

Manonmaniam Sundaranar University

Tirunelveli

List of Supportive Courses through MOOCs for the II year P.G.

Programmes of the Univ. Depts / Centres [2019-20 Odd Sem.]

***Note: The Course 'Learning English' has been replaced by 'The Psychology of Language'**

Sl. No	University Department / Centre	Title of the Supportive Course (MOOCs)	Subject Code	Name of the Mentor
1.	Animal Science	Industrial Biotechnology	AZOMSB	Dr.S. Kalidass
2.	Biotechnology	Genetic Engineering: Theory and Application	ABTMSB	Dr.S. Venkatesh
3.	Centre for Information Technology & Engineering (CITE)	Social Networks	AITMSB	Mrs.P. Kavitha
4.	Centre for Marine Science & Technology (CMST)	Dairy and Food process and products technology	AMBMSB	Dr. M. Michael Babu
5.	Chemistry	Analytical Chemistry	ACHMSB	Dr. K. Swarnalatha
6.	Commerce	Marketing Management - I	ACOMSB	Dr.K. Rajamannar
7.	Communication	Text, Textuality and Digital media	AMCMSB	Mr. Gnana D. Hans
8.	Computer Science & Engineering	The Joy of Computing using Python	ACSMSB	Dr.G.Murugeswari
9.	Criminology and Criminal Justice Science	Intellectual Property Rights and Competition Law	ACJMSB	Dr.E.EnanalaPeriyar
10.	Economics	Human Resource Development	AEOMSB	Dr.G. Monikanda Prasad
11.	Education	Educational Leadership	AEDMSB	Dr. S.R. Sundaravalli
12.	English	The Psychology of Language	AENMSB	Dr.P. Vedamuthan
13.	Geo Technology	Remote Sensing and GIS	AGPMSB	Dr. Y. Srinivas

14.	History	Folk And Minor Art In India	AHSMSB	Dr. P. Senrayaperumal
15.	Management Studies	Corporate Social Responsibility	AMSMSB	Dr.M.Bhoopal
16.	Mathematics	Mathematical Finance	AMAMSB	Dr.R.Kala
17.	PG - Extension Centre	Positive Psychology	APEMSB	Dr. P. Indu & Ms. K. Krishna Kumari
18.	Pharmaceutical Chemistry	Computer Aided Drug Design	AOCMSB	Dr.K.Nagashri
19.	Physics	Nanotechnology in Agriculture	APHMSB	Dr. S. Arunavathi
20.	Plant Science	Organic Farming for Sustainable Agricultural Production	ABYMSB	Dr. A. Selvam
21.	Psychology	Developing Soft Skills and Personality	APYMSB	Dr.S.S.Srinithi
22.	Renewable Energy Science	Technologies For Clean And Renewable Energy Production	AREMSB	Dr. R. Lavanya
23.	Sri Paramakalyani Centre for Excellence of Science	Wildlife Conservation	AEVMSB	Dr. M. Muralidharan
24.	Statistics	Introduction to R Software	ASTMSB	Dr.V. Denesh Kumar



Instructor Name : DEBABRATA DAS (IIT Kharagpur - Biotechnology)

COURSE DURATION : Jul-Oct 2017 **CORE / ELECTIVE :** Core **UG / PG:** UG

PRE-REQUISITES : Knowledge in microbiology, biochemistry and mathematics in 10+2 level

INTENDED AUDIENCE : Biotechnology, Chemical Engineering, Biochemical Engineering, Food Technology, Environmental Engineering, Applied Microbiology, Pharmacy.

INDUSTRIES APPLICABLE TO : DuPont India; IFB Agra Industry; IOC; ONGC; Dr. Reddy's Laboratories; Biocon, United beverages.

COURSE OUTLINE : The course aims to provide fundamental insights to exploit enzymes and microbes for the manufacturing of products which have a huge industrial significance. It uniquely blends the science and engineering with various biochemical processes to obtain products of diverse fields such as chemicals, food, bio-energy etc. The course introduces bioreactors, its types, operation methods and provides an experimental demonstration of the same. Strategies to obtain higher yields, design of the reactors and production of bio-fuels from microbes are thoroughly explained. Students of various disciplines such as biotechnology, chemical engineering, food engineering, and pharmaceutical industries can be benefited from the course as it discusses the existing bio-process applications such as wine and cheese making, antibiotics and vaccines etc. The course majorly focuses on the applications and allows students to gain practical knowledge rather than mere theory. Major bottlenecks for the operation of biochemical industries will be discussed.

ABOUT INSTRUCTOR : Dr. Debabrata Das pursued his doctoral studies from Indian Institute of Technology Delhi. Prof. D Das is involved in three different area of research: Gaseous energy recovery from organic wastes; algal biorefinery and CO₂ sequestration; and microbial fuel cell. He is presently involved in teaching both undergraduate and post-graduate courses on Biochemical Reaction Engineering; Aspects of Biochemical Engineering; Bioprocess Plant and Equipment Design; and Bioprocess Technology for the students of Department of Biotechnology; Department of Chemical Engineering; Department of Chemistry and School Energy Science and Engineering. He has about 137 research publications in the peer reviewed journals and contributed more than 30 chapters in the books published by International publishers. He has two Indian patents. He is the member of the editorial board of several International Journals. He is the Fellow of Indian National Academy of Engineering (INAE).

COURSE PLAN

Week 1: Introduction, Microbes and enzymes of industrial importance

Week 2: Different types of bioreactors and bioreactor design

Week 3: Microbial growth, substrate degradation and product formation kinetics, Tutorial 1

Week 4: Instrumentation, Sterilization of air, media and reactor

Week 5: Upstream and Downstream processing,

Week 6: Production of Oxychemicals I: Tax and non-tax alcohol, Brewing industry, Tutorial 2

Week 7: Production of Oxychemicals II Wine making, Vinegar and citric acid production, Tutorial 3

Week 8: Production of Oxychemicals III Antibiotics: Penicillin; Streptomycin

Week 9: High fructose corn syrup, Cheese making, and Single cell production

Week 10: Vaccines production and Metal leaching

Week 11: Bioenergy- Gaseous fuels: Biohydrogen, Biomethane and Microbial fuel cell; Liquid fuels: Bioethanol, Biodiesel and Biobutanol

Week 12: Aerobic and Anaerobic wastewater treatment processes, Tutorial 4



Genetic Engineering: Theory and Application

Instructor Name : PROF.VISHAL TRIVEDI (IIT Guwahati - Biotechnology)

COURSE DURATION : Jul-Sep 2019 CORE / ELECTIVE : Elective UG / PG: Both

PRE-REQUISITES : General Biology 10+2

INTENDED AUDIENCE : UG/PG/PhD/Scientist in industry

INDUSTRIES APPLICABLE TO : Biocon <https://www.biocon.com/> Jubilant Life Sciences www.jubl.com/ Shantha Biotechnics Ltd Panacea Biotec Other companies related to biotechnology

COURSE OUTLINE : In the current MOOCs course I have put effort to briefly discuss about biotechnology, its scope and impact on human life with several customized products. The Development of technology and generation of product has multiple steps and understanding these steps are being covered in this course with a discussion of biotechnology application at the end. By the end of this course, student will be able to understand following aspects of biotechnology: 1. Basic metabolic pathways and their regulation. 2. Microbial growth kinetics with an emphasis on fermentation 3. Basic molecular biology tools used in biotechnology. 4. Basic methodology for product recovery and analysis.

ABOUT INSTRUCTOR : Dr. Trivedi did his Ph.D. from Central Drug Research Institute, Lucknow in the field of Structural Biology. From his postdoctoral research at the Department of Molecular and Cellular Biology, Harvard University and Molecular Oncology Research Institute, Tufts University, Boston, USA, he gained extensive research experience in the field of cell biology, intracellular signal transduction, and immunology. Currently, his laboratory at Department of Biosciences and Bioengineering has an active group working and exploring questions related to malaria parasite biochemistry, the role of novel proteins, development of anti-malarial agents, and lastly understanding factors playing a crucial role in immunomodulation and host pathology in different organs.

