



Dayananda Sagar University
&
CSI Student Chapter
Bengaluru



Department of Computer Science & Engineering
cordially invites you to the Value Added Course on
"AWS"

Course Contents:

1. AWS Cloud technical essentials
2. AWS Fundamentals - Addressing security risks
3. Migrating to Cloud
4. Techniques to build serverless applications

Details:

1. Last Date for Registration : 14/07/2018
2. On successful completion of the course, candidates will be issued participation certificates & handout book.

Date & Venue Details

16/07/2018 - 28/07/2018, Duration: 32 Hours
Lab 4, Ground Floor, Block B, DSU Campus 3

Organized by:

❖ Dr. Sanjay Chitnis

(Director of Innovation Lab)

Sanjay Chitnis
09/07/2018

Chairman / HOD
Computer Science Engg. Dep
Dayananda Sagar University
School of Engineering
Kudlu Gate, Main Road
BANGALORE - 560 078



Dayananda Sagar University

&

CSI Student Chapter

Bengaluru



Department of Computer Science & Engineering

cordially invites you to the Value Added Course on

“INTEL AI CERTIFICATE”

Course Contents:

1. Introduction to Artificial Intelligence
2. Python for data science, AI & Development
3. Fundamentals of Machine Learning
3. Python project for AI application development

Details:

1. Last Date for Registration : 12/07/2018
2. On successful completion of the course, candidates will be issued participation certificates & handout book.

Date & Venue Details

15/07/2018 - 24/07/2018, Duration: 32 Hours
Lab 4, Ground Floor, Block B, DSU Campus 3

Organized by:

❖ **Dr. Sanjay Chitnis**

(Director of Innovation Lab)

Sanjay Chitnis
06/07/2018

Chairman / HOD
Computer Science Engg. Dept
Dayananda Sagar University
School of Engineering
Kudlu Gate, Hosur Main Road,
BANGALORE - 560 068



Dayananda Sagar University
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CSI Student Chapter
Bengaluru



Department of Computer Science & Engineering
cordially invites you to the Value Added Course on

“DEEP LEARNING ON NVIDIA JETSON NANO”

Course Contents:

- Introduction to The NVIDIA Jetson Nano Developer Kit
- Prepare for setup, Items for getting started
- Write Image to the MicroSD Card
- Setup and First Boot, Initial setup with display attached, Initial setup with Headless mode
- Projects and Learning, Create your own projects
- Troubleshooting, Power, Display

Date & Venue Details

25/07/2019 - 29/07/2019, Duration: 32 Hours
Lab 4, Ground Floor, Block B, DSU Campus 3

Last Date for Registration : 23/07/2019

Organized by:

❖ Dr. Sanjay Chitnis

(Director of Innovation Lab)


18/07/2019
Chairman / HOD
Computer Science Engg. Dept
Dayananda Sagar University
School of Engineering
Kudlu Sagar, Hosur Main Road,
BANGALORE - 560 068



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Department of Computer Science & Engineering

cordially invites you to the Value Added Course on

“DEEP LEARNING”

Course Contents:

- Techniques, terminology, and mathematics of deep learning
- Fundamental neural network architectures, feedforward networks, convolutional networks, and recurrent networks
- How to appropriately build and train these models
- Various deep learning applications
- How to use pre-trained models for best results

Date & Venue Details

29/07/2019 - 01/08/2019, Duration: 32 Hours
Lab 4, Ground Floor, Block B, DSU Campus 3

Last Date for Registration : 25/07/2019

Organized by:

❖ Dr. Sanjay Chitnis

(Director of Innovation Lab)

Sanjay Chitnis
25/07/2019

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Dayananda Sagar University
School of Engineering
Kudrin Gate, Hosur Main R.
BANGALORE - 560 068



Dayananda Sagar University
&
CSI Student Chapter
Bengaluru



Department of Computer Science & Engineering
cordially invites you to the Value Added Course on
"Intel Deep Learning"

Course Contents:

1. Introduction to deep learning
2. Fundamentals of Neural Networks
3. Convolutional Neural Networks for image classification
4. Improving deep neural networks
5. Sequence models

Details:

1. Last Date for Registration : 07/07/2018
2. On successful completion of the course, candidates will be issued participation certificates & handout book.


Date & Venue Details

11/07/2018 - 20/07/2018, Duration: 32 Hours
Lab 4, Ground Floor, Block B, DSU Campus 3

Organized by:

❖ Dr. Sanjay Chitnis

(Director of Innovation Lab)


02/07/2018
Chairman / HOD
Computer Science Engg. Dept.
Dayananda Sagar University
School of Engineering
Kudlu Gate, Hosur Main Road,
BANGALORE - 560 066



Dayananda Sagar University
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CSI Student Chapter
Bengaluru



Department of Computer Science & Engineering
cordially invites you to the Value Added Course on
"PYTHON PROGRAMMING"

Course Contents:


- Introduction to Python: Data Types, Data Structures.
- Decision Control and Loops, Functions and Scoping, Python Lambda and Python Modules
- Python Files and Exception Handling.
- Object Oriented Features.

Course Instructors:

- Prof. Ruchika
- Prof. Karishma Chavhan
- Prof. Shwetha G S
- Prof. Kalpana
- Prof. Cauvery Raju
- Prof. Keerthi
- Dr. Monali
- Dr. Revathi V

Date & Venue Details

15/03/2019 - 19/03/2019, Duration: 32 Hours
Lab 5, Ground Floor, Block B, DSU Campus 3


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Dayananda Sagar University
School of Engineering
Kudlu Gate, Hosur Main Road,
BANGALORE - 560 068



Department of Computer Science & Engineering

Course Outcomes- Value added courses

Course name	Course Outcomes
AWS	<ol style="list-style-type: none">1. Explain the fundamentals of cloud computing2. Describe the fundamentals of AWS3. Build a simple AWS project4. Solve the security issues in cloud computing5. Configure a serverless application using AWS.
Intel AI certificate	<ol style="list-style-type: none">1. Discuss the mathematics behind functioning of artificial neural networks2. Discuss feed forward networks and their training issues3. Build a Convolutional Neural Network4. Build and train Recurrent Neural Networks
Deep Learning on NVIDIA Jetson Nano	<ol style="list-style-type: none">1. Explain application fields of deep learning models.2. Describe the general principles of neural networks and Deep learning.3. Configure NVIDIA Jetson Nano for Computer Vision and Deep Learning4. Build a deep learning project using NVIDIA Jetson Nano
Deep Learning	<ol style="list-style-type: none">1. Compare Various deep learning Algorithms used for Classification, Segmentation and detection2. Compare various deep neural network architectures3. Apply various deep learning algorithms based on real-world applications.4. Analyze the layers in the architecture of convolution neural networks
Intel Deep Learning	<ol style="list-style-type: none">1. Describe the basics of neural networks2. Build basic deep learning models3. Implement convolutional neural network for image classification task.4. Compare various deep learning models
Python Programming	<ol style="list-style-type: none">1. Outline basic python programming for problem solving.2. Build python programs using core data structures like list, dictionaries and tuples3. Implement object oriented concepts using python4. Design applications related to web services and network programming.



Dayananda Sagar University

School of Engineering, Innovation Campus, Campus III,
Near Kudlu gate, Hosur Main Road, Bengaluru-68

Department of Computer Science & Engineering
presents

Demystifying AI & ML



VALUE ADDED COURSE ON ARTIFICIAL INTELLIGENCE
AND MACHINE LEARNING

DATE : 24th - 29th January, 2022

DURATION : 32 Hours

MODE OF CONDUCTION : Online

PRE-REQUISITES : Python PL

OBJECTIVES :

The workshop envisages to achieve the following objectives: -

- Elucidate the AI and ML Framework
- Understand the mathematics and statistics for ML
- Understand Python Libraries for AI and ML
- Understand the machine Learning Models
- Demonstrate the Working of Machine Learning Techniques.
- Understand the Recent trends and Advances in AI and ML
- Explain the applications of Machine learning in different functional areas like Cyber Security, Cloud computing and cognitive computing

J. Srinivas
Chairman / HOD
Computer Science Engg. Dept
Dayananda Sagar University
School of Engineering
Kudlu Gate, Hosur Main Road,
BANGALORE - 560 088

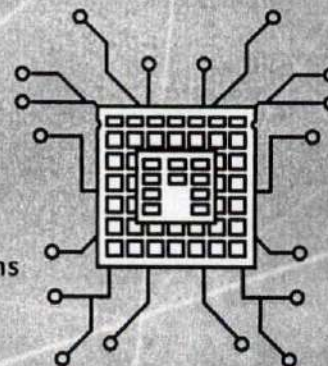


OFFERED TO : 6TH SEMESTER CSE STUDENTS

Number of participants limited to 90 (First come first serve)

COURSE OUTCOMES :

- ❖ Understand Recent trends and prospects of Machine Learning Applications relevant to the Industry
- ❖ Understand Machine Learning and its current applications.
- ❖ Combine the knowledge of engineering mathematics and with Machine learning fundamentals to solve complex ML problems
- ❖ Design and develop solutions for simple and complex Machine learning applications
- ❖ Analysis and interpretation of data and synthesis of information
- ❖ Understand the relevance of a multidisciplinary approach in future that would have societal and environmental impact.



SYLLABUS :

Module 1

Introduction to AI and ML, ML types and systems. Evolution of AI and ML, Python Libraries for Machine Learning (6 hours)

Module 2

Mathematics for AI and ML, Statistics for AI and ML, Linear Regression (6 hours)

Module 3

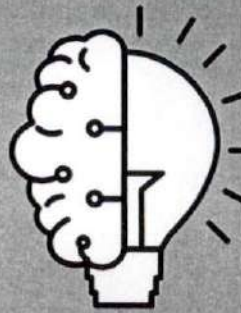
Design and process flow of ML project, pattern recognition and MI Applications, video data processing and MI Applications (9 hours)

Module 4

ML models (Supervised learning algorithms) and Applications, ML Model Assessment, Recent trends and Advances in AI and ML (6 hours)

Module 5

Machine Learning in Industry, Machine learning for Cyber Security and Cloud computing , ML and computational Cognitive Systems (5 hours)



RESOURCE PERSONS - FACULTY OF CSE DEPARTMENT

Dr. Girisha G S

Dr. Jayavrinda Vrindavanam

Dr. Meenakshi Malhotra

Dr. Basavaraj N Hiremath

Dr. Kiran Malagi

Dr. Rajesh T M

Dr. Renuka Devi

Dr. Debanjali Battacharya

Dr. Pramod Naik

Dr. Jayita Saha

Dr. Savitha Hiremath

Dr. Tina Babu

Mr. Sankar Dasagi

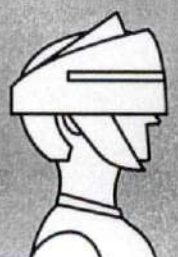
Prof. Arjun Krishnamurthy

REGISTRATION LINK : <https://forms.gle/rXjfEUtNKikQJLZ4A>


REGISTER ASAP !!

Contact :

Dr. Jayavrinda Vrindavanam (9636602677, jayavrinda-cse@dsu.edu.in)




The Dept. of CSE (Data Science) has successfully organized a 5 days value-added course on "**Data Science Skills for Digital Tribe**". The targeted audience was 2nd Year students of the Department of CSE. The course was organized in virtual mode. Around 100+ students were registered for the course. All students were trained on both theoretical and practical knowledge of the present technologies in the Data Science domain. At the end of the course an evaluation was carried out and the students have performed satisfactorily, feedback was taken from the students and it is found to be satisfactory.



Dayananda Sagar University

Department of Computer Science and Engineering (Data Science)

Cordially invites you to the
Value added course
ON
DATA SCIENCE SKILLS for DIGITAL TRIBE
(24th-31st January, 2022)



Libraries:
Scikit-learn
Numpy

32 Hours
Course
in
Virtual
Mode

BI Tools:
in-Memory
infuse-self service

Syllabus

- 24th
January,
2022

Module 1: Introduction to Data Science & BI with DAV - 6hrs
- 25th
January,
2022

Module 2: Introduction to Modern tools and Libraries - 6hrs
- 27th
January,
2022

Module 3: Mathematics for Data Science & Data Pre-processing and Feature Extraction - 6hrs
- 28th
January,
2022

Module 4: Machine learning Algorithms & BI tools Self-Service Dashboards - 6hrs
- 31st
January,
2022

Case studies - 8hrs

Course Outcomes

- Outline the Roles of a Data Analysts and Scientists
- Apply Techniques and Tools for Data Transformation
- Understand the KDD through Data Mining concepts
- Apply Machine Learning Techniques
- Use Data Visualization and Optimization Tools and Techniques

Hurry up

Targeted Audience:
4th Semester Students of CSE Department
Total number of seats - 90 (First Come First Serve)

Registration Link : <https://forms.gle/tGtVChdmD3XK2QrS6>

Resource Persons - Faculty of CSE Department
Dr. Girisha G S, Dr. Shaila S G, Dr. Kiran B. Malagi, Dr. Basavaraj N. Hiremath, Dr. Pramod Nalk,
Dr. Rajesh T M, Dr. Renuka Devi, Dr. Revathi V, Prof. Shivamma, Prof. Pooja Pandey



Dayananda Sagar University

Department of Computer Science and Engineering



Cordially invites you to the
Value added course
on

"Introduction to IOT and Arduino Programming"

(18th-19th June 2022)

Syllabus

- **Module 1: Introduction to Networking and IoT**
- **Module 2: Architecture of Arduino, Sensors-Specifications, Interfacing sensors to Arduino**
- **Module 3: Introduction to Arduino IDE and Programming with Arduino & NodeMCU**
- **Module 4: Wi-Fi configuration for real-time operations using NodeMCU-ESP8266, Blynk App for cloud applications and Web Interface, Google Assistant**
- **Module 5: Projects**

Course Outcomes

- **Understanding the IOT and its applications**
- **Understand the function of electronic sensors and components**
- **To familiarize Arduino as IDE, programming language & platform.**
- **To provide knowledge of Arduino boards and basic components**
- **Develop skills to design and implement various smart system application.**
- **To provide knowledge of different Smart System applications.**

Targeted Audience:

2nd Semester B Tech Students

Resource Persons - Faculty of CSE Department

Dr. Girisha G S, Prof. C V S N Reddy, Prof. Savita Vijay, Prof. Vaidehi Verma, Prof Shwetha G S, Prof. Kavya, Prof. Trupti, Prof. Manjula

Chairman / HOD

Computer Science Engg. Dept
Dayananda Sagar University
School of Engineering

G. Girisha
22/6/22



Dayananda Sagar University School of Engineering

Kudlu Gate, Hosur Main Road, Bengaluru - 560068

Department of Computer Science & Engineering (AI & ML)
presents

Deciphering ML and DL

Value Added Course on Machine Learning
and Deep Learning

DATE: 4th - 8th July, 2022

DURATION: 32 Hours

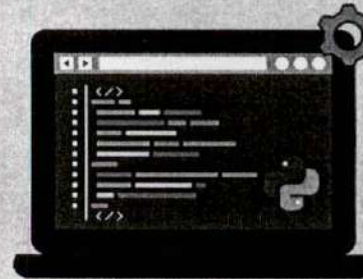
MODE OF CONDUCTION: Hybrid **PRE-REQUISITES:** Python PL

Offered to: 4th Semester CSE Students

OBJECTIVES:

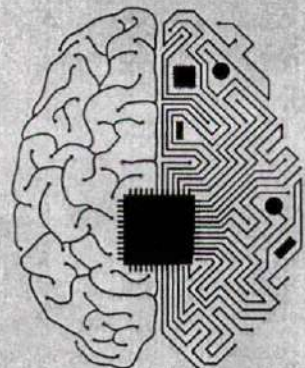
The workshop envisages to achieve the following objectives -

- Elucidate ML and DL framework
- Understand mathematics and statistics for ML
- Understand Python libraries for ML
- Understand Machine Learning models
- Demonstrate working of Machine Learning techniques
- Understand recent trends and advances in ML
- Understand Deep Learning models and applications



COURSE OUTCOMES:

- Understand recent trends and prospects of Machine Learning applications relevant to the industry
- Understand Machine Learning and its current applications
- Combine knowledge of engineering mathematics with Machine Learning fundamentals to solve complex ML problems
- Design and develop solutions for simple and complex Machine Learning applications
- Understand Deep Learning and its current applications



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Computer Science Engg. Dept.
Dayananda Sagar University
School of Engineering
Kudlu Gate, Hosur Main Road

SYLLABUS:

MODULE 1

Introduction to ML, ML types and systems, Mathematics and Statistics for ML, Python libraries for Machine Learning (6 hours)

MODULE 2

Design and process flow of ML project, ML models (Supervised learning algorithms) and applications, ML Model Assessment, Recent trends and advances in AI and ML (6 hours)

MODULE 3

Unsupervised Learning and Reinforcement Learning (9 hours)

MODULE 4

ML Applications, Introduction to DL, Neural Network and Back Propagation Algorithm (6 hours)

MODULE 5

Convolution Neural Network, DL applications in NLP and health care (5 hours)

Resource Persons - Faculty of CSE and CSE (AI & ML) Departments

Dr. Girisha G S

Dr. Jayavrinda Vrindavanam

Dr. Sindhu Menon

Dr. Arun Raman

Dr. Savitha Hiremath

Dr. Meenakshi Malhotra

Dr. Pramod Naik

Dr. Debanjali Battacharya

Dr. Monika Goyal

Dr. Tina Babu

Prof. Arjun Krishnamurthy

Dr. Jayita Saha

Registration Link: <https://forms.gle/EdhpgY2EmK3mWZE57>

REGISTER ASAP!!

For More Details, Contact:

Faculty Coordinators -

Prof. Roshni M Balakrishnan (+91 8606182281, mroshnib-cse@dsu.edu.in)

Dr. Tina Babu (+91 9400475537, b.tina-cse@dsu.edu.in)

Student Coordinator -

Raghav Nanjappan (+91 8880620320, r6nanjappan@gmail.com)



Dayananda Sagar University

Department of Computer Science and Engineering



Cordially invites you to the
Value added course
on

"Introduction to IOT and Arduino Programming"

(18th-19th June 2022)

Syllabus

- **Module 1: Introduction to Networking and IoT**
- **Module 2: Architecture of Arduino, Sensors-Specifications, Interfacing sensors to Arduino**
- **Module 3: Introduction to Arduino IDE and Programming with Arduino & NodeMCU**
- **Module 4: Wi-Fi configuration for real-time operations using NodeMCU-ESP8266, Blynk App for cloud applications and Web Interface, Google Assistant**
- **Module 5: Projects**

Course Outcomes

- **Understanding the IOT and its applications**
- **Understand the function of electronic sensors and components**
- **To familiarize Arduino as IDE, programming language & platform.**
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- **Develop skills to design and implement various smart system application.**
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Targeted Audience:

2nd Semester B Tech Students

Resource Persons - Faculty of CSE Department

Dr. Girisha G S, Prof. C V S N Reddy, Prof. Savita Vijay, Prof. Vaidehi Verma, Prof Shwetha G S, Prof. Kavya, Prof. Trupti, Prof. Manjula

Chairman / HOD

Computer Science Engg. Dept

Dayananda Sagar University

School of Engineering

G. Girisha
22/6/22

DAYANANDA SAGAR UNIVERSITY

Shavige Malleshwara Hills

Kumarswamy Layout

Bangalore



**FACULTY OF SBAS
OFFER
SHORT TERM VALUE ADDED COURSE**

Course Title for B. Sc.

**I Semester: Public Health
Microbiology**

III Semester: Vermicomposting

V Semester: Preclinical

Toxicology

Course Title for M. Sc.

I Semester: Clinical Biochemistry

Duration: 30 HOURS

Date of Commencement:08/01/2017

DAYANANDA SAGAR UNIVERSITY

Shavige Malleshwara Hills
Kumarswamy Layout
Bangalore



**FACULTY OF SBAS
OFFER
SHORT TERM VALUE ADDED COURSE**

Course Title for B. Sc.

I Semester: Public Health Microbiology

III Semester: Vermicomposting

V Semester: Preclinical Toxicology

Course Title for M. Sc.

I Semester: Clinical Biochemistry

III Semester: Models of studying human disease

Duration: 30 HOURS

Date of Commencement:08/01/2018

DAYANANDA SAGAR UNIVERSITY

Shavige Malleshwara Hills

Kumarswamy Layout

Bangalore



**FACULTY OF SBAS
OFFER
SHORT TERM VALUE ADDED COURSE**

Course Title for B. Sc.

I Semester: Public Health Microbiology

III Semester: Vermicomposting

V Semester: Preclinical Toxicology

Course Title for M. Sc.

I Semester: Clinical Biochemistry

III Semester: Models of studying human disease

Duration: 30 HOURS

Date of Commencement:01/02/2019

DAYANANDA SAGAR UNIVERSITY
SHAVIGE MALLESHWARA HILLS, KUMARASWAMY
LAYOUT
BENGALURU – 560 078, KARNATAKA.

SCHOOL OF BASIC & APPLIED SCIENCES



VALUE ADDED SYLLABUS
FOR
BACHELOR OF SCIENCE (B.Sc.) – 2017
MASTER OF SCIENCE (M.Sc.) – 2017

(With effect from 2017-18)

Dean,
School of Basic & Applied Sciences,
Dayananda Sagar University,
K.S. Layout, Bengaluru - 560 078.,

TITLE OF THE COURSE : PUBLIC HEALTH MICROBIOLOGY
COURSE CODE : 17CC1101
L: T: P: C : 1: 0: 0:1

TOTAL HOURS: 30

COURSE OBJECTIVES:

- 1 Study emphasizes the relationship between the defences of the human body and the virulence factors of pathogenic microorganisms.
2. It describes the infection, diseases, pathogenesis and the body's defence against pathogenic microorganisms.

COURSE OUTCOMES:

1. It describes how diseases are spread and how the transmission of pathogens can be controlled.

MODULE 1

7Hrs

Public Health Microbiology and Disease Outbreaks: Introduction to public health- definition, significance and importance of public health. Descriptive and Analytical Epidemiological studies. Experimental studies – human volunteers. Sources of disease outbreaks, reservoir of pathogens, common source of epidemic. Public health organizations.

MODULE 2

7Hrs

Host microbe relationship: Normal microflora of human body and its significance. Pathogen, pathogenicity and virulence. Portal of entry. Mechanism of microbial adhesion, colonization and invasion of mucous membranes of respiratory, enteric and urogenital tracts. Emerging and re-emerging diseases, reservoir of infection. Disease transmission through air, water and food.

MODULE 3

7Hrs

Disease prevention and vaccination: Preventing exposure to pathogenic microorganisms. Removal of pathogen from food and water. Vector control. Quarantine and isolation of individual with diseases. Herd immunity, vaccines for disease prevention, toxoids, other approaches to vaccine development.

MODULE 4

7Hrs

Diagnosis of infectious diseases and biomedical waste management: Diagnosis blood counts, skin testing and antibody titres. Isolation and culture procedures. Respiratory tract cultures, CSF cultures, blood cultures, urine cultures, faecal culture, eye and ear culture. Collection, transport, processing and storage of biological specimens. Recent advancement in diseases diagnosis. Biomedical waste, classification, types and treatment.

REFERENCES:

1. Brock T.D and Madigan M.T. (1992) Biology of Microorganisms 6th edition. Prentice Hall, Eagle wood cliffs N.J.
2. Connie R Mahon (2010). Textbook of Diagnostic Microbiology. 3rd edition. Pearson.
3. Fritz H. Kayser (2005), Medical Microbiology. ThiemeVerlag.
4. Jacquelyn G. Black, Larry M.L Lewis (2009). Microbiology, Principles and Exploration 6th Edition Wiley, John and Sons.
5. Jenson, Wright, Robinson (1997), Microbiology for the Health Sciences 4th edition, Prentice hall.
6. Kufe, et al., (2003), Cancer Medicine, BC Decker Inc.
7. Leslic Collier, John Oxford (2000). Human virology a text book for students of medicine, dentistry and microbiology (2nd edition). Oxford University Press.
8. Mackie and McCarthy (1996) Medical microbiology. Vol2, practical medical microbiology, Churchill Livingstone.
9. Mackie and McCarthy (1996) Medical microbiology vol 1, Medical infection. Vol 2, practical medical microbiology, Churchill Livingstone.
10. Madigan, Martinko, Dunlap, Clark. (2009). Brock Biology of Microorganisms, Twelfth Edition, Benjamin Cummings.
11. Marjorie Cowan, Kathleen Park Talaro (2009). Microbiology: A Systems Approach. 2nd Edition. The McGraw/Hill.
12. Nester, Roberts, Pearsall Anderson (1998). Microbiology-A Human Perspective, 2nd edition, McGraw-Hill.
13. Robert S. Burlage, Ronald Atlas, David Stahl, Gill Geesy, Gary Sayler (1998) Techniques in Microbial Ecology, Oxford University Press. New York.
14. Wadher and Bhoosreddy (2005) Medical microbiology. Himalaya Publisher.
15. Warren Levinson (2000) Medical Microbiology and Immunology: Examination and Board Review 8th Edition. McGraw Hill.
16. Warren Levinson (2000) Medical Microbiology and Immunology examination and board review (8th edition) McGraw Hill.

TITLE OF THE COURSE : VERMICOMPOSTING
COURSE CODE : 17CC1102
L: T: P: C : 1: 0: 0:1

Total hours: 30h

COURSE OBJECTIVE:

- To understand concepts of biofertilizers like vermicomposting.
- To understand techniques in Vermicomposting.
- To increase employability of the students.
- To improve the soil quality by promoting the biofertilizers.

COURSE OUTCOME

- 1) Produce good quality of Vermicompost and Vermiculture.
- 2) Acquire skills for entrepreneurship .

MODULE-1

10H

Vermicomposting : Introduction and scope, types of earthworm and classification epigeic, endogeic, diageic. Life history of Earthworms (Earthworm Species Eisenia foetida)

MODULE-2

10h

Vermicompost Production : Establishment of Vermicomposting and vermiwash unit, different methods of vermicomposting: small and large scale bed method, pit method, harvesting the compost, storing and packing of vermicompost

MODULE-3

10h

Precautions while Vermicomposting, physico- chemical analysis of vermicompost, physical parameters of vermicompost, nutrient content of vermicompost and their role in agriculture, benefits of vermicompost, pests and diseases of Earthworms.

REFERENCES:

1. The Textbook of Vermicompost, Vermiwash and Biopesticides : Keshav singh and et al Publisher: Biotech Books.

2. The Book Hand Book Of Biofertilizers & Vermiculture Publisher: Engineers India Research Institute Handbook of Organic Farming and Organic Foods With Vermicomposting Neem Publisher: Engineers India Research Institute
3. Text Book of Applied Zoology: Vermiculture, Apiculture, Sericulture, Lac Culture, Agricultural Pests and their Controls: Pradip Jabde Publisher: Discovery Publishing House
4. The Worm Farmer's Handbook Mid- to Large-Scale Vermicomposting for Farms, Businesses, Municipalities, Schools, and Institutions :Rhonda Sherman Publisher: Chelsea Green Publishing
5. Vermiculture Technology: Earthworms, Organic Wastes, and Environmental Management:Clive A. Edwards, Norman Q. Arancon, Rhonda L. Sherman Publisher: CRC Press 2010
6. Commercial Vermiculture: How to Build a Thriving Business in Redworms:Peter Bogdanov Applied Zoology:N Arumugam , T Murugan , R Ram Prabhu ,J Johnson Rajeshwar. Publisher: Saras Publication.
7. Worm Farming: Setup A Sustainable Vermiculture Earthworm Composting Ranch: Brian Grant Publisher: Sparrow Publications

TITLE OF THE COURSE : PRECLINICAL TOXICOLOGY

COURSE CODE : 17CC1103

L: T: P: C : 1: 0: 0:1

TOTAL HOURS: 30

COURSE OBJECTIVE:

1. Is aimed at fresher who needs to get initiated into Clinical research studies that require basic knowledge of principles of pharmacokinetics, drug metabolism, organ toxicity and toxicity evaluation concepts
2. To give essentials of toxicology required by professionals aiming to work involving preclinical toxicity evaluation studies.

COURSE OUTCOME:

1. Student should get adequate understanding of principles of preclinical toxicology
2. Student should get foundation knowledge to enable them to take up studies in clinical research.

MODULE 1

15Hrs

Introduction to toxicology: definition, sources of drugs & routes of drugs administration..

Pharmacokinetics: Dose-response relationships: threshold dose, no observed effect level (NOEL), measurement of cumulative effects- time relationship. The *area under the curve (AUC)* of the concentration-time profiles, absolute bioavailability, Volume of Distribution (*Vd*). maximum tolerated dose (MTD). Basics of pharmacokinetics, calculation of pharmacokinetic estimates.

MODULE 2

15Hrs

Overview of metabolism of toxicants: Phase I(C P450 system) and PhaseII (conjugation)

Organ toxicity : Hepatotoxicity: mechanism of hepatotoxicity caused by carbon tetrachloride.

Nephrotoxicity, Neurotoxicity,Endocrine toxicants, Respiratory toxicity.

Evaluation of toxicity- Selection of organisms, Preclinical toxicological studies. Calculation of LD₅₀ & ED₅₀. Acute, subacute and chronic toxicity studies. Irwin profile test. .Lipinski's rule for drug like molecule.

REFERENCES:

Text books:

1. Essentials of medical pharmacology. TRIPATHI (K D). 6th edition, 2009, Jaypee Brothers Publishers.
2. Concepts of toxicology , OMKAR, 2014, Vishal Publishers.
3. Textbook of modern toxicology. HODGSON (Ernest), 4th Ed. 2010, John Wiley.

Reference Books

4. Foyes principles of medicinal chemistry, LEMKE (Thomas L);6th edition, 2008, Wolter Klu Publishers.
5. Introduction to biochemical toxicology, HODGSON (Ernest); 3rd edition, 2001, Wiley Publishers.
6. Goodman and Gilman pharmacological chemistry, HARDMAN (Joel G);LIM,10th edition, 2001, Tata McGrawhill.
7. In vitro toxicology. GAD (Shayne Cox), 2nd Ed., 2000, Taylor Publications.
8. Medical toxicology., DART (Richard C),2004, Lippincott.
9. Molecular toxicology: advanced text, PLANT (Nick), 2003, BIOS Science.
10. Principles of toxicology testing, BARILE (Frank A)., 2008, CRC Press.
11. Casarett and Doulls toxicology, KLAASSEN (Curtis D)., 6th edition, 2001, Oxford University Press.
12. Environmental toxicology. , BHATTACHARYA, 2011, Books & AI Publishers.

TITLE OF THE COURSE : CLINICAL BIOCHEMISTRY

COURSE CODE : 17CC1104

L: T: P: C : 1: 0: 0: 1

COURSE OBJECTIVE:

Student will have a basic understanding of metabolic reactions, their regulation and how breakdown of this circuit will lead to diseased state. Students will also be made aware as to how these diseases affect the body, how are they detected and how to handle them.

COURSE OUTCOME:

Students will be able to comprehend the logic behind metabolic reactions and how they lead to production of energy by the body. They will have an overall view of several diseases including their biochemical implications and tests performed for detection.

MODULE 1

15 h

Chemical reactions, Thermodynamics of reactions, introduction to cell, Anabolism and catabolism, Brief introduction to carbohydrate, fat and protein metabolism. Electron transport chain, The role of enzymes and hormones in regulation of metabolism

MODULE 2

15 h

Metabolic disorders: Diabetes Mellitus, Atherosclerosis, Renal failure and muscular dystrophies. Etiology and Detection. Role of isozymes. Detection of sugar, creatinine, urea and proteins in biological fluids in laboratory

BOOKS:

1. Lehninger- Principles of Biochemistry; DL Nelson and MM Cox [Eds), 6th Edn. Macmillan Publications (2012).

REFERENCE:

1. Donald Voet, Judith G Voet, Biochemistry, 4th Edition, John Wiley and Sons
2. Textbook of Biochemistry with Clinical Correlations – Thomas M. Devlin, John Wiley & Sons; 7th edition (22 January 2010)



**DAYANANDA SAGAR UNIVERSITY
SCHOOL OF BASIC & APPLIED SCIENCES**

SHAVIGE MALLESHWARA HILLS, KUMARASWAMY
LAYOUT
BENGALURU – 560 078, KARNATAKA.

DATE: 1:12:2017

CIRCULAR

The School of Basic & Applied Sciences of DSU is planned to conduct a certification courses on “Public health Microbiology”, Vermicomposting and Preclinical Toxicology for the benefit of I, III and V semester B.Sc. students. Clinical Biochemistry for M. Sc, I Semester students. This courses is scheduled from 08:01:2017 for 30 hours durations and timings are 1.30PM – 3.30Pm on every Saturday.

All the registered students must attend the classes without fail.


Dean,
Dean,

School of Basic & Applied Sciences,
Dayananda Sagar University,
K S layout, Bengaluru - 560 078.,

DAYANANDA SAGAR UNIVERSITY

SHAVIGE MALLESHWARA HILLS, KUMARASWAMY LAYOUT
BENGALORE, KARNATAKA.

SCHOOL OF BASIC & APPLIED SCIENCES



SL. No	COURSE	SEMESTER	COURSE CODE	COURSE TITLE	YEAR
1	B. Sc	I	17CC1101	Public health Microbiology	2017
		II	17CC1102	Vermicomposting	
		III	17CC1103	Preclinical Toxicology	
2	M. Sc	I	17CC1104	Clinical Biochemistry	


Dr. Sunil S More
Professor & Dean
School of Basic & Applied Sciences
Dayananda Sagar University,
K. S. Layout, Bengaluru-78

DAYANANDA SAGAR UNIVERSITY
SHAVIGE MALLESHWARA HILLS, KUMARASWAMY
LAYOUT
BENGALURU – 560 078, KARNATAKA.

SCHOOL OF BASIC & APPLIED SCIENCES



VALUE ADDED SYLLABUS
FOR
BACHELOR OF SCIENCE (B.Sc.) – 2017
MASTER OF SCIENCE (M.Sc.) – 2017

(With effect from 2017-18)

Dean,
School of Basic & Applied Sciences,
Dayananda Sagar University,
K.S. Layout, Bengaluru - 560 078.,

TITLE OF THE COURSE : PUBLIC HEALTH MICROBIOLOGY
COURSE CODE : 17CC1101
L: T: P: C : 1: 0: 0:1

TOTAL HOURS: 30

COURSE OBJECTIVES:

- 1 Study emphasizes the relationship between the defences of the human body and the virulence factors of pathogenic microorganisms.
2. It describes the infection, diseases, pathogenesis and the body's defence against pathogenic microorganisms.

COURSE OUTCOMES:

1. It describes how diseases are spread and how the transmission of pathogens can be controlled.

MODULE 1

7Hrs

Public Health Microbiology and Disease Outbreaks: Introduction to public health- definition, significance and importance of public health. Descriptive and Analytical Epidemiological studies. Experimental studies – human volunteers. Sources of disease outbreaks, reservoir of pathogens, common source of epidemic. Public health organizations.

MODULE 2

7Hrs

Host microbe relationship: Normal microflora of human body and its significance. Pathogen, pathogenicity and virulence. Portal of entry. Mechanism of microbial adhesion, colonization and invasion of mucous membranes of respiratory, enteric and urogenital tracts. Emerging and re-emerging diseases, reservoir of infection. Disease transmission through air, water and food.

MODULE 3

7Hrs

Disease prevention and vaccination: Preventing exposure to pathogenic microorganisms. Removal of pathogen from food and water. Vector control. Quarantine and isolation of individual with diseases. Herd immunity, vaccines for disease prevention, toxoids, other approaches to vaccine development.

