, medicine, forensic sciences	4
5.	Cancer diagnostics	Cancer cytology analysis, genetic and epigenetic biomarkers	3
6.	Diagnosis in Forensic science	Forensic DNA typing and data analysis, Next generation sequencing technology and applications	3
7.	Engineering of Therapeuticals	Scientific and technological innovations in biopharmaceuticals production, Mutagenesis techniques	3
8.	Manipulating Host systems	Prokaryotes, yeast, baculo-virus and mammalian cells for production of recombinant proteins	5
9.	Therapeutic applications	Recombinant blood related products, hormones, interleukins, Vaccines, Monoclonal antibodies and Therapeutic enzymes	8
10.	Nucleic acid therapeutics	Antisense oligodeoxynucleotides, ribozyme, small interfering RNAs, aptamers as therapeuticals	2
		Total number of Lectures	**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Assignments, Case Study)
Total	**100**

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	Yi-Wei Tang & Charles W Stratton, "Advanced techniques in Diagnostic microbiology", 2nd Ed. Springer 2013
2.	Jean-Louis Serre, "Diagnostic techniques in Genetics", John Wiley& Sons publication 2006

3.	Kathleen Deska and Timothy J. Pagana, "Mosby's Manual of Diagnostics and Laboratory Test" Elsevier 2005
4.	S.B. Primrose, "Molecular Biotechnology", 2nd Edition Blackwell Scientific Publication, 1999
5.	O.Kayser and R.H. Muller, 'Pharmaceutical biotechnology" Wiley-VCH, 2005
6.	Michael J. Groves, 'Pharmaceutical biotechnology" 2nd edition CRC Press, 2005
7.	S.N. Jogdand, "Biopharmaceuticals" Ist edition Himalaya Publishing House, 2006
8.	Refereed papers from scientific journals for case studies

Detailed Syllabus

Lecture-wise Breakup

Course Code	17M12BT113	**Semester** Even **(specify Odd/Even)**	**Semester** VIII / M/Tech 1st Sem **Session** 2018 -2019 **Month from** January to June
Course Name	BIOPROCESS & INDUSTRIAL BIOTECHNOLOGY		
Credits	3	**Contact Hours**	3

Faculty (Names)	**Coordinator(s)**	DR. ASHWANI MATHUR
	Teacher(s) (Alphabetically)	DR. ASHWANI MATHUR DR INDIRA P SARETHY

COURSE OUTCOMES		**COGNITIVE LEVELS**
CO1	Relate role of economic principles in biomanufacturing processes	Understanding (C2)
CO2	Apply knowledge of engineering principles in designing of bioreactors for prokaryotic and eukaryotic systems	Applying (C3)
CO3	Analyze the role of bioprocess conditions in eukaryote cell culture	Analyzing (C4)
CO4	Evaluate various strategies used for production of primary and secondary metabolites	Evaluating (C5)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Introduction to Industrial Bioprocesses	Concept of sustainability and sustainable manufacturing, Economic assessment and concept of cost and Lang factor; Non-ideal systems of cultivating microorganism and economic process scale-up	3

2.	Microbial Process Development: Solid state fermentation	Cell growth kinetics of bacteria and fungi in non-ideal reactors; Concepts of solid state fermentation; mechanism of cell growth and indirect methods of estimating cell growth kinetics, Comparison of solid *versus* submerged fermentation; water activity; bioprocess parameters regulating solid stste fermentation	8
3.	Animal cell fermentation	Animal cell metabolism: Basic understanding of substrate and by-poduct stoichiometry, Concept of primary cells, cell lines and cancerous cells; growth characteristics and kinetics, methods and reactors for scalable production of animal cells and derived products; Biomaterial properties for anchorage dependent cell lines; Graf reactor; Concept of 2D and 3D culture, Bioreactors in Tissue Engineering, reactor design consideration	7
4.	Plant Cell Fermentation	Importance of plant cell cultivation, Plant cell / hairy root culture, callus and shoot propagation, kinetics of cell growth and product formation, Reactors for plant cell culture- type of reactors, comparison of reactor performance, immobilized plant cell reactor.	8
5.	Algal Fermentation	Basic classification of algae, Morphology and physiology; Algal derived metabolites, methods of studying growth kinetics of chemotropic and phototropic algae, type of reactors; Lab scale photo-bioreactors- Design and engineering principles, Large scale pond reactors	6
6.	Production of Primary & Secondary Metabolites	Isolation, preservation and propagation of microbial culture- An industrial perspective, Process technology for production of organisc acids, amino acids, alcohols, antibiotics, vitamins, nucleotide and steroids, flavours; production of industrial enzymes: protease, cellulose, amylase, lipase; Enzyme inhibitors: inhibitors of cholesterol synthesis; biopesticides, biofertilizers, biopreservatives; biopolymers; plant	10

		derived therapeutically important metabolites	
		Total number of Lectures	**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Class Test-1, Presentation / Report)
Total	**100**