COURSE PLAN

Week 1: Introduction and Basics of Biological System.

Week 2: Basics of Biological System

Week 3: Basics of Cloning (Part I)

Week 4: Basics of Cloning (Part II)

Week 5: Recombinant DNA Technology (Part I)

Week 6: Recombinant DNA Technology (Part II)

Week 7: Product Recovery and Characterization

Week 8: Biotechnology in Social Welfare



Social networks

ABOUT THE COURSE:

The world has become highly interconnected and hence more complex than ever before. We are surrounded by a multitude of networks in our daily life, for example, friendship networks, online social networks, world wide web, road networks etc. All these networks are today available online in the form of graphs which hold a whole lot of hidden information. They encompass surprising secrets which have been time and again revealed with the help of tools like graph theory, sociology, game theory etc. The study of these graphs and revelation of their properties with these tools have been termed as Social Network Analysis.

Some of the surprising observations and beautiful discoveries achieved with Social Network Analysis are listed below:

1. **6 degrees of separation:** You can reach out to any person on this earth within an average of 6 hops. That means, "You know someone who knows someone who knows someone who knows someone who knows Justin Beiber (or Angelina Jolie or literally anyone on this planet.)".
2. **The algorithm behind Google search:** How does Google achieve such precise and valid search results? The underlying algorithm is fairly simple and relies totally on the network of web pages.
3. **How do you get your dream job:** Not through your best friends but through your acquaintances to whom you talk relatively less frequently! Sounds counterintuitive.
4. **Link prediction:** Can one predict who is going to be your next Facebook friend, or which product are you going to buy next on Flipkart, or which is the next movie you are going to watch on Netflix? Yes, it is possible.
5. **Viral Marketing:** Want to make your new product sell out quickly? How do you determine the people to whom you should be giving the free samples? Does that even matter?
6. **Contagion:** Not only information but happiness, obesity, altruism, depression all spread from person to person.

As one can see through above examples, the study of networks has penetrated into all spheres of our life. The course revolves around the study of some well-known theories of social and information networks and their applications on real-world datasets. Not only does the course introduces you to the current advancement in the field, but paves a way for you to take this advancement one step further.

Moreover, the course is highly programming intensive. Not to worry, we do not assume the students to know Python before hand and provide even the basic tutorials for this language. Hence, it is also a great way to learn this powerful programming language. The course takes you from the most basic functionality of Python to the most advanced one where the students are able to code a real word dataset crunching algorithm on their own.

By the end of the course, you will

- be well versed in the basic theories and popular results of social network analysis.
- be able to crunch the online available graph datasets and process them with the help of python networkx package.
- be able to visualize the graph datasets.

COURSE LAYOUT:

Week 1: Introduction

Week 2: Handling Real-world Network Datasets

Week 3: Strength of Weak Ties

Week 4: Strong and Weak Relationships (Continued) & Homophily

Week 5: Homophily Continued and +Ve / -Ve Relationships

Week 6: Link Analysis

Week 7: Cascading Behaviour in Networks

Week 8: Link Analysis (Continued)

Week 9: Power Laws and Rich-Get-Richer Phenomena

Week 10: Power law (contd..) and Epidemics

Week 11: Small World Phenomenon

Week 12: Pseudocore (How to go viral on web)



Dairy and Food process and products technology

Agriculture

Instructor Name: Tridib Kumar Goswami

Institute: IIT Kharagpur

Department: Agriculture

Course Intro: : This course will cover basics of dairy (liquid food) food processing and preservation technologies required in any dairy and food processing industries. The basic knowledge on dairy food processing is intermingled with most of the unit operations at some or other stage of processing. Since, this basic aspect of food processing and preservation is not taught in most of the Agricultural engineering institutions elaborately, a comprehension of these aspects of processing and preservation will enrich the knowledge base of the students in general.

Pre Requisites: : Not required

Core/Elective: : Core_Elective

UG/PG: : Both

Industry Support : Any Processing Industry such as Britannia, ITC, Hindustan Lever, Mother Dairy, Amul, etc.

Reference : None

About Instructor: Prof. Tridib Kumar Goswami, a NAAS, ISAE, IE, AABS Fellow, did his B.Sc. in Chemistry (Hons) from University of Calcutta, B.Tech. in Food Technology and Biochemical Engineering from Jadavpur University, Ph.D. from IIT Kharagpur. After serving Kwality Ice Cream, Bombay for 1½ years, he joined IIT Kharagpur in 1989 and is still continuing as a Professor. He has earned 5 Indian Patents, published 104 papers in peer reviewed reputed journals, 55 conference proceedings. He has written 4 books and 14 book chapters published by International publishers. He has travelled around the world for presenting papers and was specially invited by Jeonbuk National University, Korea with full sponsorship in 2009. He has guided 14 Ph.D., out of which 3 theses have been awarded the prestigious Jawaharlal Nehru Award offered by ICAR. One of his papers was awarded the prestigious N.N.



COURSE PLAN

SL.NO	Week	Module Name
1	1	Basic principles and methods of food processing and preservation. Emerging Technologies in food processing. Food additives and preservatives
2	2	Food laws and standards. Effect of processing on acceptability and nutritive value of food.
3	3	Physico-chemical properties and structure of milk and milk constituents.
4	4	Chemical and microbial spoilage of milk and milk products; Fluid milk Processing, packaging and distribution
5	5	: Common dairy processes – cream separation (standardization), pasteurization, sterilization and Homogenization.
6	6	Process technology for manufacture of evaporated milk, condensed milk, dried milk, malted milk, infant and baby foods, ice-cream, cheese, butter, fermented milk and indigenous dairy products.
7	7	Methods and procedures for sampling and testing of milk and milk products. Laws and standards for milk and milk products.
8	8	Technological processes for industrially manufactured foods of commercial importance, from plant and animal origin.
9	9	Cereals, vegetables, fruits, meats, poultry and egg products; Bakery, pasta and confectionary products, ready to eat foods, fermented foods, alcoholic and non-alcoholic Beverages, tea, coffee and cocoa, fabricated foods.
10	10	Packaging materials; Characteristics, properties and their design. Packaging requirement for Different processed and unprocessed foods.
11	11	Working Principles of various type of fillers : form-fill- seal machine.



12	12	Gas packaging and modified atmospherePackage design. Shelf life prediction of foods in packages. Quality control inFood packaging. Product safety and packaging regulations.
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ANALYTICAL CHEMISTRY



PROF. DEBASHIS RAY

Department of Chemistry
IIT Kharagpur

TYPE OF COURSE : Rerun| Core| UG/PG

COURSE DURATION : 12weeks (30 Jul'18 - 19 Oct'18)

INTENDED AUDIENCE : BE/B.Tech, M.Sc

EXAM DATE : 28 Oct 2018

PRE-REQUISITES : H. S. +2 Level

INDUSTRIES APPLICABLE TO : Hindustan Lever Ltd, Ranbaxy, Shell, ONGC, NTPC, SAIL, CIL, Waters, PHE Dept.

COURSE OUTLINE :

It will give the opportunity to study and use specialized instruments and specific methods to separate, identify, and quantify the unknown substance. Spectroscopic technique will consist of applications of atomic absorption spectroscopy, atomic emission spectroscopy, ultraviolet-visible spectroscopy, X-ray fluorescence spectroscopy, infrared spectroscopy, Raman spectroscopy and Mössbauer spectroscopy. In electrochemical methods cyclic voltammetry, coulometry and amperometry will be discussed. The course has applications that include forensic science, analysis of biological samples, clinical analysis, environmental analysis, and materials analysis.