MODULE 4

7Hrs

Diagnosis of infectious diseases and biomedical waste management: Diagnosis blood counts, skin testing and antibody titres. Isolation and culture procedures. Respiratory tract cultures, CSF cultures, blood cultures, urine cultures, faecal culture, eye and ear culture. Collection, transport, processing and storage of biological specimens. Recent advancement in diseases diagnosis. Biomedical waste, classification, types and treatment.

REFERENCES:

1. Brock T.D and Madigan M.T. (1992) Biology of Microorganisms 6th edition. Prentice Hall, Eagle wood cliffs N.J.
2. Connie R Mahon (2010). Textbook of Diagnostic Microbiology. 3rd edition. Pearson.
3. Fritz H. Kayser (2005), Medical Microbiology. ThiemeVerlag.
4. Jacquelyn G. Black, Larry M.L Lewis (2009). Microbiology, Principles and Exploration 6th Edition Wiley, John and Sons.
5. Jenson, Wright, Robinson (1997), Microbiology for the Health Sciences 4th edition, Prentice hall.
6. Kufe, et al., (2003), Cancer Medicine, BC Decker Inc.
7. Leslic Collier, John Oxford (2000). Human virology a text book for students of medicine, dentistry and microbiology (2nd edition). Oxford University Press.
8. Mackie and McCarthy (1996) Medical microbiology. Vol2, practical medical microbiology, Churchill Livingstone.
9. Mackie and McCarthy (1996) Medical microbiology vol 1, Medical infection. Vol 2, practical medical microbiology, Churchill Livingstone.
10. Madigan, Martinko, Dunlap, Clark. (2009). Brock Biology of Microorganisms, Twelfth Edition, Benjamin Cummings.
11. Marjorie Cowan, Kathleen Park Talaro (2009). Microbiology: A Systems Approach. 2nd Edition. The McGraw/Hill.
12. Nester, Roberts, Pearsall Anderson (1998). Microbiology-A Human Perspective, 2nd edition, McGraw-Hill.
13. Robert S. Burlage, Ronald Atlas, David Stahl, Gill Geesy, Gary Sayler (1998) Techniques in Microbial Ecology, Oxford University Press. New York.
14. Wadher and Bhoosreddy (2005) Medical microbiology. Himalaya Publisher.
15. Warren Levinson (2000) Medical Microbiology and Immunology: Examination and Board Review 8th Edition. McGraw Hill.
16. Warren Levinson (2000) Medical Microbiology and Immunology examination and board review (8th edition) McGraw Hill.

TITLE OF THE COURSE : VERMICOMPOSTING
COURSE CODE : 17CC1102
L: T: P: C : 1: 0: 0:1

Total hours: 30h

COURSE OBJECTIVE:

- To understand concepts of biofertilizers like vermicomposting.
- To understand techniques in Vermicomposting.
- To increase employability of the students.
- To improve the soil quality by promoting the biofertilizers.

COURSE OUTCOME

- 1) Produce good quality of Vermicompost and Vermiculture.
- 2) Acquire skills for entrepreneurship .

MODULE-1

10H

Vermicomposting : Introduction and scope, types of earthworm and classification epigeic, endogeic, diageic. Life history of Earthworms (Earthworm Species Eisenia foetida)

MODULE-2

10h

Vermicompost Production : Establishment of Vermicomposting and vermiwash unit, different methods of vermicomposting: small and large scale bed method, pit method, harvesting the compost, storing and packing of vermicompost

MODULE-3

10h

Precautions while Vermicomposting, physico- chemical analysis of vermicompost, physical parameters of vermicompost, nutrient content of vermicompost and their role in agriculture, benefits of vermicompost, pests and diseases of Earthworms.

REFERENCES:

1. The Textbook of Vermicompost, Vermiwash and Biopesticides : Keshav singh and et al Publisher: Biotech Books.

2. The Book Hand Book Of Biofertilizers & Vermiculture Publisher: Engineers India Research Institute Handbook of Organic Farming and Organic Foods With Vermicomposting Neem Publisher: Engineers India Research Institute
3. Text Book of Applied Zoology: Vermiculture, Apiculture, Sericulture, Lac Culture, Agricultural Pests and their Controls: Pradip Jabde Publisher: Discovery Publishing House
4. The Worm Farmer's Handbook Mid- to Large-Scale Vermicomposting for Farms, Businesses, Municipalities, Schools, and Institutions :Rhonda Sherman Publisher: Chelsea Green Publishing
5. Vermiculture Technology: Earthworms, Organic Wastes, and Environmental Management:Clive A. Edwards, Norman Q. Arancon, Rhonda L. Sherman Publisher: CRC Press 2010
6. Commercial Vermiculture: How to Build a Thriving Business in Redworms:Peter Bogdanov Applied Zoology:N Arumugam , T Murugan , R Ram Prabhu ,J Johnson Rajeshwar. Publisher: Saras Publication.
7. Worm Farming: Setup A Sustainable Vermiculture Earthworm Composting Ranch: Brian Grant Publisher: Sparrow Publications

TITLE OF THE COURSE : PRECLINICAL TOXICOLOGY

COURSE CODE : 17CC1103

L: T: P: C : 1: 0: 0:1

TOTAL HOURS: 30

COURSE OBJECTIVE:

1. Is aimed at fresher who needs to get initiated into Clinical research studies that require basic knowledge of principles of pharmacokinetics, drug metabolism, organ toxicity and toxicity evaluation concepts
2. To give essentials of toxicology required by professionals aiming to work involving preclinical toxicity evaluation studies.

COURSE OUTCOME:

1. Student should get adequate understanding of principles of preclinical toxicology
2. Student should get foundation knowledge to enable them to take up studies in clinical research.

MODULE 1

15Hrs

Introduction to toxicology: definition, sources of drugs & routes of drugs administration..

Pharmacokinetics: Dose-response relationships: threshold dose, no observed effect level (NOEL), measurement of cumulative effects- time relationship. The *area under the curve* (AUC) of the concentration-time profiles, absolute bioavailability, Volume of Distribution (Vd). maximum tolerated dose (MTD). Basics of pharmacokinetics, calculation of pharmacokinetic estimates.

MODULE 2

15Hrs

Overview of metabolism of toxicants: Phase I(C P450 system) and PhaseII (conjugation)

Organ toxicity : Hepatotoxicity: mechanism of hepatotoxicity caused by carbon tetrachloride.

Nephrotoxicity, Neurotoxicity,Endocrine toxicants, Respiratory toxicity.

Evaluation of toxicity- Selection of organisms, Preclinical toxicological studies. Calculation of LD₅₀ & ED₅₀. Acute, subacute and chronic toxicity studies. Irwin profile test. .Lipinski's rule for drug like molecule.

REFERENCES:

Text books:

1. Essentials of medical pharmacology. TRIPATHI (K D). 6th edition, 2009, Jaypee Brothers Publishers.
2. Concepts of toxicology , OMKAR, 2014, Vishal Publishers.
3. Textbook of modern toxicology. HODGSON (Ernest), 4th Ed. 2010, John Wiley.

Reference Books

4. Foyes principles of medicinal chemistry, LEMKE (Thomas L);6th edition, 2008, Wolter Klu Publishers.
5. Introduction to biochemical toxicology, HODGSON (Ernest); 3rd edition, 2001, Wiley Publishers.
6. Goodman and Gilman pharmacological chemistry, HARDMAN (Joel G);LIM,10th edition, 2001, Tata McGrawhill.
7. In vitro toxicology. GAD (Shayne Cox), 2nd Ed., 2000, Taylor Publications.
8. Medical toxicology., DART (Richard C),2004, Lippincott.
9. Molecular toxicology: advanced text, PLANT (Nick), 2003, BIOS Science.
10. Principles of toxicology testing, BARILE (Frank A)., 2008, CRC Press.
11. Casarett and Doulls toxicology, KLAASSEN (Curtis D)., 6th edition, 2001, Oxford University Press.
12. Environmental toxicology. , BHATTACHARYA, 2011, Books & AI Publishers.

TITLE OF THE COURSE : CLINICAL BIOCHEMISTRY

COURSE CODE : 17CC1104

L: T: P: C : 1: 0: 0: 1

COURSE OBJECTIVE:

Student will have a basic understanding of metabolic reactions, their regulation and how breakdown of this circuit will lead to diseased state. Students will also be made aware as to how these diseases affect the body, how are they detected and how to handle them.

COURSE OUTCOME:

Students will be able to comprehend the logic behind metabolic reactions and how they lead to production of energy by the body. They will have an overall view of several diseases including their biochemical implications and tests performed for detection.

MODULE 1

15 h

Chemical reactions, Thermodynamics of reactions, introduction to cell, Anabolism and catabolism, Brief introduction to carbohydrate, fat and protein metabolism. Electron transport chain, The role of enzymes and hormones in regulation of metabolism

MODULE 2

15 h

Metabolic disorders: Diabetes Mellitus, Atherosclerosis, Renal failure and muscular dystrophies. Etiology and Detection. Role of isozymes. Detection of sugar, creatinine, urea and proteins in biological fluids in laboratory

BOOKS:

1. Lehninger- Principles of Biochemistry; DL Nelson and MM Cox [Eds), 6th Edn. Macmillan Publications (2012).

REFERENCE:

1. Donald Voet, Judith G Voet, Biochemistry, 4th Edition, John Wiley and Sons
2. Textbook of Biochemistry with Clinical Correlations – Thomas M. Devlin, John Wiley & Sons; 7th edition (22 January 2010)



DAYANANDA SAGAR UNIVERSITY
SHAVIGE MALLESHWARA HILLS, KUMARASWAMY
LAYOUT
BENGALURU – 560 078, KARNATAKA.
(2017-2018)

TITLE OF THE COURSE : PUBLIC HEALTH MICROBIOLOGY

COURSE OBJECTIVES:

- 1 Study emphasizes the relationship between the defences of the human body and the virulence factors of pathogenic microorganisms.
2. It describes the infection, diseases, pathogenesis and the body's defence against pathogenic microorganisms.

COURSE OUTCOMES:

1. Apply the knowledge to understand the **microbial** physiology and to identify the microorganisms.
2. It describes how diseases are spread and how the transmission of pathogens can be controlled.

TITLE OF THE COURSE : VERMICOMPOSTING

COURSE OBJECTIVE:

- To understand concepts of biofertilizers like vermicomposting.

- To understand techniques in Vermicomposting.
- To increase employability of the students.
- To improve the soil quality by promoting the biofertilizers.

COURSE OUTCOME

- 1) Produce good quality of Vermicompost and Vermiculture.
- 2) Acquire skills for entrepreneurship .

TITLE OF THE COURSE : PRECLINICAL TOXICOLOGY

COURSE OBJECTIVE:

1. Is aimed at fresher who needs to get initiated into Clinical research studies that require basic knowledge of principles of pharmacokinetics, drug metabolism, organ toxicity and toxicity evaluation concepts
2. To give essentials of toxicology required by professionals aiming to work involving preclinical toxicity evaluation studies.

COURSE OUTCOME:

1. Student should get adequate understanding of principles of preclinical toxicology
2. Student should get foundation knowledge to enable them to take up studies in clinical research.

TITLE OF THE COURSE : CLINICAL BIOCHEMISTRY

COURSE OBJECTIVE:

- Student will have a basic understanding of metabolic reactions, their regulation and how breakdown of this circuit will lead to diseased state.
- Students will also be made aware as to how these diseases affect the body, how are they detected and how to handle them.

COURSE OUTCOME:

- Students will be able to comprehend the logic behind metabolic reactions and how they lead to production of energy by the body.
- They will have an overall view of several diseases including their biochemical implications and tests performed for detection.



**DAYANANDA SAGAR UNIVERSITY
SCHOOL OF BASIC & APPLIED SCIENCES**

SHAVIGE MALLESHWARA HILLS, KUMARASWAMY
LAYOUT
BENGALURU – 560 078, KARNATAKA.

DATE: 27:12:2018

CIRCULAR

The School of Basic & Applied Sciences of DSU is planned to conduct a certification courses on “Public health Microbiology”, Vermicomposting and Preclinical Toxicology for the benefit of I, III and V semester B.Sc. students. Clinical Biochemistry and Models for studying human diseases for M. Sc, I and III Semester students. This courses is scheduled from 08:01:2018 for 30 hours durations and timings are 1.30PM – 3.30Pm on every Saturday.

All the registered students must attend the classes without fail .

27/12/18

Dean

Dean,

School of Basic & Applied Sciences,
Dayananda Sagar University,
K.S. Layout, Bengaluru - 560 078.

DAYANANDA SAGAR UNIVERSITY
SHAVIGE MALLESHWARA HILLS, KUMARASWAMY LAYOUT
BENGALORE, KARNATAKA.

SCHOOL OF BASIC & APPLIED SCIENCES



SL. No	COURSE	SEMESTER	COURSE CODE	COURSE TITLE	YEAR
1	B. Sc	I	18CC1101	Public health Microbiology	2018
		II	18CC1102	Vermicomposting	
		III	18CC1103	Preclinical Toxicology	
2	M. Sc	I	18CC1104	Clinical Biochemistry	
		III	18CC1105	Models for studying human diseases	


Dr. Sunil S More
Professor & Dean
School of Basic & Applied Sciences,
Dayananda Sagar University,
K. S. Layout, Bengaluru-7E.



DAYANANDA SAGAR UNIVERSITY
SHAVIGE MALLESHWARA HILLS, KUMARASWAMY
LAYOUT
BENGALURU – 560 078, KARNATAKA.
(2016-2017)

TITLE OF THE COURSE : PUBLIC HEALTH MICROBIOLOGY

COURSE OBJECTIVES:

- 1 Study emphasizes the relationship between the defences of the human body and the virulence factors of pathogenic microorganisms.
2. It describes the infection, diseases, pathogenesis and the body's defence against pathogenic microorganisms.

COURSE OUTCOMES:

1. Apply the knowledge to understand the **microbial** physiology and to identify the microorganisms.
2. It describes how diseases are spread and how the transmission of pathogens can be controlled.

TITLE OF THE COURSE : VERMICOMPOSTING

COURSE OBJECTIVE:

- To understand concepts of biofertilizers like vermicomposting.
- To understand techniques in Vermicomposting.

- To increase employability of the students.
- To improve the soil quality by promoting the biofertilizers.

COURSE OUTCOME

- 1) Produce good quality of Vermicompost and Vermiculture.
- 2) Acquire skills for entrepreneurship .



**DAYANANDA SAGAR UNIVERSITY
SCHOOL OF BASIC & APPLIED SCIENCES**

SHAVIGE MALLESHWARA HILLS, KUMARASWAMY
LAYOUT
BENGALURU – 560 111, KARNATAKA.

DATE: 30/11/2019

CIRCULAR

The School of Basic & Applied Sciences of DSU is planned to conduct a certification courses on “Public health Microbiology”, Vermicomposting and Preclinical Toxicology for the benefit of I, III and V semester B.Sc. students. Clinical Biochemistry and Models for studying human diseases for M. Sc, I and III Semester students. This courses is scheduled from 01/02:2019 for 30 hours durations and timings are 1.30PM – 3.30Pm on every Saturday.

All the registered students must attend the classes without fail .

30/11/2019

Dean

Dean,

School of Basic & Applied Sciences,
Dayananda Sagar University,
Shavige Malleleshwara Hills, Bengaluru - 560 078.


DAYANANDA SAGAR UNIVERSITY

SHAVIGE MALLESHWARA HILLS, KUMARASWAMY LAYOUT
BENGALORE, KARNATAKA.

SCHOOL OF BASIC & APPLIED SCIENCES



SL. No	COURSE	SEMESTER	COURSE CODE	COURSE TITLE	YEAR
1	B. Sc	I	19CC1101	Public health Microbiology	2019
		II	19CC1102	Vermicomposting	
		III	19CC1103	Preclinical Toxicology	
2	M. Sc	I	19CC1104	Clinical Biochemistry	
		III	19CC1105	Models for studying human diseases	


Dr. Sunil S More
Professor & Dean
School of Basic & Applied Sciences,
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K. S. Layout, Bengaluru-78.

DAYANANDA SAGAR UNIVERSITY
SHAVIGE MALLESHWARA HILLS, KUMARASWAMY
LAYOUT
BENGALURU – 560 111, KARNATAKA.

SCHOOL OF BASIC & APPLIED SCIENCES



VALUE ADDED SYLLABUS
FOR
BACHELOR OF SCIENCE (B.Sc.) – 2019
MASTER OF SCIENCE (M.Sc.) – 2019

(With effect from 2019-20)


Dean

School of Basic & Applied Sciences
Dayananda Sagar University,
K.S. Layout, Bengaluru - 560 078.

TITLE OF THE COURSE : PUBLIC HEALTH MICROBIOLOGY
COURSE CODE : 19CC1101
L: T: P: C : 1: 0: 0:1

TOTAL HOURS: 30

- 1 Study emphasizes the relationship between the defences of the human body and the virulence factors of pathogenic microorganisms.
2. It describes the infection, diseases, pathogenesis and the body's defence against pathogenic microorganisms.

COURSE OUTCOMES:

1. It describes how diseases are spread and how the transmission of pathogens can be controlled.

MODULE 1

7Hrs

Public Health Microbiology and Disease Outbreaks: Introduction to public health- definition, significance and importance of public health. Descriptive and Analytical Epidemiological studies. Experimental studies – human volunteers. Sources of disease outbreaks, reservoir of pathogens, common source of epidemic. Public health organizations.

MODULE 2

7Hrs

Host microbe relationship: Normal microflora of human body and its significance. Pathogen, pathogenicity and virulence. Portal of entry. Mechanism of microbial adhesion, colonization and invasion of mucous membranes of respiratory, enteric and urogenital tracts. Emerging and re-emerging diseases, reservoir of infection. Disease transmission through air, water and food.

MODULE 3

7Hrs

Disease prevention and vaccination: Preventing exposure to pathogenic microorganisms. Removal of pathogen from food and water. Vector control. Quarantine and isolation of individual with diseases. Herd immunity, vaccines for disease prevention, toxoids, other approaches to vaccine development.

MODULE 4

7Hrs

Diagnosis of infectious diseases and biomedical waste management: Diagnosis blood counts, skin testing and antibody titres. Isolation and culture procedures. Respiratory tract cultures, CSF cultures, blood cultures, urine cultures, faecal culture, eye and ear culture. Collection, transport, processing and storage of biological specimens. Recent advancement in diseases diagnosis. Biomedical waste, classification, types and treatment.

REFERENCES:

1. Brock T.D and Madigan M.T. (1992) Biology of Microorganisms 6th edition. Prentice Hall, Eagle wood cliffs N.J.
2. Connie R Mahon (2010). Textbook of Diagnostic Microbiology. 3rd edition. Pearson.
3. Fritz H. Kayser (2005), Medical Microbiology. ThiemeVerlag.
4. Jacquelyn G. Black, Larry M.L Lewis (2009). Microbiology, Principles and Exploration 6th Edition Wiley, John and Sons.
5. Jenson, Wright, Robinson (1997), Microbiology for the Health Sciences 4th edition, Prentice hall.
6. Kufe, et al., (2003), Cancer Medicine, BC Decker Inc.
7. Leslic Collier, John Oxford (2000). Human virology a text book for students of medicine, dentistry and microbiology (2nd edition). Oxford University Press.
8. Mackie and McCarthy (1996) Medical microbiology. Vol2, practical medical microbiology, Churchill Livingstone.
9. Mackie and McCarthy (1996) Medical microbiology vol 1, Medical infection. Vol 2, practical medical microbiology, Churchill Livingstone.
10. Madigan, Martinko, Dunlap, Clark. (2009). Brock Biology of Microorganisms, Twelfth Edition, Benjamin Cummings.
11. Marjorie Cowan, Kathleen Park Talaro (2009). Microbiology: A Systems Approach. 2nd Edition. The McGraw/Hill.
12. Nester, Roberts, Pearsall Anderson (1998). Microbiology-A Human Perspective, 2nd edition, McGraw-Hill.
13. Robert S. Burlage, Ronald Atlas, David Stahl, Gill Geesy, Gary Sayler (1998) Techniques in Microbial Ecology, Oxford University Press. New York.
14. Wadher and Bhoosreddy (2005) Medical microbiology. Himalaya Publisher.
15. Warren Levinson (2000) Medical Microbiology and Immunology: Examination and Board Review 8th Edition. McGraw Hill.
16. Warren Levinson (2000) Medical Microbiology and Immunology examination and board review (8th edition) McGraw Hill.

TITLE OF THE COURSE : VERICOMPOSTING

COURSE CODE : 19CC1102

L: T: P: C : 1: 0: 0:1

Total hours: 30h

COURSE OBJECTIVE:

- To understand concepts of biofertilizers like vermicomposting.
- To understand techniques in Vermicomposting.
- To increase employability of the students.
- To improve the soil quality by promoting the biofertilizers.

COURSE OUTCOME

- 1) Produce good quality of Vermicompost and Vermiculture.
- 2) Acquire skills for entrepreneurship .

MODULE-1

10H

Vermicomposting : Introduction and scope, types of earthworm and classification epigeic, endogeic, diageic. Life history of Earthworms (Earthworm Species Eisenia foetida)

MODULE-2

10h

Vermicompost Production : Establishment of Vermicomposting and vermiculture unit, different methods of vermicomposting: small and large scale bed method, pit method, harvesting the compost, storing and packing of vermicompost

MODULE-3

10h

Precautions while Vermicomposting, physico- chemical analysis of vermicompost, physical parameters of vermicompost, nutrient content of vermicompost and their role in agriculture, benefits of vermicompost, pests and diseases of Earthworms.

REFERENCES:

1. The Textbook of Vermicompost, Vermiculture and Biopesticides : Keshav singh and et al Publisher: Biotech Books.
2. The Book Hand Book Of Biofertilizers & Vermiculture Publisher: Engineers India Research Institute Handbook of Organic Farming and Organic Foods With Vermicomposting Neem Publisher: Engineers India Research Institute

3. Text Book of Applied Zoology: Vermiculture, Apiculture, Sericulture, Lac Culture, Agricultural Pests and their Controls: Pradip Jabde Publisher: Discovery Publishing House
4. The Worm Farmer's Handbook Mid- to Large-Scale Vermicomposting for Farms, Businesses, Municipalities, Schools, and Institutions :Rhonda Sherman Publisher: Chelsea Green Publishing
5. Vermiculture Technology: Earthworms, Organic Wastes, and Environmental Management:Clive A. Edwards, Norman Q. Arancon, Rhonda L. Sherman Publisher: CRC Press 2010
6. Commercial Vermiculture: How to Build a Thriving Business in Redworms:Peter Bogdanov Applied Zoology:N Arumugam , T Murugan , R Ram Prabhu ,J Johnson Rajeshwar. Publisher: Saras Publication.
7. Worm Farming: Setup A Sustainable Vermiculture Earthworm Composting Ranch: Brian Grant Publisher: Sparrow Publications

TITLE OF THE COURSE : PRECLINICAL TOXICOLOGY

COURSE CODE : 19CC1103

L: T: P: C : 1: 0: 0:1

TOTAL HOURS: 30

COURSE OBJECTIVE:

1. Is aimed at fresher who needs to get initiated into Clinical research studies that require basic knowledge of principles of pharmacokinetics, drug metabolism, organ toxicity and toxicity evaluation concepts
2. To give essentials of toxicology required by professionals aiming to work involving preclinical toxicity evaluation studies.

COURSE OUTCOME:

1. Student should get adequate understanding of principles of preclinical toxicology
2. Student should get foundation knowledge to enable them to take up studies in clinical research.

MODULE 1

15Hrs

Introduction to toxicology: definition, sources of drugs & routes of drugs administration..

Pharmacokinetics: Dose-response relationships: threshold dose, no observed effect level (NOEL), measurement of cumulative effects- time relationship. The *area under the curve (AUC)* of the concentration-time profiles, absolute bioavailability, Volume of Distribution (*Vd*). maximum tolerated dose (MTD). Basics of pharmacokinetics, calculation of pharmacokinetic estimates.

MODULE 2

15Hrs

Overview of metabolism of toxicants: Phase I(C P450 system) and PhaseII (conjugation)

Organ toxicity : Hepatotoxicity: mechanism of hepatotoxicity caused by carbon tetrachloride.

Nephrotoxicity, Neurotoxicity,Endocrine toxicants, Respiratory toxicity.

Evaluation of toxicity- Selection of organisms, Preclinical toxicological studies. Calculation of LD₅₀ & ED₅₀. Acute, subacute and chronic toxicity studies. Irwin profile test. .Lipinski's rule for drug like molecule.

REFERENCES:

Text books:

1. Essentials of medical pharmacology. TRIPATHI (K D). 6th edition, 2009, Jaypee Brothers Publishers.
2. Concepts of toxicology , OMKAR, 2014, Vishal Publishers.
3. Textbook of modern toxicology. HODGSON (Ernest), 4th Ed. 2010, John Wiley.

Reference Books

4. Foyes principles of medicinal chemistry, LEMKE (Thomas L);6th edition, 2008, Wolter Klu Publishers.
5. Introduction to biochemical toxicology, HODGSON (Ernest); 3rd edition, 2001, Wiley Publishers.
6. Goodman and Gilman pharmacological chemistry, HARDMAN (Joel G);LIM,10th edition, 2001, Tata McGrawhill.
7. In vitro toxicology. GAD (Shayne Cox), 2nd Ed., 2000, Taylor Publications.
8. Medical toxicology., DART (Richard C),2004, Lippincott.
9. Molecular toxicology: advanced text, PLANT (Nick), 2003, BIOS Science.
10. Principles of toxicology testing, BARILE (Frank A)., 2008, CRC Press.
11. Casarett and Doulls toxicology, KLAASSEN (Curtis D)., 6th edition, 2001, Oxford University Press.
12. Environmental toxicology. , BHATTACHARYA, 2011, Books & AI Publishers.

TITLE OF THE COURSE : CLINICAL BIOCHEMISTRY

COURSE CODE : 19CC1104

L: T: P: C : 1: 0: 0: 1

COURSE OBJECTIVE:

Student will have a basic understanding of metabolic reactions, their regulation and how breakdown of this circuit will lead to diseased state. Students will also be made aware as to how these diseases affect the body, how are they detected and how to handle them.

COURSE OUTCOME:

Students will be able to comprehend the logic behind metabolic reactions and how they lead to production of energy by the body. They will have an overall view of several diseases including their biochemical implications and tests performed for detection.

MODULE 1

15 h

Chemical reactions, Thermodynamics of reactions, introduction to cell, Anabolism and catabolism, Brief introduction to carbohydrate, fat and protein metabolism. Electron transport chain, The role of enzymes and hormones in regulation of metabolism

MODULE 2

15 h

Metabolic disorders: Diabetes Mellitus, Atherosclerosis, Renal failure and muscular dystrophies. Etiology and Detection. Role of isozymes. Detection of sugar, creatinine, urea and proteins in biological fluids in laboratory

BOOKS:

1. Lehninger- Principles of Biochemistry; DL Nelson and MM Cox [Eds), 6th Edn. Macmillan Publications (2012).

REFERENCE:

1. Donald Voet, Judith G Voet, Biochemistry, 4th Edition, John Wiley and Sons
2. Textbook of Biochemistry with Clinical Correlations – Thomas M. Devlin, John Wiley & Sons; 7th edition (22 January 2010)

TITLE OF THE COURSE : MODELS FOR STUDYING HUMAN DISEASES

COURSE CODE : 19CC1105

L: T: P: C : 1: 0: 0:1

TOTAL HOURS: 30

COURSE OBJECTIVE:

To understand the models to study human lifestyle disorders which are relevant to solve medical and non-medical health issues.

COURSE OUTCOME:

The student will be able to optimize and validate the models (vertebrate and non-vertebrate) for better understanding of lifestyle disorders.

MODULE 1

15 hrs

Features for considering organisms as an experimental model. Understanding the central dogma of molecular biology, Concepts of Bacteria, Fungi, Viruses and their related virulence. Comparison of bacterial genome and proteome to fly, mealy bug, *C. elegans*, earthworm and other invertebrates. Use of bacteria and fly as model organisms for studying various human related diseases. Concepts of Gnotobiotics and its research implications.

MODULE 2

15 hrs

Drosophila - Life cycle, Genetic control and embryonic development: maternal effect genes, Segmentation genes, Homeotic selector genes, Biochemical assays, fly as a model for Diabetes, Neurodegeneration and Microbiome (bacterial, fungal and viral associations). Mitochondrial dysfunctions, oxidative stress and concepts & theory on free radicals. Nano-phytobioactives and their applications in human health with special reference to neurobiology.

BOOKS:

- Principles of Lehninger Biochemistry, by Nelson and Cox (2008). McGraw-Hill Higher Education.
- Dennis, D.T and Turpin D.H. (ed). 1990. *Plant physiology, Biochemistry and Molecular biology*, Longman Scientific and Technical Esses.

- Lea, P.J. and Leegood, R.C. 1993. *Plant Biochemistry and Molecular Biology*. John Wiley & Sons, West Sussex.

REFERENCES:

- Taiz, I. and Zeiger, E. 1999. *Plant Physiology*. The Benjamin/comings publishing Co., Redwood City, USA.
- Willey, J. M., Sherwood, L., Woolverton, C. J., & Prescott, L. M. (2008). *Prescott, Harley, and Klein's microbiology (8th edn)*. New York: McGraw-Hill Higher Education.



DAYANANDA SAGAR UNIVERSITY

**SHAVIGE MALLESHWARA HILLS, KUMARASWAMY
LAYOUT**

BENGALURU – 560 078, KARNATAKA.

(2019-2020)

TITLE OF THE COURSE : PUBLIC HEALTH MICROBIOLOGY

COURSE OBJECTIVES:

- 1 Study emphasizes the relationship between the defences of the human body and the virulence factors of pathogenic microorganisms.
2. It describes the infection, diseases, pathogenesis and the body's defence against pathogenic microorganisms.

COURSE OUTCOMES:

1. Apply the knowledge to understand the **microbial** physiology and to identify the microorganisms.
2. It describes how diseases are spread and how the transmission of pathogens can be controlled.

TITLE OF THE COURSE : VERMICOMPOSTING

COURSE OBJECTIVE:

- To understand concepts of biofertilizers like vermicomposting.

- To understand techniques in Vermicomposting.
- To increase employability of the students.
- To improve the soil quality by promoting the biofertilizers.

COURSE OUTCOME

- 1) Produce good quality of Vermicompost and Vermiculture.
- 2) Acquire skills for entrepreneurship .

TITLE OF THE COURSE : PRECLINICAL TOXICOLOGY

COURSE OBJECTIVE:

1. Is aimed at fresher who needs to get initiated into Clinical research studies that require basic knowledge of principles of pharmacokinetics, drug metabolism, organ toxicity and toxicity evaluation concepts
2. To give essentials of toxicology required by professionals aiming to work involving preclinical toxicity evaluation studies.

COURSE OUTCOME:

1. Student should get adequate understanding of principles of preclinical toxicology
2. Student should get foundation knowledge to enable them to take up studies in clinical research.

TITLE OF THE COURSE : CLINICAL BIOCHEMISTRY

COURSE OBJECTIVE:

- Student will have a basic understanding of metabolic reactions, their regulation and how breakdown of this circuit will lead to diseased state.
- Students will also be made aware as to how these diseases affect the body, how are they detected and how to handle them.

COURSE OUTCOME:

- Students will be able to comprehend the logic behind metabolic reactions and how they lead to production of energy by the body.
- They will have an overall view of several diseases including their biochemical implications and tests performed for detection.

TITLE OF THE COURSE : MODELS FOR STUDYING HUMAN DISEASES

COURSE OBJECTIVE:

To understand the models to study human lifestyle disorders which are relevant to solve medical and non-medical health issues.

COURSE OUTCOME:

The student will be able to optimize and validate the models (vertebrate and non-vertebrate) for better understanding of lifestyle disorders.

DAYANANDA SAGAR UNIVERSITY
SHAVIGE MALLESHWARA HILLS, KUMARASWAMY
LAYOUT
BENGALURU – 560 111, KARNATAKA.



SCHOOL OF BASIC & APPLIED SCIENCES

DATE: 20:10:2020

CIRCULAR

The School of Basic & Applied Sciences of DSU is planned to conduct a certification courses on “Public health Microbiology”, Vermicomposting and Preclinical Toxicology for the benefit of I, III and V semester B.Sc. students. Clinical Biochemistry and Models for studying human diseases for M. Sc, I and III Semester students. This courses is scheduled from 23:11:2020 for 30 hours durations and timings are 1.30PM – 3.30Pm on every Saturday.

All the registered students must attend the classes without fail .

J
20/10/20
Dean and Director
SBAS Dean,
School of Basic & Applied Sciences,
Dayananda Sagar University,
K.S. Layout, Bengaluru - 560 078.,

DAYANANDA SAGAR UNIVERSITY
SHAVIGE MALLESHWARA HILLS, KUMARASWAMY LAYOUT
BENGALORE, KARNATAKA.

SCHOOL OF BASIC & APPLIED SCIENCES



SL. No	COURSE	SEMESTER	COURSE CODE	COURSE TITLE	YEAR
1	B. Sc	I	20CC1101	Public health Microbiology	2020
		II	20CC1102	Vermicomposting	
		III	20CC1103	Preclinical Toxicology	
2	M. Sc	I	20CC1104	Clinical Biochemistry	
		III	20CC1105	Models for studying human diseases	

Dr. Sunil S More
Professor & Dean
School of Basic & Applied Sciences,
Dayananda Sagar University,
K. S. Layout, Bengaluru-78.

DAYANANDA SAGAR UNIVERSITY

**SHAVIGE MALLESHWARA HILLS, KUMARASWAMY
LAYOUT BENGALURU - 560 111, KARNATAKA.**

SCHOOL OF BASIC & APPLIED SCIENCES



SYLLABUS

FOR

CERTIFICATE COURSES

2020

(With effect from 2020-2021)

20/10/20
Dean,

School of Basic & Applied Sciences,
Dayananda Sagar University,
K.S. Layout, Bengaluru - 560 078.

TITLE OF THE COURSE : PUBLIC HEALTH MICROBIOLOGY
COURSE CODE : 20CC1101
L: T: P: C : 1: 0: 0:1

TOTAL HOURS: 30

1 Study emphasizes the relationship between the defences of the human body and the virulence factors of pathogenic microorganisms.

2. It describes the infection, diseases, pathogenesis and the body's defence against pathogenic microorganisms.

COURSE OUTCOMES:

1. It describes how diseases are spread and how the transmission of pathogens can be controlled.

MODULE 1

7Hrs

Public Health Microbiology and Disease Outbreaks: Introduction to public health- definition, significance and importance of public health. Descriptive and Analytical Epidemiological studies. Experimental studies – human volunteers. Sources of disease outbreaks, reservoir of pathogens, common source of epidemic. Public health organizations.

MODULE 2

7Hrs

Host microbe relationship: Normal microflora of human body and its significance. Pathogen, pathogenicity and virulence. Portal of entry. Mechanism of microbial adhesion, colonization and invasion of mucous membranes of respiratory, enteric and urogenital tracts. Emerging and re-emerging diseases, reservoir of infection. Disease transmission through air, water and food.

MODULE 3

7Hrs

Disease prevention and vaccination: Preventing exposure to pathogenic microorganisms. Removal of pathogen from food and water. Vector control. Quarantine and isolation of individual with diseases. Herd immunity, vaccines for disease prevention, toxoids, other approaches to vaccine development.

MODULE 4

7Hrs

Diagnosis of infectious diseases and biomedical waste management: Diagnosis blood counts, skin testing and antibody titres. Isolation and culture procedures. Respiratory tract cultures, CSF cultures, blood cultures, urine cultures, faecal culture, eye and ear culture. Collection, transport, processing and storage of biological specimens. Recent advancement in diseases diagnosis. Biomedical waste, classification, types and treatment.