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	P. M. Doran. *Bioprocess Engineering Principles*. Academic Press, USA, 2002
2.	S. J. Pirt. Principles of Microbe and Cell Cultivation. Blackwell Scientific Publications, Oxford Press, London, 1975
3.	P.F. Stanbury, A. Whittakar and S. J. Hall. *Principles of Fermentation Technology.* Butterworth-Heinemann, Oxford Press, London, 1994
4.	S. Aiba, A.E. Humphrey and N. F. Millis. *Biochemical Engineering.* University of Tokyo Press, Toyko, Japan, 1973
5.	A. H. Scragg. *Bioreactors in Biotechnology: A practical approach.* Ellis Horwood Publications, New York, USA, 1991
6.	Wulf Cruger and Anneliese Crueger. *Biotechnology: A Textbook of Industrial Microbiology.* Panima Publishing Corporation, New Delhi, India, 2003

Detailed Syllabus

Lecture-wise Breakup

Course Code	**18M12BT116**	**Semester** Even **(specify Odd/Even)**	**Semester** VIII **Session** 2018 -2019 **Month from** January to June
Course Name	**IPR in Biotechnology**		
Credits	3	**Contact Hours**	3

Faculty (Names)	**Coordinator(s)**	Dr. Indira P. Sarethy
	Teacher(s) (Alphabetically)	Dr. Indira P. Sarethy, Dr. Shweta Dang

COURSE OUTCOMES		**COGNITIVE LEVELS**
CO1	Explain and interpret the types of intellectual property rights, related laws and systems	**Understand (C2)**
CO2	Apply specific IPR issues pertaining to medical biotechnology	**Apply (C3)**
CO3	Evaluate plant and traditional knowledge protection	**Evaluate (C5)**
CO4	Appraise commercialization of intellectual property, infringements and laws applicable	**Evaluate (C5)**

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	**Introduction**	Intellectual Property Rights - their Relevance, Importance and Business Interest to Industry, Academia, Protection of Intellectual Property, Relationship of IPRs with biotechnology	**2**
2.	**Types of Intellectual Property Rights**	Patents, Trademarks, Copyrights, Industrial Designs, Geographical Indications, Trade secrets, non-disclosure agreements	**2**
3.	**Patents**	General Introduction to Patents, Patent Terminology, Patent Claims, Patent Life and Geographical Boundaries,	**4**

		Utilization of Intellectual Patents, Licensing of patents	
4.	**Elements of patentability**	Invention/Discovery, What constitutes Patentable subject matter, the Utility, novelty and non-obviousness of an invention, Patentability in Biotechnological Inventions: Case studies	**2**
5.	**Preparation and Process for Patenting**	Procedural steps to grant of a patent, Process of filing patents in India, PCT application, protocols of application, pre-grant & post-grant opposition	**3**
6.	**Patent Search**	Invention in context of "prior art", Patent Search methods, Patent Databases & Libraries, online tools, Country-wise patent searches (USPTO, EPO, India etc.), patent mapping	**2**
7.	**IPR laws**	Basic features of the Indian Patent Act, the Indian Copyright Act, and the Indian Plant Varieties Protection and Farmers' Rights Act, A brief overview of other Patent Acts & Latest Amendments of Indian, European & US patent systems	**2**
8.	**Patent issues in Drugs and Pharmaceuticals**	Generics, Compulsory Licensing, Exclusive Marketing Rights (EMR), Bolar provision, Bayh-Dole act, Second medical use	**2**
9.	**Worldwide Patent Protection, WTO & TRIPS Agreement**	Brief Background of different International conventions such as Paris convention, TRIPS, WTO, PCT and Patent Harmonisation including Sui-generis system, The relationship between IPRs and international trade, Overview of WTO & TRIPS Agreement, Enforcement and dispute settlement under the TRIPS Agreement, The implication of TRIPS for developing countries in the overall WTO system	**2**
10.	**Gene patents**	Introduction & overview, what constitutes gene patents, Bayh-Dole Act, ESTs, Cohen-Boyer technology, PCR patents, EPO case, BRCA gene, Types of IPR involved, Genetic Use Restriction Technologies, Patenting of biologics, Hatch Waxman Act	**9**
11.	**Protection of Plant Varieties /Seeds**	The interface between technology and IPRs in the context of plants, Key features of UPOV 1978, UPOV 1991 and TRIPS with respect to IPRs on plants, Indian Law on Protection of Plant Varieties, DUS criteria, patenting of genetically modified plants, The significance of IPRs in agricultural biotechnology, Biodiversity, Conventions & Treaties, plant patents, Plant Varieties Protection Act, Plant Breeders' Rights, UPOV, benefit sharing, *sui*	**4**

		*generis*systems Case studies	
12.	**Traditional Knowledge and Intellectual Property Rights**	The importance and relevance of Traditional Knowledge for developing nations, The various approaches to protecting TK, The local, national and global dimensions of the issues in TK and IPRs, Traditional Medicine & IP Protection, Folklore, Patenting of Health Foods: Case studies	**4**
13.	**Patent Infringement and Commercializing Intellectual Property Rights**	What all are considered as patent Infringement: Case studies, defenses to infringement including experimental use, patent misuse, legal considerations, Patent Valuations, Competition and Confidentiality issues, Assignment of Intellectual Property Rights, Technology Transfer Agreements	**4**
		Total number of Lectures	**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Assignments 1, 2. Presentation 1)
Total	**100**