ABOUT INSTRUCTOR :

Prof. Debashis Ray is an M.Sc. (Gold Medalist) from Burdwan University in 1985 and did his Ph. D. from IACS (degree from Jadavpur University) in 1989 and in faculty roll of IIT Kharagpur from 1990. Specialization: Inorganic Chemistry, Coordination Chemistry, Bioinorganic Chemistry, Analytical Chemistry. Received INSA YS Medal in 1994 and CRSI Bronze Medal in 2007. Visited Indiana University during 1995 availing BOYSCAST fellowship of Govt of India, Oxford University in 2001 using INSA-RSC exchange program and was a Humboldt Fellow during 2002-2003 in MPI, Muelheim, Germany.

COURSE PLAN :

- Week 01** : Chemicals and Materials Analysis Methods
- Week 02** : Role of Analytical Chemistry and Techniques
- Week 03** : Chemical Equilibria and Basis of Chemical Analysis
- Week 04** : Spectrochemical Methods - I
- Week 05** : Spectrochemical Methods - II
- Week 06** : Thermal Methods - I
- Week 07** : Thermal Methods - II
- Week 08** : Electroanalytical Methods - I
- Week 09** : Electroanalytical Methods - II
- Week 10** : Electrochemical Sensors
- Week 11** : Bioanalytical Chemistry
- Week 12** : Applications of Chemical Analysis

NOC:Marketing Management-I - Video course

COURSE OUTLINE

This is part-I of a course on Marketing Management. The objective of the course is to introduce the participants to principles and practices, theoretical building blocks of marketing, its role as an organizational engine and the evolving marketing process of today. At the end of the course, a participant will be able to understand and manage the core marketing management function.

COURSE DETAIL

Week .No	Topic
1	Introduction to Marketing <ul style="list-style-type: none"> o Defining Marketing o Core concepts in Marketing o Evolution of Marketing o Marketing Planning Process o Contemporary Issues and Practices
2	Scanning the Business Environment <ul style="list-style-type: none"> o The value chain o Core Competencies o Strategic Planning Process o PESTEL o Competition Analysis o SWOT Analysis
3&4	Marketing Information System and Marketing Research <ul style="list-style-type: none"> o Role of Marketing Information System in Managerial Decision Making Process o Components of Marketing Information systems o The Marketing Research Process: An overview Defining the Management Decision Problem and Marketing Research Problem Framing Research Objectives and developing the research plan Exploratory vs. Conclusive Research
5&6	Buyer Behavior <ul style="list-style-type: none"> o Consumer Behavior Consumer buying process model What Influences Consumer Behavior Key Psychological Processes The Buying Decision Process: The Five Stage Model Other Theories of Consumer Decision Making o Industrial Buyer Behavior Concept of Buying Center Industrial buying process model Influence of Economic and Behavioral Factors Influence of Procurement Organization Role of Negotiation Process



NP-TEL

NPTEL

<http://nptel.ac.in>

Management

Coordinators:
Dr. Shashi Shekhar Mishra

Department of Industrial and Management Engineering IIT Kanpur

Prof. Jayanta Chatterjee

Industrial & Management Engineering IIT Kanpur

7&8

Generic Marketing Strategies

- o Defining Market Segmentation
- o Bases of segmentation
- o Evaluation and Targeting Market Segments
- o Brand Positioning and Differentiation



**HUMANITIES &
SOCIAL SCIENCES**

Text, Textuality and Digital Media

Instructor Name: Prof. Arjun Ghosh (IIT Delhi - Humanities and Social Sciences)

COURSE DURATION: Jul-Oct 2019 **CORE / ELECTIVE:** Elective **UG / PG:** UG

PRE-REQUISITES: 10+2

INTENDED AUDIENCE: Undergraduate: Those interested in studying the history of the book and the onset of digital media

INDUSTRIES APPLICABLE TO: NA

COURSE OUTLINE: The emergence of digital means of communication and representation is transforming the way human beings assimilate and engage with knowledge. To understand this process this course will study the evolution of language, narratives and representation through the history of technologies of communication – oral, written, print and the digital. It will explore concepts of copyright, censorship, authorship, nation formation. Students would engage in debates surrounding blogging, facebook, google, twitter, instagram, video games, wikipedia and other forms of electronic texts. Students who have already completed a Literature course are likely to benefit from the experience.

ABOUT INSTRUCTOR: Arjun works on the politics of performance and mobilisation, copyright and intellectual property, new media and the internet. He was formerly a Fellow at the Indian Institute of Advanced Study, Shimla and currently teaches at IIT Delhi. He is the author of A History of the Jana Natya Manch: Plays For the People (Sage, 2012) and Freedom from Profit: Eschewing Copyright in Resistance Art (IIAS, 2014) and an annotated translation of Nabanna (Rupa, 2018).

COURSE PLAN

Week 1: Understanding Media

Week 2: Writing as Technology

Week 3: Seeing as writing

Week 4: Discovery of Printing

Week 5: History of the book

Week 6: Print and Nationalism

Week 7: Origins of Copyright

Week 8: Television and society

Week 9: Electronic Literature

Week 10: Future of the Book

Week 11: Digital Media and the Mind

Week 12: Social Media and Search Engines



The Joy of Computing

Computer Science and Engineering

Instructor Name: S. R. S. Iyengar

Institute: IITRopar

Department: Computer Science and Engineering

Course Intro: : A fun filled whirlwind tour of 30 hrs, covering everything you need to know to fall in love with the most sought after skill of the 21st century. The course brings programming to your desk with anecdotes, analogies and illustrious examples. Turning abstractions to insights and engineering to art, the course focuses primarily to inspire the learner's mind to think logically and arrive at a solution programmatically. As part of the course, you will be learning how to practice and culture the art of programming with Python as a language. At the end of the course, we introduce some of the current advances in computing to motivate the enthusiastic learner to pursue further directions.

Pre Requisites: : 10th standard/high school

Core/Elective: : Core

UG/PG: : Both

Industry Support : Every software company is aware of the potential of a first course in computer science. Especially of a "first course" in computing, done right.

Reference : None (most of our material will be provided to the students by us in the form of lecture notes.)

About Instructor: Sudarshan Iyengar has a PhD from the Indian Institute of Science and is currently working as an assistant professor at IIT Ropar and has been teaching this course from the past 4 years.



COURSE PLAN

SL.NO	Week	Module Name
1	1	Computation - 1 (Motivation from Nature: A Computer-less Debate)
2	2	Computation - 2 (From History to the State of the Art)
3	3	Scratch Programming: A Gamey Kickstart
4	4	Cultivating and Culturing the Skillful Art of Programming
5	5	Python: A Dexterâ€™s Laboratory
6	6	Python: From Basics to Beyond
7	7	Python: Power, Possibilities and the Unimaginables
8	8	Data Structures: Oh! Aint they Fun?
9	9	Algorithmic Thinking: Who Said Art is Limited to Picasso?
10	10	Crunching Data, Munching Inferences and Trillion Dollar Questions...
11	11	Yours Sincerely and Genuinely: The Artificialized Intelligence!
12	12	Conclusion, the New Beginnings and... the Destination Next?



Instructor Name:

Prof. K.D. Raju (IIT Kharagpur - Multidisciplinary)

Prof. Niharika Sahoo Bhattacharya (IIT Kharagpur - Humanities and Social Sciences)

COURSE DURATION: Jul-Sep 2019 **CORE / ELECTIVE:** Elective **UG / PG:** Both

PRE-REQUISITES: Not necessary. Brief introduction to Intellectual Property Rights may be useful.