REFERENCES:

1. Brock T.D and Madigan M.T. (1992) Biology of Microorganisms 6th edition. Prentice Hall, Eagle wood cliffs N.J.
2. Connie R Mahon (2010). Textbook of Diagnostic Microbiology. 3rd edition. Pearson.
3. Fritz H. Kayser (2005), Medical Microbiology. ThiemeVerlag.
4. Jacquelyn G. Black, Larry M.L Lewis (2009). Microbiology, Principles and Exploration 6th Edition Wiley, John and Sons.
5. Jenson, Wright, Robinson (1997), Microbiology for the Health Sciences 4th edition, Prentice hall.
6. Kufe, et al., (2003), Cancer Medicine, BC Decker Inc.
7. Leslic Collier, John Oxford (2000). Human virology a text book for students of medicine, dentistry and microbiology (2nd edition). Oxford University Press.
8. Mackie and McCarthy (1996) Medical microbiology. Vol2, practical medical microbiology, Churchill Livingstone.
9. Mackie and McCarthy (1996) Medical microbiology vol 1, Medical infection. Vol 2, practical medical microbiology, Churchill Livingstone.
10. Madigan, Martinko, Dunlap, Clark. (2009). Brock Biology of Microorganisms, Twelfth Edition, Benjamin Cummings.
11. Marjorie Cowan, Kathleen Park Talaro (2009). Microbiology: A Systems Approach. 2nd Edition. The McGraw/Hill.
12. Nester, Roberts, Pearsall Anderson (1998). Microbiology-A Human Perspective, 2nd edition, McGraw-Hill.
13. Robert S. Burlage, Ronald Atlas, David Stahl, Gill Geesy, Gary Sayler (1998) Techniques in Microbial Ecology, Oxford University Press. New York.
14. Wadher and Bhoosreddy (2005) Medical microbiology. Himalaya Publisher.
15. Warren Levinson (2000) Medical Microbiology and Immunology: Examination and Board Review 8th Edition. McGraw Hill.
16. Warren Levinson (2000) Medical Microbiology and immunology examination and board review (8th edition) McGraw Hill.

TITLE OF THE COURSE : VERICOMPOSTING
COURSE CODE : 20CC1102
L: T: P: C : 1: 0: 0:1

Total hours: 30h

COURSE OBJECTIVE:

To understand concepts of biofertilizers like vermicomposting.

- To understand techniques in Vermicomposting.
- To increase employability of the students.
- To improve the soil quality by promoting the biofertilizers.

COURSE OUTCOME

- 1) Produce good quality of Vermicompost and Vermiculture.
- 2) Acquire skills for entrepreneurship .

MODULE-1

10H

Vermicomposting : Introduction and scope, types of earthworm and classification epigeic, endogeic, diageic. Life history of Earthworms (Earthworm Species Eisenia foetida)

MODULE-2

10h

Vermicompost Production : Establishment of Vermicomposting and vermiwash unit, different methods of vermicomposting: small and large scale bed method, pit method, harvesting the compost, storing and packing of vermicompost

MODULE-3

10h

Precautions while Vermicomposting, physico- chemical analysis of vermicompost, physical parameters of vermicompost, nutrient content of vermicompost and their role in agriculture, benefits of vermicompost, pests and diseases of Earthworms.

REFERENCES:

1. The Textbook of Vermicompost, Vermiwash and Biopesticides : Keshav singh and et al Publisher: Biotech Books.
2. The Book Hand Book Of Biofertilizers & Vermiculture Publisher: Engineers India Research Institute Handbook of Organic Farming and Organic Foods With Vermicomposting Neem Publisher: Engineers India Research Institute

3. Text Book of Applied Zoology: Vermiculture, Apiculture, Sericulture, Lac Culture, Agricultural Pests and their Controls: Pradip Jabde Publisher: Discovery Publishing House
4. The Worm Farmer's Handbook Mid- to Large-Scale Vermicomposting for Farms, Businesses, Municipalities, Schools, and Institutions :Rhonda Sherman Publisher: Chelsea Green Publishing
5. Vermiculture Technology: Earthworms, Organic Wastes, and Environmental Management:Clive A. Edwards, Norman Q. Arancon, Rhonda L. Sherman Publisher: CRC Press 2010
6. Commercial Vermiculture: How to Build a Thriving Business in Redworms:Peter Bogdanov Applied Zoology:N Arumugam , T Murugan , R Ram Prabhu ,J Johnson Rajeshwar. Publisher: Saras Publication.
7. Worm Farming: Setup A Sustainable Vermiculture Earthworm Composting Ranch: Brian Grant Publisher: Sparrow Publications

TITLE OF THE COURSE : PRECLINICAL TOXICOLOGY

COURSE CODE : 20CC1103

L: T: P: C : 1: 0: 0:1

TOTAL HOURS: 30

COURSE OBJECTIVE:

1. Is aimed at fresher who needs to get initiated into Clinical research studies that require basic knowledge of principles of pharmacokinetics, drug metabolism, organ toxicity and toxicity evaluation concepts
2. To give essentials of toxicology required by professionals aiming to work involving preclinical toxicity evaluation studies.

COURSE OUTCOME:

1. Student should get adequate understanding of principles of preclinical toxicology
2. Student should get foundation knowledge to enable them to take up studies in clinical research.

MODULE 1

15Hrs

Introduction to toxicology: definition, sources of drugs & routes of drugs administration..

Pharmacokinetics: Dose-response relationships: threshold dose, no observed effect level (NOEL), measurement of cumulative effects- time relationship. The *area under the curve (AUC)* of the concentration-time profiles, absolute bioavailability, Volume of Distribution (*Vd*). maximum tolerated dose (MTD). Basics of pharmacokinetics, calculation of pharmacokinetic estimates.

MODULE 2

15Hrs

Overview of metabolism of toxicants: Phase I(C P450 system) and PhaseII (conjugation)

Organ toxicity : Hepatotoxicity: mechanism of hepatotoxicity caused by carbon tetrachloride.

Nephrotoxicity, Neurotoxicity,Endocrine toxicants, Respiratory toxicity.

Evaluation of toxicity- Selection of organisms, Preclinical toxicological studies. Calculation of LD₅₀ & ED₅₀. Acute, subacute and chronic toxicity studies. Irwin profile test. .Lipinski's rule for drug like molecule.

REFERENCES:

Text books:

1. Essentials of medical pharmacology. TRIPATHI (K D). 6th edition, 2009, Jaypee Brothers Publishers.
2. Concepts of toxicology , OMKAR, 2014, Vishal Publishers.
3. Textbook of modern toxicology. HODGSON (Ernest), 4th Ed. 2010, John Wiley.

Reference Books

4. Foyes principles of medicinal chemistry, LEMKE (Thomas L);6th edition, 2008, Wolter Klu Publishers.
5. Introduction to biochemical toxicology, HODGSON (Ernest); 3rd edition, 2001, Wiley Publishers.
6. Goodman and Gilman pharmacological chemistry, HARDMAN (Joel G);LIM,10th edition, 2001, Tata McGrawhill.
7. In vitro toxicology. GAD (Shayne Cox), 2nd Ed., 2000, Taylor Publications.
8. Medical toxicology., DART (Richard C),2004, Lippincott.
9. Molecular toxicology: advanced text, PLANT (Nick), 2003, BIOS Science.
10. Principles of toxicology testing, BARILE (Frank A)., 2008, CRC Press.
11. Casarett and Doulls toxicology, KLAASSEN (Curtis D)., 6th edition, 2001, Oxford University Press.
12. Environmental toxicology. , BHATTACHARYA, 2011, Books & AI Publishers.

TITLE OF THE COURSE : CLINICAL BIOCHEMISTRY

COURSE CODE : 20CC1104

L: T: P: C : 1: 0: 0: 1

COURSE OBJECTIVE:

Student will have a basic understanding of metabolic reactions, their regulation and how breakdown of this circuit will lead to diseased state. Students will also be made aware as to how these diseases affect the body, how are they detected and how to handle them.

COURSE OUTCOME:

Students will be able to comprehend the logic behind metabolic reactions and how they lead to production of energy by the body. They will have an overall view of several diseases including their biochemical implications and tests performed for detection.

MODULE 1

15 h

Chemical reactions, Thermodynamics of reactions, introduction to cell, Anabolism and catabolism, Brief introduction to carbohydrate, fat and protein metabolism. Electron transport chain, The role of enzymes and hormones in regulation of metabolism

MODULE 2

15 h

Metabolic disorders: Diabetes Mellitus, Atherosclerosis, Renal failure and muscular dystrophies. Etiology and Detection. Role of isozymes. Detection of sugar, creatinine, urea and proteins in biological fluids in laboratory

BOOKS:

1. Lehninger- Principles of Biochemistry; DL Nelson and MM Cox [Eds), 6th Edn. Macmillan Publications (2012).

REFERENCE:

1. Donald Voet, Judith G Voet, Biochemistry, 4th Edition, John Wiley and Sons
2. Textbook of Biochemistry with Clinical Correlations – Thomas M. Devlin, John Wiley & Sons; 7th edition (22 January 2010)

TITLE OF THE COURSE : MODELS FOR STUDYING HUMAN DISEASES

COURSE CODE : 20CC1105

L: T: P: C : 1: 0: 0:1

TOTAL HOURS: 30

COURSE OBJECTIVE:

To understand the models to study human lifestyle disorders which are relevant to solve medical and non-medical health issues.

COURSE OUTCOME:

The student will be able to optimize and validate the models (vertebrate and non-vertebrate) for better understanding of lifestyle disorders.

MODULE 1

15 hrs

Features for considering organisms as an experimental model. Understanding the central dogma of molecular biology, Concepts of Bacteria, Fungi, Viruses and their related virulence. Comparison of bacterial genome and proteome to fly, mealy bug, *C. elegans*, earthworm and other invertebrates. Use of bacteria and fly as model organisms for studying various human related diseases. Concepts of Gnotobiotics and its research implications.

MODULE 2

15 hrs

Drosophila - Life cycle, Genetic control and embryonic development: maternal effect genes, Segmentation genes, Homeotic selector genes, Biochemical assays, fly as a model for Diabetes, Neurodegeneration and Microbiome (bacterial, fungal and viral associations). Mitochondrial dysfunctions, oxidative stress and concepts & theory on free radicals. Nano-phytobioactives and their applications in human health with special reference to neurobiology.

BOOKS:

- Principles of Lehninger Biochemistry, by Nelson and Cox (2008). McGraw-Hill Higher Education.
- Dennis, D.T and Turpin D.H. (ed). 1990. *Plant physiology, Biochemistry and Molecular biology*, Longman Scientific and Technical Esses.

- Lea, P.J. and Leegood, R.C. 1993. *Plant Biochemistry and Molecular Biology*. John Wiley & Sons, West Sussex.

REFERENCES:

- Taiz, I. and Zeiger, E. 1999. *Plant Physiology*. The Benjamin/comings publishing Co., Redwood City, USA.
- Willey, J. M., Sherwood, L., Woolverton, C. J., & Prescott, L. M. (2008). *Prescott, Harley, and Klein's microbiology (8th edn)*. New York: McGraw-Hill Higher Education.



DAYANANDA SAGAR UNIVERSITY
SHAVIGE MALLESHWARA HILLS, KUMARASWAMY
LAYOUT
BENGALURU – 560 111, KARNATAKA.
(2020-2021)

TITLE OF THE COURSE : PUBLIC HEALTH MICROBIOLOGY

COURSE OBJECTIVES:

- 1 Study emphasizes the relationship between the defences of the human body and the virulence factors of pathogenic microorganisms.
2. It describes the infection, diseases, pathogenesis and the body's defence against pathogenic microorganisms.

COURSE OUTCOMES:

1. Apply the knowledge to understand the **microbial** physiology and to identify the microorganisms.
2. It describes how diseases are spread and how the transmission of pathogens can be controlled.

TITLE OF THE COURSE : VERMICOMPOSTING

COURSE OBJECTIVE:

- To understand concepts of biofertilizers like vermicomposting.

- To understand techniques in Vermicomposting.
- To increase employability of the students.
- To improve the soil quality by promoting the biofertilizers.

COURSE OUTCOME

- 1) Produce good quality of Vermicompost and Vermiculture.
- 2) Acquire skills for entrepreneurship .

TITLE OF THE COURSE : PRECLINICAL TOXICOLOGY

COURSE OBJECTIVE:

1. Is aimed at fresher who needs to get initiated into Clinical research studies that require basic knowledge of principles of pharmacokinetics, drug metabolism, organ toxicity and toxicity evaluation concepts
2. To give essentials of toxicology required by professionals aiming to work involving preclinical toxicity evaluation studies.

COURSE OUTCOME:

1. Student should get adequate understanding of principles of preclinical toxicology
2. Student should get foundation knowledge to enable them to take up studies in clinical research.

TITLE OF THE COURSE : CLINICAL BIOCHEMISTRY

COURSE OBJECTIVE:

- Student will have a basic understanding of metabolic reactions, their regulation and how breakdown of this circuit will lead to diseased state.
- Students will also be made aware as to how these diseases affect the body, how are they detected and how to handle them.

COURSE OUTCOME:

- Students will be able to comprehend the logic behind metabolic reactions and how they lead to production of energy by the body.
- They will have an overall view of several diseases including their biochemical implications and tests performed for detection.

TITLE OF THE COURSE : MODELS FOR STUDYING HUMAN DISEASES

COURSE OBJECTIVE:

To understand the models to study human lifestyle disorders which are relevant to solve medical and non-medical health issues.

COURSE OUTCOME:

The student will be able to optimize and validate the models (vertebrate and non-vertebrate) for better understanding of lifestyle disorders.

DAYANANDA SAGAR UNIVERSITY

SHAVIGE MALLESHWARA HILLS, KUMARASWAMY LAYOUT
BENGALORE – 560 111, KARNATAKA.

SCHOOL OF BASIC & APPLIED SCIENCES



SL. No	COURSE	SEMESTER	COURSE CODE	COURSE TITLE	YEAR
1	B.Sc.	I	21CC1101	Public health Microbiology	2021
		II	21CC1102	Vermicomposting	
		III	21CC1103	Preclinical Toxicology	
2	M.Sc.	I	21CC1104	Clinical Biochemistry	
		III	21CC1105	Models for studying human diseases	


Dr. Sunil S More
Professor & Dean
School of Basic & Applied Sciences,
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K. S. Layout, Bengaluru-72.



**Dayananda Sagar
University** Bengaluru

DAYANANDA SAGAR UNIVERSITY
School of Basic and Applied Sciences
Shavige Malleshwara Hills
Kumarswamy Layout
Bangalore-560111
Karnataka

SYLLABUS
FOR
CERTIFICATE COURSES
2021

(With effect from 2021-2022)


Dr. Sunil S More
Professor & Dean
School of Basic & Applied Sciences
Dayananda Sagar University
K.S. Layout, Bengaluru-78

TITLE OF THE COURSE : PUBLIC HEALTH MICROBIOLOGY

COURSE CODE : 21CC1101

L: T: P: C : 1: 0: 0:1

TOTAL HOURS: 30

1 Study emphasizes the relationship between the defences of the human body and the virulence factors of pathogenic microorganisms.

2. It describes the infection, diseases, pathogenesis and the body's defence against pathogenic microorganisms.

COURSE OUTCOMES:

1. It describes how diseases are spread and how the transmission of pathogens can be controlled.

MODULE 1

7Hrs

Public Health Microbiology and Disease Outbreaks: Introduction to public health-definition, significance and importance of public health. Descriptive and Analytical Epidemiological studies. Experimental studies – human volunteers. Sources of disease outbreaks, reservoir of pathogens, common source of epidemic. Public health organizations.

MODULE 2

7Hrs

Host microbe relationship: Normal microflora of human body and its significance. Pathogen, pathogenicity and virulence. Portal of entry. Mechanism of microbial adhesion, colonization and invasion of mucous membranes of respiratory, enteric and urogenital tracts. Emerging and re-emerging diseases, reservoir of infection. Disease transmission through air, water and food.

MODULE 3

7Hrs

Disease prevention and vaccination: Preventing exposure to pathogenic microorganisms. Removal of pathogen from food and water. Vector control. Quarantine and isolation of

individual with diseases. Herd immunity, vaccines for disease prevention, toxoids, other approaches to vaccine development.

MODULE 4

7Hrs

Diagnosis of infectious diseases and biomedical waste management: Diagnosis blood counts, skin testing and antibody titres. Isolation and culture procedures. Respiratory tract cultures, CSF cultures, blood cultures, urine cultures, faecal culture, eye and ear culture. Collection, transport, processing and storage of biological specimens. Recent advancement in diseases diagnosis. Biomedical waste, classification, types and treatment.

REFERENCES:

1. Brock T.D and Madigan M.T. (1992) Biology of Microorganisms 6th edition. Prentice Hall, Eagle wood cliffs N.J.
2. Connie R Mahon (2010). Textbook of Diagnostic Microbiology. 3rd edition. Pearson.
3. Fritz H. Kayser (2005), Medical Microbiology. Thieme Verlag.
4. Jacquelyn G. Black, Larry M.L Lewis (2009). Microbiology, Principles and Exploration 6th Edition Wiley, John and Sons.
5. Jenson, Wright, Robinson (1997), Microbiology for the Health Sciences 4th edition, Prentice hall.
6. Kufe, et al., (2003), Cancer Medicine, BC Decker Inc.
7. Leslic Collier, John Oxford (2000). Human virology a text book for students of medicine, dentistry and microbiology (2nd edition). Oxford University Press.
8. Mackie and McCarthey (1996) Medical microbiology. Vol2, practical medical microbiology, Churchill Livingstone.
9. Mackie and McCarthey (1996) Medical microbiology vol 1, Medical infection. Vol 2, practical medical microbiology, Churchill Livingstone.
10. Madigan, Martinko, Dunlap, Clark. (2009). Brock Biology of Microorganisms, Twelfth Edition, Benjamin Cummings.
11. Marjorie Cowan, Kathleen Park Talaro (2009). Microbiology: A Systems Approach. 2nd Edition. The McGraw/Hill.
12. Nester, Roberts, Pearsall Anderson (1998). Microbiology-A Human Perspective, 2nd edition, McGraw-Hill.
13. Robert S. Burlage, Ronald Atlas, David Stahl, Gill Geesy, Gary Sayler (1998) Techniques in Microbial Ecology, Oxford University Press. New York.
14. Wadher and Bhoosreddy (2005) Medical microbiology. Himalaya Publisher.
15. Warren Levinson (2000) Medical Microbiology and Immunology: Examination and Board Review 8th Edition. McGraw Hill.
16. Warren Levinson (2000) Medical Microbiology and immunology examination and board review (8th edition) McGraw Hill.

TITLE OF THE COURSE : VERMICOMPOSTING
COURSE CODE : 21CC1102
L: T: P: C : 1: 0: 0:1

Total hours: 30h

COURSE OBJECTIVE:

To understand concepts of biofertilizers like vermicomposting.

- To understand techniques in Vermicomposting.
- To increase employability of the students.
- To improve the soil quality by promoting the biofertilizers.

COURSE OUTCOME

- 1) Produce good quality of Vermicompost and Vermiculture.
- 2) Acquire skills for entrepreneurship .

MODULE-1 10H

Vermicomposting : Introduction and scope, types of earthworm and classification epigeic, endogeic, diageic. Life history of Earthworms (Earthworm Species Eisenia foetida)

MODULE-2 10h

Vermicompost Production : Establishment of Vermicomposting and vermiwash unit, different methods of vermicomposting: small and large scale bed method, pit method, harvesting the compost, storing and packing of vermicompost

MODULE-3 10h

Precautions while Vermicomposting, physico- chemical analysis of vermicompost, physical parameters of vermicompost, nutrient content of vermicompost and their role in agriculture, benefits of vermicompost, pests and diseases of Earthworms.

REFERENCES:

1. The Textbook of Vermicompost, Vermiwash and Biopesticides : Keshav singh and et al Publisher: Biotech Books.
2. The Book Hand Book Of Biofertilizers & Vermiculture Publisher: Engineers India Research Institute Handbook of Organic Farming and Organic Foods With Vermicomposting Neem Publisher: Engineers India Research Institute
3. Text Book of Applied Zoology: Vermiculture, Apiculture, Sericulture, Lac Culture, Agricultural Pests and their Controls: Pradip Jabde Publisher: Discovery Publishing House
4. The Worm Farmer's Handbook Mid- to Large-Scale Vermicomposting for Farms, Businesses, Municipalities, Schools, and Institutions :Rhonda Sherman Publisher: Chelsea Green Publishing
5. Vermiculture Technology: Earthworms, Organic Wastes, and Environmental Management:Clive A. Edwards, Norman Q. Arancon, Rhonda L. Sherman Publisher: CRC Press 2010
6. Commercial Vermiculture: How to Build a Thriving Business in Redworms:Peter Bogdanov Applied Zoology:N Arumugam , T Murugan , R Ram Prabhu ,J Johnson Rajeshwar. Publisher: Saras Publication.
7. Worm Farming: Setup A Sustainable Vermiculture Earthworm Composting Ranch: Brian Grant Publisher: Sparrow Publications

TITLE OF THE COURSE : PRECLINICAL TOXICOLOGY

COURSE CODE : 21CC1103

L: T: P: C : 1: 0: 0:1

TOTAL HOURS: 30

COURSE OBJECTIVE:

1. Is aimed at fresher who needs to get initiated into Clinical research studies that require basic knowledge of principles of pharmacokinetics, drug metabolism, organ toxicity and toxicity evaluation concepts
2. To give essentials of toxicology required by professionals aiming to work involving preclinical toxicity evaluation studies.

COURSE OUTCOME:

1. Student should get adequate understanding of principles of preclinical toxicology
2. Student should get foundation knowledge to enable them to take up studies in clinical research.

MODULE 1

15Hrs

Introduction to toxicology: definition, sources of drugs & routes of drugs administration..

Pharmacokinetics: Dose-response relationships: threshold dose, no observed effect level (NOEL), measurement of cumulative effects- time relationship. The *area under the curve (AUC)* of the concentration-time profiles, absolute bioavailability, Volume of Distribution (*Vd*). maximum tolerated dose (MTD). Basics of pharmacokinetics, calculation of pharmacokinetic estimates.

MODULE 2

15Hrs

Overview of metabolism of toxicants: Phase I(C P450 system) and PhaseII (conjugation)

Organ toxicity : Hepatotoxicity: mechanism of hepatotoxicity caused by carbon tetrachloride. Nephrotoxicity, Neurotoxicity, Endocrine toxicants, Respiratory toxicity.

Evaluation of toxicity- Selection of organisms, Preclinical toxicological studies. Calculation of LD₅₀ & ED₅₀. Acute, subacute and chronic toxicity studies. Irwin profile test. Lipinski's rule for drug like molecule.

REFERENCES:

Text books:

1. Essentials of medical pharmacology. TRIPATHI (K D). 6th edition, 2009, Jaypee Brothers Publishers.
2. Concepts of toxicology , OMKAR, 2014, Vishal Publishers.
3. Textbook of modern toxicology. HODGSON (Ernest), 4th Ed. 2010, John Wiley.

Reference Books

4. Foyes principles of medicinal chemistry, LEMKE (Thomas L); 6th edition, 2008, Wolter Klu Publishers.
5. Introduction to biochemical toxicology, HODGSON (Ernest); 3rd edition, 2001, Wiley Publishers.
6. Goodman and Gilman pharmacological chemistry, HARDMAN (Joel G); LIM, 10th edition, 2001, Tata McGrawhill.
7. In vitro toxicology. GAD (Shayne Cox), 2nd Ed., 2000, Taylor Publications.
8. Medical toxicology., DART (Richard C), 2004, Lippincott.
9. Molecular toxicology: advanced text, PLANT (Nick), 2003, BIOS Science.
10. Principles of toxicology testing, BARILE (Frank A)., 2008, CRC Press.
11. Casarett and Doulls toxicology, KLAASSEN (Curtis D)., 6th edition, 2001, Oxford University Press.
12. Environmental toxicology. , BHATTACHARYA, 2011, Books & Al Publishers.

TITLE OF THE COURSE : CLINICAL BIOCHEMISTRY

COURSE CODE : 21CC1104

L: T: P: C : 1: 0: 0: 1

COURSE OBJECTIVE:

Student will have a basic understanding of metabolic reactions, their regulation and how breakdown of this circuit will lead to diseased state. Students will also be made aware as to how these diseases affect the body, how are they detected and how to handle them.

COURSE OUTCOME:

Students will be able to comprehend the logic behind metabolic reactions and how they lead to production of energy by the body. They will have an overall view of several diseases including their biochemical implications and tests performed for detection.

MODULE 1

15 h

Chemical reactions, Thermodynamics of reactions, introduction to cell, Anabolism and catabolism, Brief introduction to carbohydrate, fat and protein metabolism. Electron transport chain, The role of enzymes and hormones in regulation of metabolism

MODULE 2

15 h

Metabolic disorders: Diabetes Mellitus, Atherosclerosis, Renal failure and muscular dystrophies. Etiology and Detection. Role of isozymes. Detection of sugar, creatinine, urea and proteins in biological fluids in laboratory

BOOKS:

1. Lehninger- Principles of Biochemistry; DL Nelson and MM Cox [Eds), 6th Edn. Macmillan Publications (2012).

REFERENCE:

1. Donald Voet, Judith G Voet, Biochemistry, 4th Edition, John Wiley and Sons
2. Textbook of Biochemistry with Clinical Correlations – Thomas M. Devlin, John Wiley & Sons; 7th edition (22 January 2010)

TITLE OF THE COURSE : MODELS FOR STUDYING HUMAN DISEASES

COURSE CODE : 21CC1105

L: T: P: C : 1: 0: 0:1

TOTAL HOURS: 30

COURSE OBJECTIVE:

To understand the models to study human lifestyle disorders which are relevant to solve medical and non-medical health issues.

COURSE OUTCOME:

The student will be able to optimize and validate the models (vertebrate and non-vertebrate) for better understanding of lifestyle disorders.

MODULE 1

15 hrs

Features for considering organisms as an experimental model. Understanding the central dogma of molecular biology, Concepts of Bacteria, Fungi, Viruses and their related virulence. Comparison of bacterial genome and proteome to fly, mealy bug, *C. elegans*, earthworm and other invertebrates. Use of bacteria and fly as model organisms for studying various human related diseases. Concepts of Gnotobiotics and its research implications.

MODULE 2

15 hrs

Drosophila - Life cycle, Genetic control and embryonic development: maternal effect genes, Segmentation genes, Homeotic selector genes, Biochemical assays, fly as a model for Diabetes, Neurodegeneration and Microbiome (bacterial, fungal and viral associations). Mitochondrial dysfunctions, oxidative stress and concepts & theory on free radicals. Nano-phytobioactives and their applications in human health with special reference to neurobiology.

BOOKS:

- Principles of Lehninger Biochemistry, by Nelson and Cox (2008). McGraw-Hill Higher Education.

- Dennis, D.T and Turpin D.H. (ed). 1990. *Plant physiology, Biochemistry and Molecular biology*, Longman Scientific and Technical Essex.
- Lea, P.J. and Leegood, R.C. 1993. *Plant Biochemistry and Molecular Biology*. John Wiley & Sons, West Susses.

REFERENCES:

- Taiz, I. and Zeiger, E. 1999. *Plant Physiology*. The Benjamin/comings publishing Co., Redwood City, USA.
- Willey, J. M., Sherwood, L., Woolverton, C. J., & Prescott, L. M. (2008). *Prescott, Harley, and Klein's microbiology (8th edn)*. New York: McGraw-Hill Higher Education.



DAYANANDA SAGAR UNIVERSITY
SHAVIGE MALLESHWARA HILLS, KUMARASWAMY
LAYOUT
BENGALURU – 560 111, KARNATAKA.
(2021-2022)

TITLE OF THE COURSE : PUBLIC HEALTH MICROBIOLOGY

COURSE OBJECTIVES:

- 1 Study emphasizes the relationship between the defences of the human body and the virulence factors of pathogenic microorganisms.
2. It describes the infection, diseases, pathogenesis and the body's defence against pathogenic microorganisms.

COURSE OUTCOMES:

1. Apply the knowledge to understand the **microbial** physiology and to identify the microorganisms.
2. It describes how diseases are spread and how the transmission of pathogens can be controlled.

TITLE OF THE COURSE : VERMICOMPOSTING

COURSE OBJECTIVE:

- To understand concepts of biofertilizers like vermicomposting.

- To understand techniques in Vermicomposting.
- To increase employability of the students.
- To improve the soil quality by promoting the biofertilizers.

COURSE OUTCOME

- 1) Produce good quality of Vermicompost and Vermiculture.
- 2) Acquire skills for entrepreneurship .

TITLE OF THE COURSE : PRECLINICAL TOXICOLOGY

COURSE OBJECTIVE:

1. Is aimed at fresher who needs to get initiated into Clinical research studies that require basic knowledge of principles of pharmacokinetics, drug metabolism, organ toxicity and toxicity evaluation concepts
2. To give essentials of toxicology required by professionals aiming to work involving preclinical toxicity evaluation studies.

COURSE OUTCOME:

1. Student should get adequate understanding of principles of preclinical toxicology
2. Student should get foundation knowledge to enable them to take up studies in clinical research.

TITLE OF THE COURSE : CLINICAL BIOCHEMISTRY

COURSE OBJECTIVE:

- Student will have a basic understanding of metabolic reactions, their regulation and how breakdown of this circuit will lead to diseased state.
- Students will also be made aware as to how these diseases affect the body, how are they detected and how to handle them.

COURSE OUTCOME:

- Students will be able to comprehend the logic behind metabolic reactions and how they lead to production of energy by the body.
- They will have an overall view of several diseases including their biochemical implications and tests performed for detection.

TITLE OF THE COURSE : MODELS FOR STUDYING HUMAN DISEASES

COURSE OBJECTIVE:

To understand the models to study human lifestyle disorders which are relevant to solve medical and non-medical health issues.

COURSE OUTCOME:

The student will be able to optimize and validate the models (vertebrate and non-vertebrate) for better understanding of lifestyle disorders.

CENTRE OF COMPETENCE FOR AUTOMATION TECHNOLOGIES

KUDLU GATE, HOSUR ROAD, BENGALURU-560068.

INDUSTRIAL HYDRAULICS

2022: 3rd Sem B. Tech Mechanical Engineering

Course Content

BASIC & ELECTRO HYDRAULICS

What is Hydraulics?

- Important basic terms
- Characteristics of Industrial Hydraulics
- Comparison of Hydraulics Vs. Electrical
- Electronics, Pneumatics and Mechanical
- Applications of Hydraulics

Basic physical properties

- i. Pressure.
- ii. Pascal's Law.
- iii. Force transmission
- iv. Pressure transmission
- v. Displacement Transmission
- vi. Calculations
- vii. Flow rate and Flow Law.

- **Graphical Symbols and Hydraulic circuits.**
- **Hydraulic Fluids**
- **Hydraulic pumps**
- **Hydraulic Cylinder and Motor**

Hydraulic Control valves

- i. PCV
- ii. FCV
- iii. DCV

- **Introduction to Relay Based Control System**

- **Function of Relays**
- **SPDT contacts**
- **Signal storage logic**
- **AND and OR logic**

Hands-On-Training

Exercise 1 : Extending a cylinder by operating a push button

Exercise 2 : Signal storage by electrical self-locking, setting and resetting using a momentary-contact switch

Exercise 3 Mechanical locking by means of momentary-contact switch contacts

Exercise 4 Electrical locking by means of contactor contacts

Exercise 5 : Signal storage by means of contactor contacts

Accumulator

Exercise 6 : accumulator applications

Exercise 7 : Pressure switches and proximity switches

Exercise 8 : Advance control with time-dependent intermediate stop

Course Description: This course is an introduction to the basic hydraulic systems. Underlying scientific principles and their practical applications are covered. The laboratory reinforces the principles learned through hands-on experiments.

Course Objectives: Upon successful completion of Introduction to Hydraulic Systems, the student demonstrate proficiency in the following:

- Introductory concepts within hydraulic systems.
- Specific design, application, and maintenance functions of hydraulic systems.
- Hydraulic pumps, fluid conductors, connectors, and means of transmission.

Course Outcomes: On completion of the Technical Certification – Hydraulics, students were able to:

- Demonstrate knowledge of introductory concepts within hydraulic systems.
- Identify specific design, application, and maintenance functions of hydraulic systems.
- Demonstrate knowledge of hydraulic pumps, fluid conductors, connectors, and means of transmission.
- Perform work safely by promoting a safe work environment.
- Communicate technical information.

CENTRE OF COMPETENCE FOR AUTOMATION TECHNOLOGIES

KUDLU GATE, HOSUR ROAD, BENGALURU-560068.

INDUSTRIAL PNEUMATICS

2022: 4th sem B. Tech Mechanical Engineering

Course Content

BASIC & ELECTRO PNEUMATICS

What is Pneumatics?

- What is Pneumatics?
- Important basic terms
- Characteristics of Industrial Pneumatics
- Comparison of Pneumatics Vs Electrical
- Applications of Pneumatics

Basic physical properties

- i. Pressure.
- ii. Pascal's Law.
- iii. Force transmission
- iv. Pressure transmission
- v. Displacement Transmission
- vi. Calculations
- vii. Flow rate and Flow Law.

- **Graphical Symbols and Pneumatic circuits.**
- **Generation of compressed air**
- **Processing of compressed air**
- **Maintenance unit**
- **Compressors**

Pneumatic Control valves

i. PCV

- ii. FCV
- iii. DCV

- **Introduction to Relay Based Control System**
- **Function of Relays**
- **SPDT contacts**
- **Signal storage logic**
- **AND and OR logic**

Hands-On-Training

Exercise 1 : Direct and indirect control of a single-acting cylinder, extending

Exercise 2 : Direct and indirect control of a double-acting cylinder with pushbutton

Exercise 3 : Signal storage by means of contactor contacts

Exercise 4: Controlling a double-acting cylinder, impulse valve, 2 push-buttons

Exercise 5 : Displacement dependent control of a double acting cylinder, impulse valve

Exercise 6 : Pressure-dependent control of 1 double-acting cylinder

Exercise 7 : Time-dependent control of 1 double-acting cylinder

Exercise 8 : Holding-element control of a double-acting cylinder with impulse valve, directly controlled

Exercise 9 : Displacement-dependent control of a double-acting cylinder, impulse valve, cylinder switch

Exercise 10 : Sequential control of 2 double-acting cylinders with impulse valves and signal overlapping

Exercise 11 : Sequential control of 2 double-acting cylinders with spring return valves and step sequence

Course Description: This course is an introduction to the basic pneumatic systems. Underlying scientific principles and their practical applications are covered. The laboratory reinforces the principles learned through hands-on experiments.

Course Objectives: Upon successful completion of Introduction to Pneumatic Systems, the student demonstrate proficiency in the following:

- Introductory concepts within pneumatic systems.
- Specific design, application, and maintenance functions of pneumatic systems.
- Air Water Filter, Compressor, Manifold, connectors, and means of transmission.

Program Outcomes: On completion of the Technical Certification – Pneumatics, students were able to:

- Demonstrate knowledge of introductory concepts within pneumatic systems.
- Identify specific design, application, and maintenance functions of pneumatic systems.
- Demonstrate knowledge of Air Water Filter, Compressor, Manifold, connectors, and means of transmission.
- Perform work safely by promoting a safe work environment.
- Communicate technical information.

CENTRE OF COMPETENCE FOR AUTOMATION TECHNOLOGIES

KUDLU GATE, HOSUR ROAD, BENGALURU-560068.

INDUSTRIAL HYDRAULICS

2017-2018: 3rd Sem. B. Tech Mechanical Engineering

Course Content

BASIC & ELECTRO HYDRAULICS

What is Hydraulics?