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	USPTO Web Patent Databases at: www.uspto.gov/patft
2.	Government of India's Patents Website: patinfo.nic.in
3.	Intellectual property India: www.ipindia.nic.in
4.	"Indian Patent Law : Legal and Business Implications" by Ajit Parulekar, Sarita D'Souza Macmillan India publication, 2006
5.	"Agriculture and Intellectual Property Rights", edited by: Santaniello,V., Evenson, R.E., Zilberman, D. and Carlson, G.A. University Press publication, 2003
6.	Research papers and Reports provided from time to time

Detailed Syllabus

Lecture-wise Breakup

Course Code	15B1NBT835	**Semester (Even)**	**Semester** VIII **Session** 2018 -2019 **Month from** January to June
Course Name	Human Nutrition and Health		
Credits	3-0-1	**Contact Hours**	4

Faculty (Names)	**Coordinator(s)**	Dr Neeraj Wadhwa
	Teacher(s) (Alphabetically)	Neeraj Wadhwa

COURSE OUTCOMES		**COGNITIVE LEVELS**
C434-1.1	Relate roles and functions of principal nutrients and the processes involved in digestion, absorption and metabolism.	**Understand Level (C2)**
C434-1.2	Apply the knowledge of Dietary Guidelines, Nutrient Reference Values and nutrient content of primary food sources to estimate energy requirements, assess dietary quality and plan a healthy diet.	**Apply Level (C3)**
C434-1.3	Explain the role of food and nutrients in health and disease processes	**Understand Level (C2)**
C434-1.4	Evaluate the relationship between diet, lifestyle diseases and their nutritivedemands.	**Evaluate Level (C5)**
C434-1.5	Plan diets to help in the prevention of chronic disease and provide appropriate nutrition during all phases of development	**Create Level (C6)**

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	**Introduction to Nutrition Science**	Basics of nutrition research and some important terms global look at meal planning guides and tools and provides you with an opportunity to determine your own individual nutrient needs	**6**
2.	**Basic Nutrients**	Macronutrients-I: Carbohydrates and Water Macronutrients-II: Proteins and Lipids, Vitamins, Minerals Food Safety; Nutrition Related Disorders Major Deficiency	**6**

		Diseases Nutrition and Infection’	
3.	**Meal Planning**	Principles of Meal Planning and Meal Planning for the Adult, Food Budgeting, Food Selection Food Storage, Food Preservation and Other Methods of Maximization of Nutritional Benefit	4
4.	**Effective utilization of food resources**	Food safety ; Understand the hazards of food adulteration, and apply laws and standards regarding food quality and safety, protect food from different types of food, contamination,- list substances that are accidentally or intentionally added to food items,	6
5.	**Common food borne diseases.**	Identify the types, causes and spread of diarrhorea, dysentery, cholera, typhoid and infectious hepatitis enumerate their symptoms and complications and describe the factors in the control. prevention and management of these diseases;	6
6.	**Parasitic Infestation of Man**	Identify the common parasitic infestations of manTaeniasis, Hydatidosis, Ascariasis, Ancylostomiasis, Amoebiasis, Giardiasis, Trichuriasis, Oxyuriasis**.**	6
7.	Dietary Management of **Diabetes**	Study the role of nutrition in the prevention and management of pre-diabetes and Types 1, 2 and gestational diabetes	3
8.	Dietary Management of **Cancer**	Diet and cancer are certainly linked diet-related risk factors in cancer development as well as evidence-based guidelines for the nutritional management of cancer and treatment-related side effects	3
9.	Dietary Management of **Obesity and**	Explore the complex and interrelated factors that contribute to rising obesity rates, discuss various approaches to weight loss and weight maintenance and strategize for future	3

	Weight Management	solutions to this global epidemic	
10.	Dietary Management of **Disorders of the GI Tract**	Specific GI focus areas include celiac disease and gluten free foods, diverticular disease, peptic ulcer disease, inflammatory bowel disease, dysphagia, gas, constipation and malabsorptive disorders and look at the roles of dietary fiber and probiotics and prebiotics in gut health	3
		Total number of Lectures	**46**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Assignment)
Total	**100**

Recommended Reading material:

1.	Eastwood, M (2010). Principles of Human Nutrition. Blackwell Publishing 2 nd ed.
2.	Gibney, M.J., Lanham, S.A., Cassidy, N.A., Vorster, H.H (2009). Introduction to Human Nutrition. 2nd ed. Wiley-Blackwell.
3.	Dennis M.M, Robert E.C (2013) Advanced Human Nutrition Jones & Bartlet
4.	.Geissler. C, Powers,H (2010) Human Nutrition Churchill Livingstone 12th ed. 5. Whitney E.N, Rolfe S.R (2012) Understanding Nutrition Cengage Learning; 13th ed.