INTENDED AUDIENCE: Students from Law, Management and business studies, and Technical background can benefit from the program

INDUSTRIES APPLICABLE TO: NA

COURSE OUTLINE: Competition Law and Intellectual Property Law prima facie appear to have conflicting objectives and goals. While Competition law operates towards facilitating the market growth by curbing anti-competitive practices in the market, IPRs confer exclusive monopoly to the proprietor. However, both are intended towards promoting innovation and consumer welfare. In the ever evolving technology driven society, the recent conflict between the domain of IPRs and completion law pertains to the exercise of rights in IPR affecting competition law. Therefore, in the light of the above intricacies and problems the course aims to discuss the general principles and laws related to Intellectual Property Right and Competition law, The course also provides an overview of the application and operation of both the laws in different jurisdictions and tries to simplify the overlapping domain of IP and Competition Law.

ABOUT INSTRUCTOR: Dr. Raju K.D is presently Professor at Rajiv Gandhi School of Intellectual Property Law, Indian Institute of Technology, Kharagpur. His earlier assignments include Deputy Secretary, PHD Chamber of Commerce and Industry, New Delhi, Assistant Director and Lecturer at Amity Institute of Global Legal Education and Research, New Delhi. He worked with NGOs like Oxfam. His research career began with M.Phil studies at Jawaharlal Nehru University, New Delhi on International Law and further his doctoral studies at JNU. He has been awarded "Fulbright Scholarship by the United States Education Foundation in India (USEFI) for completing his doctoral studies at the University of Illinois, Urbana Champagne, United States. He has been awarded with the Microsoft Outstanding Young Faculty Award in 2011.

Dr Niharika Sahoo Bhattacharya is currently working as an Assistant Professor in Rajiv Gandhi School of Intellectual Property Law. She has done her doctoral studies in the interdisciplinary area of IPR and biomedicines from IIT Kharagpur. Her broad research interest is to analyze and understand the complexities between scientific innovations, their protection and commercialization. Her other research interest are IP issues in pharmaceuticals, IP and competition law, and Plant variety Protection. She is actively involved in the research and teaching of various IP subjects and published in many peer reviewed international journals of repute.

COURSE PLAN

Week 1: Function of IPR. Public good, Incentive theory, different forms of IPR

Week 2: Introduction to competition Law, Anti-competitive agreements, Abuse of dominance, Regulation of combinations,

Week 3: The relationship and Interaction between IPR and competition law

Week 4: The economics of US Antitrust law, IP and competition issues, Technology transfer agreements

Week 5: The EU experience with IP and Competition Law

Week 6: Market allocation, Horizontal agreements, Vertical agreements, licensing issues

Week 7: Indian Competition Act and IPR protection

Week 8: Anticompetitive agreement and abuse of dominance in IPR protection, IPR issues in merger and acquisition; Harmonization of IP protection and competition Law in India



PROF. KAILASH B.L. SRIVASTAVA
Department of Humanities and Social Sciences
IIT Kharagpur

TYPE OF COURSE : Rerun| Core | PG **COURSE DURATION** : 12 weeks (30 Jul'18 - 19 Oct'18)
INTENDED AUDIENCE : M.E./M.Tech,M.S,M.Sc, PhD, MBA **EXAM DATE** : 28 Oct 2018
MBA(HR)
INDUSTRIES APPLICABLE TO : IT Companies/ R&D Companies/ Pharma Companies/ Manufacturing and Services sector

COURSE OUTLINE :

The course aims to equip students to develop themselves into a critically reflective and capable HRD practitioner, or a manager who can facilitate the learning of others. The major objective of the course is to explain and demonstrate the contribution of HRD in an organization and enable student to develop an ability to decide learning and training needs; and have competence in the design and delivery of learning programmes. Organizations are made up of people: their knowledge, skills, attitudes and interconnections. In order to survive and thrive, organizations need to facilitate the growth of all of these as part of a HRD strategy. Human Resource Development (HRD) is a key activity that systematically leads to the growth and development of people in organisations, and makes organisations more effective. The process of identifying needs and designing and delivering HRD interventions that are part of the course are crucial skills for all managers. The course will focus on the role of HRD in designing and implementing appropriate strategies in line with the business goals of their organization.

ABOUT INSTRUCTOR :

Dr. Kailash B.L. Srivastava is Professor, Department of Humanities and Social Sciences and Joint Professor in Vinod Gupta School Management, and specializes in the area of Human Resource Management and Development and Organizational Behaviour at Indian Institute of Technology, Kharagpur. He holds a first class Master's degree in Psychology from Gorakhpur University and Ph.D. from Indian Institute of Technology, Kanpur, and has around 25 years of teaching, research, and training experience.

COURSE PLAN :

- Week 01** : Introduction to Human Resource Development: Emergent of HRD, Critical HRD roles, challenges for HRD.
- Week 02** : HRD in global perspective, HRD- Performance link, Strategic perspective of HRD.
- Week 03** : HRD Process Model: identification of HRD needs and Design and development of HRD programmes.
- Week 04** : HRD Process Model: Methods of Implantation, Evaluation of HRD programmes.
- Week 05** : Employee coaching and performance management: Coaching to improve poor performance, coaching analysis.
- Week 06** : HRD interventions: Mentoring for employee development: Role of mentoring in development.
- Week 07** : Employee counseling for HRD: Overview of counseling programmes, employee assistance programme, stress management, employee wellness and health promotion.
- Week 08** : Competency framework of HRD: why competency mapping? Understanding the competency mapping framework,.
- Week 09** : Career Planning, management, and development: Career development stages and activities, role of individual and organization in career planning, Issues in career management.
- Week 10** : Intellectual capital (IC), its measurement and management: Components of IC, measurement models of IC, IC index and challenges for HR.
- Week 11** : HRD, Organizational Learning, and learning organizations.
- Week 12** : The future of HRD and HRD Ethics: Research, practice and education of HRD for innovation and talent development and management, Role of HRD in developing ethical attitude and behavior and development, Ethical problems with HRD roles .



Educational leadership

ABOUT THE COURSE

In the context of Global, Multicultural & Virtual work environments domain knowledge alone is not a sufficient guarantee for professional success. Since long we have been talking about organizational leadership or corporate leadership. In fact leadership is an adjective mostly attached to the growth of industry. Rarely do we realize the importance of leadership in educational institutions. This course is designed to help the teaching/Academic professionals to understand how educational leadership can transform and enhance the effectiveness of educational institutions. This course intends to focus on academic community and to encourage individual members to develop various skills, competencies, abilities to enhance their leadership skills. It will also help them to develop awareness into their self-motivation, reflective practices, critical thinking and positive plans of actions for enhancing their leadership impact and institutional effectiveness. This course is aimed to mobilize human resources of education sector, educational administration and prospective teachers

COURSE LAYOUT

Week 1: Educational Management & Leadership: Issues & challenges

Week 2: Professional Development & the Reflective Practitioner

Week 3: Professional Ethics & Values in Teaching

Week 4: Key Challenges for Educational Leaders: Grooming Capable & Authentic Educational Leaders

Week 5: Emotional Intelligence & Educational Leadership

Week 6: Leadership for Managing Diversity & Inclusion in Education

Week 7: Educational Leadership in a changing World : 21st Century Challenges

Week 8: Innovative Pedagogy ,Technology & Turnaround Leadership : The Stakeholders' Perspectives



**HUMANITIES &
SOCIAL SCIENCES**

The Psychology of Language

Instructor Name: Prof.Naveen Kashyap (IIT Guwahati - Humanities and Social Sciences)

COURSE DURATION: Jul-Sep 2019 **CORE / ELECTIVE:** Elective **UG / PG:** Both

PRE-REQUISITES: NA

INTENDED AUDIENCE: Students, Teachers

INDUSTRIES APPLICABLE TO: NA

COURSE OUTLINE: The very basic form of exchanging information between two living beings is termed as communication. A highly developed form of communication is language, which is used mostly by human beings. The present course will introduce the concept of language and the psychology behind the learning and using of language

ABOUT INSTRUCTOR: Naveen Kashyap, Ph.D is as Associate Professor of Psychology at the Indian Institute of Technology Guwahati. His research interests are sleep and human cognitive processes. Dr Kashyap has been teaching courses like cognitive psychology, introduction to psychology, consumer psychology, advance cognitive process and research methodology to UG and PG students of IITG Guwahati for the past 10 years