- Important basic terms
- Characteristics of Industrial Hydraulics
- Comparison of Hydraulics Vs. Electrical
- Electronics, Pneumatics and Mechanical
- Applications of Hydraulics

Basic physical properties

- i. Pressure.
- ii. Pascal's Law.
- iii. Force transmission
- iv. Pressure transmission
- v. Displacement Transmission
- vi. Calculations
- vii. Flow rate and Flow Law.

- **Graphical Symbols and Hydraulic circuits.**
- **Hydraulic Fluids**
- **Hydraulic pumps**
- **Hydraulic Cylinder and Motor**

Hydraulic Control valves

- i. PCV
- ii. FCV
- iii. DCV

- **Introduction to Relay Based Control System**
- **Function of Relays**
- **SPDT contacts**
- **Signal storage logic**
- **AND and OR logic**

Hands-On-Training

Exercise 1 : Extending a cylinder by operating a push button

Exercise 2 : Signal storage by electrical self-locking, setting and resetting using a momentary-contact switch

Exercise 3 Mechanical locking by means of momentary-contact switch contacts

Exercise 4 Electrical locking by means of contactor contacts

Exercise 5 : Signal storage by means of contactor contacts

Accumulator

Exercise 6 : accumulator applications

Exercise 7 : Pressure switches and proximity switches

Exercise 8 : Advance control with time-dependent intermediate stop

Course Description: This course is an introduction to the basic hydraulic systems. Underlying scientific principles and their practical applications are covered. The laboratory reinforces the principles learned through hands-on experiments.

Course Objectives: Upon successful completion of Introduction to Hydraulic Systems, the student demonstrate proficiency in the following:

- Introductory concepts within hydraulic systems.
- Specific design, application, and maintenance functions of hydraulic systems.
- Hydraulic pumps, fluid conductors, connectors, and means of transmission.

Course Outcomes: On completion of the Technical Certification – Hydraulics, students were able to:

- Demonstrate knowledge of introductory concepts within hydraulic systems.
- Identify specific design, application, and maintenance functions of hydraulic systems.
- Demonstrate knowledge of hydraulic pumps, fluid conductors, connectors, and means of transmission.
- Perform work safely by promoting a safe work environment.
- Communicate technical information.

CENTRE OF COMPETENCE FOR AUTOMATION TECHNOLOGIES

KUDLU GATE, HOSUR ROAD, BENGALURU-560068.

INDUSTRIAL PNEUMATICS

2017-2018: 4th Sem. B. Tech Mechanical Engineering

Course Content

BASIC & ELECTRO PNEUMATICS

What is Pneumatics?

- What is Pneumatics?
- Important basic terms
- Characteristics of Industrial Pneumatics
- Comparison of Pneumatics Vs Electrical
- Applications of Pneumatics

Basic physical properties

- i. Pressure.
- ii. Pascal's Law.
- iii. Force transmission
- iv. Pressure transmission
- v. Displacement Transmission
- vi. Calculations
- vii. Flow rate and Flow Law.

- **Graphical Symbols and Pneumatic circuits.**
- **Generation of compressed air**
- **Processing of compressed air**
- **Maintenance unit**
- **Compressors**

Pneumatic Control valves

i. PCV

- ii. FCV
- iii. DCV

- **Introduction to Relay Based Control System**
- **Function of Relays**
- **SPDT contacts**
- **Signal storage logic**
- **AND and OR logic**

Hands-On-Training

Exercise 1 : Direct and indirect control of a single-acting cylinder, extending

Exercise 2 : Direct and indirect control of a double-acting cylinder with pushbutton

Exercise 3 : Signal storage by means of contactor contacts

Exercise 4: Controlling a double-acting cylinder, impulse valve, 2 push-buttons

Exercise 5 : Displacement dependent control of a double acting cylinder, impulse valve

Exercise 6 : Pressure-dependent control of 1 double-acting cylinder

Exercise 7 : Time-dependent control of 1 double-acting cylinder

Exercise 8 : Holding-element control of a double-acting cylinder with impulse valve, directly controlled

Exercise 9 : Displacement-dependent control of a double-acting cylinder, impulse valve, cylinder switch

Exercise 10 : Sequential control of 2 double-acting cylinders with impulse valves and signal overlapping

Exercise 11 : Sequential control of 2 double-acting cylinders with spring return valves and step sequence

Course Description: This course is an introduction to the basic pneumatic systems. Underlying scientific principles and their practical applications are covered. The laboratory reinforces the principles learned through hands-on experiments.

Course Objectives: Upon successful completion of Introduction to Pneumatic Systems, the student demonstrate proficiency in the following:

- Introductory concepts within pneumatic systems.
- Specific design, application, and maintenance functions of pneumatic systems.
- Air Water Filter, Compressor, Manifold, connectors, and means of transmission.

Program Outcomes: On completion of the Technical Certification – Pneumatics, students were able to:

- Demonstrate knowledge of introductory concepts within pneumatic systems.
- Identify specific design, application, and maintenance functions of pneumatic systems.
- Demonstrate knowledge of Air Water Filter, Compressor, Manifold, connectors, and means of transmission.
- Perform work safely by promoting a safe work environment.
- Communicate technical information.

CENTRE OF COMPETENCE FOR AUTOMATION TECHNOLOGIES

KUDLU GATE, HOSUR ROAD, BENGALURU-560068.

INDUSTRIAL HYDRAULICS

2018-2019: 3rd Sem. B. Tech Mechanical Engineering

Course Content

BASIC & ELECTRO HYDRAULICS

What is Hydraulics?

- Important basic terms
- Characteristics of Industrial Hydraulics
- Comparison of Hydraulics Vs. Electrical
- Electronics, Pneumatics and Mechanical
- Applications of Hydraulics

Basic physical properties

- i. Pressure.
- ii. Pascal's Law.
- iii. Force transmission
- iv. Pressure transmission
- v. Displacement Transmission
- vi. Calculations
- vii. Flow rate and Flow Law.

- **Graphical Symbols and Hydraulic circuits.**
- **Hydraulic Fluids**
- **Hydraulic pumps**
- **Hydraulic Cylinder and Motor**

Hydraulic Control valves

- i. PCV
- ii. FCV
- iii. DCV

- **Introduction to Relay Based Control System**

- **Function of Relays**
- **SPDT contacts**
- **Signal storage logic**
- **AND and OR logic**

Hands-On-Training

Exercise 1 : Extending a cylinder by operating a push button

Exercise 2 : Signal storage by electrical self-locking, setting and resetting using a momentary-contact switch

Exercise 3 Mechanical locking by means of momentary-contact switch contacts

Exercise 4 Electrical locking by means of contactor contacts

Exercise 5 : Signal storage by means of contactor contacts

Accumulator

Exercise 6 : accumulator applications

Exercise 7 : Pressure switches and proximity switches

Exercise 8 : Advance control with time-dependent intermediate stop

Course Description: This course is an introduction to the basic hydraulic systems. Underlying scientific principles and their practical applications are covered. The laboratory reinforces the principles learned through hands-on experiments.

Course Objectives: Upon successful completion of Introduction to Hydraulic Systems, the student demonstrate proficiency in the following:

- Introductory concepts within hydraulic systems.
- Specific design, application, and maintenance functions of hydraulic systems.
- Hydraulic pumps, fluid conductors, connectors, and means of transmission.

Course Outcomes: On completion of the Technical Certification – Hydraulics, students were able to:

- Demonstrate knowledge of introductory concepts within hydraulic systems.
- Identify specific design, application, and maintenance functions of hydraulic systems.
- Demonstrate knowledge of hydraulic pumps, fluid conductors, connectors, and means of transmission.
- Perform work safely by promoting a safe work environment.
- Communicate technical information.

CENTRE OF COMPETENCE FOR AUTOMATION TECHNOLOGIES

KUDLU GATE, HOSUR ROAD, BENGALURU-560068.

INDUSTRIAL PNEUMATICS

2018-2019: 4th Sem. B. Tech Mechanical Engineering

Course Content

BASIC & ELECTRO PNEUMATICS

What is Pneumatics?

- What is Pneumatics?
- Important basic terms
- Characteristics of Industrial Pneumatics
- Comparison of Pneumatics Vs Electrical
- Applications of Pneumatics

Basic physical properties

- i. Pressure.
- ii. Pascal's Law.
- iii. Force transmission
- iv. Pressure transmission
- v. Displacement Transmission
- vi. Calculations
- vii. Flow rate and Flow Law.

- **Graphical Symbols and Pneumatic circuits.**
- **Generation of compressed air**
- **Processing of compressed air**
- **Maintenance unit**
- **Compressors**

Pneumatic Control valves

i. PCV

- ii. FCV
- iii. DCV

- **Introduction to Relay Based Control System**
- **Function of Relays**
- **SPDT contacts**
- **Signal storage logic**
- **AND and OR logic**

Hands-On-Training

Exercise 1 : Direct and indirect control of a single-acting cylinder, extending

Exercise 2 : Direct and indirect control of a double-acting cylinder with pushbutton

Exercise 3 : Signal storage by means of contactor contacts

Exercise 4: Controlling a double-acting cylinder, impulse valve, 2 push-buttons

Exercise 5 : Displacement dependent control of a double acting cylinder, impulse valve

Exercise 6 : Pressure-dependent control of 1 double-acting cylinder

Exercise 7 : Time-dependent control of 1 double-acting cylinder

Exercise 8 : Holding-element control of a double-acting cylinder with impulse valve, directly controlled

Exercise 9 : Displacement-dependent control of a double-acting cylinder, impulse valve, cylinder switch

Exercise 10 : Sequential control of 2 double-acting cylinders with impulse valves and signal overlapping

Exercise 11 : Sequential control of 2 double-acting cylinders with spring return valves and step sequence

Course Description: This course is an introduction to the basic pneumatic systems. Underlying scientific principles and their practical applications are covered. The laboratory reinforces the principles learned through hands-on experiments.

Course Objectives: Upon successful completion of Introduction to Pneumatic Systems, the student demonstrate proficiency in the following:

- Introductory concepts within pneumatic systems.
- Specific design, application, and maintenance functions of pneumatic systems.
- Air Water Filter, Compressor, Manifold, connectors, and means of transmission.

Program Outcomes: On completion of the Technical Certification – Pneumatics, students were able to:

- Demonstrate knowledge of introductory concepts within pneumatic systems.
- Identify specific design, application, and maintenance functions of pneumatic systems.
- Demonstrate knowledge of Air Water Filter, Compressor, Manifold, connectors, and means of transmission.
- Perform work safely by promoting a safe work environment.
- Communicate technical information.

CENTRE OF COMPETENCE FOR AUTOMATION TECHNOLOGIES

KUDLU GATE, HOSUR ROAD, BENGALURU-560068.

INDUSTRIAL HYDRAULICS

2019-2020: 3rd Sem. B. Tech Mechanical Engineering

Course Content

BASIC & ELECTRO HYDRAULICS

What is Hydraulics?

- Important basic terms
- Characteristics of Industrial Hydraulics
- Comparison of Hydraulics Vs. Electrical
- Electronics, Pneumatics and Mechanical
- Applications of Hydraulics

Basic physical properties

- i. Pressure.
- ii. Pascal's Law.
- iii. Force transmission
- iv. Pressure transmission
- v. Displacement Transmission
- vi. Calculations
- vii. Flow rate and Flow Law.

- **Graphical Symbols and Hydraulic circuits.**
- **Hydraulic Fluids**
- **Hydraulic pumps**
- **Hydraulic Cylinder and Motor**

Hydraulic Control valves

- i. PCV
- ii. FCV
- iii. DCV

- **Introduction to Relay Based Control System**

- **Function of Relays**
- **SPDT contacts**
- **Signal storage logic**
- **AND and OR logic**

Hands-On-Training

Exercise 1 : Extending a cylinder by operating a push button

Exercise 2 : Signal storage by electrical self-locking, setting and resetting using a momentary-contact switch

Exercise 3 Mechanical locking by means of momentary-contact switch contacts

Exercise 4 Electrical locking by means of contactor contacts

Exercise 5 : Signal storage by means of contactor contacts

Accumulator

Exercise 6 : accumulator applications

Exercise 7 : Pressure switches and proximity switches

Exercise 8 : Advance control with time-dependent intermediate stop

Course Description: This course is an introduction to the basic hydraulic systems. Underlying scientific principles and their practical applications are covered. The laboratory reinforces the principles learned through hands-on experiments.

Course Objectives: Upon successful completion of Introduction to Hydraulic Systems, the student demonstrate proficiency in the following:

- Introductory concepts within hydraulic systems.
- Specific design, application, and maintenance functions of hydraulic systems.
- Hydraulic pumps, fluid conductors, connectors, and means of transmission.

Course Outcomes: On completion of the Technical Certification – Hydraulics, students were able to:

- Demonstrate knowledge of introductory concepts within hydraulic systems.
- Identify specific design, application, and maintenance functions of hydraulic systems.
- Demonstrate knowledge of hydraulic pumps, fluid conductors, connectors, and means of transmission.
- Perform work safely by promoting a safe work environment.
- Communicate technical information.

CENTRE OF COMPETENCE FOR AUTOMATION TECHNOLOGIES

KUDLU GATE, HOSUR ROAD, BENGALURU-560068.

INDUSTRIAL PNEUMATICS

2019-2020: 4th Sem. B. Tech Mechanical Engineering

Course Content

BASIC & ELECTRO PNEUMATICS

What is Pneumatics?

- What is Pneumatics?
- Important basic terms
- Characteristics of Industrial Pneumatics
- Comparison of Pneumatics Vs Electrical
- Applications of Pneumatics

Basic physical properties

- i. Pressure.
- ii. Pascal's Law.
- iii. Force transmission
- iv. Pressure transmission
- v. Displacement Transmission
- vi. Calculations
- vii. Flow rate and Flow Law.

- **Graphical Symbols and Pneumatic circuits.**
- **Generation of compressed air**
- **Processing of compressed air**
- **Maintenance unit**
- **Compressors**

Pneumatic Control valves

i. PCV

- ii. FCV
- iii. DCV

- **Introduction to Relay Based Control System**
- **Function of Relays**
- **SPDT contacts**
- **Signal storage logic**
- **AND and OR logic**

Hands-On-Training

Exercise 1 : Direct and indirect control of a single-acting cylinder, extending

Exercise 2 : Direct and indirect control of a double-acting cylinder with pushbutton

Exercise 3 : Signal storage by means of contactor contacts

Exercise 4: Controlling a double-acting cylinder, impulse valve, 2 push-buttons

Exercise 5 : Displacement dependent control of a double acting cylinder, impulse valve

Exercise 6 : Pressure-dependent control of 1 double-acting cylinder

Exercise 7 : Time-dependent control of 1 double-acting cylinder

Exercise 8 : Holding-element control of a double-acting cylinder with impulse valve, directly controlled

Exercise 9 : Displacement-dependent control of a double-acting cylinder, impulse valve, cylinder switch

Exercise 10 : Sequential control of 2 double-acting cylinders with impulse valves and signal overlapping

Exercise 11 : Sequential control of 2 double-acting cylinders with spring return valves and step sequence

Course Description: This course is an introduction to the basic pneumatic systems. Underlying scientific principles and their practical applications are covered. The laboratory reinforces the principles learned through hands-on experiments.

Course Objectives: Upon successful completion of Introduction to Pneumatic Systems, the student demonstrate proficiency in the following:

- Introductory concepts within pneumatic systems.
- Specific design, application, and maintenance functions of pneumatic systems.
- Air Water Filter, Compressor, Manifold, connectors, and means of transmission.

Program Outcomes: On completion of the Technical Certification – Pneumatics, students were able to:

- Demonstrate knowledge of introductory concepts within pneumatic systems.
- Identify specific design, application, and maintenance functions of pneumatic systems.
- Demonstrate knowledge of Air Water Filter, Compressor, Manifold, connectors, and means of transmission.
- Perform work safely by promoting a safe work environment.
- Communicate technical information.

CENTRE OF COMPETENCE FOR AUTOMATION TECHNOLOGIES

KUDLU GATE, HOSUR ROAD, BENGALURU-560068.

INDUSTRIAL HYDRAULICS

2020-2021: 3rd Sem. B. Tech Mechanical Engineering

Course Content

BASIC & ELECTRO HYDRAULICS

What is Hydraulics?

- Important basic terms
- Characteristics of Industrial Hydraulics
- Comparison of Hydraulics Vs. Electrical
- Electronics, Pneumatics and Mechanical
- Applications of Hydraulics

Basic physical properties

- i. Pressure.
- ii. Pascal's Law.
- iii. Force transmission
- iv. Pressure transmission
- v. Displacement Transmission
- vi. Calculations
- vii. Flow rate and Flow Law.

- **Graphical Symbols and Hydraulic circuits.**
- **Hydraulic Fluids**
- **Hydraulic pumps**
- **Hydraulic Cylinder and Motor**

Hydraulic Control valves

- i. PCV
- ii. FCV
- iii. DCV

- **Introduction to Relay Based Control System**

- **Function of Relays**
- **SPDT contacts**
- **Signal storage logic**
- **AND and OR logic**

Hands-On-Training

Exercise 1 : Extending a cylinder by operating a push button

Exercise 2 : Signal storage by electrical self-locking, setting and resetting using a momentary-contact switch

Exercise 3 Mechanical locking by means of momentary-contact switch contacts

Exercise 4 Electrical locking by means of contactor contacts

Exercise 5 : Signal storage by means of contactor contacts

Accumulator

Exercise 6 : accumulator applications

Exercise 7 : Pressure switches and proximity switches

Exercise 8 : Advance control with time-dependent intermediate stop

Course Description: This course is an introduction to the basic hydraulic systems. Underlying scientific principles and their practical applications are covered. The laboratory reinforces the principles learned through hands-on experiments.

Course Objectives: Upon successful completion of Introduction to Hydraulic Systems, the student demonstrate proficiency in the following:

- Introductory concepts within hydraulic systems.
- Specific design, application, and maintenance functions of hydraulic systems.
- Hydraulic pumps, fluid conductors, connectors, and means of transmission.

Course Outcomes: On completion of the Technical Certification – Hydraulics, students were able to:

- Demonstrate knowledge of introductory concepts within hydraulic systems.
- Identify specific design, application, and maintenance functions of hydraulic systems.
- Demonstrate knowledge of hydraulic pumps, fluid conductors, connectors, and means of transmission.
- Perform work safely by promoting a safe work environment.
- Communicate technical information.

CENTRE OF COMPETENCE FOR AUTOMATION TECHNOLOGIES

KUDLU GATE, HOSUR ROAD, BENGALURU-560068.

INDUSTRIAL PNEUMATICS

2020-2021: 4th Sem. B. Tech Mechanical Engineering

Course Content

BASIC & ELECTRO PNEUMATICS

What is Pneumatics?

- What is Pneumatics?
- Important basic terms
- Characteristics of Industrial Pneumatics
- Comparison of Pneumatics Vs Electrical
- Applications of Pneumatics

Basic physical properties

- i. Pressure.
- ii. Pascal's Law.
- iii. Force transmission
- iv. Pressure transmission
- v. Displacement Transmission
- vi. Calculations
- vii. Flow rate and Flow Law.

- **Graphical Symbols and Pneumatic circuits.**
- **Generation of compressed air**
- **Processing of compressed air**
- **Maintenance unit**
- **Compressors**

Pneumatic Control valves

i. PCV

- ii. FCV
- iii. DCV

- **Introduction to Relay Based Control System**
- **Function of Relays**
- **SPDT contacts**
- **Signal storage logic**
- **AND and OR logic**

Hands-On-Training

Exercise 1 : Direct and indirect control of a single-acting cylinder, extending

Exercise 2 : Direct and indirect control of a double-acting cylinder with pushbutton

Exercise 3 : Signal storage by means of contactor contacts

Exercise 4: Controlling a double-acting cylinder, impulse valve, 2 push-buttons

Exercise 5 : Displacement dependent control of a double acting cylinder, impulse valve

Exercise 6 : Pressure-dependent control of 1 double-acting cylinder

Exercise 7 : Time-dependent control of 1 double-acting cylinder

Exercise 8 : Holding-element control of a double-acting cylinder with impulse valve, directly controlled

Exercise 9 : Displacement-dependent control of a double-acting cylinder, impulse valve, cylinder switch

Exercise 10 : Sequential control of 2 double-acting cylinders with impulse valves and signal overlapping

Exercise 11 : Sequential control of 2 double-acting cylinders with spring return valves and step sequence

Course Description: This course is an introduction to the basic pneumatic systems. Underlying scientific principles and their practical applications are covered. The laboratory reinforces the principles learned through hands-on experiments.

Course Objectives: Upon successful completion of Introduction to Pneumatic Systems, the student demonstrate proficiency in the following:

- Introductory concepts within pneumatic systems.
- Specific design, application, and maintenance functions of pneumatic systems.
- Air Water Filter, Compressor, Manifold, connectors, and means of transmission.

Program Outcomes: On completion of the Technical Certification – Pneumatics, students were able to:

- Demonstrate knowledge of introductory concepts within pneumatic systems.
- Identify specific design, application, and maintenance functions of pneumatic systems.
- Demonstrate knowledge of Air Water Filter, Compressor, Manifold, connectors, and means of transmission.
- Perform work safely by promoting a safe work environment.
- Communicate technical information.

Autodesk Design and Innovation Centre

Course: Autodesk FUSION 360-Beginner

SEMESTER	III
YEAR	II
COURSE CODE	
TITLE OF THE COURSE	Autodesk FUSION 360-Beginner

Course Aim and Summary

The course aims at introducing fundamentals of design and computer aided design using Autodesk FUSION 360 along with various parameter involved in developing a product from scratch. The course deals with all the parameters involved in starting with CAD and setting up base knowledge for product design.

Course Objectives:

The objectives of the course are:

- To understand fundamentals of design and computer aided design
- To explore various tools offered in FUSION 360
- Training on all the basic tools required to start a product design
- To enable the students to explore the CAD environment and understand core concepts of design
- To expose students to industrial part or component modelling techniques

Course Outcomes

Students after completing the course will be able to:

1. Download Student version of Cloud Based Fusion 360 software and install on their Laptops
2. Use features of Fusion 360 such as Sketching, Part modelling, Assembly, Simulation and rendering.
3. Create simple 3-D solid models using Fusion 360
4. Demonstrate application of various Workbench options
5. Create 3-D models of Mechanical components as a project
6. Be industry ready with the latest design tool knowledge

MODULE	COURSE	DESCRIPTION
MODULE 1	SKETCHING	Introduction to sketching; Various sketching tools; lines, circles, slots and various other sketching tools; Modify tools; trim, extend, fillet, chamfer and other important modifier tools. Dimension and Constraints; Various dimensioning types available in the software and various constraints available to fully define a sketch
MODULE 2	PART MODELLING	Converting the 2D sketches to 3D parts will be covered here along with all the 3D part modelling tools and some options to edit the features of the existing parts
MODULE 3	ASSEMBLY DESIGN AND DRAFTING	Assembling various parts and defining relationships between them. Creating joints like rigid, slot, revolve, ball and other major joints to define the motion between the components ;Generate drafts or drawings of the given

		assembly or part and adding all the necessary information and generating bill of materials
MODULE 4	ANIMATION AND RENDER	Introduction to animation environment and also simple animation on existing assemblies to understand how they actual work in real life application; Photorealistic renders for looks and presentation will be extracted with the help of the rendering tool and exported to be used for various applications.
MODULE 5	SIMULATION	Finite element analysis is the method applied to understand the behaviour of the designed parts in real world application and a glimpse of this will be explained in the simulation environment

Autodesk Design and Innovation Centre

Course: Autodesk FUSION 360-Advanced

SEMESTER	IV
YEAR	II
COURSE CODE	
TITLE OF THE COURSE	Autodesk FUSION 360-Advanced

Course Aim and Summary

The course aims at introducing advanced concepts of design using Autodesk FUSION 360 dealing product analysis, refinement and manufacturing. The course deals with all the parameters involved in analysing a design for practical application and to refine the design to its best possible state and set up the product for manufacturing with various manufacturing techniques.

Course Objectives:

The objectives of the course are:

- To understand various analysis done on a model using FEM techniques
- To refine the product design with the inputs from FEM outcomes
- To re-define the modelling technique using generative design enabling AI and cloud computing
- To set-up the model environment and generate tooling operations and jigs and fixtures with CAM

Course Outcomes:

Students after completing the course will be able to:

- Understand the fundamentals of Finite element analysis
- Apply the concept of analysis to refine the component design
- Apply advanced designing techniques like Generative Design and explore unconventional design options
- Understand the difference between conventional product design and analysis and generative design principles
- Generating tool path and machining operations for manufacturing the design to obtain the physical component

MODULE	COURSE	DESCRIPTION
MODULE 1	SHAPE OPTIMIZATION	Introduction to shape optimization; Meshing model into finite elements ;Setting the information for optimization of the model; Constraining the model and playing loads; Setting symmetry planes for even optimization; Setting the information for optimization of the model based on strength or weight or both ;Solving the optimization criteria set; Analyzing the obtained optimized mesh; Importing the mesh top design environment and reiterating the model based on the mesh reference to create a refined product design.

MODULE 2	GENERATIVE DESIGN	Introduction to Generative design; Difference between Generative design and topology optimization; Process parameters set up and live demonstration ;Studying the outcomes of generative design solver; Case study analysis; Manufacturing criteria; Challenges of generative design.
MODULE 3	CAM	Introduction to Computer aided manufacturing; Setting up the environment and model ;Setting stock and machine information Setting the operation parameters and tool information based on the library or by creating tools for the machine available ;Performing necessary machining operations in CAM environment ;Generating machine codes based on the operations; Virtual demo of machining in FUSION 360; Validation of machining parameters set; Exporting the G-code and feeding it to a CNC machine
MODULE 4	RAPID PROTOTYPING	Introduction to rapid prototyping; Introduction to additive manufacturing and the history of 3D printing; Various methods for additive manufacturing and their merits and demerits; Introduction to desktop manufacturing and prototyping.; Additive manufacturing as the future of manufacturing and the business prospects of additive manufacturing.
MODULE 5	3D PRINTING	Introduction to FDM manufacturing and demonstration of various parts constituting an FDM machine; General working principle of FDM machine.; Introduction to 3D printing slicer software; Working demonstration of FDM machine; Session on design for additive manufacturing covering various domains of engineering with examples using FUSION 360 and covering some essential tools required for designing a product or a simple part; Introduction to PrusaSlicer and advanced options in PrusaSlicer and print settings; Understanding various materials for 3D printing and determining the best material for use in a given situation; Understanding the complete process of 3D printing beginning from the design of the component and checking the requirements for 3D printing and slicing the part and beginning to print the part; Post processing of the printed parts; Live demonstration of 3D printing; Printed models display and review on how to achieve design best suited for 3D printing using DFAM techniques.

Autodesk Design and Innovation Centre

Course: Autodesk FUSION 360-Beginner

SEMESTER	III
YEAR	II
COURSE CODE	
TITLE OF THE COURSE	Autodesk FUSION 360-Beginner

Course Aim and Summary

The course aims at introducing fundamentals of design and computer aided design using Autodesk FUSION 360 along with various parameter involved in developing a product from scratch. The course deals with all the parameters involved in starting with CAD and setting up base knowledge for product design.

Course Objectives:

The objectives of the course are:

- To understand fundamentals of design and computer aided design
- To explore various tools offered in FUSION 360
- Training on all the basic tools required to start a product design
- To enable the students to explore the CAD environment and understand core concepts of design
- To expose students to industrial part or component modelling techniques

Course Outcomes

Students after completing the course will be able to:

1. Download Student version of Cloud Based Fusion 360 software and install on their Laptops
2. Use features of Fusion 360 such as Sketching, Part modelling, Assembly, Simulation and rendering.
3. Create simple 3-D solid models using Fusion 360
4. Demonstrate application of various Workbench options
5. Create 3-D models of Mechanical components as a project
6. Be industry ready with the latest design tool knowledge

MODULE	COURSE	DESCRIPTION
MODULE 1	SKETCHING	Introduction to sketching; Various sketching tools; lines, circles, slots and various other sketching tools; Modify tools; trim, extend, fillet, chamfer and other important modifier tools. Dimension and Constraints; Various dimensioning types available in the software and various constraints available to fully define a sketch
MODULE 2	PART MODELLING	Converting the 2D sketches to 3D parts will be covered here along with all the 3D part modelling tools and some options to edit the features of the existing parts
MODULE 3	ASSEMBLY DESIGN AND DRAFTING	Assembling various parts and defining relationships between them. Creating joints like rigid, slot, revolve, ball and other major joints to define the motion between the components ;Generate drafts or drawings of the given

		assembly or part and adding all the necessary information and generating bill of materials
MODULE 4	ANIMATION AND RENDER	Introduction to animation environment and also simple animation on existing assemblies to understand how they actual work in real life application; Photorealistic renders for looks and presentation will be extracted with the help of the rendering tool and exported to be used for various applications.
MODULE 5	SIMULATION	Finite element analysis is the method applied to understand the behaviour of the designed parts in real world application and a glimpse of this will be explained in the simulation environment

Autodesk Design and Innovation Centre

Course: Autodesk FUSION 360-Advanced

SEMESTER	IV
YEAR	II
COURSE CODE	
TITLE OF THE COURSE	Autodesk FUSION 360-Advanced

Course Aim and Summary

The course aims at introducing advanced concepts of design using Autodesk FUSION 360 dealing product analysis, refinement and manufacturing. The course deals with all the parameters involved in analysing a design for practical application and to refine the design to its best possible state and set up the product for manufacturing with various manufacturing techniques.

Course Objectives:

The objectives of the course are:

- To understand various analysis done on a model using FEM techniques
- To refine the product design with the inputs from FEM outcomes
- To re-define the modelling technique using generative design enabling AI and cloud computing
- To set-up the model environment and generate tooling operations and jigs and fixtures with CAM

Course Outcomes:

Students after completing the course will be able to:

- Understand the fundamentals of Finite element analysis
- Apply the concept of analysis to refine the component design
- Apply advanced designing techniques like Generative Design and explore unconventional design options
- Understand the difference between conventional product design and analysis and generative design principles
- Generating tool path and machining operations for manufacturing the design to obtain the physical component

MODULE	COURSE	DESCRIPTION
MODULE 1	SHAPE OPTIMIZATION	Introduction to shape optimization; Meshing model into finite elements ;Setting the information for optimization of the model; Constraining the model and playing loads; Setting symmetry planes for even optimization; Setting the information for optimization of the model based on strength or weight or both ;Solving the optimization criteria set; Analyzing the obtained optimized mesh; Importing the mesh top design environment and reiterating the model based on the mesh reference to create a refined product design.

MODULE 2	GENERATIVE DESIGN	Introduction to Generative design; Difference between Generative design and topology optimization; Process parameters set up and live demonstration ;Studying the outcomes of generative design solver; Case study analysis; Manufacturing criteria; Challenges of generative design.
MODULE 3	CAM	Introduction to Computer aided manufacturing; Setting up the environment and model ;Setting stock and machine information Setting the operation parameters and tool information based on the library or by creating tools for the machine available ;Performing necessary machining operations in CAM environment ;Generating machine codes based on the operations; Virtual demo of machining in FUSION 360; Validation of machining parameters set; Exporting the G-code and feeding it to a CNC machine
MODULE 4	RAPID PROTOTYPING	Introduction to rapid prototyping; Introduction to additive manufacturing and the history of 3D printing; Various methods for additive manufacturing and their merits and demerits; Introduction to desktop manufacturing and prototyping.; Additive manufacturing as the future of manufacturing and the business prospects of additive manufacturing.
MODULE 5	3D PRINTING	Introduction to FDM manufacturing and demonstration of various parts constituting an FDM machine; General working principle of FDM machine.; Introduction to 3D printing slicer software; Working demonstration of FDM machine; Session on design for additive manufacturing covering various domains of engineering with examples using FUSION 360 and covering some essential tools required for designing a product or a simple part; Introduction to PrusaSlicer and advanced options in PrusaSlicer and print settings; Understanding various materials for 3D printing and determining the best material for use in a given situation; Understanding the complete process of 3D printing beginning from the design of the component and checking the requirements for 3D printing and slicing the part and beginning to print the part; Post processing of the printed parts; Live demonstration of 3D printing; Printed models display and review on how to achieve design best suited for 3D printing using DFAM techniques.

CENTRE OF COMPETENCE FOR AUTOMATION TECHNOLOGIES

KUDLU GATE, HOSUR ROAD, BENGALURU-560068.

INDUSTRIAL HYDRAULICS

2016-2017: 3rd Sem. B. Tech Mechanical Engineering

Course Content

BASIC & ELECTRO HYDRAULICS

What is Hydraulics?

- Important basic terms
- Characteristics of Industrial Hydraulics
- Comparison of Hydraulics Vs. Electrical
- Electronics, Pneumatics and Mechanical
- Applications of Hydraulics

Basic physical properties

- i. Pressure.
- ii. Pascal's Law.
- iii. Force transmission
- iv. Pressure transmission
- v. Displacement Transmission
- vi. Calculations
- vii. Flow rate and Flow Law.

- **Graphical Symbols and Hydraulic circuits.**
- **Hydraulic Fluids**
- **Hydraulic pumps**
- **Hydraulic Cylinder and Motor**

Hydraulic Control valves

- i. PCV
- ii. FCV
- iii. DCV

- **Introduction to Relay Based Control System**

- **Function of Relays**
- **SPDT contacts**
- **Signal storage logic**
- **AND and OR logic**

Hands-On-Training

Exercise 1 : Extending a cylinder by operating a push button

Exercise 2 : Signal storage by electrical self-locking, setting and resetting using a momentary-contact switch

Exercise 3 Mechanical locking by means of momentary-contact switch contacts

Exercise 4 Electrical locking by means of contactor contacts

Exercise 5 : Signal storage by means of contactor contacts

Accumulator

Exercise 6 : accumulator applications

Exercise 7 : Pressure switches and proximity switches

Exercise 8 : Advance control with time-dependent intermediate stop

Course Description: This course is an introduction to the basic hydraulic systems. Underlying scientific principles and their practical applications are covered. The laboratory reinforces the principles learned through hands-on experiments.

Course Objectives: Upon successful completion of Introduction to Hydraulic Systems, the student demonstrate proficiency in the following:

- Introductory concepts within hydraulic systems.
- Specific design, application, and maintenance functions of hydraulic systems.
- Hydraulic pumps, fluid conductors, connectors, and means of transmission.

Course Outcomes: On completion of the Technical Certification – Hydraulics, students were able to:

- Demonstrate knowledge of introductory concepts within hydraulic systems.
- Identify specific design, application, and maintenance functions of hydraulic systems.
- Demonstrate knowledge of hydraulic pumps, fluid conductors, connectors, and means of transmission.
- Perform work safely by promoting a safe work environment.
- Communicate technical information.

CENTRE OF COMPETENCE FOR AUTOMATION TECHNOLOGIES

KUDLU GATE, HOSUR ROAD, BENGALURU-560068.

INDUSTRIAL PNEUMATICS

2016-2017: 4th Sem. B. Tech Mechanical Engineering

Course Content

BASIC & ELECTRO PNEUMATICS

What is Pneumatics?

- What is Pneumatics?
- Important basic terms
- Characteristics of Industrial Pneumatics
- Comparison of Pneumatics Vs Electrical
- Applications of Pneumatics

Basic physical properties

- i. Pressure.
- ii. Pascal's Law.
- iii. Force transmission
- iv. Pressure transmission
- v. Displacement Transmission
- vi. Calculations
- vii. Flow rate and Flow Law.