Project Part -2 (15B19BT891)

Detailed Syllabus

Lecture-wise Breakup

S.No.	Code	Course Outcome	Cognitive level
1	CO891.1	Summarize research literature	Understanding Level Level II
2	CO891.2	Develop experimental solutions to resolve the identified problem	Applying Level Level III
3	CO891.3	Evaluate and analyze the experimental results	Evaluating Level Level V
4	CO891.4	Compose and present the scientific findings.	Creating Level Level VI

Detailed Syllabus

Lecture-wise Breakup

Course Code	16B1NMA831	**Semester** Even **(specify Odd/Even)**	**Semester** VIII **Session** 2018-2019 **Month from** January 2019 to June 2019
Course Name	Optimization Techniques		
Credits	3	**Contact Hours**	3-0-0
Faculty (Names)	**Coordinator(s)**	Prof. A. K. Aggarwal	
	Teacher(s) (Alphabetically)	Prof. A. K. Aggarwal	

COURSE OUTCOMES		**COGNITIVE LEVELS**
After pursuing the above mentioned course, the students will be able to:		
C402-2.1	apply generalized, revised and dual simplex method for linear programming problems (LPP).	Applying Level (C3)
C402-2.2	apply graphical, algebraic and linear programming techniques for pure and mixed strategy problems in game theory.	Applying Level (C3)
C402-2.3	classify and solve the problems on queuing and inventory models.	Analyzing Level (C4)
C402-2.4	solve and analyze the network scheduling and sequencing problems.	Analyzing Level (C4)
C402-2.5	make use of dynamic programming technique to solve complex linear programming problems.	Applying Level (C3)
C402-2.6	determine numerical solution of nonlinear multidimensional problems.	Evaluating Level (C5)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Review of Linear Programming	Convex sets, Linear Programming Problems (LPP), graphical and simplex method, Big-M method, Two phase method, generalized simplex method, revised simplex method, Duality theory, dual simplex method.	08
2.	Game Theory	Rectangular Games, Minmax Theorem, Graphical Solution of 2×n, 3×n, m×2, m×3 and mxn Games, Reduction to Linear Programming Problems.	06
3.	Queuing Theory & Inventory Model:	Introduction, Steady-State Solutions of Markovian Queuing Models: M/M/1, M/M/1 with limited waiting space, M/M/C, M/M/C with limited space, M/G/1, Inventory Models.	06
4.	Sequencing & Scheduling	Processing of Jobs through Machines, CPM and PERT.	06
5.	Dynamic	Discrete and Continuous Dynamic Programming, Simple	06

	Programming	Illustrations.	
6.	Nonlinear Programming	Unimodal function, One Dimensional minimization problem, Newton's Method Golden Section, Fibonacci Search, Bisection, Steepest Descent Method, Multidimensional Newton's method.	08
		Total number of Lectures	**40**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Quiz, Assignments)
Total	**100**

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	Taha H. A., Operations Research: An Introduction, 7th edition, PHI, 2002.
2.	Rao, S. S. - Engineering Optimization, Theory and Practice, Third Edition, New Age International Publishers, 2010.
3.	Wagner, H. M., Principles of Operations Research with Applications to Managerial Decisions, Prentice Hall of India Pvt. Ltd., 1975.
4.	Hillier F. and Lieberman G. J., Introduction to Operations Research, 6th edition, McGraw-Hill, 1995.

Detailed Syllabus

Lecture-wise Breakup

Course Code	18B12HS815	**Semester Even**	**Semester 8th Session 2018 -2019** **Month from January 2019 to May 2019**
Course Name	QUALITY ISSUES IN ENGINEERING		
Credits	3	**Contact Hours**	3-0-0

Faculty (Names)	**Coordinator(s)**	Dr. Santoshi Sengupta
	Teacher(s) (Alphabetically)	Dr. Santoshi Sengupta

COURSE OUTCOMES		**COGNITIVE LEVELS**
C402-32.1	Apply the concepts of quality within quality management systems by understanding various perspectives, historical evolution; and contributions of key gurus in the field of quality	Apply Level (C3)
C402-32.2	Determine the effectiveness of acceptance sampling using single and double sampling plans and operating characteristic curves	Evaluate Level (C5)
C402-32.3	Determine quality by employing a wide range of basic quality tools, lean concepts and process improvement techniques such quality function deployment	Evaluate Level (C5)
C402-32.4	Examine the importance of six sigma, various quality standards, awards, certifications	Analyze Level (C4)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Fundamentals of Quality	Perspectives and Definitions of Quality, Dimensions Of Quality for Product and Service, History of Quality, Phases of Quality Assurance, Alignment, Linkage, Reengineering, Contribution of Gurus – Shewhart, Deming, Ishikawa, Juran	6
2.	Cost of Quality and Quality Function	Cost of Quality, Voice Of Customers: Kano's Model,	6

