



STELLA MARY'S COLLEGE OF ENGINEERING

*(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai, Accredited by
NAAC & NBA (Mech & CSE))*

*Aruthenganvilai, Kallukatti Junction Azhikal Post, Kanyakumari District-629202,
Tamil Nadu*

DEPARTMENT OF MECHANICAL ENGINEERING

ACADEMIC YEAR 2023-2024

Year/Semester: III/06

Subject code/Title: OCS353- Data Science Fundamentals

Year/Semester: IV/07

Subject code/Title: OML351- Introduction to non-Destructive Testing

Subject code/Title: OIM353- Production Planning and Control

ELECTIVE CHOICE WILLINGNESS FORM

*Verified
Sankar*

Head of Department
Department of Mechanical Engineering
Stella Mary's College of Engineering
Aruthenganvilai, Azhikal Post
Kanyakumari District-629 202, Tamil Nadu





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DEPARTMENT OF MECHANICAL ENGINEERING

ELECTIVE COURSE WILLINGNESS FORM

ACADEMIC YEAR: 2023-2024 [EVEN]

YEAR / SEMESTER: III / S6

Register Number	Name of the Student	Students Willingness					
		Subject Code	Subject Code	Subject Code	Subject Code	Subject Code	Subject Code
963521114001	ABINESH A	CCS333	OCE353	OCS353	OME354	OAB52	OAE352
963521114002	ABINESH RAJ S			✓			
963521114003	ABISH S			✓			
963521114004	ABISHEK N				✓		
963521114005	AJAY P S			✓			
963521114006	AJAY BASKAR.K.C			✓			
963521114007	AJIN FRIDOLIN .V			✓			
963521114008	AJIN PRASHANTH.D.G			✓			
963521114009	AKHILAN.J.V			✓			
963521114010	ANISH N			✓			
963521114011	ANISH T			✓			
963521114012	AROCKIA JINESH C			✓			
963521114013	ATHEESH S			✓			
963521114014	BARATH RAJAN P			✓			
963521114015	BEBIN.M			✓			
963521114018	DHANAKOTTI@PRAV EEN S			✓			
963521114019	EDWIN RAJA C			✓			
963521114020	JENISH N J			✓			
963521114022	JEYA SAMUEL J			✓			
963521114023	KANISH M			✓			
963521114024	KEBIJOE K			✓			
963521114025	KRITHIK ROSHAN P			✓			
963521114026	LEEFAN S			✓			
963521114027	LOKESH A			✓			
963521114028	LOVELIN J			✓			
963521114029	MAFIN D P			✓			
963521114031	MARIYAPPAN S			✓			
963521114032	MATHAN A			✓			
963521114033	MEBIL M			✓			
963521114034	MOHAMED AZEEM A			✓			



		Subject Code 01M351		Subject Code 01M353			
963521114035	MOHAMMED SHAHEEN M	✓		✓			
963521114037	MUTHU KUMARAN S	✓		✓			
963521114038	NABEEL A	✓		✓			
963521114039	NITHISH R	✓		✓			
963521114040	PAVISHETH P	✓		✓			
963521114041	RAHUL S	✓		✓			
963521114042	RAHUL V	✓		✓			
963521114043	RAJA LINGAM G	✓		✓			
963521114044	RAMESH T	✓		✓			
963521114045	SABAREESH M	✓		✓			
963521114046	SAJIN M I	✓		✓			
963521114047	SAJU C S	✓		✓			
963521114048	SHERVIN KUMAR S	✓		✓			
963521114049	SILJO G	✓		✓			
963521114050	SUDARSAN U	✓		✓			
963521114051	SUJITH T	✓		✓			
963521114052	SYED HASAN JAHSIR M	✓		✓			
963521114053	THANESH T	✓		✓			
963521114054	VARSHAN J	✓		✓			
963521114055	VASANTH A	✓		✓			
963521114056	VINESH S K		✓	✓			
963521114301	ABINESH S	✓		✓			
963521114302	ASWIN R	✓		✓			
963521114303	DHINESH G S	✓		✓			
963521114304	MANOHAR R	✓		✓			
963521114305	NITHEESH R V	✓		✓			
963521114306	PAULWIN A	✓		✓			
963521114307	PON VIJAYA PRABHU S		✓	✓			
963521114308	RENJU KUMAR U J	✓		✓			
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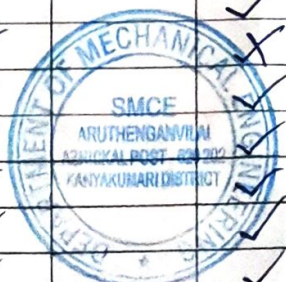
DEPARTMENT OF MECHANICAL ENGINEERING