- **Graphical Symbols and Pneumatic circuits.**
- **Generation of compressed air**
- **Processing of compressed air**
- **Maintenance unit**
- **Compressors**

Pneumatic Control valves

i. PCV

- ii. FCV
- iii. DCV

- **Introduction to Relay Based Control System**
- **Function of Relays**
- **SPDT contacts**
- **Signal storage logic**
- **AND and OR logic**

Hands-On-Training

Exercise 1 : Direct and indirect control of a single-acting cylinder, extending

Exercise 2 : Direct and indirect control of a double-acting cylinder with pushbutton

Exercise 3 : Signal storage by means of contactor contacts

Exercise 4: Controlling a double-acting cylinder, impulse valve, 2 push-buttons

Exercise 5 : Displacement dependent control of a double acting cylinder, impulse valve

Exercise 6 : Pressure-dependent control of 1 double-acting cylinder

Exercise 7 : Time-dependent control of 1 double-acting cylinder

Exercise 8 : Holding-element control of a double-acting cylinder with impulse valve, directly controlled

Exercise 9 : Displacement-dependent control of a double-acting cylinder, impulse valve, cylinder switch

Exercise 10 : Sequential control of 2 double-acting cylinders with impulse valves and signal overlapping

Exercise 11 : Sequential control of 2 double-acting cylinders with spring return valves and step sequence

Course Description: This course is an introduction to the basic pneumatic systems. Underlying scientific principles and their practical applications are covered. The laboratory reinforces the principles learned through hands-on experiments.

Course Objectives: Upon successful completion of Introduction to Pneumatic Systems, the student demonstrate proficiency in the following:

- Introductory concepts within pneumatic systems.
- Specific design, application, and maintenance functions of pneumatic systems.
- Air Water Filter, Compressor, Manifold, connectors, and means of transmission.

Program Outcomes: On completion of the Technical Certification – Pneumatics, students were able to:

- Demonstrate knowledge of introductory concepts within pneumatic systems.
- Identify specific design, application, and maintenance functions of pneumatic systems.
- Demonstrate knowledge of Air Water Filter, Compressor, Manifold, connectors, and means of transmission.
- Perform work safely by promoting a safe work environment.
- Communicate technical information.

CENTRE OF COMPETENCE FOR AUTOMATION TECHNOLOGIES

KUDLU GATE, HOSUR ROAD, BENGALURU-560068.

INDUSTRIAL HYDRAULICS

2017-2018: 3rd Sem. B. Tech Mechanical Engineering

Course Content

BASIC & ELECTRO HYDRAULICS

What is Hydraulics?

- Important basic terms
- Characteristics of Industrial Hydraulics
- Comparison of Hydraulics Vs. Electrical
- Electronics, Pneumatics and Mechanical
- Applications of Hydraulics

Basic physical properties

- i. Pressure.
- ii. Pascal's Law.
- iii. Force transmission
- iv. Pressure transmission
- v. Displacement Transmission
- vi. Calculations
- vii. Flow rate and Flow Law.

- **Graphical Symbols and Hydraulic circuits.**
- **Hydraulic Fluids**
- **Hydraulic pumps**
- **Hydraulic Cylinder and Motor**

Hydraulic Control valves

- i. PCV
- ii. FCV
- iii. DCV

- **Introduction to Relay Based Control System**
- **Function of Relays**
- **SPDT contacts**
- **Signal storage logic**
- **AND and OR logic**

Hands-On-Training

Exercise 1 : Extending a cylinder by operating a push button

Exercise 2 : Signal storage by electrical self-locking, setting and resetting using a momentary-contact switch

Exercise 3 Mechanical locking by means of momentary-contact switch contacts

Exercise 4 Electrical locking by means of contactor contacts

Exercise 5 : Signal storage by means of contactor contacts

Accumulator

Exercise 6 : accumulator applications

Exercise 7 : Pressure switches and proximity switches

Exercise 8 : Advance control with time-dependent intermediate stop

Course Description: This course is an introduction to the basic hydraulic systems. Underlying scientific principles and their practical applications are covered. The laboratory reinforces the principles learned through hands-on experiments.

Course Objectives: Upon successful completion of Introduction to Hydraulic Systems, the student demonstrate proficiency in the following:

- Introductory concepts within hydraulic systems.
- Specific design, application, and maintenance functions of hydraulic systems.
- Hydraulic pumps, fluid conductors, connectors, and means of transmission.

Course Outcomes: On completion of the Technical Certification – Hydraulics, students were able to:

- Demonstrate knowledge of introductory concepts within hydraulic systems.
- Identify specific design, application, and maintenance functions of hydraulic systems.
- Demonstrate knowledge of hydraulic pumps, fluid conductors, connectors, and means of transmission.
- Perform work safely by promoting a safe work environment.
- Communicate technical information.

CENTRE OF COMPETENCE FOR AUTOMATION TECHNOLOGIES

KUDLU GATE, HOSUR ROAD, BENGALURU-560068.

INDUSTRIAL PNEUMATICS

2017-2018: 4th Sem. B. Tech Mechanical Engineering

Course Content

BASIC & ELECTRO PNEUMATICS

What is Pneumatics?

- What is Pneumatics?
- Important basic terms
- Characteristics of Industrial Pneumatics
- Comparison of Pneumatics Vs Electrical
- Applications of Pneumatics

Basic physical properties

- i. Pressure.
- ii. Pascal's Law.
- iii. Force transmission
- iv. Pressure transmission
- v. Displacement Transmission
- vi. Calculations
- vii. Flow rate and Flow Law.

- **Graphical Symbols and Pneumatic circuits.**
- **Generation of compressed air**
- **Processing of compressed air**
- **Maintenance unit**
- **Compressors**

Pneumatic Control valves

i. PCV

- ii. FCV
- iii. DCV

- **Introduction to Relay Based Control System**
- **Function of Relays**
- **SPDT contacts**
- **Signal storage logic**
- **AND and OR logic**

Hands-On-Training

Exercise 1 : Direct and indirect control of a single-acting cylinder, extending

Exercise 2 : Direct and indirect control of a double-acting cylinder with pushbutton

Exercise 3 : Signal storage by means of contactor contacts

Exercise 4: Controlling a double-acting cylinder, impulse valve, 2 push-buttons

Exercise 5 : Displacement dependent control of a double acting cylinder, impulse valve

Exercise 6 : Pressure-dependent control of 1 double-acting cylinder

Exercise 7 : Time-dependent control of 1 double-acting cylinder

Exercise 8 : Holding-element control of a double-acting cylinder with impulse valve, directly controlled

Exercise 9 : Displacement-dependent control of a double-acting cylinder, impulse valve, cylinder switch

Exercise 10 : Sequential control of 2 double-acting cylinders with impulse valves and signal overlapping

Exercise 11 : Sequential control of 2 double-acting cylinders with spring return valves and step sequence

Course Description: This course is an introduction to the basic pneumatic systems. Underlying scientific principles and their practical applications are covered. The laboratory reinforces the principles learned through hands-on experiments.

Course Objectives: Upon successful completion of Introduction to Pneumatic Systems, the student demonstrate proficiency in the following:

- Introductory concepts within pneumatic systems.
- Specific design, application, and maintenance functions of pneumatic systems.
- Air Water Filter, Compressor, Manifold, connectors, and means of transmission.

Program Outcomes: On completion of the Technical Certification – Pneumatics, students were able to:

- Demonstrate knowledge of introductory concepts within pneumatic systems.
- Identify specific design, application, and maintenance functions of pneumatic systems.
- Demonstrate knowledge of Air Water Filter, Compressor, Manifold, connectors, and means of transmission.
- Perform work safely by promoting a safe work environment.
- Communicate technical information.

CENTRE OF COMPETENCE FOR AUTOMATION TECHNOLOGIES

KUDLU GATE, HOSUR ROAD, BENGALURU-560068.

INDUSTRIAL HYDRAULICS

2018-2019: 3rd Sem. B. Tech Mechanical Engineering

Course Content

BASIC & ELECTRO HYDRAULICS

What is Hydraulics?

- Important basic terms
- Characteristics of Industrial Hydraulics
- Comparison of Hydraulics Vs. Electrical
- Electronics, Pneumatics and Mechanical
- Applications of Hydraulics

Basic physical properties

- i. Pressure.
- ii. Pascal's Law.
- iii. Force transmission
- iv. Pressure transmission
- v. Displacement Transmission
- vi. Calculations
- vii. Flow rate and Flow Law.

- **Graphical Symbols and Hydraulic circuits.**
- **Hydraulic Fluids**
- **Hydraulic pumps**
- **Hydraulic Cylinder and Motor**

Hydraulic Control valves

- i. PCV
- ii. FCV
- iii. DCV

- **Introduction to Relay Based Control System**

- **Function of Relays**
- **SPDT contacts**
- **Signal storage logic**
- **AND and OR logic**

Hands-On-Training

Exercise 1 : Extending a cylinder by operating a push button

Exercise 2 : Signal storage by electrical self-locking, setting and resetting using a momentary-contact switch

Exercise 3 Mechanical locking by means of momentary-contact switch contacts

Exercise 4 Electrical locking by means of contactor contacts

Exercise 5 : Signal storage by means of contactor contacts

Accumulator

Exercise 6 : accumulator applications

Exercise 7 : Pressure switches and proximity switches

Exercise 8 : Advance control with time-dependent intermediate stop

Course Description: This course is an introduction to the basic hydraulic systems. Underlying scientific principles and their practical applications are covered. The laboratory reinforces the principles learned through hands-on experiments.

Course Objectives: Upon successful completion of Introduction to Hydraulic Systems, the student demonstrate proficiency in the following:

- Introductory concepts within hydraulic systems.
- Specific design, application, and maintenance functions of hydraulic systems.
- Hydraulic pumps, fluid conductors, connectors, and means of transmission.

Course Outcomes: On completion of the Technical Certification – Hydraulics, students were able to:

- Demonstrate knowledge of introductory concepts within hydraulic systems.
- Identify specific design, application, and maintenance functions of hydraulic systems.
- Demonstrate knowledge of hydraulic pumps, fluid conductors, connectors, and means of transmission.
- Perform work safely by promoting a safe work environment.
- Communicate technical information.

CENTRE OF COMPETENCE FOR AUTOMATION TECHNOLOGIES

KUDLU GATE, HOSUR ROAD, BENGALURU-560068.

INDUSTRIAL PNEUMATICS

2018-2019: 4th Sem. B. Tech Mechanical Engineering

Course Content

BASIC & ELECTRO PNEUMATICS

What is Pneumatics?

- What is Pneumatics?
- Important basic terms
- Characteristics of Industrial Pneumatics
- Comparison of Pneumatics Vs Electrical
- Applications of Pneumatics

Basic physical properties

- i. Pressure.
- ii. Pascal's Law.
- iii. Force transmission
- iv. Pressure transmission
- v. Displacement Transmission
- vi. Calculations
- vii. Flow rate and Flow Law.

- **Graphical Symbols and Pneumatic circuits.**
- **Generation of compressed air**
- **Processing of compressed air**
- **Maintenance unit**
- **Compressors**

Pneumatic Control valves

i. PCV

- ii. FCV
- iii. DCV

- **Introduction to Relay Based Control System**
- **Function of Relays**
- **SPDT contacts**
- **Signal storage logic**
- **AND and OR logic**

Hands-On-Training

Exercise 1 : Direct and indirect control of a single-acting cylinder, extending

Exercise 2 : Direct and indirect control of a double-acting cylinder with pushbutton

Exercise 3 : Signal storage by means of contactor contacts

Exercise 4: Controlling a double-acting cylinder, impulse valve, 2 push-buttons

Exercise 5 : Displacement dependent control of a double acting cylinder, impulse valve

Exercise 6 : Pressure-dependent control of 1 double-acting cylinder

Exercise 7 : Time-dependent control of 1 double-acting cylinder

Exercise 8 : Holding-element control of a double-acting cylinder with impulse valve, directly controlled

Exercise 9 : Displacement-dependent control of a double-acting cylinder, impulse valve, cylinder switch

Exercise 10 : Sequential control of 2 double-acting cylinders with impulse valves and signal overlapping

Exercise 11 : Sequential control of 2 double-acting cylinders with spring return valves and step sequence

Course Description: This course is an introduction to the basic pneumatic systems. Underlying scientific principles and their practical applications are covered. The laboratory reinforces the principles learned through hands-on experiments.

Course Objectives: Upon successful completion of Introduction to Pneumatic Systems, the student demonstrate proficiency in the following:

- Introductory concepts within pneumatic systems.
- Specific design, application, and maintenance functions of pneumatic systems.
- Air Water Filter, Compressor, Manifold, connectors, and means of transmission.

Program Outcomes: On completion of the Technical Certification – Pneumatics, students were able to:

- Demonstrate knowledge of introductory concepts within pneumatic systems.
- Identify specific design, application, and maintenance functions of pneumatic systems.
- Demonstrate knowledge of Air Water Filter, Compressor, Manifold, connectors, and means of transmission.
- Perform work safely by promoting a safe work environment.
- Communicate technical information.

CENTRE OF COMPETENCE FOR AUTOMATION TECHNOLOGIES

KUDLU GATE, HOSUR ROAD, BENGALURU-560068.

INDUSTRIAL HYDRAULICS

2019-2020: 3rd Sem. B. Tech Mechanical Engineering

Course Content

BASIC & ELECTRO HYDRAULICS

What is Hydraulics?

- Important basic terms
- Characteristics of Industrial Hydraulics
- Comparison of Hydraulics Vs. Electrical
- Electronics, Pneumatics and Mechanical
- Applications of Hydraulics

Basic physical properties

- i. Pressure.
- ii. Pascal's Law.
- iii. Force transmission
- iv. Pressure transmission
- v. Displacement Transmission
- vi. Calculations
- vii. Flow rate and Flow Law.

- **Graphical Symbols and Hydraulic circuits.**
- **Hydraulic Fluids**
- **Hydraulic pumps**
- **Hydraulic Cylinder and Motor**

Hydraulic Control valves

- i. PCV
- ii. FCV
- iii. DCV

- **Introduction to Relay Based Control System**

- **Function of Relays**
- **SPDT contacts**
- **Signal storage logic**
- **AND and OR logic**

Hands-On-Training

Exercise 1 : Extending a cylinder by operating a push button

Exercise 2 : Signal storage by electrical self-locking, setting and resetting using a momentary-contact switch

Exercise 3 Mechanical locking by means of momentary-contact switch contacts

Exercise 4 Electrical locking by means of contactor contacts

Exercise 5 : Signal storage by means of contactor contacts

Accumulator

Exercise 6 : accumulator applications

Exercise 7 : Pressure switches and proximity switches

Exercise 8 : Advance control with time-dependent intermediate stop

Course Description: This course is an introduction to the basic hydraulic systems. Underlying scientific principles and their practical applications are covered. The laboratory reinforces the principles learned through hands-on experiments.

Course Objectives: Upon successful completion of Introduction to Hydraulic Systems, the student demonstrate proficiency in the following:

- Introductory concepts within hydraulic systems.
- Specific design, application, and maintenance functions of hydraulic systems.
- Hydraulic pumps, fluid conductors, connectors, and means of transmission.

Course Outcomes: On completion of the Technical Certification – Hydraulics, students were able to:

- Demonstrate knowledge of introductory concepts within hydraulic systems.
- Identify specific design, application, and maintenance functions of hydraulic systems.
- Demonstrate knowledge of hydraulic pumps, fluid conductors, connectors, and means of transmission.
- Perform work safely by promoting a safe work environment.
- Communicate technical information.

CENTRE OF COMPETENCE FOR AUTOMATION TECHNOLOGIES

KUDLU GATE, HOSUR ROAD, BENGALURU-560068.

INDUSTRIAL PNEUMATICS

2019-2020: 4th Sem. B. Tech Mechanical Engineering

Course Content

BASIC & ELECTRO PNEUMATICS

What is Pneumatics?

- What is Pneumatics?
- Important basic terms
- Characteristics of Industrial Pneumatics
- Comparison of Pneumatics Vs Electrical
- Applications of Pneumatics

Basic physical properties

- i. Pressure.
- ii. Pascal's Law.
- iii. Force transmission
- iv. Pressure transmission
- v. Displacement Transmission
- vi. Calculations
- vii. Flow rate and Flow Law.

- **Graphical Symbols and Pneumatic circuits.**
- **Generation of compressed air**
- **Processing of compressed air**
- **Maintenance unit**
- **Compressors**

Pneumatic Control valves

i. PCV

- ii. FCV
- iii. DCV

- **Introduction to Relay Based Control System**
- **Function of Relays**
- **SPDT contacts**
- **Signal storage logic**
- **AND and OR logic**

Hands-On-Training

Exercise 1 : Direct and indirect control of a single-acting cylinder, extending

Exercise 2 : Direct and indirect control of a double-acting cylinder with pushbutton

Exercise 3 : Signal storage by means of contactor contacts

Exercise 4: Controlling a double-acting cylinder, impulse valve, 2 push-buttons

Exercise 5 : Displacement dependent control of a double acting cylinder, impulse valve

Exercise 6 : Pressure-dependent control of 1 double-acting cylinder

Exercise 7 : Time-dependent control of 1 double-acting cylinder

Exercise 8 : Holding-element control of a double-acting cylinder with impulse valve, directly controlled

Exercise 9 : Displacement-dependent control of a double-acting cylinder, impulse valve, cylinder switch

Exercise 10 : Sequential control of 2 double-acting cylinders with impulse valves and signal overlapping

Exercise 11 : Sequential control of 2 double-acting cylinders with spring return valves and step sequence

Course Description: This course is an introduction to the basic pneumatic systems. Underlying scientific principles and their practical applications are covered. The laboratory reinforces the principles learned through hands-on experiments.

Course Objectives: Upon successful completion of Introduction to Pneumatic Systems, the student demonstrate proficiency in the following:

- Introductory concepts within pneumatic systems.
- Specific design, application, and maintenance functions of pneumatic systems.
- Air Water Filter, Compressor, Manifold, connectors, and means of transmission.

Program Outcomes: On completion of the Technical Certification – Pneumatics, students were able to:

- Demonstrate knowledge of introductory concepts within pneumatic systems.
- Identify specific design, application, and maintenance functions of pneumatic systems.
- Demonstrate knowledge of Air Water Filter, Compressor, Manifold, connectors, and means of transmission.
- Perform work safely by promoting a safe work environment.
- Communicate technical information.

CENTRE OF COMPETENCE FOR AUTOMATION TECHNOLOGIES

KUDLU GATE, HOSUR ROAD, BENGALURU-560068.

INDUSTRIAL HYDRAULICS

2020-2021: 3rd Sem. B. Tech Mechanical Engineering

Course Content

BASIC & ELECTRO HYDRAULICS

What is Hydraulics?

- Important basic terms
- Characteristics of Industrial Hydraulics
- Comparison of Hydraulics Vs. Electrical
- Electronics, Pneumatics and Mechanical
- Applications of Hydraulics

Basic physical properties

- i. Pressure.
- ii. Pascal's Law.
- iii. Force transmission
- iv. Pressure transmission
- v. Displacement Transmission
- vi. Calculations
- vii. Flow rate and Flow Law.

- **Graphical Symbols and Hydraulic circuits.**
- **Hydraulic Fluids**
- **Hydraulic pumps**
- **Hydraulic Cylinder and Motor**

Hydraulic Control valves

- i. PCV
- ii. FCV
- iii. DCV

- **Introduction to Relay Based Control System**

- **Function of Relays**
- **SPDT contacts**
- **Signal storage logic**
- **AND and OR logic**

Hands-On-Training

Exercise 1 : Extending a cylinder by operating a push button

Exercise 2 : Signal storage by electrical self-locking, setting and resetting using a momentary-contact switch

Exercise 3 Mechanical locking by means of momentary-contact switch contacts

Exercise 4 Electrical locking by means of contactor contacts

Exercise 5 : Signal storage by means of contactor contacts

Accumulator

Exercise 6 : accumulator applications

Exercise 7 : Pressure switches and proximity switches

Exercise 8 : Advance control with time-dependent intermediate stop

Course Description: This course is an introduction to the basic hydraulic systems. Underlying scientific principles and their practical applications are covered. The laboratory reinforces the principles learned through hands-on experiments.

Course Objectives: Upon successful completion of Introduction to Hydraulic Systems, the student demonstrate proficiency in the following:

- Introductory concepts within hydraulic systems.
- Specific design, application, and maintenance functions of hydraulic systems.
- Hydraulic pumps, fluid conductors, connectors, and means of transmission.

Course Outcomes: On completion of the Technical Certification – Hydraulics, students were able to:

- Demonstrate knowledge of introductory concepts within hydraulic systems.
- Identify specific design, application, and maintenance functions of hydraulic systems.
- Demonstrate knowledge of hydraulic pumps, fluid conductors, connectors, and means of transmission.
- Perform work safely by promoting a safe work environment.
- Communicate technical information.

CENTRE OF COMPETENCE FOR AUTOMATION TECHNOLOGIES

KUDLU GATE, HOSUR ROAD, BENGALURU-560068.

INDUSTRIAL PNEUMATICS

2020-2021: 4th Sem. B. Tech Mechanical Engineering

Course Content

BASIC & ELECTRO PNEUMATICS

What is Pneumatics?

- What is Pneumatics?
- Important basic terms
- Characteristics of Industrial Pneumatics
- Comparison of Pneumatics Vs Electrical
- Applications of Pneumatics

Basic physical properties

- i. Pressure.
- ii. Pascal's Law.
- iii. Force transmission
- iv. Pressure transmission
- v. Displacement Transmission
- vi. Calculations
- vii. Flow rate and Flow Law.

- **Graphical Symbols and Pneumatic circuits.**
- **Generation of compressed air**
- **Processing of compressed air**
- **Maintenance unit**
- **Compressors**

Pneumatic Control valves

i. PCV

- ii. FCV
- iii. DCV

- **Introduction to Relay Based Control System**
- **Function of Relays**
- **SPDT contacts**
- **Signal storage logic**
- **AND and OR logic**

Hands-On-Training

Exercise 1 : Direct and indirect control of a single-acting cylinder, extending

Exercise 2 : Direct and indirect control of a double-acting cylinder with pushbutton

Exercise 3 : Signal storage by means of contactor contacts

Exercise 4: Controlling a double-acting cylinder, impulse valve, 2 push-buttons

Exercise 5 : Displacement dependent control of a double acting cylinder, impulse valve

Exercise 6 : Pressure-dependent control of 1 double-acting cylinder

Exercise 7 : Time-dependent control of 1 double-acting cylinder

Exercise 8 : Holding-element control of a double-acting cylinder with impulse valve, directly controlled

Exercise 9 : Displacement-dependent control of a double-acting cylinder, impulse valve, cylinder switch

Exercise 10 : Sequential control of 2 double-acting cylinders with impulse valves and signal overlapping

Exercise 11 : Sequential control of 2 double-acting cylinders with spring return valves and step sequence

Course Description: This course is an introduction to the basic pneumatic systems. Underlying scientific principles and their practical applications are covered. The laboratory reinforces the principles learned through hands-on experiments.

Course Objectives: Upon successful completion of Introduction to Pneumatic Systems, the student demonstrate proficiency in the following:

- Introductory concepts within pneumatic systems.
- Specific design, application, and maintenance functions of pneumatic systems.
- Air Water Filter, Compressor, Manifold, connectors, and means of transmission.

Program Outcomes: On completion of the Technical Certification – Pneumatics, students were able to:

- Demonstrate knowledge of introductory concepts within pneumatic systems.
- Identify specific design, application, and maintenance functions of pneumatic systems.
- Demonstrate knowledge of Air Water Filter, Compressor, Manifold, connectors, and means of transmission.
- Perform work safely by promoting a safe work environment.
- Communicate technical information.

Chief Patrons
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Dr. Premachandra Sagar,
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Prof. R. Janardhan,
Pro - Vice Chancellor

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Registrar

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Dean, SOE

Dr. Valbhav A M,
Chairman - ECE

DSU NODAL COORDINATOR
Dr. Saara K,
Associate Professor, ECE

COORDINATOR
Mrs. Anna Merine George
Asst. Prof, ECE

Registration:

- Registration Link will be shared through mail.
- No registration fee.

For queries contact:
saara-ecce@dsu.edu.in; 9620461641;
annageorge-ecce@dsu.edu.in;
9902548065



Dayananda Sagar
University
Bengaluru



SCHOOL OF ENGINEERING

**ELECTRONICS &
COMMUNICATION ENGINEERING**
KUDLU GATE, HOSUR MAIN
ROAD, BENGALURU - 560114

5TH WORKSHOP ON VIRTUAL LABS

17th-31st January 2022
Time: 5:00-8:00 PM

**in collaboration
with
IIT Roorkee**



An MOE Govt of India Initiative

ABOUT VIRTUAL LAB

Virtual lab is an initiative of Ministry of Education under the National Mission on Education through ICT. It provides a complete learning management system where the students can avail the various tools for learning, including additional web sources, video lectures, animated demonstrations and self-evaluation. Virtual lab provides remote access to Labs in various disciplines of Science and Engineering.

The workshop aims to familiarize students with virtual lab platform for conducting physics, chemistry, Basic Electronics, Digital Electronics and Mechanical Workshop related experiments for first-year students.

**PRINCIPAL INSTITUTE
COORDINATOR**

PROF. R.S. ANAND,
Virtual Labs, EE Department,
IIT Roorkee
Resource Persons

MR. CHETAN DHIMAN
MR. AMIT SHARMA
MR. JASBIR SINGH
MR. RAJEEV KUMAR
Virtual Labs, EE Department, IIT Roorkee
Roorkee

Dr. Pushpa P V, ECE, DSU
Dr. V. Revathi, CSE, DSU
Mrs. Anna Merine George, ECE, DSU
Mr. Sripad Kulkarni, AE, DSU
Mr. Srinath R, AE, DSU
Mr. Karthik S. T, AE, DSU

School of Engineering,
Dayananda Sagar University,
Bengaluru



Virtual Lab Schedule

17th January-31st January 2022

17th January 2022
Virtual Labs for Electrical Engineering,
Anna Merine George, Asst Professor,
Dept of ECE, SOE, DSU
Time: 5:00-8:00 PM
Participants: All faculty & Students

18th January 2022
Time: 5:00-6:30 PM
Virtual Lab for Computer Science Engineering,
Dr. V. Revathi, Dept of CSE, SOE, DSU

Time: 6:30-8:00 PM

Virtual Lab for Aerospace Engineering
Mr. Srinath R & Karthik S.T, Dept of AE, SOE, DSU
Participants: All faculty & Students

19th January 2022
Demonstration of Virtual Lab Experiments
Mr. Chetan Dhiman , IIT Roorkee
Time: 5:00-8:00 PM
Participants First Year students

20th January 2022
Time: 5:00-6:30 PM
Virtual Lab for Electronics Engineers
Dr. Pushpa P V, Dept of ECE, SOE, DSU

Time: 6:30-8:00 PM

Virtual Lab for Aerospace Engineering
Mr. Sripad Kulkarni, Dept of AE, SOE, DSU

Participants: All faculty & Students

Chairman,
Dept. of Electronics and Communication Engineering
School of Engineering,
Dayananda Sagar University,
Kudlu Gate, Hosur Main Road,
Bengaluru - 560 088



Virtual Lab Schedule

17th January-31st January 2022

21st January 2022
Demonstration of Virtual Lab Experiments
Mr. Amit Sharma, IIT Roorkee
Time: 5:00-8:00 PM
Participants First Year students

24th January 2022
Demonstration of Virtual Lab Experiments
Mr. Chetan Dhiman, IIT Roorkee
Time: 5:00-8:00 PM
Participants First Year students

25th January 2022
Demonstration of Virtual Lab Experiments
Mr. Jasbir Singh, IIT Roorkee
Time: 5:00-8:00 PM
Participants First Year students

27th January 2022
Demonstration of Virtual Lab Experiments
Mr. Rajeev Kumar, IIT Roorkee
Time: 5:00-8 :00 PM
Participants First Year students

28th January 2022
Demonstration of Virtual Lab Experiments
Mr. Amit Sharma, IIT Roorkee
Time: 5:00-8:00 PM
Participants First Year students

31st January 2022
Demonstration of Virtual Lab Experiments
Mr. Rajeev Kumar, IIT Roorkee
Time: 5:00-8:00 PM
Participants First Year students

**CENTRE OF COMPETENCE FOR
AUTOMATION TECHNOLOGIES**

KUDLU GATE, HOSUR ROAD, BENGALURU-560068.

INDUSTRIAL HYDRAULICS

B. Tech Electronics & Communication Engineering

Course Description: This course is an introduction to the basic hydraulic systems. Underlying scientific principles and their practical applications are covered. The laboratory reinforces the principles learned through hands-on experiments.

Course Objectives: Upon successful completion of Introduction to Hydraulic Systems, the student demonstrate proficiency in the following:

- Introductory concepts within hydraulic systems.
- Specific design, application, and maintenance functions of hydraulic systems.
- Hydraulic pumps, fluid conductors, connectors, and means of transmission.

Course Outcomes: On completion of the Technical Certification – Hydraulics, students were able to:

- Demonstrate knowledge of introductory concepts within hydraulic systems.
- Identify specific design, application, and maintenance functions of hydraulic systems.
- Demonstrate knowledge of hydraulic pumps, fluid conductors, connectors, and means of transmission.
- Perform work safely by promoting a safe work environment.
- Communicate technical information



Chairman,
Dept. of Electronics and Communication Engineering,
School of Engineering,
Dayananda Sagar University,
Kudlu Gate, Hosur Main Road,
Bengaluru - 560 068

Course Content

BASIC & ELECTRO HYDRAULICS

What is Hydraulics?

- Important basic terms
- Characteristics of Industrial Hydraulics
- Comparison of Hydraulics Vs. Electrical
- Electronics, Pneumatics and Mechanical
- Applications of Hydraulics

Basic physical properties

- i. Pressure.
- ii. Pascal's Law.
- iii. Force transmission
- iv. Pressure transmission
- v. Displacement Transmission
- vi. Calculations
- vii. Flow rate and Flow Law.

- **Graphical Symbols and Hydraulic circuits.**
- **Hydraulic Fluids**
- **Hydraulic pumps**
- **Hydraulic Cylinder and Motor**

Hydraulic Control valves

- i. PCV
- ii. FCV
- iii. DCV

- **Introduction to Relay Based Control System**
- **Function of Relays**
- **SPDT contacts**
- **Signal storage logic**
- **AND and OR logic**

Hands-On-Training

Exercise 1 : Extending a cylinder by operating a push button

Exercise 2 : Signal storage by electrical self-locking, setting and resetting

using a momentary-contact switch

Exercise 3 Mechanical locking by means of momentary-contact switch contacts

Exercise 4 Electrical locking by means of contactor contacts

Exercise 5 : Signal storage by means of contactor contacts

Accumulator

Exercise 6 : accumulator applications

Exercise 7 : Pressure switches and proximity switches

Exercise 8 : Advance control with time-dependent intermediate stop

INDUSTRIAL PNEUMATICS

B. Tech Electronics & Communication Engineering

Course Description: This course is an introduction to the basic pneumatic systems. Underlying scientific principles and their practical applications are covered. The laboratory reinforces the principles learned through hands-on experiments.

Course Objectives: Upon successful completion of Introduction to Pneumatic Systems, the student demonstrate proficiency in the following:

- Introductory concepts within pneumatic systems.
- Specific design, application, and maintenance functions of pneumatic systems.
- Air Water Filter, Compressor, Manifold, connectors, and means of transmission.

Course Outcomes: On completion of the Technical Certification – Pneumatics, students were able to:

- Demonstrate knowledge of introductory concepts within pneumatic systems.
- Identify specific design, application, and maintenance functions of pneumatic systems.
- Demonstrate knowledge of Air Water Filter, Compressor, Manifold, connectors, and means of transmission.
- Perform work safely by promoting a safe work environment.
- Communicate technical information.

Course Content

BASIC & ELECTRO PNEUMATICS

What is Pneumatics?

- What is Pneumatics?
- Important basic terms
- Characteristics of Industrial Pneumatics
- Comparison of Pneumatics Vs Electrical
- Applications of Pneumatics

Basic physical properties

- i. Pressure.
- ii. Pascal's Law.
- iii. Force transmission
- iv. Pressure transmission
- v. Displacement Transmission
- vi. Calculations
- vii. Flow rate and Flow Law.

- **Graphical Symbols and Pneumatic circuits.**
- **Generation of compressed air**
- **Processing of compressed air**
- **Maintenance unit**
- **Compressors**

Pneumatic Control valves

- i. PCV**
- ii. FCV**
- iii. DCV**

- **Introduction to Relay Based Control System**
- **Function of Relays**
- **SPDT contacts**
- **Signal storage logic**
- **AND and OR logic**

Hands-On-Training

Exercise 1 : Direct and indirect control of a single-acting cylinder, extending

Exercise 2 : Direct and indirect control of a double-acting cylinder with pushbutton

Exercise 3 : Signal storage by means of contactor contacts

Exercise 4: Controlling a double-acting cylinder, impulse valve, 2 push-buttons

Exercise 5 : Displacement dependent control of a double acting cylinder, impulse valve

Exercise 6 : Pressure-dependent control of 1 double-acting cylinder

Exercise 7 : Time-dependent control of 1 double-acting cylinder

Exercise 8 : Holding-element control of a double-acting cylinder with impulse valve, directly controlled

Exercise 9 : Displacement-dependent control of a double-acting cylinder, impulse valve, cylinder switch

Exercise 10 : Sequential control of 2 double-acting cylinders with impulse

valves and signal overlapping

Exercise 11 : Sequential control of 2 double-acting cylinders with spring return valves and step sequence

PROGRAMMABLE LOGIC CONTROLLER

B. Tech Electronics & Communication Engineering

Course Objectives:

1. The Participants were able to design, assemble and test basic PLC based control circuits, using commonly available PLC's and SCADA Function blocks.
2. The Participants were able to design Circuits using Sensors on control boards, also were able to interpret the data using the Sensors with different materials.

Course Outcomes:

1. The Participants were able to know the role of Electro Pneumatics, Sensors and PLC's in automation technology.
2. The Participants were able to know the Innovative development and current trends in automation products and their applications.