	Deployment	House Of Quality, QFD Process	
3.	Basic Tools of Quality	Checksheets, Cause and Effect Diagrams, Histograms, Flowcharts, Pareto Analysis, Scatter Diagrams, Run Charts	9
4.	Statistical Thinking And Applications	Acceptance Sampling, Single Sampling Plan, Double Sampling Plan, Statistical Process Control, Specification And Control Limits, Control Charts For Attributes, Control Charts For Variables	9
5.	Six Sigma, Benchmarking and Lean Concepts	Six Sigma, Capability Of A Process/Product/Service, DMAIC Process, Benchmarking Meaning, Process, Methods; JIT, Andon, Kanban, Kaizen, Poka-Yoke, 5-S, 7 Mudas	9
6.	Quality Standards and Awards	ISO Standards, MBNQA, RGNQA, Deming Prize	3
Total number of Lectures			**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Project, Assignment, Case Study, Quiz, Oral Questions)
Total	**100**

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	NVS Raju, Total Quality Management, 1st Edition, Cengage Learning, 2014
2.	Kanishka Bedi, Quality Management, 1st Edition, Oxford University Press, 2006
3.	D.H. Besterfield, Total Quality Management, Revised 3rd Edition, Pearson Education, 2011

Detailed Syllabus

Lecture-wise Breakup

Course Code	13B1NHS831	**Semester** Even	**Semester VIII Session** 2018 -2019 **Month from** Jan 2019 to June2019
Course Name	**ORGANIZATIONAL PSYCHOLOGY**		
Credits	3	**Contact Hours**	3-0-0

Faculty (Names)	**Coordinator(s)**	Dr Nilu Choudhary
	Teacher(s) (Alphabetically)	Dr Nilu Choudhary

COURSE OUTCOMES		**COGNITIVE LEVELS**
C402-29.1	Demonstrate advanced knowledge in organizational psychology, including a discussion of its historical origins and development.	Understanding Level(C2)
C402-29.2	Explain the psychological principles underlying job analysis, selection process, and performance appraisal.	Understanding Level(C2)
C402-29.3	Evaluate critically the nature of leadership and its role and development within organizations	Evaluating Level(C5)
C402-29.4	Analyze the impact of social, ethical, cultural economic and political influences on organizational behavior in local, national and global communities	Analyzing level(C4)
C402-29.5	Analyze critically the conceptual and theoretical frameworks relating to organizational psychology.	Analyzing Level(C4)
C402-29.6	Creates a learning environment that promotes respect, collaboration, productive group interaction and creates new opportunities for development and exploration.	Creating Level(C6)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**

1.	Introduction	Meaning and Scope of Organizational Psychology	2
2.	Origins of Organizational Psychology	Scientific Management, The Hawthorne Studies and the Human Relations Approach to Management and Ergonomics	7
3.	Job Analysis and Job Evaluation	Business ethics & Organizing and describing the tasks involved in a job and determining the position's monetary value,	4
4.	Personnel Selection	Matching the best person to each job using, KASo's testing, interviews , work sample exercises	4
5.	Training ,	On the job, Off the job training, Orientation, formal training, and mentoring.	3
6.	Performance Appraisal	Objective and subjective measures, Sources of Bias in Performance Ratings, 360-Degree Feedback, The Importance of Fairness, Other Performance Measures: Thinking Outside the Box and Organizational Citizenship Behaviour (OCB)	4
7.	Motivation, Approaches to Management:, Leadership	The "Japanese" Management Style, Theory X and Theory Y, Strengths-Based Management	6
8	Learning Organization	Traditional and learning Organization, Employee Commitment, The Meaning of Work	4
9	Organizational Culture	rganizational Culture, Factors Contributing to Positive Organizational Culture, Toxic Factors in the Workplace,	4
10	Modern Organization Design	Organizational Design, Hollow, Modular, network design	2
11	Stress at Work	Job Stress at Work, Managing Job Stress	2
		Total number of Lectures	**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Assignments, Quiz)
Total	**100**

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)	
1.	Blum, N.L., & Naylor, J.C. "Industrial Psychology – its theoretical and social foundation", Cbs, 2004
2.	Dunnette, M. D., & Hough, L. M. "Handbook of Industrial and Organizational Psychology", Consulting Psychology Press, 1992
3.	Griffin, R. W. & Moorhead G. "Organizational Behaviour: Managing People and Organizations", South-Western Cengage Learning, 2009
4.	Luthans, F. "Organizational Behaviour", McGraw-Hill/Irwin, 2011
5	Robbins, S. P. "Organizational Behaviour", Prentice Hall, 2009
6	Schultz, D. P., & Schultz, S. P. "Psychology and Industry Today: An Introduction to Industrial and Organizational Psychology", MacMillan Co., 1992
7	Journal of Occupational and Organizational Psychology, The British Psychological Society
8	International Journal of Organization Theory & Behavior, Pracedemics Press
9	Work & Stress: An International Journal of Work, Health and Organizations, Routledge