COURSE PLAN

Week 1: Communication and Language

Week 2: The science of language

Week 3: Speech perception

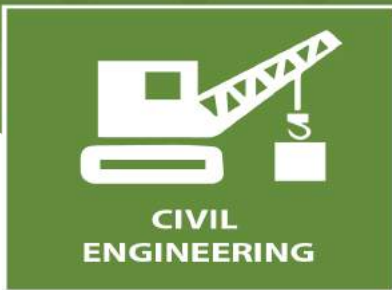
Week 4: Speech Production

Week 5: Words

Week 6: Sentences Sentence structure, comprehending sentences, producing sentences, syntactic rules

Week 7: Discourse Conversation, Narratives and references

Week 8: Reading and Writing Writing, cognitive processes in reading and writing



Instructor Name : PROF. RISHIKESH BHARTI (IIT Guwahati - Civil Engineering)

COURSE DURATION : Jul-Sep 2019 **CORE / ELECTIVE :** Core **UG / PG:** Both

PRE-REQUISITES : No

INTENDED AUDIENCE : PG Students

INDUSTRIES APPLICABLE TO : Rolta India, RMSI Private Limited, ArcGeosystems

COURSE OUTLINE : This course will introduce the students to the state-of-the-art concepts and practices of remote sensing and GIS. It starts with the fundamentals of remote sensing and GIS and subsequently advanced methods will be covered. This course is designed to give comprehensive understanding on the application of remote sensing and GIS in solving the research problems. Upon completion, the participants should be able to use remote sensing (Satellite images and Field data) and GIS in their future research work.

ABOUT INSTRUCTOR : Rishikesh Bharti is a faculty member at the Department of Civil Engineering, Indian Institute of Technology Guwahati. He has been teaching Advanced Remote Sensing, Geohazard Science and Engineering, Advanced Techniques in Geoscience, Engineering Geology to the B.Tech, M.Tech and PhD students at IIT Guwahati. Hydrogeomorphology, Geospatial modelling, Snow and Glacier Studies, Spectroscopy of natural & manmade materials and Advance remote sensing (Hyperspectral and thermal) for the earth and planetary exploration are his major research interests. He hope participants will enjoy and learn the proposed course. The details of his research can be found at Website: <http://www.iitg.ac.in/rbharti/>.

COURSE PLAN

Week 1:Remote Sensing Data and Corrections

Week 2:Satellite Image Corrections

Week 3:Digital Image Processing-I

Week 4:Digital Image Processing-II

Week 5:Thermal and Microwave

Week 6:Imaging Spectroscopy-I

Week 7:Imaging Spectroscopy-II & GIS-I

Week 8:GIS-II and Application

NOC:Folk and Minor Art in India - Video course

COURSE OUTLINE

- Indian folk artistry is uniquely recognized all over the world not only for richness of aesthetics but also as indicators of age-old habitual belief.
- They comprise of tacit knowledge that is protected by passing on through generations.
- Having said that one must also consider the folk artists as creative individuals with adequate freedom of expression to keep the tradition alive and going.
- In India, the mainstream academic style of art synergized with the principle of vernacular art and culture to boost 'Nationalistic' idea as well as 'Modernism' since pre-colonial era.
- The course traces the journey of an array of indigenous art styles from traditional to contemporary and comments on sustainability of culture through preservation, conservation and paradigm shift.

COURSE DETAIL

Week	Topics
1.	Changing definition of Folk and Minor Art Timeline and Regions: General Mapping Traditional Roots: Elements and Principles Timelessness : Primitive Connection Evolution in Purpose: Ritualistic to Propagative Contemporary Practice
2.	Classification and Connections: Traditional Roots Available literary recourses Mythical Associations Idea of Nationalism in the Context of Folk art Idea of Modernism In the context of Folk Art Relevance of the Art Practice
3.	Contextualization and Decontextualization



NP-TEL

NPTEL

<http://nptel.ac.in>

Humanities and Social Sciences

Pre-requisites:

Bachelor Degree in
Humanities

Coordinators:

Dr. Shatarupa Thakurta Roy
Department of Humanities and
Social Sciences IIT Kanpur

	<p>Concept of Communication for Social Purpose Aesthetic Perspective Secularity and Religious Plurality Ethnographic perspective on the study of Folk Art and Culture About the Exponents who brought the culture under the limelight</p>	
4.	<p>Contextualization and Decontextualization School of Art in Madhubani Painting Art as a Feminine Preserve vs the Male painters of Madhubani Yamapata, Pytkar and other art practice of Jharkhand Yamapata by the Jadopatias Sohari Painters and their Art Patachitra of Bengal and Odisha</p>	
5.	<p>Continuum of the Practice: Ancient Centres and Contemporary Case study 1 Stylistic Variety in Bengal Case study 2 Stylistic Variety in Odisha Case study 3 Stylistic Variety in Andhra Pradesh Exponents and their Contributions Hypothesis on Possible Stylistic influences</p>	
6.	<p>Characteristics of Contemporary Collection Thematic Analysis Iconic Analysis Semiotic Analysis Effect of narratives: Qualitative Evaluation Individual Expression in Contemporary Art</p>	
7.	<p>Cultural Condition: Colonial and Post colonial Ideologies Social Formation during Preindependence New Aesthetics: early Prints and Battala Prints Artist Block Makers and Hybrid Aesthetics of Urban Folk Art Kalighat Painting to Haripura Posters: A synergy Jamini Roy: Accommodating Vernacular Idiom in Academic Practice</p>	
8.	<p>Coexistence and Collaborations with Mainstream Art Strategies for Future and Sustainability: Vision and Revision Alternative Context: place of folk art in Contemporary Lifestyle Ancient literary sources and canonization: Scholarly Comments</p>	

References:

- Archer William G. and Dr. Mildred Archer, 1934 Collection of India Records Office in London, 1946
- Archer William G, The hill of flutes: Life, love, and poetry in tribal India: a portrait of the Santals, S. Chand Publications, New Delhi, 1974.
- Archer, Mildred, Domestic Arts of Mithila: Painting, Mulk Raj Anand (Editor), Marg: A Magazine of the Arts: Volume XX, No. 1, 1966.
- Bagchi, J., The history and culture of the Palas of Bengal and Bihar c. 750 A.D. - c. 1200 A.D, Abhinav Publications, New Delhi, 1993.
- Bose Nandalal, Vision and Creation, Visva Bharati, 1999.
- Chakraverty Anjan, Indian Miniature Painting, Indian Crest, Lustre Press, Roli Books, 2005.
- Das, Nirmalendu. 'The early Indian Printmakers: An approach to Social Science, Ethical and Technical Study'. Lalit Kala Contemporary Issue No. 39, Asstt. Editor (c): Mukhopadhyay, Amit, Lalit Kala Academy, Rabindra Bhavan, New Delhi, March'94.
- Doshi Saryu, Masterpieces of Jain Painting, Marg Smithsonian Inst Pr, 1985
- Dutt Gurusaday, The Importance of Folk Art, Folk Art and Its Relation to National Culture, Source: Gurusaday Dutta Museum, Kolkata
- Garimella Annapurna, Vernacular, in the contemporary, Catalogue 1 & 2 Part one, Curated by Jackfruit Research and Design, Devi Art Foundation, New Delhi, 2010.
- Havell, E. B., Indian sculpture and painting. John Murray, London, 1908.
- Havell, E. B. A Handbook of Indian Art. John Murray, London, 1920.
- Jain Jyotindram, Other Masters: Five Contemporary Folk and Tribal Artists of India, Crafts Museum and The Handicrafts and Handlooms Exports Corporation of India Ltd. (New Delhi - India), 1998.
- Jain Jyotindra, Kalighat Painting: Images from a Changing World, Mapin Publishing Pvt. Ltd., Ahmedabad, 1999.
- Joshi, T.: Timeless Traditions Contemporary Forms Art and Crafts of Madhya Pradesh, Wisdom Tree, New Delhi, 2007.
- Kramrisch, Stella, The Vishnudharmottara Part III: A Treatise On Indian Painting and Image-Making. Second Revised and Engaged Edition, Calcutta University Press, Calcutta, 1928.
- Lazaro Desmond Peter, Pichhvai Painting Tradition of Rajasthan: Materials, Methods and Symbolism, Mapin Publishing Gp Pty Ltd, 2006.
- Mitter Partha, The Triumph of Modernism, India's Artists and