Course Content

PROGRAMMABLE LOGIC CONTROLLER

- What is PLC?
- Basic concepts of PLC
- Working of PLC & General Applications
- Indracontrol PLC's – Technical Details
- Hardware Details of L10/L20
- Documentation provided in CD
- Related Software's for PLC
- Detailed presentation on Inline Products
- Technical & Hardware details on :
 - Digital I/O's
 - Analog I/O's
 - Bus-couplers
 - Function Modules

- Indraworks Software Installation
- Indraworks Software features explanation in detail.
- Indralogic standard settings
- Project development in Indraworks
- Hardware Configuration

Hands-On-Training

- Project Development in Indralogic
- Logic Development
- Ladder Diagram
 - Addressing of Digital I/O's
 - Creating Parallel Paths (Network)
 - Programming Language Selection/Conversion
- Logic Development
 - Variable Declaration (Local/Global)
 - Declaration in Tabular Format
 - Function Blocks (Timers, Counters etc.)
 - Exercises
- Logic Development
 - Segregation of programs based on functionality or application
 - Mathematical Functions (Add, Sub, Div etc.)
 - Exercises
- Logic Development
 - Data type Conversion Operators
 - Inserting Blocks or inputs
 - Exercises

PLC Basic

- Logic Development
 - Addressing Analog I/O's
 - Working with Analog I/O's
 - Configuring Analog I/O's
 - Exercises
- PLC Configuration
- Task Configuration
- Watch & Recipe Manager
- Target Settings
- Project/Data Backup
 - Export/Import
 - Source Code Download
 - Archive/Restore

- Exercises
- Project Development in Indralogic
- Logic Development
 - Ladder Diagram
 - Addressing of Digital I/O's
 - Creating Parallel Paths (Network)
 - Programming Language Selection/Conversion
- Logic Development
 - Variable Declaration (Local/Global)
 - Declaration in Tabular Format
 - Function Blocks (Timers, Counters etc.)
 - Exercises
- Logic Development
 - Segregation of programs based on functionality or Application
 - Mathematical Functions (Add, Sub, Div. etc.)
 - Exercises
- Logic Development
 - Data type Conversion Operators
 - Inserting Blocks or inputs
 - Exercises
- Logic Development
 - Addressing Analog I/O's
 - Working with Analog I/O's
 - Configuring Analog I/O's
 - Exercises
- PLC Configuration
- Task Configuration
- Watch & Recipe Manager
- Target Settings
- Project/DataBackup
 - Export/Import
 - Source Code Download
 - Archive/Restore
- Exercises
- Universal Simulator Projects interfaced with PLC



Dayananda Sagar University

School of Engineering, Kudlu Gate,
Hosur Main Road,
Bengaluru - 560068

Department of Electronics and Communication Engineering

Industrial Automation Lab

Schedule

Day	Time	Schedule
1	9:00 to 12.30	Introduction of Automation
1	1:30 to 4:30 PM	Hydrauluaics Pneumatics Introduction
2	9:00 to 12.30	Hands on Hydraulics lab
2	1:30 to 4:30 PM	Hands on Hydraulics lab
3	9:00 to 12.30	Hands on Pneumatics lab
3	1:30 to 4:30 PM	Hands on Pneumatics lab
4	9:00 to 12.30	Introduction to PLC
4	1:30 to 4:30 PM	Hands on PLC

Chairman,

Dept. of Electronics and Communication Engineering
School of Engineering,
Dayananda Sagar University,
Kudlu Gate, Hosur Main Road,
Bengaluru - 560 068

Chief Patrons

Dr. D. Hemachandra Sagar,
Chancellor

Dr. Premachandra Sagar, Pro-
Chancellor

Patrons

Shri. Galiswamy, Secretary, DSI

Dr. A.N.N Murthy, Vice -

Chancellor

Prof. R. Janardhan, Pro - Vice

Chancellor

Dr. Puttamadappa, Registrar

Conveners

Dr. A Srinivas, Dean, SOE

Dr. Vaibhav A M, Chairman - ECE

Participants will get a chance to do various real time IoT applications using various hardware available. Hardwares like ESP 8266 modules and various sensors.

Peer to Peer learning Day - Learn from your other fellow participants about the projects they are working on and vice versa.

Program Benefits:

- Emulate real time IoT application sequence
- Work on safety and automation tasks in daily life
- Conceptualize and develop products using IoT
- Develop confidence of presenting their project/Product
- Implement concepts of UI, data handling and control instructions

Overview

Understand IoT landscape and all emerging areas to develop projects related to smart city

Understand and build IoT applications

Implement concepts of UI, data handling and control instructions

Topics

Day 1: Hardware Interfacing and Offline Coding

Understanding the PIN diagram of ESP and its libraries

Configuring an ESP with sensors

Coding using Arduino IDE

Data Acquisition and Transfer using Blynk

Day 2: Integrating Hardware and Cloud Platform

Learn the working of IFTTT (eg Google Assistant)

Interface ESP with Ubidots(IOT Cloud)

Learn about MIT APP Inventor

MIT App Inventor Interface with Real time Data

IoT Protocols

Day 3: Hands-on Project Presentation

Workshop

on

INTERNET OF THINGS (IOT)

5th, 6th & 7th February 2019

Resource Persons:

Mr. Abhinav Karan

Mr. Chandrakant Singh

ORGANIZED BY

SCHOOL OF ENGINEERING
Department of Electronics and Communication Engineering
School of Engineering
Dayananda Sagar University
Kudlu Gate, Hosur Road,
Bengaluru - 560068



Dayananda Sagar
University Bengaluru



Internet of Things (IOT)

Schedule

Day	Time	Topics covered
1	8:00 am to 10:00 AM	Introduction to IoT
	10:00AM to 10:15 AM	Short Break
	10:15 to 1:00 PM	Hardware Interfacing and offline coding
	1:00 PM to 2:00 PM	Lunch Break
	2:00 PM to 3:30 PM	Understanding the PINdiagram of ESP and itslibraries
	3:30 to 3:45 PM	Short Break
	3:45 Pm to 6:00 PM	Configuring an ESP withsensors
2	8:00 am to 10:00 AM	Coding using Arduino IDE
	10:00AM to 10:15 AM	Short Break
	10:15 to 1:00 PM	Data Acquisition andTransfer using Blynk
	1:00 PM to 2:00 PM	Lunch Break
	2:00 PM to 3:30 PM	Introduction to Integrating Hardwareand Cloud Platform Learn the working of IFTTT(eg Google Assistant)
	3:30 to 3:45 PM	Short Break
	3:45 Pm to 6:00 PM	Interface ESP withUbidots(IOT Cloud)
3	8:00 am to 10:00 AM	Learn about MIT APPInventor MIT App Inventor Interfacewith Real time Database usingIoT Protocols
	10:00AM to 10:15 AM	Short Break
	10:15 to 1:00 PM	Hands-on Lab and Project Presentation
	1:00 PM to 2:00 PM	Lunch Break
	2:00 PM to 3:30 PM	Hands-on Lab and Project Presentation
	3:30 to 3:45 PM	Short Break
	3:45 Pm to 6:00 PM	Hands-on Lab and Project Presentation


Chairman,
 Dept. of Electronics and Communication Engineering
 School of Engineering,
 Dayananda Sagar University,
 Kudlu Gate, Hosur Main Road,
 Bengaluru - 560 068



Dayananda Sagar University

School of Engineering, Kudlu Gate,
Hosur Main Road,
Bengaluru - 560068

Department of Electronics and Communication Engineering

Course outcomes

1. Able to understand the basic framework of an IoT echo system
2. Able to understand and utilize various opensource IoT platforms for IoT based application development.
3. Able to Conceptualize and Develop products using IoT

Chief Patrons

Dr. D. Hemachandra Sagar,
Chancellor

Dr. Premachandra Sagar, Pro-
Chancellor

Patrons

Shri. Galiswamy, Secretary, DSI

Dr. A.N.N Murthy, Vice -

Chancellor

Prof. R. Janardhan, Pro - Vice

Chancellor

Dr.  Ramadappa, Registrar
Conveners

Dr. A Srinivas, Dean, SOE

Dr. H.L Vishwanth, Chairman -
ICE

Participants will get a chance to do various real time IoT applications using various hardware available. Hardware like ESP 8266 modules and various sensors.

Peer to Peer learning Day - Learn from our other fellow participants about the projects they are working on and vice versa.

Program Benefits:

Emulate real time IoT application sequence

Work on safety and automation tasks in daily life

Conceptualize and develop products using IoT

Develop confidence of presenting their project/Product

Implement concepts of UI, data handling and control instructions

Overview

Understand IoT landscape and all emerging areas to develop projects related to smart city

Understand and build IoT applications

Implement concepts of UI, data handling and control instructions

Topics

Day 1: Hardware Interfacing and Offline Coding

Understanding the PIN diagram of ESP and its libraries

Configuring an ESP with sensors

Coding using Arduino IDE

Data Acquisition and Transfer using Blynk

Day 2: Integrating Hardware and Cloud Platform

Learn the working of IFTTT (eg Google Assistant)

Interface ESP with Ubidots(IOT Cloud)

Learn about MIT APP Inventor

MIT App Inventor Interface with Real time Database using IoT Protocols

Day 3: Hands-on Lab and Project Presentation

Workshop

on

INTERNET OF THINGS (IOT)

9th, 10th & 12th March 2018

Resource Persons:

Mr. Abhinav Karan

Mr. Chandrakant Singh

ORGANIZED BY
SCHOOL OF ENGINEERING

ELECTRONICS & COMMUNICATION
ENGINEERING
KUDLU GATE, HOSUR MAIN ROAD,
BENGALURU - 560068



Dayananda Sagar
University Bengaluru

Chairman,

Dept. of Electronics and Communication Engineering

School of Engineering,

Dayananda Sagar University,

Kudlu Gate, Hosur Main Road,

Bengaluru - 560 068

Internet of Things (IOT)

Schedule

Day	Time	Topics covered
1	8:00 am to 10:00 AM	Introduction to IoT
	10:00AM to 10:15 AM	Short Break
	10:15 to 1:00 PM	Hardware Interfacing and offline coding
	1:00 PM to 2:00 PM	Lunch Break
	2:00 PM to 3:30 PM	Understanding the PINdiagram of ESP and itslibraries
	3:30 to 3:45 PM	Short Break
	3:45 Pm to 6:00 PM	Configuring an ESP withsensors
2	8:00 am to 10:00 AM	Coding using Arduino IDE
	10:00AM to 10:15 AM	Short Break
	10:15 to 1:00 PM	Data Acquisition andTransfer using Blynk
	1:00 PM to 2:00 PM	Lunch Break
	2:00 PM to 3:30 PM	Introduction to Integrating Hardwareand Cloud Platform Learn the working of IFTTT(eg Google Assistant)
	3:30 to 3:45 PM	Short Break
	3:45 Pm to 6:00 PM	Interface ESP withUbidots(IOT Cloud)
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	10:15 to 1:00 PM	Hands-on Lab and Project Presentation
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	3:30 to 3:45 PM	Short Break
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Chairman,

Dept. of Electronics and Communication Engineering
 School of Engineering,
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 Bengaluru - 560 068



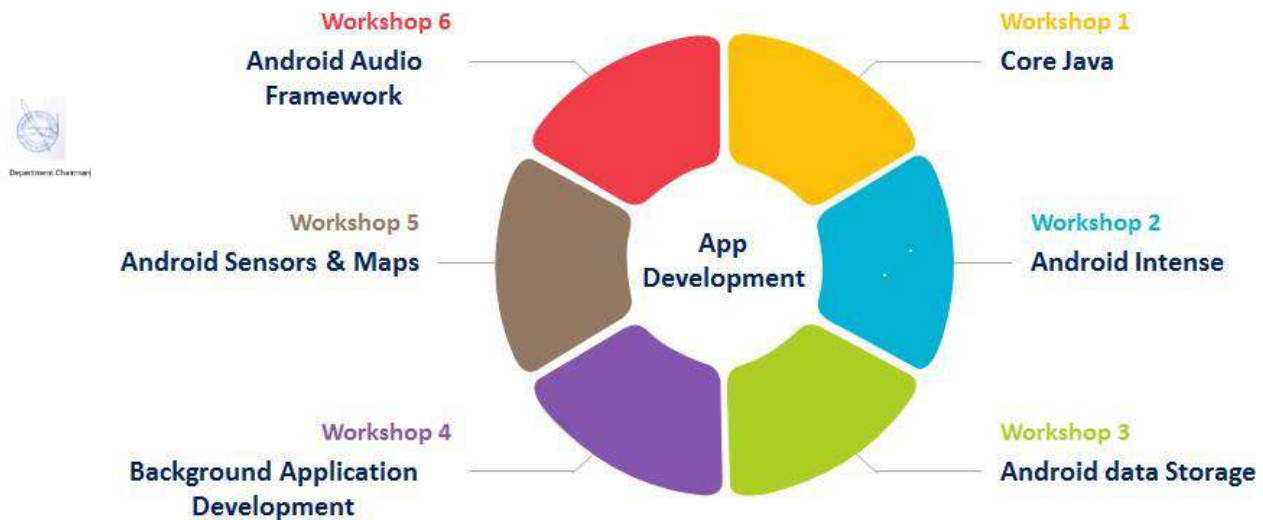
ANDROID APPLICATION DEVELOPMENT



Masterclass Series
50 Hours Workshop On
Mobile Android App Development & App Design Contest

DAYANANDA SAGAR UNIVERSITY

Department of Computer Science & Technology



Workshop	Topic
Workshop #1	Core Java Skill and Introduction to Android Application Development.
Workshop #2	Hands of Interactive Session on Core Android Components Intents and Data Storage.
Workshop #3	Hands of Interactive Session with Asynchronous Programming and Core Android Component Broadcast Receiver.
Workshop #4	Hands on Session working with Background Application Development and Notifications.
Workshop #5	Advanced Concepts of Android Location, Sensors, Maps and Audio Framework.
Workshop #6	Hands on Session on Mini Android App Development to Communicate with Web Services and Demonstration of Some Mini Projects.

Venue – CT Lab, B Block, DSU

Student Coordinators: Shoumya (6205017536)
Mukund (7019745356)

Faculty Coordinator: Dr.Pramod T C
(8123432938)



Dayanand Sagara University

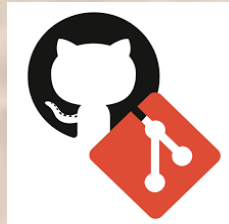
Department of Computer Science & Technology



**Cordially invites you to the
Value added course
On
“Git & GitHub 101”
For 5th & 7th Sem CST students
Date: 21st to 24th July 2022
Mode of conduction: Online**

COURSE OBJECTIVES

- How to keep track of the different versions of your code and configuration files using a popular version control system (VCS) called Git.
- How to setup an account with GitHub and how can you create your own remote repositories to store code and configuration



COURSE OUTCOMES

- Students will be able to maintain their code's history in Git and collaborate with others in GitHub.
- Students would be able to have their github credentials as a value add.

****The top 3 projects will be suitably rewarded after the mini hackathon****

Faculty Cordinators

Prof Baskar Venugopalan

Prof Swetha Patil

Student Cordinators

Amitash, Rahul

Conveners

1. Dr A Srinivas

(Dean DSU SOE)

2. Dr M Shahina Parveen

(Chairperson,CST)



Google Android Application Development

Course Duration: 50 Hours

6 days with 8-9 Hours/Day

Android is the first truly open and comprehensive platform for mobile devices, all of the software to run a mobile phone but without the proprietary obstacles that have hindered mobile innovation. This course is designed for Java programmers who want to kick start their careers in mobile application development

Course Content:

Day 1

Short Introduction to Core Java Fundamentals

- Setting up Java Development Environment
- OOPS Concepts
- Setters and Getters
- Classes and Interfaces
- Constructors
- Method Overloading

Setup of Android Development Environment

- System requirements
- Eclipse and SDK installation, AVD creation
- Creating first Android application
- Project Structure



Android Application Fundamentals

- Dalvik Virtual Machine
- Introduction to Basic Building Blocks of Android
- Life Cycle of an Android Application

User Interface

- Layout Fundamentals
- Layout Manager Introductions
- Linear Layout
- Relative Layout
- Constraint Layout.

Activity

- Life Cycle of an Activity
- Data Binding Libraries
- Interaction with Other Apps
- Working with Fragments



Day 2

Intents

- Intent Filters
- Intent Categories
- Registering Our Custom Phone Dialler.
- Bundles and Parcelables
- Passing Data Via Intents

Data Storage

- Preferences
- Storing Files on SD card
- SQLite Databases
- Content Providers
- Building a Content Provider
- Accessing Phone Contacts Provider



Day 3

Menu and Dialog:

- Building Menus
- Options Menu
- Context Menu
- Creating Alert Dialogs
- Creating Input Dialogs

Broadcast Receivers

- Types of Broadcasts
- Creating and Registering Broadcast Receivers
- Sending Broadcast Messages

Asynchronous Components

- Async Tasks
- Threads and Handler
- The Timer Class



Day 4

Working with Notifications

- Creating Notifications
- Managing Notifications

Services

- Services Introduction
- Types of Services
- Local Service
- Binder Service
- Remote Service
- Intent Service
- Overview of Android Interface Definition Language (AIDL)
- Defining the interface
- Implementing an interface
- Exposing the interface
- Invoking IPC methods



Day 5

Building Location Based Applications

- Working with Locations
- Location Manager
- Working with GoogleMaps

Working with Adaptors

- Recycler Views
- Array adaptors
- Creating Custom Adaptors

Android Media API

- Playing audio/video
- Media recording



Day 6

Advanced Android Topics

- Server Communication using HTTP
- GET and POST
- A Small Exercise on Communicating with Web Service

Working with Sensors

- Vibrating a Phone.
- Working with Accelerometer.

Android Application Signing

- Signing Android Applications
- Run Time Permission Declaration & Enforcement

Demonstration of Bluetooth Application

- Bluetooth Stack Introduction
- Demonstration of Bluetooth Application

Demonstration of Developing Server Backend

- Developing Server Application
- Hosting the Application in Apache Tomcat

Workshops

ANDROID APPLICATION DEVELOPMENT

Masterclass Series

50 Hours Workshop On

Mobile Android App Development & App Design Contest

DAYANANDA SAGAR UNIVERSITY

Department of Computer Science & Technology

Topics
Day 1 - Core Java Skill and Introduction to Android Application Development.
Day 2 - Hands of Interactive Session on Core Android Components Intents and Data Storage.
Day 3 - Hands of Interactive Session with <u>Asynchronous</u> Programming and Core Android Component Broadcast Receiver.
Day 4 - Hands on Session working with Background Application Development and Notifications.
Day 5 - Advanced Concepts of Android Location, Sensors, Maps and Audio Framework.
Day 6 - Hands on Session on Mini Android App Development to Communicate with Web Services and Demonstration of Some Mini Projects.

Venue - CT Lab, B Block, DSU



DAYANANDA SAGAR UNIVERSITY
College of Pharmaceutical Sciences
Kumaraswamy layout, Bengaluru -78

01/06/2021

STUDENT CIRCULAR

This is to inform all the students pursuing B.Pharm/
M.Pharm/ Pharm.D are required to register their names
for the value added program in the following subjects for
the academic year 2020-21.

1. Pharmaceutics - Drug Targeting Strategies
2. Pharmaceutical Chemistry - Green Chemistry
3. Pharmacognosy - Plant Tissue Culture
4. Pharmacology - Pre-clinical Research in Neuropharmacology
5. Pharmacy Practice - Medical Writing

Kalpana
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College of Pharmaceutical Sciences
Dayananda Sagar University
Kumaraswamy Layout,
Bengaluru - 560 078.



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University

College of Pharmaceutical Sciences

Certificate Program 01

Green Chemistry - Approaches & Applications

Objective of the course: .

The course has been developed with the following objective for the students to understand:

1. The concept of Green chemistry.
2. Various approaches towards green chemistry along with their advantages and disadvantages.
3. Knowledge of its experimental design.

Course outcomes:

1. The value-added course on green chemistry will help individuals to develop their own skills in their chosen field of study.
2. Learning Green chemistry will equip the student with knowledge to design chemical processes that reduces or eliminates use of Hazardous substances in industrial scale.
3. To Learn alternative technologies that have industrial applications and at the same time are safer for human health and protect natural environment.

Course & Syllabus

(30 hours)

Module – 1 : Introduction to Green Chemistry:

4 hours

- Basic principles Needs
- Advantages & disadvantages of green chem

Module – 2: Approaches to Green Chemistry:

10 hours

- Green reagents, Green catalysis,
- Microwave assisted synthesis,
- Ultrasound assisted synthesis,
- Biocatalysts, solid state synthesis.

Module-3: Techniques and advances of Green chemistry:

10 hours

- Microwave
- Ultrasound
- Biocatalyst
- Solid state synthesis
- Water as solvent

Module-4 : Assignments on experimental design & industrial applications 9 hours

- Microwave assisted synthesis of medicinal compounds such as paracetamol, Aspirin, Chalcones, Benzimidazole etc.

References:

1. New trends in Green Chemistry, V.K.Ahluwalia, M. Kidwai., Anamaya Publishers, New Delhi.
2. Green Chemistry – Fundamentals and applications, Suresh.C.Ameta, Rakshit Ameta, Apple Academic Press.
3. A introductory text on green chemistry for undergraduate students, Indu Tucker Sidhwani, Rakesh K Sharma, Wiley.



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Certificate Program 02
Drug Targeting Strategies

Objective of the Course:

- To impart knowledge on the fundamentals and concept of drug targeting
- To provide knowledge on various targeting techniques
- To understand the need of drug targeting
- To apply the knowledge of drug targeting approaches in the pharmaceutical industry

Course outcome:

- Understand the fundamentals of drug targeting
- Learn various drug targeting approaches
- Know the advances in drug targeting

Course & Syllabus

(30 hours)

Module – 1: Drug targeting- Introduction and concept
Introduction, definition, advantages, disadvantages, rationale of drug targeting, classification- passive targeting, inverse targeting, active targeting- ligand mediated targeting and physical targeting, dual targeting. Basics of receptors and ligands.

7 hours

Module – 2 : Nanocarriers for drug targeting
Introduction, ideal characteristics of carriers. Preparation, evaluation and application of polymeric nanoparticles and liposomes. Basics of monoclonal antibodies.

8 hours

Module – 3 : Biodistribution and pharmacokinetics of nanocarriers
Absorption kinetics and bioavailability, kinetics of pharmacologic response, relationship between volume of distribution, drug binding and elimination. Guidelines for human pharmacokinetics studies.

7 hours

Module – 4 : Brain targeting
Invasive strategies- hyperosmolar blood-brain barrier disruption, intracerebral injection, intracerebral implants.
Non-invasive strategies- use of endogenous transporters, prodrugs and chemical drug delivery systems, nanoparticles, liposomes, vector mediated drug delivery

8 hours

References:

1. Y W. Chien, Novel Drug Delivery Systems, 2nd edition, revised and expanded, Marcel Dekker, Inc., New York, 1992.
2. S.P.Vyas and R.K.Khar, Controlled Drug Delivery - Concepts and Advances, Vallabh Prakashan, New Delhi, First edition 2002.
3. N.K. Jain, Controlled and Novel Drug Delivery, CBS Publishers & Distributors, New Delhi, First edition 1997 (Reprint in 2001).



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Certificate Program 03
Pre-Clinical Research in Neuropharmacology

Objective of the Course:

1. To provide knowledge and understanding of various screening models. Used for the study of CNS disorders.
2. To appreciate the need for further research in the area of neuropharmacology.
3. To apply the knowledge of pre-clinical research in neuropharmacology in the pharmaceutical industry.

Course Outcomes:

1. Discuss the fundamentals of central nervous system pharmacology.
2. To understand the preclinical screening with reference to neurodegenerative disorders.
3. To know the recent drugs and available advanced therapy for CNS disorders.
4. Be able to communicate the scientific information as a report.

Course & Syllabus	30 hours
Module – 1 :	8 hours
Fundamentals: Introduction to CNS pharmacology, neurotransmission in the CNS, neurodegeneration- mechanism and factors affecting, related neurodegenerative disorders.	
Module – 2 :	10 hours
Screening models for common neurodegenerative disorders like Alzheimer's disease, Parkinson's disease, multiple sclerosis, schizophrenia and drug induced neurodegeneration.	
Module – 3 :	6 hours
Recent advances in the screening and treatment of important neurodegenerative disorders like Alzheimer's disease, Parkinson's disease, multiple sclerosis etc.	
Module – 4 :	6 hours
Industrial applications of pre-clinical study in neuropharmacology.	

References:

1. Vogel hg, editor. Drug discovery and evaluation: pharmacological assays. Springer science & business media; 2002 jun 13.
2. Brunton ll, hilal-dandan r, knollmann bc, editors. Goodman & gilman's the pharmacological basis of therapeutics. New york: mcgraw-hill education; 2018.
3. Mattson mp, duan w, pedersen wa, culmsee c. Neurodegenerative disorders and ischemic brain diseases. Apoptosis. 2001; 6(1):69-81.



Dayananda Sagar
University

College of Pharmaceutical Sciences

Certificate Program 04

Plant Tissue Culture

Objective of the Course:

1. To introduce biotechnological methods in plants.
2. To widen the knowledge related to modern plant biotechnology process
3. To make understand the biotechnological process & their applicative value in agriculture pharmaceutical and food industry.

Course Outcomes:

1. Upon completion of the course the student will be able to recall the basic concepts of biotechnology and process of plant tissue culture.
2. Report measures for conservation of biodiversity
3. Apply learned techniques in a new or similar situation
4. Design and experiment with step-by-step instruction to address the research problems.

Course & Syllabus

30 hours

Module I: Fundamentals of plant tissue culture:

8 hours

- Introduction of lab design and sterilisation techniques.
- Types of culture media and their application.
- Concept of plant tissue culture, initiation of plant tissue culture.

Module II: Different methods of Tissue culture

10 hours

- Organogenesis and Embryogenesis.
- Synthetic seeds, Protoplast fusion.
- Micro propagation of medicinal and aromatic plants
- Gene transfer in plants and their applications.

Module III: Applications of Tissue culture

7 hours

- Secondary metabolites with emphasis on production of medicinal agents.
- Germplasm Conservation.
- Bioreactors and fermentation.

Module IV: Assignments on Transgenic plants

5 hours

- Plant biotechnology industries in Karnataka.
- Hardening and Acclimatization in green house.
- Biotechnology: Some thought provoking newer ideas.

REFERENCES

1. Pharmaceutical Biotechnology by SP. Vyas and VK. Dixit, CBS Publishers.
2. Elements in Biotechnology by PK. Gupta, Rastogi Publications, New Delhi.
3. Pharmacognosy and Pharmacobiotechnology by Ashutosh Kar, New Age International limited, Publishers.
4. Pharmacognosy by G. E. Trease and WC. Evans, 16th Edition, Elsevier.



DAYANANDA SAGAR UNIVERSITY
College of Pharmaceutical Sciences
Kumaraswamy layout, Bengaluru -78

25/04/2022

STUDENT CIRCULAR

This is to inform all the students pursuing B.Pharm/
M.Pharm/ Pharm.D are required to register their names
for the value added program in the following subjects for
the academic year 2021-22.

1. Pharmaceutics - Drug Targeting Strategies
2. Pharmaceutical Chemistry - Green Chemistry
3. Pharmacognosy - Plant Tissue Culture
4. Pharmacology - Pre-clinical Research in Neuropharmacology
5. Pharmacy Practice - Medical Writing


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Dayananda Sagar University
Kumaraswamy Layout,
Bengaluru, 560 078.



Dayananda Sagar
University

College of Pharmaceutical Sciences

Certificate Program 01

Green Chemistry - Approaches & Applications

Objective of the course: .

The course has been developed with the following objective for the students to understand:

1. The concept of Green chemistry.
2. Various approaches towards green chemistry along with their advantages and disadvantages.
3. Knowledge of its experimental design.

Course outcomes:

1. The value-added course on green chemistry will help individuals to develop their own skills in their chosen field of study.
2. Learning Green chemistry will equip the student with knowledge to design chemical processes that reduces or eliminates use of Hazardous substances in industrial scale.
3. To Learn alternative technologies that have industrial applications and at the same time are safer for human health and protect natural environment.

Course & Syllabus

(30 hours)

Module – 1 : Introduction to Green Chemistry:

4 hours

- Basic principles Needs
- Advantages & disadvantages of green chem

Module – 2: Approaches to Green Chemistry:

10 hours

- Green reagents, Green catalysis,
- Microwave assisted synthesis,
- Ultrasound assisted synthesis,
- Biocatalysts, solid state synthesis.

Module-3: Techniques and advances of Green chemistry:

10 hours

- Microwave
- Ultrasound
- Biocatalyst
- Solid state synthesis
- Water as solvent

Module-4 : Assignments on experimental design & industrial applications 9 hours

- Microwave assisted synthesis of medicinal compounds such as paracetamol, Aspirin, Chalcones, Benzimidazole etc.

References:

1. New trends in Green Chemistry, V.K.Ahluwalia, M. Kidwai., Anamaya Publishers, New Delhi.
2. Green Chemistry – Fundamentals and applications, Suresh.C.Ameta, Rakshit Ameta, Apple Academic Press.
3. A introductory text on green chemistry for undergraduate students, Indu Tucker Sidhwani, Rakesh K Sharma, Wiley.



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Certificate Program 02
Drug Targeting Strategies

Objective of the Course:

- To impart knowledge on the fundamentals and concept of drug targeting
- To provide knowledge on various targeting techniques
- To understand the need of drug targeting
- To apply the knowledge of drug targeting approaches in the pharmaceutical industry

Course outcome:

- Understand the fundamentals of drug targeting
- Learn various drug targeting approaches
- Know the advances in drug targeting

Course & Syllabus

(30 hours)

Module – 1: Drug targeting- Introduction and concept
Introduction, definition, advantages, disadvantages, rationale of drug targeting, classification- passive targeting, inverse targeting, active targeting- ligand mediated targeting and physical targeting, dual targeting. Basics of receptors and ligands.

7 hours

Module – 2 : Nanocarriers for drug targeting
Introduction, ideal characteristics of carriers. Preparation, evaluation and application of polymeric nanoparticles and liposomes. Basics of monoclonal antibodies.

8 hours

Module – 3 : Biodistribution and pharmacokinetics of nanocarriers
Absorption kinetics and bioavailability, kinetics of pharmacologic response, relationship between volume of distribution, drug binding and elimination. Guidelines for human pharmacokinetics studies.

7 hours

Module – 4 : Brain targeting
Invasive strategies- hyperosmolar blood-brain barrier disruption, intracerebral injection, intracerebral implants.
Non-invasive strategies- use of endogenous transporters, prodrugs and chemical drug delivery systems, nanoparticles, liposomes, vector mediated drug delivery

8 hours

References:

1. Y W. Chien, Novel Drug Delivery Systems, 2nd edition, revised and expanded, Marcel Dekker, Inc., New York, 1992.
2. S.P.Vyas and R.K.Khar, Controlled Drug Delivery - Concepts and Advances, Vallabh Prakashan, New Delhi, First edition 2002.
3. N.K. Jain, Controlled and Novel Drug Delivery, CBS Publishers & Distributors, New Delhi, First edition 1997 (Reprint in 2001).



Dayananda Sagar
University

College of Pharmaceutical Sciences

Certificate Program 03
Pre-Clinical Research in Neuropharmacology

Objective of the Course:

1. To provide knowledge and understanding of various screening models. Used for the study of CNS disorders.
2. To appreciate the need for further research in the area of neuropharmacology.
3. To apply the knowledge of pre-clinical research in neuropharmacology in the pharmaceutical industry.

Course Outcomes:

1. Discuss the fundamentals of central nervous system pharmacology.
2. To understand the preclinical screening with reference to neurodegenerative disorders.
3. To know the recent drugs and available advanced therapy for CNS disorders.
4. Be able to communicate the scientific information as a report.

Course & Syllabus	30 hours
Module – 1 :	8 hours
Fundamentals: Introduction to CNS pharmacology, neurotransmission in the CNS, neurodegeneration- mechanism and factors affecting, related neurodegenerative disorders.	
Module – 2 :	10 hours
Screening models for common neurodegenerative disorders like Alzheimer's disease, Parkinson's disease, multiple sclerosis, schizophrenia and drug induced neurodegeneration.	
Module – 3 :	6 hours
Recent advances in the screening and treatment of important neurodegenerative disorders like Alzheimer's disease, Parkinson's disease, multiple sclerosis etc.	
Module – 4 :	6 hours
Industrial applications of pre-clinical study in neuropharmacology.	

References:

1. Vogel hg, editor. Drug discovery and evaluation: pharmacological assays. Springer science & business media; 2002 jun 13.
2. Brunton ll, hilal-dandan r, knollmann bc, editors. Goodman & gilman's the pharmacological basis of therapeutics. New york: mcgraw-hill education; 2018.
3. Mattson mp, duan w, pedersen wa, culmsee c. Neurodegenerative disorders and ischemic brain diseases. Apoptosis. 2001; 6(1):69-81.



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College of Pharmaceutical Sciences

Certificate Program 04

Plant Tissue Culture

Objective of the Course:

1. To introduce biotechnological methods in plants.
2. To widen the knowledge related to modern plant biotechnology process
3. To make understand the biotechnological process & their applicative value in agriculture pharmaceutical and food industry.

Course Outcomes:

1. Upon completion of the course the student will be able to recall the basic concepts of biotechnology and process of plant tissue culture.
2. Report measures for conservation of biodiversity
3. Apply learned techniques in a new or similar situation
4. Design and experiment with step-by-step instruction to address the research problems.

Course & Syllabus

30 hours

Module I: Fundamentals of plant tissue culture:

8 hours

- Introduction of lab design and sterilisation techniques.
- Types of culture media and their application.
- Concept of plant tissue culture, initiation of plant tissue culture.

Module II: Different methods of Tissue culture

10 hours

- Organogenesis and Embryogenesis.
- Synthetic seeds, Protoplast fusion.
- Micro propagation of medicinal and aromatic plants
- Gene transfer in plants and their applications.

Module III: Applications of Tissue culture

7 hours

- Secondary metabolites with emphasis on production of medicinal agents.
- Germplasm Conservation.
- Bioreactors and fermentation.

Module IV: Assignments on Transgenic plants

5 hours

- Plant biotechnology industries in Karnataka.
- Hardening and Acclimatization in green house.
- Biotechnology: Some thought provoking newer ideas.

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1. Pharmaceutical Biotechnology by SP. Vyas and VK. Dixit, CBS Publishers.
2. Elements in Biotechnology by PK. Gupta, Rastogi Publications, New Delhi.
3. Pharmacognosy and Pharmacobiotechnology by Ashutosh Kar, New Age International limited, Publishers.
4. Pharmacognosy by G. E. Trease and WC. Evans, 16th Edition, Elsevier.



DAYANANDA SAGAR UNIVERSITY
College of Pharmaceutical Sciences
Kumaraswamy layout, Bengaluru -78

25/06/2022

STUDENT CIRCULAR

This is to inform all the students pursuing Pharm.D are required to register their names for the value added program in the following subjects for the academic year 2021-22.

SUBJECT	TOPICS
Human Anatomy and Physiology	Health Education and First Aid
Pharmaceutics	Advanced Pharmaceutical Product Development
Medicinal Biochemistry	New Trends in Drug Discovery and Drug Development
Pharmaceutical Organic Chemistry	Advanced Organic Chemistry- Principles and Methodology
Pharmaceutical Inorganic Chemistry	Introduction to Analytical Chemistry


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Bengaluru, - 560 078.



Dayananda Sagar
University

College of Pharmaceutical Sciences

Certificate Program 10

INTRODUCTION TO ANALYTICAL CHEMISTRY

Approaches & Applications

Objective of the course: The course has been developed with the following objective for the students to understand:

1. The concept of ANALYTICAL chemistry.
2. Various approaches towards ANALYTICAL chemistry along with their advantages and disadvantages.
3. Knowledge of its experimental design.

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Dayananda Sagar University
Kumaraswamy Layout,
Bengaluru - 560 073.

Course outcomes:

1. The value-added course on ANALYTICAL chemistry will help individuals to develop their own skills in their chosen field of study.
2. Learning ANALYTICAL chemistry will equip the student with knowledge to design chemical processes to enhance the industrial output.
3. To Learn alternative technologies that have industrial applications and at the same time are safer for human health and protect natural environment.

Course & Syllabus
(30 hours)

Course & Syllabus

Unit - 1 UV-Visible Spectroscopy: Principle of UV-Visible Spectroscopy, Chromophores and their interaction with UV-visible radiation and their utilization in structural, qualitative and quantitative analysis of drug molecules. Woodward-Fieser rule, use of shift reagents for elucidation of structures. Fundamentals of Optical Rotatory Dispersion. Cotton effect curves, octant rule, circular dichroism.

4 hours

Unit - 2 Infrared Spectroscopy: Infrared radiation and its interaction with organic molecules, vibrational mode of bonds, instrumentation and applications, effect of hydrogen bonding and conjugation on absorption bands, interpretation of IR spectra. FTIR and ATR, X-ray diffraction methods.

10 hours

Unit - 3 Nuclear magnetic resonance spectroscopy: Magnetic properties of nuclei, field and precession, chemical shift concept, isotopic nuclei, reference standards and solvents. ¹H NMR spectra, chemical shifts, multiplicity, coupling constants, integration of signals, interpretation of spectra, decoupling-double resonance and shift reagent methods. Principles of FT-NMR with reference to ¹³C NMR, free induction decay, average time domain and frequency domain signals. Spin-spin and spin-lattice relaxation phenomenon. Protein noise decoupled spectra. Nuclear overhauser enhanced ¹³C NMR spectra, their interpretation and application. APT and DEPT techniques. Introduction of 2D NMR techniques, COSY, with application.