Detailed Syllabus

Lecture-wise Breakup

Course Code	18B12HS814	**Semester** Even	**Semester** VIII **Session** 2018 -2019 **Month from** Jan 2019 to June 2019
Course Name	KNOWLEDGE MANAGEMENT		
Credits	3	**Contact Hours**	3-0-0
Faculty (Names)	**Coordinator(s)**	Dr. Anshu Banwari	
	Teacher(s) (Alphabetically)	Dr. Anshu Banwari	

COURSE OUTCOMES		**COGNITIVE LEVELS**
C402-30.1	Demonstrate the way knowledge is embedded in today's organization and behavioral aspects involved in managing it	Understanding Level (C2)
C402-30.2	Compare and contrast different methods to preserve, nurture, share and manage knowledge	Understanding Level (C2)
C402-30.3	Identify appropriate methods for knowledge integration to gain competitive advantage	Applying Level (C3)
C402-30.4	Identify the legal ramifications arising from knowledge sharing and an insight into the ethical concerns faced by individuals and organizations	Applying Level (C3)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Introduction to Knowledge Management	Cognition and Knowledge Management, Data, Information and Knowledge, Types of Knowledge, Reasoning and Heuristics, Expert Knowledge, Human thinking and Learning, Knowledge Management myths	4
2.	Life Cycle of a knowledge Management	Challenges in building Knowledge Management Systems, Conventional V/S Knowledge Management System Lifecycle, Knowledge Management System Life Cycle, System	6

	System	Justification, Role of Rapid Prototyping, Selecting an expert, Role of Knowledge developer	
3.	Knowledge Creation and Knowledge Architecture	Models of Knowledge Creation and Transformation, Knowledge Architecture, The people Core, Identifying Knowledge centers, The technical core	5
4.	Capturing Tacit Knowledge	Evaluating the expert, Developing a Relationship with expert, Fuzzy reasoning and the quality of Knowledge capture, Interview as a tool, Knowledge capture techniques	6
5.	Knowledge Codification and System Implementation	Codification Tools and Procedures, The knowledge Developer's Skill set, Quality assurance, Approaches to Logical testing and Acceptance testing, Issues related to deployment	6
6.	Knowledge Transfer and Knowledge Sharing	Transfer strategies, Inhibitors of Knowledge transfer, Role of Internet in Knowledge Transfer	5
7.	Managing Knowledge Workers	Business Roles in the Learning Organizations, Work adjustment and the Knowledge Worker, Technology and the Knowledge worker, Role of the CKO, Managing Considerations, Managing Knowledge Projects	5
8.	Ethical, Legal and Managerial Issues	Knowledge Owners, Legal Issues, Ethical Decision cycle, Major threats to Ethics, The Privacy factor	5
Total number of Lectures			**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Project, Oral questions, Assignment)
Total	**100**

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1	**D. Hislop,** Knowledge Management in Organizations, Oxford University Press, 2013
2.	**E. M. Awad and H. M. Ghaziri,** Knowledge Management, Pearson Education, 2007
3.	**S. Warier**, Knowledge Management, Vikas Publishing House, 2011

Detailed Syllabus

Lecture-wise Breakup

Course Code	19B12HS814	**Semester (specify Odd/Even):Even**	**Semester: 8th Session:** 2018 -2019 **Month from: January 18 –June18**
Course Name	**Digital Transformation in Financial Services**		
Credits	**3**	**Contact Hours**	3-0-0

Faculty (Names)	**Coordinator(s)**	Dr.Sakshi Varshney
	Teacher(s) (Alphabetically)	Dr.Sakshi Varshney

COURSE OUTCOMES		**COGNITIVE LEVELS**
C402-31.1	Outline the changes that influence the financial sector in digital age	Understand (Level 2)
C402-31.2	Evaluate the key differences between traditional business management and technology management and the impact it has on business models	Evaluating (Level 5)
C402-31.3	Analyze the new developments in Financial Technology in banking sector.	Analyzing (Level 4)
C402-31.4	Analyze Consumer Behaviors & digital disruptions in Insurance	Analyzing (Level 4)
C402-31.5	Evaluate the limits, risks and broader policy and social implications of digital technology.	Evaluating (Level 5)
C402-31.6	Organising for Digital Innovation and Apply the knowledge of income tax by digital filing of income tax.	Applying (Level3)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Introduction	Financial services, Digitization, Digitalization, Digital Transformation, digital tools in finance, importance and	**04**

		risks. CASE STUDY OF BNP Paribus	
2.	Digital Payment System	Electronic commerce, Advantages & Disadvantages of e commerce, Categories of e commerce, E payment systems, Electronic wallets, Smart Cards, credit cards, debit cards, Advantages and Disadvantages	**04**
3.	Digitization in Banking	Banking: its types, evolution of e banking ,otp, payment mechanisms, RTGS,NEFT, AEPS, UPI, POS, Digital wallets.	**06**
4.	Business Models for Digital Financial Services	Revenue stream Distribution strategy Partnership strategy technology Implementation	**05**
5.	Consumer Behaviors in Digital Economy	Analysis of behavior of financial service user, financial service provider, Principles of behavioral finance,	**05**
6.	Digital Disruptions in Insurance	Digital Changes in Life Insurance, Health & Other Insurance	**06**
7.	Digital Financial Services Risk and its Management	Strategic Risk, Regulatory, Operational Risk, Technology, Financial , Political Risk, Fraud risk, Agent Management Risk, Reputational Risk, Partnership Risk, Risk Management	**08**
8.	Digital/E-Income Tax Filing	Income tax filing, Issues related and suggestions & Organising for digital Innovation	**04**
		Total number of Lectures	**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Project, Presentation, Attendance)
Total	**100**

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	Scardovi C., Transformation in Investment Management. In: Digital Transformation in Financial Services.