Avant-grade 1922-1947, Oxford University Press, 2007
Ramani Shakuntala, Kalamkari and Traditional Design Heritage of India, Wisdom Tree, 2007.
Sarkar Nikhil, Calcutta Woodcuts: Aspects of a Popular Art. Page 47, Woodcut Prints of Nineteenth Century Calcutta, Edited by Ashit Paul, Seagull Books, Calcutta, 1983
Singh Chandramani, Centres of Pahari Painting, Abhinav Publications, 1981.
Som Sovon, Shilpa Shiksha O Aupaniveshik Bharat (Art Education in Colonial India-Bengali), Publications Division, Ministry of Information and Broadcasting, Government of India, 1998
Sobhan Som Openti Biscope, camp, 15, dihi entail road, Calcutta-14, January 1993
Subramanyan K. G., Living Tradition, Perspectives on Modern Indian Art, Seagull Books Pvt. Limited, Kolkata, 1987.
Subramanyan K. G., Magic of Making, Essays on Art and Culture, Seagull Books, 2007
Subhramanyan K. G., Moving Focus: Essays on Indian Art, Lalit Kala Akademi, New Delhi, 1978, Reissued by Seagull Books, Calcutta in 2006
Subhramanyan K. G., 'The Nandalal Gandhi Rabindranath Connection', Rhythm of India, The Art of Nandalal Bose, San Diego Museum of Art, California, 2008.
Szanton David L and Malini Bakshi, Mithila Painting: The evolution of an Art Form, Pinkmango, San Francisco, USA, 2007
Vatsayan Kapila, The Square and the Circle of the Indian Arts, Abhinav Publications, 1997



CORPORATE SOCIAL RESPONSIBILITY



PROF. ARADHANA MALIK
Department of Management
IIT Kharagpur

TYPE OF COURSE : Rerun | Core | UG/PG **COURSE DURATION** : 8 weeks (06 Aug'18 - 28 Sep'18)
INTENDED AUDIENCE : B.E/B.Tech, M.E/M.Tech, M.S, B.Sc, **EXAM DATE** : 07 Oct 2018
M.Sc, PhD, MBA
INDUSTRIES APPLICABLE TO : All corporate organizations

COURSE OUTLINE :

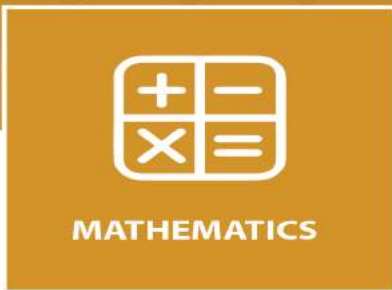
The course introduces participants to the field of Corporate Social Responsibility. The course begins with a discussion on the history of CSR activities, and moves through planning, implementation, evaluation and development of the CSR cycle in profit making organizations. The course concludes with a discussion on how the field of CSR is likely to develop in future.

ABOUT INSTRUCTOR :

Prof. Aradhana Malik earned her Masters in Child Development from Punjab University, Chandigarh, India and PhD from University of Denver, USA. She has been serving Indian Institute of Technology Kharagpur as faculty in the School of Management since 2008. She teaches intercultural communication, business ethics and organizational behavior to Undergraduate, Masters and Doctoral level students. Her research and academic interests include, ageing, orality, human technology interaction, intercultural communication, communication disorders, management of public health and neuro linguistic programming (NLP).

COURSE PLAN :

- Week 01** : Introduction to CSR: What and Why of CSR.
- Week 02** : Emergence of CSR: History and current scenario.
- Week 03** : Stakeholders: Organization, Government, Society and Regulatory Environments.
- Week 04** : Planning and Implementing CSR activities.
- Week 05** : Evaluating and developing CSR activities.
- Week 06** : Corporate Governance.
- Week 07** : CSR and Sustainability.
- Week 08** : Future Directions.



Instructor Name:

Prof. N. Selvaraju (IIT Guwahati - Mathematics)

Prof. Siddhartha Pratim Chakrabarty (IIT Guwahati - Mathematics)

COURSE DURATION: Jul-Oct 2019 **CORE / ELECTIVE:** Elective **UG / PG:** Both

PRE-REQUISITES: Background in basics of probability theory

INTENDED AUDIENCE: Students at advanced undergraduate and postgraduate level in Mathematics, Statistics and allied areas as well as students of Engineering and Management interested in this field.

INDUSTRIES APPLICABLE TO: Finance Industry

COURSE OUTLINE: The course on 'Mathematical Finance' gives an introduction to this interesting and growing area. In particular, the course will cover two Nobel-prize winning frameworks, namely portfolio theory and the option pricing theory.

ABOUT INSTRUCTOR: Prof. Selvaraju has more than ten years of teaching experience (in addition to research experience) in the areas of financial mathematics, financial engineering, stochastic calculus and portfolio theory and has offered several courses to the B.Tech. (Mathematics and Computing) and M.Sc. (Mathematics and Computing) students of IIT Guwahati.

Dr. Chakrabarty has more than ten years of teaching experience (in addition to research experience) in the areas of financial engineering, computational finance, portfolio theory and financial risk management and has offered several courses to the B.Tech. (Mathematics and Computing) and M.Sc.

COURSE PLAN

Week 1: Introduction to financial markets, financial instruments, bonds, stocks and financial derivatives.

Week 2: Time value of money, simple and compound interest rate, net present value, internal rate of return and annuities.

Week 3: Markowitz portfolio theory, risk and return, two and multi asset portfolio theory, efficient frontier.

Week 4: Capital Asset Pricing Model and portfolio performance analysis.

Week 5: No arbitrage principle, pricing of forwards and futures, properties of options.

Week 6: Derivative pricing by replication in binomial model.

Week 7: Discrete probability spaces, filtration, conditional expectation

Week 8: Discrete time martingales, Markov chain, risk-neutral pricing in binomial model for European and American derivatives.

Week 9: General probability spaces, conditional expectation, Brownian motion.

Week 10: Ito integral, Ito formula, Girsanov's theorem, martingale representation theorem, stochastic differential equation.

Week 11: Black-Scholes-Merton (BSM) model, pricing of European derivatives in BSM framework.

Week 12: Valuation of European options in BSM model, BSM formula, BSM partial differential equation, hedging, model completeness, fundamental theorems of asset pricing.



**HUMANITIES &
SOCIAL SCIENCES**

Positive Psychology

Instructor Name: Prof. Kamlesh Singh (IIT Delhi - Humanities and Social Sciences)

COURSE DURATION: Jul-Sep 2019 **CORE / ELECTIVE:** Elective **UG / PG:** Both

PRE-REQUISITES: NA

INTENDED AUDIENCE: NA

INDUSTRIES APPLICABLE TO: NA

COURSE OUTLINE: This course focuses on 'Positive Psychology' (PP) which is a relatively new branch of Psychology that aims to understand, test, discover and promote the factors that allow individuals and communities to thrive. PP is based upon 3 primary concerns: positive emotions, positive individual traits, and positive institutions. This course will introduce the learners to these fundamental aspects of PP, apart from highlighting some of the core PP concepts including – happiness, flow, mindfulness, optimism, resilience, emotional intelligence, spirituality and self-related concepts (self-efficacy, self-esteem, ideal-self and real-self, self-regulation) etc. This course will facilitate to understand positive aspects of human behavior.