10 hours

Unit - 4 Mass spectrometry: Basic principles and brief outline of instrumentation. Ion formation, molecular ion, metastable ion, fragmentation process in relation to molecular structure and functional groups. Relative abundance of isotopes, chemical ionization, FAB, ESI, MALDI, GC-MS and other recent advances in mass spectrometry.

10 hours

Unit - 5 Chromatographic techniques: Principles of separation and application of Column, Paper, Thin layer and Gas chromatography, HPLC, HPTLC, Size exclusion chromatography, Affinity chromatography, Electrophoresis. Instrumentation of HPLC, Preparative and micropore columns, Reverse phase columns, Mobile phase selection and detectors in HPLC. Instrumentation and application of DCCC. Biological standardization: Bioassay & Radioimmunoassay: ELISA, Radioimmunoassay of



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drugs like Digitalis & Insulin

10 hours

REFERENCES

1. Willard, H.H., Merrit, L.L., Dean, J.A., Settle P.A., Instrumental Methods of Analysis, Van Nostrand.
2. Skoog, D.A., Heller, F.J., Nieman, T.A., Principles of Instrumental Analysis, WB Saunders.
3. Hunson, J.W., ed. Pharmaceutical Analysis, Modern Methods, part A & B, Marcel Dekker.

V. Prasad
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Certificate Program 01
ADVANCED ORGANIC CHEMISTRY

Objective of the course:

1. To understand Principles of Newer Techniques of synthesis in the field of organic chemistry.
2. Different methodologies used in the Synthesis of Organic compounds.

Course outcomes:

1. Outlines all the Underlying principles which are involved in the synthetic methods which can be adopted in the field of Organic synthesis.
2. Describes the Different techniques and methodologies involved in the Synthesis.

Course and syllabus: (30 hours)

Module 1: Fundamental Aspects and applications of Retrosynthesis: 10 hours

Synthon approach and retro synthesis applications

Basic principles, terminologies and advantages of retrosynthesis; guidelines for dissection of molecules.
Functional group interconversion and addition

Module 2: Techniques involving green chemistry: 10 hours

- a. Microwave assisted reactions: Merit and demerits of its use, increased reaction rates, mechanism, superheating effects of microwave, effects of solvents in microwave assisted synthesis, microwave technology in process optimization, its applications in various organic reactions and heterocycles synthesis
- b. Ultrasound assisted reactions: Types of sonochemical reactions, homogenous, heterogeneous liquid-liquid and liquid-solid reactions, synthetic applications

Module 3: Asymmetric synthesis 10 hours

1. Basic concepts, Methods of asymmetric synthesis using chiral pool, chiral auxiliaries and catalytic asymmetric synthesis, enantiopure separation and Stereo selective synthesis with examples.

References:

1. Organic Chemistry" Vol I and II. I.L. Finar. ELBS, Sixth ed., 1995.
2. Carey, Organic chemistry, 5th edition (Viva Books Pvt. Ltd.)
3. Organic synthesis-the disconnection approach, S. Warren, Wiley India
4. Principles of organic synthesis, ROC Norman and JMCoxan, Nelson thorns


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DAYANANDA SAGAR UNIVERSITY

College of Pharmaceutical Sciences

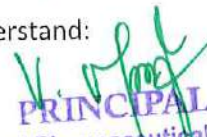
Certificate Program 06

Health Education & First Aid

Objective of the course:

The course has been developed with the following objective for the students to understand:

1. The concept of health and first aid
2. The concept of communicable diseases
3. To Know the various ways of first aiding during emergencies


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Course outcomes:

1. The value-added course on health education will help the individuals about the complete health
2. Learn the skill needed to assess the ill or injured person.
3. Learn the skills to provide CPR to infants, children and adults.
4. Learn the skill to identify Mental Health status and Psychological First Aid

Course & Syllabus (30 hours)

Module – 1 : Health concepts:

10 hours

1. Introduction to health, Definition of physical health, mental health, social health, indicatory of health, concept of disease, natural history of diseases, the disease agents, concept of prevention of diseases.
2. Hand washing and Hygiene

Module – 2:

08 Hours

1. **Nutrition and health:** Classification of foods, requirements, diseases induced due to deficiency of proteins, vitamins and minerals-treatment and prevention
2. Communicable diseases: Causative agents, mode of transmission and prevention.

Module-3:

07 Hours

First aid: Introduction to first aid and definition of first aid, Dealing with an emergency, Resuscitation (basic CPR), Recovery position, Types and Content of a First aid Kit, Dressings and Bandages

First aid related with Wounds and Injuries, Type of wounds, Small cuts and abrasions, Shock

Module - 4 :

05 Hours

Specific emergency satiation and disaster management, Emergencies at educational institutes and work, Road and traffic accidents.

References:

1. Thakaore Bhai, P. Gandhi and Harit R. Derasari, Elements of Human Anatomy Physiology and Health Education, B.S. Shah Publishers, 12th Ed, 2004.
2. Douglas E. Kelly, Richard L. Wood and Allen C. Enders, Bailey's Text Book of Microscopic Anatomy, Williams & Wilkins Publishers, 18th Ed, 1984.

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“New Trends in Drug discovery and drug development”

I. Introduction to Drug Discovery and Development (30hrs)

Syllabus:

Module -1 Stages of drug discovery and development. Conventional methods of drug design. (5hrs)

Module-2 Lead discovery and Analog Based Drug Design Rational approaches to lead discovery based on traditional medicine, Random screening, Non-random screening, serendipitous drug discovery, lead discovery based on drug metabolism, lead discovery based on clinical observation. (10hrs)

Module-3: Targets in Drug discovery and development , Biological targets, Receptors, Analog Based Drug Design: Bio-isosterism, Classification, Bio-isosteric replacement.(7 hrs)

Module-4: Designing and application of Prodrugs :- Basic concept , prodrug of functional group , prodrug design to improve patient acceptability, Drug solubility, Drug Absorption and Distribution, site specific drug delivery and sustained drug action, Rationale of prodrug design and practical consideration of prodrug design. (8hrs)

Course Objectives:

- To learn the biological target selection before the Drug discovery.
- To learn about the concepts of Prodrugs.
- To learn the stages of Drug discovery and Development
- To know about the Rational drug design method.


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Course Outcomes:

Discuss the concepts of Prodrugs and its concepts

Discuss the concept of Analog based drug design

Will be able to know about the methodology involved in Design and discovery of lead molecules.

Will be able to Design new drugs using informatics and databases.


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College of Pharmaceutical sciences



ADVANCED PHARMACEUTICAL PRODUCT DEVELOPMENT

Certificate Program :7

Objective of the course:

The candidate must be able to when they have finished the advanced pharmaceutical product development course:

1. To prepare for further study in the field and to explicate the principles of preformulation and stability studies in the development of dosage forms.
2. Identify the elements that influence the stability of pharmaceutical products.
3. Preformulations- Role and Importance in the Development of New Drugs, as Well as the Steps Involved in Its Design

Course outcomes:

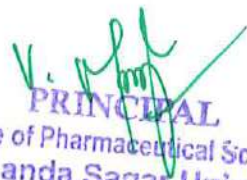
1. Acquire knowledge on various aspects related to development, manufacturing and evaluation of pharmaceuticals.
2. Recognize the significance of pharmaceutical process design.
3. Examine the findings of the evaluation and make recommendations for pharmaceutical product stabilizing agents.
4. Discuss quality concerns and offer the answers required to produce stable products.

Course and syllabus: (30 hours)

Module 1: Fundamental Aspects of Product Development: 10 hours

Studies of wettability, solubility, dissolution, partition and absorption, surfactant and hydrocolloids and their role in drug delivery and targeting.

Module 2: Formulation Considerations: 10 hours


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Preformulation studies in development of solid, oral liquid and parenteral dosage forms; solubility, dissolution rate, Pk_a , partition coefficient, stability etc., In-Vivo evaluation techniques. Pre- formulation studies, Pediatric & geriatric aspects of formulation.

Module 3: Stability Studies:

10 hours

Basic concepts, consideration of physical and chemical stability studies, determination of shelf life, problems encountered during storage of dosages forms.

Physicochemical and biological factors affecting stability of drugs, Methods to find out degradation pathways, Determination of shelf life by accelerated stability testing, Overages and ICH guidelines.

References:

Pharmaceutical Process Validation by R.Nash and Wachter, Volume 129, Latest edition, Marcel Dekker Inc, New York.

Niazi SK, Niazi S. Handbook of Preformulation: Chemical, Biological and Botanical Drugs. CRC Press; 2007.

Chilukuri DM, Sunkara G, Young D. Pharmaceutical Product Development: In Vitro-In Vivo Correlation. Informa Healthcare; 2007.


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CDSIMER
Dr. Chandramma Dayananda Sagar
Institute of Medical Education and Research



About the course

Got into a Medical College . What now?

How to manage expectations and reality?

How to cope with success and failure?

How to cope with new environment, peers, academics, duties & responsibilities and still manage to have some fun

Come on a journey with us to get a hands on experience and develop techniques that will help manage the stress, time, exams & success for a Holistic wellbeing because a healthy mind and body makes a healthy Doctor

COURSE CONTENT

1. **Mechanism & types of Stress**
2. Workshop on Stress Management
3. **Cognitive distortions & Coping Mechanisms**
4. Time management and techniques
5. **Relaxation techniques**
6. Anger management
7. **Sleep Hygiene**
8. Social media and Screen time
9. **Communication Skills & Interpersonal relations**
10. Exam preparation and Routine establishment
11. **Assertion Skills**
12. Success and stress
13. **Anxiety and Depression**
14. Suicide and Suicide gatekeeping
15. **Managing exams successfully**



DR CHANDRAMMA DAYANANDA SAGAR INSTITUTE OF MEDICAL EDUCATION AND RESEARCH

Harohalli, Kanakapura Taluk, Ramanagara District
(A unit of Dayananda Sagar University)



COURSE ON DEVELOPING SKILLS TO IMPROVE MENTAL- EMOTIONAL RESILIENCE

PROGRAM SCHEDULE

Duration: One Month (30hrs)

From 2.05.2022 to 30.05.2022

Venue: Lecture Hall

Date	Time	Topic	Name of the Resource Faculty
2.05.2022	5.30 -6.30 P.M	Introduction to Value Added Course	Dr.Neeraj Raj
3.05.2022	5.30 -6.30 P.M	Ice breaking	Dr.Anupama
4.05.2022	5.30 -6.30 P.M	Key words – a guide	Dr.Gopal Das
5.05.2022	5.30 -6.30 P.M	Mechanism of stress	Dr.Neeraj Raj
6.05.2022	5.30 -6.30 P.M	Types of stress	Dr.Neeraj Raj
7.06.2022	3.30 PM – 5.30 PM	Workshop on Stress Management	Dr.Gopal Das and Team
9.05.2022	5.30 -6.30 P.M	Cognitive distortions	Dr.Anupama
10.05.2022	5.30 -6.30 P.M	Coping mechanisms	Dr.Anupama
11.05.2022	5.30 -6.30 P.M	Time management and techniques WORKSHOP	Dr.Gopal Das and Team
12.05.2022	5.30 -6.30 P.M	Relaxation techniques WORKSHOP	Dr.Neeraj Raj and Team
13.05.2022	5.30 -6.30 P.M	Relaxation techniques WORKSHOP	Dr.Neeraj Raj and Team
14.05.2022	3.30 PM – 5.30 PM	Anger management WORKSHOP	Dr.Gopal Das and Team
16.05.2022	5.30 -6.30 P.M	Sleep Hygiene	Dr.Tarachand Naik

17.05.2022	5.30 -6.30 P.M	Social media and Screen time	Dr.Tarachand Naik
18.05.2022	5.30 -6.30 P.M	Communication Skills	Dr.Anupama
19.05.2022	5.30 -6.30 P.M	Interpersonal Relations	Dr.Anupama
20.05.2022	5.30 -6.30 P.M	Exam preparation and Routine establishment	Dr.Neeraj Raj
21.05.2022	3.30 PM – 5.30 PM	WORKSHOP- Assertion Skills	Dr.Anupama and Team
23.05.2022	5.30 -6.30 P.M	Unmanaged stress	Dr.Neeraj Raj
24.05.2022	5.30 -6.30 P.M	Success and stress	Dr.Neeraj Raj
25.05.2022	5.30 -6.30 P.M	Introduction to Anxiety and Depression	Dr.Anupama
26.05.2022	5.30 -6.30 P.M	Suicide and Suicide gatekeeping -A WORKSHOP	Dr.Gopal Das and Team
27.05.2022	5.30 -6.30 P.M	Suicide and Suicide gatekeeping -A WORKSHOP	Dr.Gopal Das and Team
28.05.2022	3.30 PM – 5.30 PM	WORKSHOP-Managing exams successfully	Dr.Gopal Das and Team
30.5.2022	5.30 -6.30 P.M	Valedictory & Feedback	

From

Dr Pratibha Nadig

Professor & HOD

Department of Pharmacology

CDSIMER, Harohalli

16 Mar 2022, Devarakaggalahalli

To

The Dean

CDSIMER

Harohalli

Through Proper Channel

Respected Sir

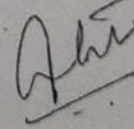
Sub: Permission to conduct 35 hours course titled "Certificate Course in Pharmacovigilance" for 2nd MBBS students

With reference to the above subject, I kindly request your permission for the conduct of 35 hrs "Certificate Course in Pharmacovigilance". The proposed dates are 01-Apr-2022 to 30-Oct-2022. The detailed schedule of activities is attached. I have also attached a copy of proposed brochure for your perusal. Kindly do the needful

Enclosure: Brochure

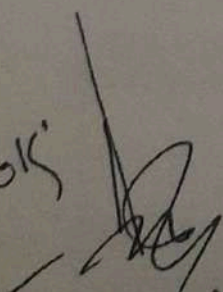
Thanking you

Yours faithfully



Head Dept. of Pharmacology
Dr. Chandramma Dayananda Sagar
Institute of Medical Education & Research
DSU, Devarakaggala Halli Village, Harohalli Hobli
Kanakapura, Ramanagara Dist., Karnataka

GK


Dr. A.C. ASHOK MBBS, MS, DNB, DA
Principal & Dean
Dr. Chandramma Dayananda Sagar
Institute of Medical Education & Research, DSU
Devarakaggala Halli, Kanakapura Road
Ramanagara Dist. - 562112, Karnataka

DSIMER

**DR CHANDRAMMA DAYANANDA SAGAR INSTITUTE OF
MEDICAL EDUCATION AND RESEARCH**
Harohalli, Kanakapura Taluk, Ramanagara District
(A unit of Dayananda Sagar University)



**CERTIFICATE COURSE IN PHARAMCOVIGILANCE
PROGRAM SCHEDULE**

Date : 01-Apr-2022 to 31-Oct-2022

Venue: CDSIMER, Dept of Pharmacology

SCHEDULE OF ACTIVITIES

Time	Topic	Name of the Resource Faculty
2-4 pm	Pharamcogvigilance: History, Definitions, Regulations, Drug Development, Safety Reports, Clinical and regulatory implications	Dr Shiva murthy N
2-4 pm	How to recognize and report an adverse drug reaction and a case based workshop	All staff of department of pharmacology
4-7 pm	Ward and Filed work - Visit to wards of various departments, review of case sheets, interview staff, students, collect ADRs	Students self directed works
4-7 pm	Ward and Filed work - Visit to wards of various departments, review of case sheets, interview staff, students, collect ADRs	Students self directed works
4-7 pm	Ward and Filed work - Visit to wards of various departments, review of case sheets, interview staff, students, collect ADRs	Students self directed works
4-7 pm	Ward and Filed work - Visit to wards of various departments, review of case sheets, interview staff, students, collect ADRs	Students self directed works
4-7 pm	Ward and Filed work - Visit to wards of various departments, review of case sheets, interview staff, students, collect ADRs	Students self directed works
3-4 pm	5 Presentation of cases to faculty	Each student complete the preparation PPT and do the presentation in front of pharmacology department faculty
2 am - 6 pm	Participation in various competitions, programs, road shows, public engagement	All faculty and students

23 Sept 2022 and complete day on 24th Sept 2022.	programs as participant and as audience to learn various concepts during National Pharmacovigilance week celebration between 22 Sept 2022 to 28th Sept 2022	
Half day on 28th Sept 2022	COMPLETION TEST AND CERTIFICATION	CDSIMER management and Guest of Honour, HOD Pharmacology, PV coordinator and Other department staff.

N. Shivakrishna
Course Coordinator

[Signature]
Head of the Department

[Signature]
Dean

Dr. Prashanth Kumar M. MBBCh, D, FA
 Vice Principal
 Dr. Chandramma Dayananda Sagar
 Institute of Medical Education & Research,
 Devarakaggalahalli, Kanakapura Road,
 Ramanagara Dist. - 562117

Head Dept. of Pharmacology
 Dr. Chandramma Dayananda Sagar
 Institute of Medical Education & Research
 Devarakaggalahalli, Kanakapura Road,
 Ramanagara Dist. - 562117



B
 H

Certification Program

Introduction to Statistics Using Excel

Dayananda Sagar University's "Introduction to Statistics" delves into statistical thinking concepts over eighteen hours that are essential for learning from data and communicating insights. By the end of the certificate course, a participant will be able to perform exploratory data analysis, understand key principles of sampling, and select appropriate tests of significance for multiple contexts. The student will gain the foundational skills that prepare them to pursue more advanced topics in statistical thinking and business analytics using Excel.

Topics include an understanding of Advanced Excel, Descriptive Statistics, Sampling, Probability, Sampling Distributions and the Central Limit Theorem, Regression, Common Tests of Significance, Resampling, Multiple Comparisons.

The certificate program is particularly recommended for those students and practicing managers who would like to take up business analytics and decision making as a specialized field of study. Eventually decision making is the fundamental role of a manager. It is also applicable for research scholars and those students making a foray into doctoral studies.

On successful completion of the course a student will be awarded a certificate from Dayananda Sagar University, Bengaluru.

Learning Outcomes:

1. A student will on completion of this course have a firm grasp on the basics of statistics
2. A student will on completion of this course have a firm grasp on the basic concepts of descriptive statistics
3. A student will on completion of this course have a firm grasp on bivariate analyses
4. A student will on completion of this course have a firm grasp on probability theory and the rules for calculating with probabilities
5. A student will on completion of this course have a firm grasp on sampling distributions
6. A student will on completion of this course have a firm grasp on inferential statistics: estimation by means of a confidence interval
7. A student will on completion of this course have a firm grasp on main ingredients of the method of significance testing

Instructor



Prof. K.N. Amaranth is an accomplished data analytics professional with impressive career credentials of about three decades. He is a versatile statistician making noteworthy recommendations for strategic decision making. Amarnath consults widely as Senior Research Analyst with deep insight into market trends and business scenarios driving at effective market positioning several product launches.

Session Plan & Schedule

Overview of Microsoft Excel, Mathematics, Probability, and Statistics for MBA				
#	Topic	Content	Remark	Duration
Session 1	Advanced Excel	Relative & Absolute Addresses, Range Names, Auditing Formulas, COUNTA, COUNTBLANK, COUNTIF, SUMIF, AVERAGEIF, COUNTIFS, SUMIFS, AVERAGEIFS, SUMPRODUCT, IF, VLOOKUP, RAND, RANDBETWEEN, Pivot Tables, Data Tables, Goal Seek	<i>It is assumed that the students have "basic" knowledge of Excel.</i>	3 hours
Session 2	Mathematics for Business	<ul style="list-style-type: none"> ➤ Linear Equations and Inequalities (Theory) ➤ Graphs and Lines (Theory) ➤ Linear Regression (Theory) ➤ Systems of Linear Equations (Theory) ➤ Matrices (Theory + Excel Demo) ➤ Linear Programming in Two Dimensions: A Geometric Approach (Theory) ➤ Linear Programming: The Simplex Method (Theory) ➤ Logic, Sets, and Counting (Theory) 		3 hours
Session 3	Describing the Distribution of a Variable & Finding Relationships among Variables	<ul style="list-style-type: none"> ➤ Introduction ➤ Basic Concepts ➤ Summarizing Categorical Variables ➤ Summarizing Numeric Variables ➤ Time Series Data ➤ Outliers and Missing Values ➤ Excel Tables for Filtering, Sorting, and Summarizing* ➤ Relationships among Categorical Variables ➤ Relationships among Categorical Variables and a Numeric Variable ➤ Relationships among Numeric Variables ➤ Pivot Tables* 		3 hours
Session 4	Probability and Probability Distributions	<ul style="list-style-type: none"> ➤ Introduction ➤ Probability Essentials ➤ Probability Distribution of a Random Variable ➤ The Normal Distribution ➤ The Binomial Distribution ➤ The Poisson and Exponential Distributions* 		3 hours
Session 5	Statistical Inference I	<ul style="list-style-type: none"> ➤ Sampling and Sampling Distributions <ul style="list-style-type: none"> ○ Introduction ○ Sampling Terminology ○ Methods for Selecting Random Samples ○ Introduction to Estimation <ul style="list-style-type: none"> ▪ The Central Limit Theorem ➤ Confidence Interval Estimation <ul style="list-style-type: none"> ○ Introduction ○ Sampling Distributions 		3 hours

		<ul style="list-style-type: none"> ○ Confidence Interval for a Mean ○ Confidence Interval for a Total ○ Confidence Interval for a Proportion ○ Confidence Interval for a Standard Deviation ○ Sample Size Selection* 		
Session 6	Statistical Inference II	<ul style="list-style-type: none"> ➤ Hypothesis Testing <ul style="list-style-type: none"> ○ Introduction ○ Concepts in Hypothesis Testing ○ Hypothesis Tests for a Population Mean ○ Hypothesis Tests for Other Parameters* ○ Tests for Normality ○ Chi-Square Test for Independence ➤ Analysis of Variance and Experimental Design <ul style="list-style-type: none"> ○ Introduction ○ One-Way ANOVA ○ Using Regression to Perform ANOVA* ○ The Multiple Comparison Problem* ○ Two-Way ANOVA* 		3 hours

* The starred line-items above are optional which may not be covered due to paucity of time.

References:

1. [For Session 1] Microsoft Excel 2019 Data Analysis and Business Modeling by Wayne Winston. A 2013 edition of the above book is freely available from the link below:
<https://bit.ly/2R8DSbu>
2. [For Session 2] College Mathematics for Business, Economics, Life Sciences, and Social Sciences (13th edition) by Barnett et al. A copy of the book can be accessed from the URL below:
<https://bit.ly/3uxOpdG>
3. Business Analytics: Data Analysis and Decision Making (7th edition) by Albright and Winston. The students need to buy this book for the Sessions 3, 4, 5, and 6.

Compulsory pre-reading:

1. Microsoft Excel 2019 Fundamentals Workshop.
<https://bit.ly/3yOxGGs>
Or any other Excel 2019 fundamentals book can also be referred.
2. Kindly brush-up your high-school mathematical understanding from the below NCERT textbooks website.
<https://ncert.nic.in/textbook.php>
Or if you have other basic mathematics books for high-school or plus-two, you can refer them.

Software required (compulsory):

Microsoft 2016 or Microsoft 2019 should be available on your laptops or desktops. Please remember to activate the “Data Analysis” and “Solver” options on your “Data” tab of Excel. After activating, it looks like the below.





DAYANANDA SAGAR UNIVERSITY
DEPARTMENT OF AEROSPACE ENGINEERING

PRODUCT DESIGN AND DEVELOPMENT – 3D Experience

Course Outcomes

1. Develop skills in conceptualization, design, and development of a new product.
2. Familiarization with design software on 3D modeling, the section of solids, orthographic view, and dimensioning
3. Utilize the basic software skills on 2d drawing towards 3D MODELING and analysis
4. Experiment with a set of tools and methods for new robust design and development

Contents

Sl. No	Semester	Topics
1.	III	Product Design
2.	IV	Aircraft structures
3.	V	Composite
4.	VI	Flight Mechanics
5.	VII	Aircraft Design & Avionics

Ravakur

Chairman
Dept of Aerospace Engineering
School of Engineering
Dayananda Sagar University
Kudlu Gate, Bengaluru

Module: Software Lab Training (50 Hrs)

A design engineer's main job is to apply the engineering design process to conceptual ideas, prototype it and develop new products or processes with a primary emphasis on functional utility, matched with global safety standards. In order to attain the required skill on CATIA 3D experience the following training sessions will be undertaken:

1. Basic Sketchor work bench: 5 Hrs

- a) Selecting & Editing of Geometry, Features, Models
- b) Creating Sketcher Geometry and use of Sketcher Tools
- c) Use of Sketches & Datum Features
- d) Introduction & understanding of Parametric concepts

2. Basic part design: 5 Hrs

- a) Creating sketch-based features (Extrudes, Revolves and Ribs holes, etc.)
- b) Creating dress up features (Shells, Draft, Rounds, Chamfers & Use Layers etc.)
- c) Use of translation features
- d) Copy, Mirror and Scaling

3. Advance Part Modeling: 15 Hrs

- a) Advanced Selection, Creating Sweeps and Blends
- b) Sweeps with Variable Sections
- c) Helical Sweeps & Swept Blends (surface design)
- d) Boolean operations with examples
- e) Measuring, Inspection, Models & Seeking Help

4. Assembly Design: 5 Hrs

- a) Concepts of assembly (top-down and bottom-up)
- b) Component Interfaces, Flexible components, restructuring simplified reps
- c) Creating and Using Assembly Structure and Skeletons
- d) Assembling with Constraints
- e) Exploding, replacing in components, cross sessional assemblies

5. Detailing (Drawing): 5 Hrs

- a) Introduction, generative drafting & interactive drafting
- b) Creating New Drawings & Drawing views (Primary and Secondary views)
- c) Adding Model Details & Tolerance information to Drawings
- d) Adding Notes, symbols, Tables, & Layers in drawings

- e) Creation of bill of material and balloons

6. Sheet metal Design: 10 Hrs

- a) Sheet metals Design process & fundamentals
- b) Creating Primary & Secondary Sheet metal wall features
- c) Bending, Unbending & Modifying Sheet Metal Models

7. Surface Modeling: 5 Hrs

- a) Creating sketch-based features
- b) Creating dress up features
- c) Use of translation features
- d) Copy, Mirror and Scaling

Semester: 4: Aircraft Structural Design

Duration: 50 Hrs

Module 1: Theory - 25 Hrs

1. Introduction: 2 Hrs
 - a) Aircraft overview
 - b) Aircraft structural components
 - c) Aircraft mechanical systems / electrical system
 - d) Different types of engine

2. Materials: 5 Hrs
 - a) Aerospace metallic materials,
 - b) Composite (non-metallic) materials,
 - c) Advanced (smart, glare etc.) aircraft Materials
 - d) Joints and fasteners in aircraft

3. Design: 8 Hrs
 - a) Loads acting on Aircraft
 - b) Aircraft weight estimation
 - c) Airframe design
 - d) Design of
 - i. Skin
 - ii. Shear Panel
 - iii. Frames
 - iv. Stringer & Stringer configurations

4. Analysis: 10 Hrs
 - a) Different types of beams
 - b) Bending of beams with applied forces & moments and reactions
 - c) Thin walled beams
 - d) Concept of shear flow
 - e) Shear center and estimation of its location
 - f) Buckling of thin walled sections
 - g) Shear force and bending moment distribution
 - i. Over the aircraft wing
 - ii. Over the fuselage
 - h) Shear flow in thin-webbed beams with parallel and non-parallel flanges

Module 2: Software – 25 Hrs

1. Design software-CATIA 15 Hrs
 - a) 2D to 3D for assembly design and drafting

- b) Aircraft frames design- structure of airframe, lugs and brackets etc.
2. Analysis software – Abacus 10 Hrs
- a) Basic of FEM-Discretization methods, analysis procedures
 - b) Basic tool demonstration and GUI explanation
 - c) Static analysis of 1D, 2D and 3D structure-static analysis (Cantilever beam, plate and solid section)

Semester 5: Composites

Duration: 50 Hrs

Module 1: Theory-30 Hrs

1. Introduction: 3 Hrs
 - a) Fundamentals of composites
 - b) Need for composites
 - c) Classification of composites
 - d) Types of resins and properties
 - e) Fiber reinforced & Particle reinforced composites
 - f) Applications of various types of composites
 - g) Advantages and limitations of composites

2. Design: 6 Hrs
 - a) Generalized Hooke's Law
 - b) Elastic constants for Anisotropic, Orthotropic and Isotropic materials
 - c) Angle ply, Cross ply laminates and general laminate
 - d) Failure criteria for composites
 - e) Governing differential equation for a general laminate
 - f) Basic design concepts of sandwich construction
 - g) Materials used for sandwich construction
 - h) Failure modes of sandwich panels

3. Analysis: 8 hrs
 - a) Micro and macro-mechanical analysis
 - b) Analysis of simple laminated composite structural elements
 - c) failure and fracture of composite lamina
 - d) Bending and vibration of composite

4. Manufacturing of composites: 8 Hrs
 - a) Various Open and closed mould processes
 - b) Manufacture of fibers,
 - c) Manufacturing of Polymer Matrix Composites,
 - d) Hand lay ups,
 - e) Spray Techniques, Filament Winding Methods,
 - f) Pultrusion,
 - g) RTM,
 - h) Bag Molding,
 - i) Injection Molding
 - j) Metal / ceramic composites

5. Testing & Inspection of composites: 5 Hrs

- a) Tensile Testing,
- b) Compression Testing,
- c) Torsion Testing,
- d) Fatigue testing
- e) Fracture testing
- f) Visual testing
- g) Tapping
- h) Ultrasonic testing,
- i) Stereography testing
- j) Thermography testing and
- k) X-Ray Testing

Module 2: Software- 20 Hrs

Design software-CATIA 5 Hrs

- a) 2D to 3D for assembly design and drafting of composite parts

Analysis software- ABACUS 15 Hrs

- a) Basic of FEM-Discretization
- b) Modeling of Composite structural elements and applying properties.
- c) Progressive Failure Analysis
- d) Delamination-Crack Propagation-micro-and macro-scale analyses of composites

Module 1: Theory-30 Hrs

1. Principles of Aerodynamics: 10 Hrs
 - a) Basics of Aerodynamics
 - b) Earth's atmosphere and International Standard Atmosphere (ISA)
 - c) Bernoulli's Principle-Equation
 - d) Low speed & high-speed Aerodynamics
 - e) Introduction, Definition and subdivisions of flight dynamics
 - f) Forces and moments acting on vehicles in flight
 - g) Equations of motion and simplification for performance analysis
 - h) Lift, different types of drag, drag polar
 - i) Variation of thrust, power and SFC with velocity & altitudes for air breathing engines
 - j) Rockets-Power available and power-required curves
 - k) Aero foil Sections
 - l) Aero foil Generation
 - m) Computational Fluid Dynamics (CFD)

2. Aerodynamic Design & Configuration: 20 Hrs
 - a) Subsonic Aerofoil Design:
 - i. Basic concepts of Fluid Mechanics: Air properties, Reynolds and Mach numbers Euler's, Bernoulli's and Navier-Stokes Equations.
 - ii. Airfoil reference frame and convention-How lift is generated-Aerodynamics Coefficients-Pressure Distribution-Drag Decomposition-Airfoil polar-Breguet equation.
 - iii. Inviscid flow theory: Potential flow-Lift around cylinder (Joukowski theorem)-Conformal mapping (Kutta condition)-Linearized method (Thin Airfoil theory)-Panels Method.
 - iv. Viscous flow Skin Friction-Laminar-to-turbulent transition-Separation (pressure drag)-flow over Cylinder at various Reynolds numbers.
 - v. Airfoil design: NACA/NASA series-Types of stall-Effects of thickness, camber and nose radius-Laminar airfoil-Stratford criterion.

 - b) From Incompressible to Supersonic Regime of 2D Aerofoil
 - i. Compressible fluid mechanics: Stagnation conditions, Mach wave, Normal shock relation, Oblique shock calculation, Expansion wave (Prandtl-Meyer).

- ii. Subcritical flow regime: Incompressible flow similarity (Prandtl-Glauert, Karman-Tsien and Laitone rules).
 - iii. Supercritical flow regime: Critical Mach number, Divergence Mach number, Buffet Phenomenon, Supercritical Airfoil, Transonic regime (Sound Barrier) and Linearized supersonic airfoil (Ackerett theory).
- c) Effects on Wings:
- i. Incompressible flow regime on straight wings: Aspect Ratio, Tip Vortices, Downwash (effective incidence), Prandtl Lifting, Line theory, Elliptical Wing, Twisted Wing, Taper ratio, Diederich formula-Vortex Lattice Method and Winglets/Sharklets.
 - ii. Incompressible flow regime on swept-wings, Principle of Stall & its modes, Spanwise flow, Forward sweeping.
 - iii. Compressible regime on wings Aspect ratio, Similarity, Extended Diederich formula, Supersonic planform design, Delta Wings.
- d) Overall Aircraft Design:
- i. High-lift devices, Purpose, Types, Principles, Active devices.
 - ii. Aircraft stability and control surfaces, Longitudinal Stability and Dihedral angle.
 - iii. Fuselage Slender body theory, Interaction Drag-Area rule.
 - iv. Wind tunnels Types, Similarity Constraint, Instrumentation.