	Springer, Cham ,2017
2.	OECD (2018), Financial Markets, Insurance and Private Pensions: Digitalisation and Finance
3.	Digital Financial Services and Risk Management, International Financial Corporation, World Bank, Africa, 2019. Accessed on 2019(Online).Available: https://www.ifc.org/wps/wcm/connect/region__ext_content/ifc_external_corporate_site/sub-saharan+africa/resources/handbook-dfs-rm

Detailed Syllabus

Lecture-wise Breakup

Course Code	19B1NHS812	**Semester- Even**	**Semester** 8th **Session** 2018 -2019 **Month from** January 2019 to June 2019
Course Name	**International Finance**		
Credits	**3**	**Contact Hours**	**3-0-0**

Faculty (Names)	**Coordinator(s)**	Dr. Mukta Mani
	Teacher(s) (Alphabetically)	Dr. Mukta Mani

COURSE OUTCOMES		**COGNITIVE LEVELS**
C402-12.1	Explain the global market scenario, its imperfections and risks which affect the multinational businesses trade.	Understanding level (C2)
C402-12.2	Analyze the international transactions of balance of payments and understand their relationship with key macroeconomic indicators	Analyzing level (C4)
C402-12.3	Apply the concepts of foreign exchange market and currency derivatives for making transactions in foreign exchange market	Applying level (C3)
C402-12.4	Analyze the role of parity conditions and other factors in exchange rate determination.	Analyzing level (C4)
C402-12.5	Analyze the central bank's intervention in foreign exchange market and evaluate the causes of exchange rate disequilibrium	Evaluating level (C5)

Module No.	**Subtitle of the Module**	**Topics in the module**	**No. of Lectures for the module**
1.	Introduction	Financial Globalization and Risk, Global financial Marketplace, Eurocurrency market and LIBOR, Theory of comparative advantage, Globalization process	**4**
2.	Balance of Payments	BOP transactions, accounting, Accounts of BOP, Capital and Financial Accounts, BOP and key	**4**

		macroeconomic variables	
3.	Exchange Rates	Foreign Exchange market, functions, participants, types of transactions: spot, forward and swap transactions Methods of stating exchange rates, quotations and changes in exchange rates	**6**
4.	Foreign Exchange rate determination and forecasting	Exchange rate determination theories, Currency market intervention, disequilibrium, forecasting	**6**
5.	Forward Exchange	Forward foreign exchange, premiums and discounts, forward rates vs future spot rates, payoff profile, swaps, forward quotations	**6**
6.	Currency Futures and options market	Foreign currency futures, Currency options, Forwards, futures and options compared	**6**
7.	International Parity Conditions	Purchasing Power Parity and Interest Parity Prices and Exchange rates, Exchange rate pass-through, Forward rate, Prices, Interest rates and exchange rates in equilibrium	**5**
8.	Transaction and Translation Exposure	Types of foreign exchange exposure, Hedging, Overview of translation, Translation methods, US translation procedures	**5**
		Total	**42**

Evaluation Criteria	
Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Class test, Assignment, Class participation)
Total	**100**

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	Eiteman, D K., Stonehill, A.I. and Moffett, M.H., *Multinational Business Finance*, 14th Ed., Pearson India Education, 2018.
2.	Levi, M.D., *International Finance*, 4th Ed., Routledge Publication, 2009.

3.	Jain, P K., Peyrard, J. and Yadav, S.S., *International Financial Management*, Macmillan India, 1999.
4.	Desai, M.A., *International Finance- A Casebook*, Wiley India, 2007.
5.	Shapiro, Alan C., *Multinational Financial Management*, 7th Ed., John Wiley and Sons Inc., 2003.