ABOUT INSTRUCTOR: Dr. Kamlesh Singh is an Associate Professor of Psychology in the Department of Humanities & Social Sciences, IIT Delhi. Her primary areas of research interest include Positive Psychology and its applications, Psychometrics, and Community Psychology. She has to her credit 85 papers in peer-reviewed National and International Journals, 14 book chapters, and 3 books. Apart from her ongoing teaching and research projects in Positive Psychology, she is also Member, Council of Advisors, International Positive Psychology Association (IPPA). Furthermore, she is the Secretary of National Positive Psychology Association (India).

COURSE PLAN

Week 1: Introduction to Positive Psychology

Week 2: Research Methods

Week 3: Character Strengths and Virtues

Week 4: Happiness & Well-Being

Week 5: Positive Emotional States and Processes

Week 6: Hope, Optimism, Self and related concepts & Resilience

Week 7: Flow, Mindfulness, and Spirituality

Week 8: Recent Trends and Directions in Positive Psychology



Computer Aided Drug Design

Biotechnology

Instructor Name: Mukesh Doble

Institute: IIT Madras

Department: Biotechnology

Course Intro: : Drug discovery and development is a time consuming and expensive process., taking about 10 years and costing about US 1.0 B dollars. Several candidates that enter clinical trials fail because of several reasons. Computer assisted drug design can speed up the process, reduce surprises and predict the properties, thereby reduce the cost of R&D. The course will cover structure and target based design, molecular modeling, quantum mechanics, drug likeness properties, QSAR and pharmacokinetic and dynamics using several softwares that are freely available.

Pre Requisites: : Prior knowledge of biochemistry, bioinformatics

Core/Elective: : Both

UG/PG: : Both

Industry Support : Pharmaceutical industries/Biopharma/biotech

Reference : None

About Instructor: Professor at the Department of Biotechnology at IIT Madras. Has previously worked in Imperial chemical Industries (ICI) and General Electric (GE) for 20 years. Areas of research are Biomaterials, Biopolymers, and Drug design. Published 280 papers and 10 books and filed 10 patents (including two US). He has delivered on line video courses in Downstream processes, Medical Biomaterials and Biostatistics and Design of Experiments



COURSE PLAN

SL.NO	Week	Module Name
1	1	Introduction to drug discovery ,Computers in discovery process ,Drug properties ,Drug properties, Data bases (DB, ZINC)
2	2	Structure and property Structure and property ,Drug likeness,ADME,ADME
3	3	ADME-rules Oral Bioavailability, Oral Bioavailability ,Oral Bioavailability ,Molecular modelling
4	4	Force field Force field ,Force field, Force field methods ,Minimum energy conformation- energy minimisation
5	5	Boundary conditions,Semi empirical quantum mechanics ,Ligand based approach ,QSAR ,QSAR-descriptors
6	6	QSAR- Pharmacophore based approach,Pharmacophore based approach,Scaffold hopping ,Target based design
7	7	Enzymesproteins structures Docking,Docking,Docking,Molecular dynamics
8	8	Molecular dynamics Pharmacokineticdynamics,Pharmacokineticdynamics,Pharmacokineticdynamics ,Conclusion



Nanotechnology in Agriculture

Biotechnology

Instructor Name: Dr. Mainak Das

Institute: IIT Kanpur

Department: Biotechnology

Course Intro: : Modern agriculture is a chemical intensive process starting from fertilizer, pesticide to food preservation. Modern nanotechnology tools if used judiciously in future, have the ability to offer sustainable development along with the optimal, precision and more effective use of chemicals. In this course, I will be sharing my journey from basic agriculture to modern day nanoparticle based agriculture practices.

Pre Requisites: : 10+2 in science

Core/Elective: : Core_Elective

UG/PG: : Both

Industry Support : Agriculture industry Seed industry

Reference : E-Reference materials will be provided during the course

About Instructor: Instructor is a faculty at Biological Sciences and Bio-engineering & Design program. He works in the areas of bio-electricity, green energy, physiology, and sensor. He has a BS training in agriculture, MS training in animal physiology and a doctoral training in biomedical sciences. He has been working in the area of nanotechnology application in animals and plants for the past 18 years.



COURSE PLAN

SL.NO	Week	Module Name
1	1	History of agriculture and the role of chemicals in modern agriculture
2	2	Overview of nanotechnology
3	3	Application of nanotechnology in modern day agriculture practices I
4	4	Application of nanotechnology in modern day agriculture practices II
5	5	Application of nanotechnologies in animal production
6	6	Nanotechnology and shelf life of agricultural and food products
7	7	Nanotechnologies for water quality and availability
8	8	Green nanotechnology and the role of good governance and policies for effective nanotechnology development



Organic Farming for Sustainable Agricultural Production Agriculture

Instructor Name: Dillip Kumar Swain

Institute: IIT Kharagpur

Department: Agriculture

Course Intro: : Organic farming is an integrated system of agricultural production based on ecological principles, promotion of biodiversity, biological cycles and organic matter recycling to maintain and improve soil fertility and environmental sustainability. The regulations for organic crop cultivation prohibit the use of chemo-synthetic pesticides, mineral fertilizers, growth promoters and Genetically Modified Organism. Indiscriminate use of these chemicals in conventional farming poses a serious threat to the quality of produce as well as the environment. Concern about food safety and security and environmental sustainability is increasing among scientist, administrator and environmentalist. In view of this, the course is designed to train students on organic farming practices, quality analysis of the products, environmental impact assessment, health benefit of the organic food etc. After successful completion of the course, the students should be able to design resource efficient farming system for small and marginal farmers for improving their economy while meeting the quality food demand in a sustainable environment.

Pre Requisites: : None

Core/Elective: : Core

UG/PG: : Both

Industry Support : None

Reference : None

About Instructor: Dr. Swain completed his Doctoral Degree from Indian Institute of Technology Kharagpur, which received the Fertilizer Association of India Silver Jubilee Award for the outstanding doctoral research in Fertilizer Usage. Before joining this Institute, Dr. Swain worked as Post-Doctoral Fellow at the United Nations University, Tokyo, Japan, availing Japan Society for the Promotion Science Fellowship. Dr. Swain teaches the subjects: Systems Approach in Agriculture, Soil-Plant-Water Relationships, Crop Production Systems, and Organic Food Chain Management for undergraduate and postgraduate students in Agricultural and Food Engineering. The research areas of Dr. Swain are Climate Change Adaptations/Mitigations for Crop Production, Organic Farming and Sustainable Agricultural Production, and Crop Modeling and Simulation. Dr. Swain is also involved in outreach activities through demonstration of food production technologies in farmers' field.



COURSE PLAN

SL.NO	Week	Module Name
1	1	Organic Farming: Concepts and principles of organic farming
2	2	Key indicators of sustainable agriculture, organic farming and climate change
3	3	Input management; compost production, vermicomposting, Compost quality, Compost utilization and marketing
4	4	Organic crop management: field crops, horticulture and plantation crops
5	5	Plant protection measures, biopesticides, natural predators, cultural practice
6	6	Rotation design for organic system, Transition to organic agriculture, farming system
7	7	Quality analysis of organic foods, Antioxidants and their natural source, organic food and human health
8	8	Standards of organic food and marketing

NOC: Developing Soft Skills and Personality - Video course

COURSE OUTLINE

The course aims to cause a basic awareness about the significance of soft skills in professional and inter-personal communications and facilitate an all-round development of personality. Hard or technical skills help securing a basic position in one's life and career. But only soft skills can ensure a person retain it, climb further, reach a pinnacle, achieve excellence, and derive fulfilment and supreme joy. Soft skills comprise pleasant and appealing personality traits as self-confidence, positive attitude, emotional intelligence, social grace, flexibility, friendliness and effective communication skills.