Module 2: Software- 20 Hrs

1. Using XFLR5: Open source
 - a) Generation of Polars for three kinds of Aerofoil (symmetrical, cambered, bottom flat) in laminar flow in order to select the most efficient configuration for a given application. Analysis of pressure distribution. Influence of Reynolds number and transition point. Estimation of the skin friction based on equivalent flat plate calculations.
 - b) Calculation of critical Mach number for the above three aero-foils. Calculation of different supersonic aero foils with both shock expansion and linearized theories
 - c) Conceptualization of optimal the Aero-foil for a given wing. Design of an elliptical, twisted and trapezoidal wings. Comparison with pre-design formulae
 - d) Design of tail plane (position & size) to ensure longitudinal stability as the airplane centre of gravity is modified. Comparison with canard configuration

Module 1: Theory-40 hrs

1. Design methodology: 5 Hrs
 - a) Review of aircraft terminology / coordinate systems / forces & moments etc.
 - b) Development of mission Requirements
 - c) Concept selection
 - d) Phases of the design process
 - i. Conceptual Design
 - ii. Preliminary Design
 - iii. Detailed Design
 - iv. Report writing

2. Aircraft sizing: 5 Hrs
 - a) Factors influencing aircraft configuration, sizing and weight breakdown
 - b) Historical weight data (Weight sizing, other constraints and sensitivity studies)
 - c) Study / Sizing with a "rubber" engine
 - d) Aerodynamics design
 - i. Structural design factors
 - ii. Airfoil and wing selection
 - iii. Empennage selection and sizing
 - iv. fuselage design
 - v. Structural layout and design
 - e) Propulsion selection
 - f) Landing gear sizing and installation

3. Aircraft performance: 5 Hrs
 - a) Aircraft Performance and Fuel Fraction Estimates
 - b) Range, Endurance, maneuvering Flight in the vertical and horizontal planes
 - c) Climbing Flight
 - d) Descent/Glide
 - e) Field Performance
 - f) Takeoff and Landing Special performance requirements
 - g) Stability, Control, (Longitudinal / Lateral and directional)
 - h) Handling Qualities

4. Aircrafts Mechanical systems: 15 Hrs

- a) Hydraulic System
 - i. Necessity of hydraulic systems in an aircraft
 - ii. Various systems operated by hydraulic system
 - iii. Typical hydraulic circuit of an aircraft various components and their functions
- b) Pneumatic system
 - i. Typical pneumatic system in aircraft
 - ii. Advantages & disadvantages
- c) Landing gear
 - i. Requirements
 - ii. configurations
 - iii. Typical Shock absorber and its functioning.
 - iv. L/G retraction and extension
 - v. Brakes in a typical aircraft
 - vi. Tire maintenance.
 - vii. L/G type and placement
- d) Aircraft control system
 - i. Various control surfaces and their operations
 - ii. Power cell system
 - iii. FBW system
- e) Engine control system
- f) Starting and Ignition system for turbo jet engines
- g) Air conditioning & Pressurization
- h) Auto pilot system

5. Avionics & Electrical 10 hrs

a) Avionics System:

- i. Communication system: 2 hrs
 - Electromagnetic spectrum
 - VHF system
 - UHF system
 - HF System
 - Satellite communication system
- ii. Navigation system: 2 hrs
 - Radio Navigation system: ADF, VOR/DME, LORAN
 - Inertial Navigation system
 - Introduction to latitude & longitude
 - Platform based system
 - Strapdown system

- Satellite Navigation System-GPS, GLONASS
- iii. Landing Aids: 1 hr.
 - Instrument Landing System (ILS)
 - Microwave Landing System (MLS)
 - iv. Cockpit Display system: 3 hrs
 - Displays technologies –LED, LCD, CRT
 - Primary Flight Displays
 - Head Up Display (HUD)
 - Multifunction Display (MFD)
 - Helmet Mounted Display (HMD)
 - Night Vision Goggles (NVG)
 - Glass cockpit

b) Electrical System: 2 hrs

- Aircraft electrical power generation
 - Starter Generator
 - IDG
 - VSCF
- Aircraft electrical power distribution
- Introduction to aircraft wiring

Module 2: Software - 30 Hrs

- a) Design of landing gear (Mechanism)
- b) Hydraulic system - Routing
- c) Installation of components
- d) Avionics LRU's Mounting Trays
- e) Electrical wiring & harness design
 - i. Schematic drawing
 - ii. Routing drawing
 - iii. Harness drawing
 - iv. Library functions for connectors & junction boxes

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School of Commerce and Management Studies-PG Programs
Course Outcomes Value Added Program

1. Financial Markets and Investment Analysis

- Understand the broad functioning of a bank both at the macro and at micro levels
- Recognize the framework of securities market and its functioning
- Develop a conceptual and analytical understanding of the framework of evaluating a bond and equity

2. Artificial Intelligence and Social Science

- Data gathering and structuring and storing to be able to derive benefits from Data bases, data warehouse/Data Marts, Data Mining, Business Intelligence, OLAP.
- Use Analytics and present insights with reasoning.
- Learn Fundamentals of AI, ML, DL concepts along with Robots & Automation
- Understand concepts of AI governance, ethics, and security
- Worldwide AI adoption and implementation

3. Applied Business Analytics Using R and Python

- Learn data structures and their application in R and Python
- Perform data visualization using R and Python
- Perform data wrangling using R and Python
- Understand concepts of AI governance, ethics and Security
- Perform data import and tidying in R and Python

4. Information Technology & Applications

- Understand the tools and applications of ERP, e-CRM, e-ticketing
- Understand the different solutions available and select and use the right solution
- Perform different roles such as Business analysts, Project Manager, IT Manager, Business Consultants

5. A Practical Guide to managing People at work

- Create a usable job summary document detailing the various parameters that it would contain
- Create a list of competencies required for a job role
- Explore the uses of an assessment center and understand the interview process. Study a model center like the one used in the armed forces
- Understand a job evaluation process and create a compensation package using logical pay band's

6. Essentials of Contemporary Marketing in the digital Era

- Create a usable marketing plan.
- Create a list of basics required for managing sales
- Create a credible digital marketing process
- Create a digital marketing plan to do SWOT analysis and defining a target group to track and measure the reach of a product/service
- Classify digital channels, their advantages and limitations , to perceiving their ways of their integration , taking into account the consideration of the available budget to promote product/service in a personalized manner

7. Job Readiness Program in Supply Chain Management

- Be ready to perform a job role as a Demand Planner in an organization.
- Be able to analyze data using standard tools and techniques to build forecasting models.
- Calculate critical parameters related to inventory management and use ABC classification to optimize inventory levels
- Be ready to perform a job role as a Procurement Executive in an organization.

8. Digital Transformation

- Understand the need and potential impact of Digital Transformation and learn to adapt to this fast-changing environment.
- Explore 4 major emerging technologies (Cloud Computing, Internet of Things (IOT), Artificial Intelligence (AI) and Big Data) impacting Digital Transformation
- Develop understanding of how Digital integrates it into the Business. Understanding on how Digital transformation will help various industries

SEMESTER/YEAR : II / I YEAR
COURSE CODE : Value Added Program
TITLE OF THE COURSE : A Practical Guide to Managing People at Work

Background

Finding and hiring the right people is often cited as the number one concern of businesses today. It seems everybody is competing for the best and brightest workers. A critical component of the **People Manager Value Proposition** is to hire talented people who enable the organization to achieve its strategic goals. Once you have hired good employees, the next step that successful people managers take is to develop the full potential of their employees. Performance management is a process that helps managers achieve the goal of getting the best from their employees.

A key role for a people manager is to hire great people, place them, pay them a fair wage, evaluate their contribution and retain them. This value-added course looks at such people management parameters in alignment with larger HR issues that organizations face and is meant to be a pre-cursor to more advanced HR courses. The aim of this course is to give a practical guide to managing people at work. In the course a student will engage with some HR theories and then see how they translate into every day working life.

At the end of this course, a student will be better equipped to choose a suitable employee, to motivate and appraise a team, to manage compensation and to lead and make decision on a day-to-day basis with respect to the HR function.

Course Objectives

1. To learn the theory and practice of Manpower Staffing.
2. To understand the role of performance appraisal and management
3. To learn the science of compensation management

Course Outcomes

On completion of this course the student should be able to:

1. Create a usable job description
2. Create a list of competencies required for a job role
3. Create a credible assessment centre and understand the interview process
4. Manage a job evaluation process and create a compensation process with a logical pay band
5. Appraise an employee using a standard appraisal method and create a Balance Score Card to bring people, learning, process and culture under one integrated approach with an HRIS.

Syllabus/Course Outline:

Unit 1: Overview of Employee Hiring (12 Hours)

- a. Staffing Strategies'
- b. Business Implications of Staffing Strategies'

- c. Job Analysis – Creation of a Job Summary & Competency Modelling
- d. Forecasting & Planning
- e. Sourcing
- f. Recruiting

Unit 2: Strategic HR in a Global Context (6 Hours)

- a. Hiring & Process – Balanced Scorecard, the HRIS
- b. Internal & External Candidates: Hiring Process, Induction & Placement: The process and outcomes

Unit 3: Performance Management Process, Role of Self-assessment and self-development

Goals in Performance management, Key performance Indicators, Key result area, Methods of performance appraisal in current scenario. Human errors in performance management. **(10 Hours)**

Unit 4: Pay structures

Pay band, pay scale and pay grade; Factors of Individual's pay models; theories of compensation packages, components of salary (cost to company), Breakup of salary, Provident fund, Gratuity fund, ITR Form-16, Types of leaves in organisation. **(4 Hours)**

Unit 5: Assignments and practical components

Prepare the Breakup of salary of Public sector and private Sector. **(4 Hours)**

Pedagogy

Case Studies, Presentations, Simulations, Field projects, Assignments

Case Analysis

1. Values-Based Approach to Candidate Selection: One Hiring Manager's Approach: Jane Dutton, Lindsay Reed: University of Michigan

This case explores how a hiring manager at LinkedIn uses a selection interview to ensure a new employee fits the organization's values and culture. This selection interview provides a glimpse into how this manager puts the organization's values and culture into practice while recruiting a new employee. The case provides students with background information about LinkedIn's growth and success, its culture, and the value CEO Jeff Weiner's places on compassion. After reading and discussing this case, students will be able to: 1.) See how selection practices impact organizational culture. 2.) Describe how future employees can use the selection process to understand the organizational culture. 3.) Understand how selection is an effective tool to both communicate an organization's culture and to maintain that culture by the people who are hired. 4.) Appreciate how leaders' values (in this case, valuing compassion) trickle down to affect the selection of employees.

2. Equity on Demand: The Netflix Approach to Compensation: David F. Larcker, Allan McCall, Brian Tayan: Stanford Graduate School of Business

Netflix was among a small group of Silicon Valley companies to emerge from the technology bubble of the late 1990s a clear winner in terms of growth, market share, and profitability. That Netflix was able not only to prevail over this competition but also to thrive was largely attributable to the culture of freedom and responsibility inculcated by founder Reed Hastings. To foster this culture, the company adopted a series of unique employment practices that were meant to attract, retain, and motivate the type of employee that Netflix valued. Among these practices was a compensation system with several unconventional features. Whereas most companies provided compensation packages with a predetermined mix of cash and equity-based awards, Netflix turned the model on its head and allowed employees to request their own mix.

SEMESTER/YEAR : II / I YEAR
COURSE CODE : Value Added Program
TITLE OF THE COURSE : Applied Business Analytics Using R and Python

Background

R and Python are two popular open source tools available for performing data exploration, data cleaning, perform descriptive and predictive analytics and perform data visualization. Through this course students will come to grips with application of different aspects of data analytics using R and Python. This course will prepare the students to handle entry level jobs in business analytics profession.

Course Objectives

1. To learn data visualization, data wrangling and data import using R
2. To learn predictive analytics using R
3. To learn exploratory data analysis using Python

Course Outcomes

On completion of this course the student should be able to:

1. Learn data structures and their application in R and Python
2. Perform data visualization using R and Python
3. Perform data wrangling using R and Python
4. Perform data import and tidying in R and Python
5. Apply predictive analytics using R

Syllabus/Course Outline:

Unit 1: Getting Started with Data in R (4 Hours)

- R and R Studio
- Coding in R
- R Packages
- Exploring Dataset

Unit 2: Data Visualization, Data Wrangling, Data Import and Data Tidying in R (10 Hours)

- Data Visualization
 - Grammar of Graphics
 - Scatterplots
 - Linegraphs
 - Histograms
 - Facets
 - Boxplots
 - Barplots
- Data Wrangling
 - Pipe Operator
 - Filter Rows
 - Summarize Variables
 - group_by rows

- mutate existing variables
- arrange and sort rows
- join dataframes
- Data Importing and Tidy Data
 - Importing Data
 - Tidy Data
 - Case Study

Unit 3: Predictive Analytics Using Classification and Regression in R (10 Hours)

- Classification Algorithms
 - KNN Algorithm
 - Diagnosing Breast Cancer Using KNN
 - Decision Tree Algorithm
 - Identifying Risky Bank Loans using Decision Trees
- Regression
 - Simple Linear Regression
 - Multiple Linear Regression
 - Predicting Medical Expenses Using Linear Regression

Unit 4: Introduction to Python (4 Hours)

- Python Environment: Anaconda
- Jupyter Notebook
- Numpy
- Pandas
- Data Structures

Unit 5: Exploratory Data Analysis Using Python (8 Hours)

- Handling Missing Data
- Data Wrangling
- Processing CSV Data
- Data Visualization: Boxplots, Heat Maps, Scatter Plots, Bubble Charts
- Fortune 500 companies analysis, Loan Data Analysis

Pedagogy

Lab, Mini Projects, Assignments

Mini Projects

- Breast cancer detection using KNN
- Identifying Risky Bank Loans using Decision Tree
- Predicting Medical Expenses using Linear Regression
- Fortune 500 companies profitability over time analysis
- Loan Data Analysis

Online Resources

<https://moderndive.netlify.app/1-getting-started.html>

MOOC

<https://www.coursera.org/learn/python-data-analysis/home/info>

Reference Books

- Machine Learning with R, Brett Lantz, PACKT Publishing
- Python for Data Analysis, Wes McKinney, O'REILLY

Tools

- R 4.0.5 <https://cran.r-project.org/bin/windows/base/>
- R Studio <https://www.rstudio.com/products/rstudio/download/#download>
- Anaconda <https://www.anaconda.com/products/individual#Downloads>

SEMESTER/YEAR : II / I YEAR
COURSE CODE : Value Added Program
TITLE OF THE COURSE : Artificial Intelligence & Data science

Background

AI has the potential to double annual economic growth rates by 2035. To avoid missing out on this opportunity, policy makers and business leaders must prepare for, and work toward, a future with artificial intelligence. Industries will require people who can develop algorithms, have a business understanding to identify problems that can be addressed by AI, and the ethical issues that may arise out of algorithm driven solutions.

Data, Data gathering, Data organisation to draw insights to make actionable sense and then follow through to the end is the reason behind data science. Data and the science that creates business insights is the joint responsibility of business executives as well as IT teams or Data Scientists and Data Engineers. Business executives need to state requirements for data scientists to organize the plumbing required.

Course Objectives

1. To enable students to understand the role of data from multiple perspective in decision making
2. To enable students to understand the importance of data for executive action to join hands with IT Teams to implement data streams from sources, create data structures to store data and be able to harness insights from such stores.
3. Use Analytics and present insights with reasoning.
4. Impart broader understanding about the impact AI can have on business. should enable a student to distinguish between the circumstances where AI can make a difference and circumstances where it will not bring any significant change.
5. Understand Artificial Intelligence technology hype cycle, have a business understanding to identify problems that can be addressed by AI, and the ethical issues that may arise out of algorithm driven solutions.
6. Learn Adoption and policy on AI by governments and top Tech companies

Course Outcomes

On completion of this course the student should be able to:

1. Data gathering and structuring and storing to be able to derive benefits from Data bases, data warehouse/Data Marts, Data Mining, Business Intelligence, OLAP.
2. Use Analytics and present insights with reasoning.
3. Learn Fundamentals of AI, ML, DL concepts along with Robots & Automation
4. Understand concepts of AI governance, ethics and security
5. Worldwide AI adoption and implementation
6. Deep dive into how AI has transformed specific industry segments

Syllabus/Course Outline:

Unit 1: Introduction to Data (7 Hours).

Introduction to features of data, Real and synthetic data, data gathering, data sources, Schema, organizing data, data bases, Relational NoSQL

Unit 2: Data Organisation & Data to Insights (8 hours).

Data Structures, Data Bases, Data Warehouses and Data Marts and ETL, Organisation of data for Data Mining, BI and OLAP, Data Presentation
Business statistics: Descriptive, Predictive and Prescriptive Analytics. Analytics models, graphical, Algebraic and Spreadsheet models. Optimization techniques.

Unit 3: Introduction to Artificial Intelligence- NLP, ML, DL and RPA (8 Hours)

History of AI, AI for business, Fundamentals of AI, Programming language, constitutes of AI; NLP, NLU & NLG; Simple Economics of Machine Intelligence, Specific Machine Learning Methods: A Deep Dive, DL, Robots and Automation

Unit 4: AI Governance, Security and Ethics for business (7 Hours)

AI Governance, Risks with AI, Challenges to Adoption, Security considerations
AI-Driven Business Transformation, Machine Learning

Unit 5: Global impact, Geopolitical and economic importance (6 Hours)

AI & Geopolitical scenario, Economic impact due to AI
Case studies in different streams of management: Marketing, HR, Finance, Service.

Pedagogy

Case Studies, Presentations, Simulations, Field projects, Assignments.

Mini Projects

- Application of AI in manufacturing
- Perspective on future of Healthcare & AI

Case Study for Discussion

GROW: Using Artificial Intelligence to Screen Human Intelligence: Ethan S. Bernstein, Paul D. McKinnon, Paul Yarabe: Harvard Business School

Over 10% of all 2017 university graduates in Japan used GROW, an artificial intelligence platform and mobile app developed by Tokyo-based people analytics start-up IGS, to recruit for a job. This case puts participants in the shoes of IGS founder and CEO Masahiro Fukuhara, a first-time entrepreneur, as he considers the varied ways the "big data" he is collecting is being used--and whether some uses promised more meaningful (or less potentially misleading) impact than others.

By illustrating, in great detail (and with the data), how three companies are using "big data" and artificial intelligence to recruit, screen, hire, place, and develop talent for their organizations, students get a first-hand appreciation for the challenges (and opportunities) of being a hiring manager in the age of "people analytics." This case will help students think through how data

and artificial intelligence can either help managers reduce bias in a hiring process--or, conversely, fall into traps that introduce even more bias over time. By the end of this session, students should have not only a much clearer picture of what it means to use "big data" to hire talent, but also an appreciation for the assets and liabilities involved in doing so.

Text Books:

1. Data Science, Richard Hurley, MIT Press (Essential Knowledge Series)
2. Data Science for Business, Thomas Provost & Tom Fawcett

Reference Books

- Master Data Management & Data Governance, Alex Berson & Larry Dubov – McGraw Hill.
- Introduction to Data Mining with Case studies, GK Gupta - PHI.
- Data Warehousing in the Real World, Sam Anahory & Dennis Murray – Pearson.
- Business Analytics, James Evans – Pearson.
- Wayne Winston, Microsoft Excel Data Analysis and Business Modeling, 5th Edition, Microsoft Press.
- Davenport Thomas H., Competing on Analytics: Updated, with a New Introduction, Harvard Business School Press.

SEMESTER/YEAR : II / I YEAR
COURSE CODE : Value Added Program
TITLE OF THE COURSE : Essentials of Contemporary Marketing in the digital era

Background

In the current order of the world, business firms have started redefining their goals in line with the paradigm shift of new technologies and advent of digitisation. It has become highly inevitable for such business firms to integrate their goals and their activities to remain competitive and successful, and as a result it has become a compelling imperative to redefine their marketing processes as well. Contemporary marketing has evolved for for-profit business organizations. Contemporary marketing holds the secret to organizational success in 2021. Marketing now does not end in merely determining the needs and wants of customers, it goes a step further to answer modern business concerns. Contemporary marketing is a part of this holistic solution.

This value added program hones students with required skills which are required to manage day to day marketing activities in terms of both Digital and Offline Marketing. It provides students with the knowledge about business advantages of the digital marketing and its importance for marketing success; to develop a digital marketing plan; to make SWOT analysis; to define a target group; to get introduced to various digital channels, their advantages and ways of integration; how to integrate different digital media and create marketing content; how to optimize a Web site and SEO optimization; how to create Google AdWords campaigns; social media planning; to get basic knowledge of Google Analytics for measuring effects of digital marketing and getting insight of future trends that will affect the future development of the digital marketing.

Course Objectives

1. To learn the theory and practice of Contemporary Marketing management in the digital era.
2. To understand the advantages and disadvantages of multiple marketing buzzwords.
3. To develop lean strategies by keeping end user a priority provision.
4. To enhance sustainable customer relationship management skills.

Course Outcomes

On completion of this course the student should be able to:

1. Create a usable marketing plan.
2. Create a list of basics required for managing sales.
3. Create a credible digital marketing process.
4. Create a digital marketing plan to do SWOT analysis and defining a target group to track and measure the reach of a product/service.
5. Classify digital channels, their advantages and limitations, to perceiving ways of their integration taking into consideration the available budget to promote product/service in a personalized manner

Syllabus/Course Outline:

Unit 1: Overview of Contemporary Marketing (6 Hours)

Concept, nature, scope and importance of contemporary marketing; Marketing concept and its evolution

Hyper-local marketing, Rural urban marketing, Internal and External Marketing, Conversational marketing, Video Marketing, Influencer Marketing, Omni-channel Marketing, Privacy Marketing, Green marketing.

Unit 2: Contemporary marketing in services sector (6 Hours)

Contemporary perspectives of services (basics+ KYC) Business to consumer services, B2B services, Services capes, blueprinting for design and diagnosis, customer/employees moderating and mediating factors. Managing Services Quality.

Unit 3: E-Commerce marketing (4 hours)

Basics of Ecommerce, Introduction to top E-commerce companies, E-Commerce marketing strategies, Product selling in E-Commerce, CRM in E-commerce

Unit 4 : Digital marketing - Key concepts + SEO + content marketing (15 Hours)

Digital marketing concepts

Introduction to marketing in digital environment, Common e-commerce business models, Pure play, Hybrid and multi-channel options, media options online, fulfilment options and strategies, introduction to payment gateways, PayPal etc

Concepts around PPC, CPC, CPA, Viral marketing, Affiliate marketing, Re-Marketing etc.

SEO/SEM

Email campaign creation and management, Google ad word, search and display engines, pricing models online, introduction to page rankings, Google ad words analytics, search engine optimization, process and methodology, long tail in SEO, link building, key word analysis, process and optimization, search engine marketing, paid versus natural search, SEM landscape, landing pages and their importance in conversion analysis, search methodology.

Content Marketing

Content marketing is a strategic marketing approach focused on creating and distributing valuable, relevant, and consistent content to attract and retain a clearly defined audience – and, ultimately, to drive profitable customer action purely on the digital domain. Digital branding strategy for marketers

Branding definitions , Brand ethos , difference between branding and marketing , digital media impact on branding , create your own brand google website.

Unit 5: Case Study Analysis, Group Assignments , Individual Presentations and Creativities (5 hours)

1. Tata's case study

A marketing case study for the 21st century. This will help Students understand more about TATA as a brand and about ethical marketing effectively,

<http://www.tata.com/aboutus/articlesinside/Ratan-N-Tata>

2. Facebook ads case study

<https://apollodigital.io/blog/digital-marketing-case-studies>

3. Website Content creation

4. Varieties of content writing , - developing an online brand with a website - This will help the student to learn developing a blogging site or branding. It will also help them understand the depth of individual concepts taught throughout the course.

Pedagogy

Case Studies, Presentations, Simulations, Field projects, Assignments

References -

1. Helping you succeed through online marketing. – [Neil Patel Blog](#)
2. Sem Rush SEO Blog -[SEMRush](#)
3. Journal of business research. [Link](#)
4. Philip Kotler Blog – [Link](#)
5. Hubspot- [Link](#)
6. Journal of marketing.[Link](#)

SEMESTER/YEAR : II / I YEAR
COURSE CODE : Value added Program
TITLE OF THE COURSE : Financial Markets and Investment Analysis

Background

The course will provide an understanding of conceptual, strategic and operational issues in the management of financial markets and the need and relevance of investments. The topics covered in the course introduces the students to the basic structure of Indian Financial System. One shall be able to understand the basic structure of commercial banking. Investments being very important for ones financial well being, plays a major role. The course also introduces one to the basics of investments and also makes one knowledgeable regarding the fundamentals before making investment decisions.

The group assignments and presentations enables one to understand the theoretical concepts well.

Course Objectives

1. To provide a fundamental understanding of commercial banks, their management and their operations
2. Explain the significance of fundamental and technical Analysis
3. Create and evaluate a portfolio in terms of risk and return

Course Outcomes

Upon successful completion of this course, the student will have reliably demonstrated ability to:

1. Understand the broad functioning of a bank both at the macro and at micro levels
2. Recognize the framework of securities market and its functioning
3. Develop a conceptual and analytical understanding of the framework of evaluating a bond and equity

Syllabus/Course Outline:

Unit 1: Introduction to Financial Institutions: (7 hrs)

Classification of financial institutions: banks and non-banks (NBFCs), difference between commercial banks and cooperative banks- private and public sector, classification as scheduled and non-scheduled, RRBs, cooperative banks, local area banks non-banking institutions- types of NBFCs--insurance, brokerages, merchant bankers—RBI- functions as currency authority, banker to the government, bankers' bank, other promotional and regulatory functions, nationalization, evolution of commercial bank: growth and progress, commercial banks and Indian economy

Unit 2: Financial Markets: (7 hrs)

Introduction of Financial Markets; Indian Financial System, Trends in commercial banking, digital banking, Case studies of recent bank failures

Unit 3: Financial Investments (6 hrs)

Investments, Need for investments, types of investments, The investment process, investment categories, various investment avenues, objectives and constraints, capital market – primary & secondary, equity & debt, IPO, options, futures, swaps

Unit 4: Decision Criteria for Investments (8 hrs)

Fundamental Analysis-EIC Framework

Technical Analysis-

Fundamental & Technical Analysis of Top 10 companies

Unit 5: Group Assignments and Presentations (8 hours)

1. Risk -Return Profiling of top five companies of selected sectors (Banking, FMCG, Auto, Pharma, IT etc)
2. Comparative Analysis of mutual funds

Analysis of growth trends (considering size, sector, and business lending type) across selected commercial banks (public sector and private sector; 2 of each)

Pedagogy

Case Studies, Presentations, Simulations, Field projects, Assignments

Suggested Books

Investment Analysis and Portfolio Management by Prasanna Chandra, Mc Graw Hill

SEMESTER/YEAR : II / I YEAR
COURSE CODE : Value Added Program
TITLE OF THE COURSE : Information Technology Applications

Background

Information, due to its nature, has numerous capabilities. Through using these capabilities, information systems can add to the value of information. For managers a deep knowledge of information technology systems and solutions in terms of the tools available, technology trends, the key features, how to use these tools effectively, how to automate the business processes using these tools, how to use the right tools for the organization, etc. are extremely important to be effective in their role.

Many large and mid-sized organizations are focussing on accomplishing this goal through the installation of various functional business systems. These broad and complex applications now form the transaction backbone of many organizations in the private, Governmental and non-Governmental sectors. With that background, this course provides a technical overview of information systems such as HR, Finance, Service and Ticket Management Systems and their impact on organizations

This course intends to enhance the skill of managers/entrepreneurs in this regard.

Course Objectives

1. To provide an exposure to the concepts and technologies of Information technology applications in a digital economy
2. To examine the importance of the applications of ERP, CRM and e-tailing applications
3. To understand the key functionalities and features of services and ticket management system

Course Outcomes

The course should help future managers by developing competencies to:

1. Understand the tools and applications of ERP, e-CRM, e-ticketing
2. Understand the different solutions available and select and use the right solution
3. Perform different roles such as Business analysts, Project Manager, IT Manager, Business Consultants

Syllabus/Course Outline:

Unit 1: Overview of ERP (8 Hours)

Introduction to ERP, Implementation of ERP, Post Implementation, ERP Modules, ERP Vendors, Advanced ERP Software Solutions

Unit 2: e-CRM (6 Hours)

Introduction to CRM, e- technologies, Architecture of e-CRM, Challenges involved in implementing e-CRM, e-CRM Solutions for B2B and B2C Market

Unit 3: e-Tailing (6 Hours)

Introduction, Technology architecture of e-tailing, Benefits and challenges of e-tailing, Future of e-tailing, Case Study of Amazon

Unit 4: IT SERVICES (6 Hours)

Helpdesk Management System, Ticket Management System, IT in Hospitality Sector, Retail Sector

Unit 5: Finance and Human Resource Information System (6 Hours)

Payment Methods, Emerging Payment Systems Institutional High value Payments, Block chain, Use of Public Key Infrastructure. Human Resource Information System lifecycle, Tools in HRIS development, Introduction to HRIS packages

Case Study Discussion: (4 Hours)

Case study discussions and presentation

Suggested Coursera Course:

Coursera Course: Technical Support Fundamentals form Google

<https://www.coursera.org/learn/technical-support-fundamentals?specialization=google-it-support#about>

Pedagogy

Case Studies, Presentations, Simulations, Field projects, Assignments

SEMESTER/YEAR : II / I YEAR
COURSE CODE : Value Added Program
TITLE OF THE COURSE : Job Readiness Program in Supply Chain Management

Background

Procurement of ready material plays a great role in the efficient functioning of a supply chain for any company. The course covers the procedural aspects of procurement at a tactical level as well as strategic sourcing, vendor selection, vendor performance and review are critical for a company to make/alter sourcing decisions and the course will cover this aspect as well.

Inventory and Warehouse management of ready material plays a great role in the efficient functioning of a supply chain for any company. Managing inventory effectively is key to the success of a manufacturing or sales/distribution organization. This course covers the commonly used methodology for optimizing inventory levels.

In addition, this course is intended to help students understand standard industry practices used in Demand Management and traditional methods of forecasting. Qualitative aspects of forecasting such as impact of macro factors are covered.

As in all supply chain systems today, use of software and tools is essential. The exercises in this course will be rooted in software tools used in the industry.

Course Objectives

1. Learn the basics of demand management processes in large organizations & hands on use of demand forecasting software tools.
2. Understand the importance of inventory management including cost, service level.
3. Understand the objectives of a purchase department in terms of Total Cost of Ownership, and maintaining optimum inventory levels.
4. Understand key terminology and concepts in inventory management.

Course Outcomes

On completion of this course the student should be able to:

1. Be ready to perform a job role as a Demand Planner in an organization.
2. Be able to analyze data using standard tools and techniques to build forecasting models.
3. Calculate critical parameters related to inventory management and use ABC classification to optimize inventory levels.
4. Be ready to perform a job role as a Procurement Executive in an organization.

Syllabus/Course Outline:

UNIT I: Enterprise demand forecasting, planning and demand management process (8 hours)

Overview of demand management and forecasting in an enterprise using a GMDH Forecasting software. Annual hierarchical planning process for the entire geography and its hierarchy, entire product family and its hierarchy. Manual override of the mathematical forecasts, rolling forecast revision and correction process. Common time series forecasting methods using moving average, regression. Understanding seasonality, trends and exponential smoothing, Measurement of error, Understanding forecast errors and different methods of calculating forecast error.

UNIT II: Traditional Demand forecasting methods (7 hours)

Common time series forecasting methods using moving average, regression. Understanding seasonality, trends and exponential smoothing. The popular Holt-Winter method of forecasting. Measurement of error, Understanding forecast errors and different methods of calculating forecast error.

UNIT III: Key operations in the purchase department (8 hours)

- The importance of lowering the total cost of ownership and managing parts availability at minimum cost.
- Managing delivery commitments to production divisions within the enterprise.

UNIT IV: Inventory Control and Warehouse Management (7 hours)

- Importance of inventory management and challenges involved in it including conflicting goals.
- Cost of carrying inventory, shelf life challenges and storage costs.
- Uncertainties in material supply from vendors and uncertainties of demand.
- Important inventory management methods and policies: Cycle & safety stock, EOQ, Lot Size, Re-order point, etc.
- ABC Classification.

Case Studies

(6Hours)

Case Study 1

Scientific Glass, Inc.: Inventory Management

In January 2010, Ava Beane, the newly hired Manager of Inventory Planning for Scientific Glass (SG), contemplated the critical nature of her first big project with the company. During her interviews for the job, several executives had told her very directly that the company's need for a more effective way to manage its inventory was urgent. At the time, Beane had felt confident she could address the problem quickly and meaningfully. Now on the job for several weeks, Beane was gaining a fuller appreciation of the difficulties of the task.

Until recently, SG had treated inventory management as largely an afterthought. As a fast-growing organization with annual sales of \$86 million, the company historically emphasized the twin goals of continued sales growth and high customer satisfaction. During the past year, however, executives at the company had identified a disturbing trend: Inventory balances were increasing substantially, which tied up extra capital the company needed to fund its growing operations. In recent years the company exceeded its target debt to total capital ratio of 40%. If this trend persisted, it could jeopardize SG's ability to fund a planned expansion into new international markets.

Beane was given four weeks to come up with recommendations on how to make the inventory plan support the company's sales and customer-service objectives without requiring a large capital investment.

CASE Study 2

Raymond: Design of Warehouse Operations

“Raymond being a leader in the industry would settle for nothing but the best practices being followed. Be it either in product innovations, manufacturing supply chain, or customer satisfaction. It was in this context that we were lagging behind in our order fulfilments to our customers. Our internal study showed that our warehouse operations were not robust enough and not aligned to the best practices being followed.” Vinod Padmanabhan, Director – Works, Chhindwara plant.

On 16 July 2014 at 9 a.m., the meeting commenced at the Chhindwara (Nagpur, India) textile plant of Raymond Limited. Avnish Naik, Deputy General Manager (Warehouse), was in a discussion with warehouse management system consultants. They were contemplating how to improve warehouse operations and increase the storage capacity at the plant. In the recent past, Raymond had witnessed a series of order cancellations because of long delays in order fulfillment (the under picking rates were more than 20%). The productivity of picking and inbound processes was declining, and the manpower requirement was at an all-time high with overtime of approximately 5,000 man days per year. Due to lack of substantial organisation of SKUs (stock keeping units) within bins, it took up to 12 days to complete the annual stock audit procedure. The company was at a risk of losing valuable clients if the warehouse management issues were not immediately rectified. Moreover, sales were projected to grow by 40% in the next one year necessitating an expansion of storage space. However, Raymond did not have sufficient funds to acquire land and build new racks at the Chhindwara plant. Naik and his team had to find innovative ways to optimise the storage bin capacity within the existing racking structure.

Pedagogy

Key concepts, Case Studies, Hands-on Lab.

Software tools used

- zoho inventory management: <https://www.zoho.com/in/inventory>
- Precoro Software: <https://www.precoro.com/>
- GMDH streamline: <https://gmdhsoftware.com/>

Reference Books

- **Supply Chain Management**, 7th edition, Pearson Publications, January 2018, by Sunil Chopra, Peter Meindl, Dharam Vir Kalra.
- **Supply Chain Management: Text and Cases**, 2nd edition, Pearson Education India, May 2016, by Janat Shah.

SEMESTER/YEAR : II / I YEAR
COURSE CODE : Value Added Program
TITLE OF THE COURSE : Digital Transformation

Background

Digital transformation is defined as, “using digital technologies to remake a process to become more efficient or effective. The idea is to use technology not just to replicate an existing service in a digital form, but to use technology to transform that service into something significantly better.”

As today’s organizations embrace digital tools to create new processes or modify existing ones, they’ll also inherently impact other important aspects, like workplace culture and customer experience. With digital transformation, companies are re-evaluating everything they do, from internal systems to online and in-person customer interactions.

It’s no secret technology has been a driving force in business transformation for years, but new technologies are now launching faster than ever. In fact, Global spending on the digital transformation of business practices, products, and organizations is forecast to reach \$2.8 trillion in 2025, more than double the amount allocated in 2020.

This course intends to enhance the skill of managers/entrepreneurs in this regard.

Course Objectives

1. To provide an exposure to the concepts of Digital Transformation.
2. To examine the importance of the major technologies impacting digital transformation.
3. To provide overview on how digital transformation is important in industry

Course Outcomes

The course should help future managers by developing competencies to:

1. Understand the need and potential impact of Digital Transformation and learn to adapt to this fast-changing environment.
2. Explore 4 major emerging technologies (Cloud Computing, Internet of Things (IOT), Artificial Intelligence (AI) and Big Data) impacting Digital Transformation
3. Develop understanding of how Digital integrates it into the Business. Understanding on how Digital transformation will help various industries

Syllabus/Course Outline:

Unit 1: Overview of Digital Transformation

2 Hours

Introduction to Digital Transformation. Explain how Digital transformation is the process of using digital technologies to create new or modify existing business processes, culture, and customer experiences to meet changing business and market requirements.

Unit 2: Importance of the major technologies impacting digital transformation 4 Hours

Introduction to following technologies:

1. Cloud Computing,
2. Internet of Things (IOT),
3. Artificial Intelligence (AI) and
4. Big Data

Unit 3: Understanding on how Digital transformation will help various industries 6 Hours

Understand the digital Transformation impact on below industries:

1. Digital Transformation for Banking, financial services and insurance (BFSI)
2. Digital Transformation for Supply Chain Management (OP)

Case Study Discussion:

Case study discussions and presentation

4 Hours

Suggested Coursera Course:

[Digital Transformation | Coursera](#)

14 Hours

Week 1	How Technology Changes Business?	3 hours
Week 2	The Mechanics of Disruption	2 hours
Week 3	Digital Trends Past and Future	5 hours
Week 4	Your Path to Digital Transformation	4 hours

Pedagogy

Case Studies, Presentations, Simulations, Assignments

Text Books:

1. Leading Digital: Turning Technology into Business Transformation, Author(s) Andrew McAfee & George Westerman, Publisher: Harvard Business; ISBN-10 : 9781625272478