Detailed Syllabus

Lecture-wise Breakup

Course Code	**18B12NHS812**	**Semester** Even **(specify Odd/Even)**	**Semester 8 Session** 2018 -2019 **Month from** Jan 2018 to July 2018
Course Name	Social and Legal Issues		
Credits	3	**Contact Hours**	**3-0-0**

Faculty (Names)	**Coordinator(s)**	Dr Swati Sharma
	Teacher(s) (Alphabetically)	Dr Swati Sharma

CO Code	COURSE OUTCOMES	COGNITIVE LEVELS
C402-10.1	Demonstrate an understanding of social science and business law to individuals and businesses.	Understanding Level (C2)
C402-10.2	Critically evaluate how information technology, contractual agreements, rights and obligations affects business and society	Evaluating Level (C5)
C402-10.3	Analyse legal implications of societal laws.	Analyzing Level (C4)
C402-10.4	Develop acceptable attitudes with respect to ethical cultural and social issues related to technology, system, information	Applying Level (C3)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Introduction	Introduction to Social and Legal Issues	1
2.	Social Structure and Impact	Social Structure Social Impact on Information system and Technology Corporate Social Responsibility	6
3.	Ethics	Business Ethics & Values, Professional Conduct, Code of ethics for an Engineer,	6

		Ethics in Bio-Tech.	
4.	Societal Laws	Introduction to Constitution, Right to information, Consumer Protection Act,	8
5.	Business Laws	Contract Act, Company Act, Negotiable Instruments Acts	8
6.	Intellectual Property & Cyberspace	Intellectual Property Issues:(What is Intellectual Property , Copyright Law, Trademark and Law of Patent	5
7.	***Cyber Crime, Laws and IT Act***	Computer Crimes(Fraud and Embezzlement, Sabotage & Information Theft, Intruders, Hacking& Cracking), Computer Crime Laws, Digital Forgery, Cyber Terrorism, Wiretapping, IT Act	8
		Total number of Lectures	**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Assignment and Oral Viva)
Total	**100**

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	Albuquerque D, Business Ethics Principles and Practices, 1st edition, Oxford University Press,2010
2.	Baase,S, A Gift Of Fire Social, Legal, & Ethical Issues in Computing and Internet,2nd edition Prentice Hall, US, 2006
3.	Diwan,P. & Kapoor,S, Cyber And E-Commerce Laws with information Technology Act, & Rules,2nd edition, Prakesh Publication House,Jaipur , 2000
4	Gogna,P.P.S., A Text book of Business Law, 1st ed, , S Chand & Company LTD.2000
5	Ghosh,B., Ethics in Management and Indian Ethos, 2nd Edition, Vikas Publishing house,New Delhi, 2006

Detailed Syllabus

Lecture-wise Breakup

Course Code	15B1NHS832	**Semester** Even **(specify Odd/Even)**	**Semester** VIII **Session** 2018 -2019 **Month from** Jan - July
Course Name	International Studies		
Credits	3	**Contact Hours**	**3-0-0**

Faculty (Names)	**Coordinator(s)**	Dr. Monica Chaudhary
	Teacher(s) (Alphabetically)	Dr. Monica Chaudhary

CO Code	COURSE OUTCOMES	COGNITIVE LEVELS
C402-8.1	Interpret the major security issues in the Eurasia Region.	Understanding (C2)
C402-8.2	Compare the developed and developing economies along with other major international economic concepts and institutions.	Applying (C3)
C402-8.3	Analyze the major historic, economic, political, socio-cultural and technological issues from a global perspective.	Analyzing (C4)
C402-8.4	Discuss India's relations with USA, Russia and China.	Understanding (C2)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Introduction	Introduction	1
2.	Historical Aspects	• Feudalism, Socialism, communism, Capitalism, • World War I • World War II: Allies & the world • Current Power Centers	12
3.	Global Markets	• The politics of trade • Liberal market economies—The United States • The rise of emerging markets—reaching where? • WTO, Trading blocks, International treaties	6

4.	Social-cultural	• Global Population, Migration • Human Rights – Amnesty, UNO, Geneva Convention • Environmental and Ethical Issues • Communication & Culture	4
5.	Political	• International Relations: Terrorism, United Nations • Current Issues in International Politics: China & Sea Water, Israel – Palestine, Ukraine, European Union • Warfare in the Modern World	8
6.	Emerging Technologies	• Top 10 emerging technologies by World Economic Forum 2018 • Emerging health technologies by WHO • Emerging technologies: options for the future	5
7.	India	• India's Relation with China, US, Russia • Great Indians Diaspora and their contributions • India: Futuristic View	8
		Total number of Lectures	**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Quiz and Attendance)
Total	**100**

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	M. Friedman, Chapters 1–3, 6, 10, and 12–13 in *Capitalism and Freedom: 40th Anniversary Edition*. University of Chicago Press, 2002.
2.	T. Oatley, International Political Economy (4th Edition) (Paperback). New York: Longman, 2010.
3.	J. Keegan, A History of Warfare , Vintage Books, New York, 1994.
4.	A. Sen, Development as Freedom, Anchor Books, New York, 1999.
5.	J.B. Stewart, "A Reporter at Large: Eight Days." *The New Yorker*, September 21, 2009.
6.	**Top 5 Futuristic Technologies That Exist Today!** https://www.youtube.com/watch?v=VUncbfJaf8Q

7.	A. Rawi, L. Alfaro, et al. "Bombardier: Canada vs. Brazil at The WTO." Harvard Business School Case. Harvard Business School Publishing. Case: 9-703-022, February 20, 2003.
8.	http://www.forbes.com/sites/carolkinseygoman/2011/11/28/how-culture-controls-communication/