COURSE DETAIL

Week	Topics
1.	Self-Assessment; Identifying Strength & Limitations; Habits, Will-Power and Drives; Developing Self-Esteem and Building Self-Confidence, Significance of Self-Discipline
2.	Understanding Perceptions, Attitudes, and Personality Types
3.	Mind-Set: Growth and Fixed; Values and Beliefs
4.	Motivation and Achieving Excellence; Self-Actualisation Need; Goal Setting, Life and Career Planning; Constructive Thinking
5.	Communicating Clearly: Understanding and Overcoming barriers



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Humanities and Social Sciences

Coordinators:

Dr. T. Ravichandran

Department of Humanities and Social Sciences IIT Kanpur

6.	Active Listening; Persuasive Speaking and Presentation Skills
7.	Conducting Meetings, Writing Minutes, Sending Memos and Notices; Netiquette: Effective E-mail Communication; Telephone Etiquette
8.	Body Language in Group Discussion and Interview

References:

- Dorch, Patricia. *What Are Soft Skills?* New York: Execu Dress Publisher, 2013.
- Kamin, Maxine. *Soft Skills Revolution: A Guide for Connecting with Compassion for Trainers, Teams, and Leaders.* Washington, DC: Pfeiffer & Company, 2013.
- Klaus, Peggy, Jane Rohman & Molly Hamaker. *The Hard Truth about Soft Skills.* London: HarperCollins E-books, 2007.
- Petes S. J., Francis. *Soft Skills and Professional Communication.* New Delhi: Tata McGraw-Hill Education, 2011.
- Stein, Steven J. & Howard E. Book., *The EQ Edge: Emotional Intelligence and Your Success.* Canada: Wiley & Sons, 2006.



Technologies for clean and renewable energy production

Instructor Name: Prof.P. Mondal (IIT Roorkee - Chemical Engineering)

COURSE DURATION: Jul-Sep 2019 CORE / ELECTIVE: Elective UG / PG: Both

PRE-REQUISITES: NA

INTENDED AUDIENCE: NA

INDUSTRIES APPLICABLE TO: NA

COURSE OUTLINE: The course deals with the production of energy from different fossil fuels through cleaner routes as well as from renewable resources. It is intended to help the young scientific professionals to keep their knowledge upgraded with the current thoughts and newer technology options along with their advances in the field of the utilization of different types of energy resources for cleaner energy production.

ABOUT INSTRUCTOR: Dr. Prasenjit Mondal, is presently working as Associate Professor in the Department of Chemical Engineering, Indian Institute of Technology Roorkee, India. He joined the institute in 2009 as Assistant Professor. He has also worked as Process Engineer in industry for two years and as scientist in Centre for Scientific and Industrial Research, India for three years before joining IIT Roorkee. His area of research is Energy and Environmental Engineering (Water /wastewater treatment through adsorption, electrocoagulation and biological processes including phytoremediation, microbial fuel cells, oil from algae, energy from coal, biomass and wastes, life cycle assessment). He has handled number of R&D projects sponsored by Industry, Govt. of India and International Agencies. He has published two books and more than 150 papers in international journals and conference proceedings. He is the recipient of NTSE scholarship, MHRD fellowship, Govt. of India and S.J.

COURSE PLAN

Week 1: Introduction, characterization of coal and conventional routes for energy production from coal

Week 2: Cleaner routes for energy production from coal

Week 3: Characterization of crude oil and conventional routes for crude oil utilization

Week 4: Cleaner routes for energy production from petroleum crude

Week 5: Cleaner energy production from gaseous fuels

Week 6: Solar and wind energy production

Week 7: Production of hydro and geothermal energy

Week 8: Energy production from biomass and wastes and energy conservation



Wild Life Conservation

Biotechnology

Instructor Name: Dr. Ankur Awadhiya, I.F.S

Institute: Indian Forest Service

Department: Biotechnology

Course Intro: : Conservation of wildlife is important, not only because animals like pandas are cute, or animals like tiger or elephant are majestic, and we want to have them with us it is also important for the provisioning of several ecosystem services and the proper working of the ecosystem itself, of which we too are a part. In this course, we shall discuss these several facets of wildlife conservation, including its importance and the threats being faced, and also how they are being managed in the field. We shall explore how to capture wild animals, how to treat them when needed, how to manage their habitats and their populations, and so on. We will use the case study approach with real-life examples from the field to get a better understanding of this field and its applications.

Pre Requisites: : Has cleared 10+2 with science

Core/Elective: : Elective

UG/PG: : Both

Industry Support : Tourism industries, Education industries, Green energy industries, Renewable energy / materials industry

Reference : 1. Pullin, A.S., Conservation Biology. 2002: Cambridge University Press. 2. Van Dyke, F., Conservation Biology: Foundations, Concepts, Applications. 2008: Springer Netherlands. 3. Selected articles / papers as referred to in the lectures

About Instructor: Dr. Ankur Awadhiya (B. Tech IIT Kanpur 2009, Ph. D IIT Kanpur 2015, AIGNFA IGNTA Dehradun 2016) is an IFS officer borne on the Madhya Pradesh cadre. His interests include photography, tourism, research, instrumentation and creative literary pursuits



COURSE PLAN

SL.NO	Week	Module Name
1	1	Introduction, Importance, Threats
2	2	Monitoring wild animals
3	3	Monitoring & managing habitats
4	4	Management of wildlife diseases
5	5	Capturing and restraining wild animals
6	6	Conservation genetics
7	7	: Ex-situ conservation
8	8	Management of changes



COMPUTER SCIENCE & ENGINEERING

INTRODUCTION TO R SOFTWARE

PROF. SHALABH

Dept. of Computer Science and Engineering
IIT Kanpur



- TYPE OF COURSE** : Rerun | Core | UG/PG **COURSE DURATION** : 8 weeks (06 Aug'18 - 28 Sep'18)
- INTENDED AUDIENCE** : B.E/B.Tech, M.E/M.Tech, B.Sc, M.Sc **EXAM DATE** : 07 Oct 2018
- PRE-REQUISITES** : Mathematics background up to class 12 is needed. Having some preliminary knowledge will be helpful but not necessarily mandatory.
- INDUSTRIES APPLICABLE TO** : All industries involved in mathematical and statistical computations, programming and simulations and having R & D set up will use this course.

COURSE OUTLINE :

Any scientific task without the knowledge of software is difficult to imagine and complete in the current scenario. R is a free software that is capable of handling mathematical and statistical manipulations. It has its own programming language as well as built in functions to perform any specialized task. We intend to learn the basics of R software in this course.

ABOUT INSTRUCTOR :

Dr. Shalabh is a Professor of Statistics at IIT Kanpur. His research areas of interest are linear models, regression analysis and econometrics. He has more than 22 years of experience in teaching and research. He has developed several web based NPTEL courses including on regression analysis and has conducted several workshops on statistics for teachers, researchers and practitioners. He has received several national and international award and fellowships. He has authored more than 70 research papers in national and international journals. He has written four books and one of the book on linear models is coauthored with Prof. C.R. Rao.

COURSE PLAN :

- Week 01** : Basic fundamentals, installation and use of software, data editing, use of R as a calculator, functions and assignments.
- Week 02** : Use of R as a calculator, functions and matrix operations, missing data and logical operators.
- Week 03** : Conditional executions and loops, data management with sequences.
- Week 04** : Data management with repeats, sorting, ordering and lists.
- Week 05** : Vector indexing, factors, Data management with strings, display and formatting.
- Week 06** : Data management with display paste, split, find and replacement, manipulations with alphabets, evaluation of strings, data frames.
- Week 07** : Data frames, import of external data in various file formats, statistical functions, compilation of data.
- Week 08** : Graphics and plots, statistical functions for central tendency, variation, skewness and kurtosis, handling of bivariate data through graphics, correlations, programming and illustration with examples.