ELECTIVE COURSE WILLINGNESS FORM

ACADEMIC YEAR: 2023-2024 [Odd]

YEAR / SEMESTER: IV / S7

Register Number	Name of the Student	Students Willingness					
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DEPARTMENT OF MECHANICAL ENGINEERING

ELECTIVE COURSE SYLLABUS

ACADEMIC YEAR: 2023-2024 [EVEN]

YEAR / SEMESTER: III / S6

OCS353

DATA SCIENCE FUNDAMENTALS

LTP C
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COURSE OBJECTIVES:

- Familiarize students with the data science process.
- Understand the data manipulation functions in Numpy and Pandas.
- Explore different types of machine learning approaches.
- Understand and practice visualization techniques using tools.
- Learn to handle large volumes of data with case studies

UNIT -I INTRODUCTION

6

Data Science: Benefits and uses – facets of data - Data Science Process: Overview – Defining research goals – Retrieving data – data preparation - Exploratory Data analysis – build the model – presenting findings and building applications - Data Mining - Data Warehousing – Basic statistical description of Data

UNIT-II DATA MANIPULATION

9

Python Shell - Jupyter Notebook - IPython Magic Commands - NumPy Arrays-Universal Functions– Aggregations – Computation on Arrays – Fancy Indexing – Sorting arrays – Structured data – Data manipulation with Pandas – Data Indexing and Selection – Handling missing data – Hierarchical indexing – Combining datasets – Aggregation and Grouping – String operations – Working with time series–High performance

UNIT-III MACHINE LEARNING

5

The modeling process-Types of machine learning - Supervised learning - Unsupervised learning- Semi-supervised learning- Classification, regression - Clustering – Outliers and Outlier Analysis

UNIT-IV DATA VISUALIZATION

5

Importing Matplotlib–Simple line plots–Simple scatter plots–visualizing errors–density and contour plots–Histograms–legends, colors–subplots–text and annotation–customization– three dimensional plotting - Geographic Data with Basemap - Visualization with Seaborn

UNIT-V HANDLING LARGE DATA

5

Problems - techniques for handling large volumes of data – programming tips for dealing with large data sets-Case studies: Predicting malicious URLs, Building a recommender system - Tools and techniques needed -Research question - Data preparation -Model building –Presentation and automation.

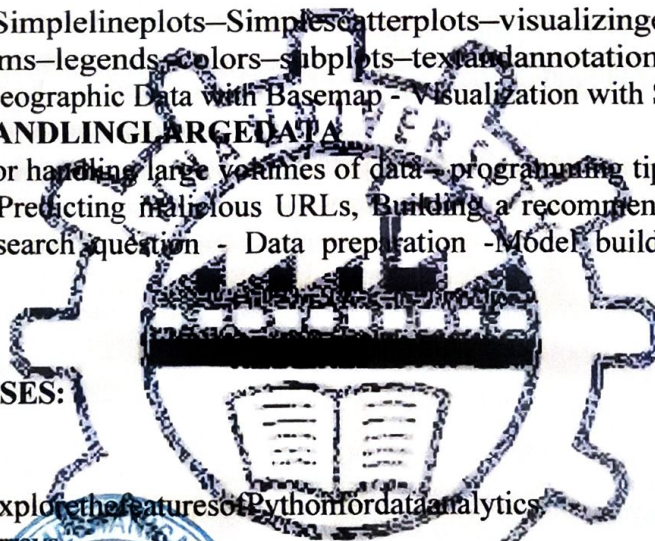
30 PERIODS

PRACTICAL EXERCISES:

30 PERIODS

LAB EXERCISES

1. Download, install and explore the features of Python for data analytics
2. Working with Numpy arrays
3. Working with Pandas data frames
4. Basic plots using Matplotlib
5. Statistical and Probability concepts
 - a) Frequency distributions
 - b) Mean, Mode, Standard Deviation
 - c) Variability
 - d) Normal curves
 - e) Correlation and scatter plots



PROFESSOR THROUGH KNOWLEDGE

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ELECTIVE COURSE SYLLABUS

ACADEMIC YEAR: 2023-2024 [Odd]

YEAR / SEMESTER: IV / S7

OML351

INTRODUCTION TO NON-DESTRUCTIVE TESTING

LTPC
3003

COURSE OBJECTIVES:

The main learning objective of this course is to prepare the students for:

- Understanding the basic importance of NDT in quality assurance.
- Imbibing the basic principles of various NDT techniques, its applications, limitations, codes and standards.
- Equipping themselves to locate a flaw in various materials, products.
- Applying the testing methods for inspecting materials in accordance with industry specifications and standards.
- Acquiring the knowledge on the selection of the suitable NDT technique for a given application

UNIT-I INTRODUCTION TO NDT & VISUAL TESTING

9

Concepts of Non-destructive testing - relative merits and limitations - NDT Versus mechanical testing, Fundamentals of Visual Testing – vision, lighting, material attributes, environmental factors, visual perception, direct and indirect methods – mirrors, magnifiers, boroscopes and fibroscopes – light sources and special lighting.

UNIT-II LIQUID PENETRANT & MAGNETIC PARTICLE TESTING

9

Liquid Penetrant Inspection: principle, applications, advantages and limitations, dyes, developers and cleaners, Methods & Interpretation.

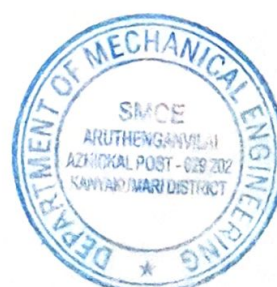
Magnetic Particle Inspection: Principles, applications, magnetization methods, magnetic particles, Testing Procedure, demagnetization, advantages and limitations, – Interpretation and evaluation of test indications.

UNIT-III EDDY CURRENT TESTING & THERMOGRAPHY

9

Eddy Current Testing: Generation of eddy currents – properties – eddy currents sensing elements, probes, Instrumentation, Types of arrangement, applications, advantages, limitations – Factors affecting sensing elements and coil impedance, calibration, Interpretation/Evaluation. Thermography- Principle, Contact & Non-Contact inspection methods, Active & Passive methods, Liquid Crystal – Concept, example, advantages & limitations. Electromagnetic spectrum, infrared thermography- approaches, IR detectors, Instrumentation and methods, applications.

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UNIT-IV

ULTRASONIC TESTING & AET

9

Ultrasonic Testing: Types of ultrasonic waves, characteristics, attenuation, couplants, probes, EMAT. Inspection methods-pulse echo, transmission and phased array techniques, types of scanning and displays, angle beam inspection of welds, time of flight diffraction (TOFD) technique,

Thickness determination by ultrasonic method, Study of A, B and C scan presentations, calibration. Acoustic Emission Technique —Introduction, Types of AE signal, AE wave propagation, Source location, Kaiser effect, AE transducers, Principle, AE parameters, AE instrumentation, Advantages & Limitations, Interpretation of Results, Applications.

UNIT-V

RADIOGRAPHY TESTING

9

Sources-X-rays and Gamma rays and their characteristics-absorption, scattering. Filters and screens, Imaging modalities-film radiography and digital radiography (Computed, Direct, Real Time, CT scan). Problems in shadow formation, exposure factors, inverse square law, exposure charts, Penetrators, safety in radiography.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

After completion of this course, the students will be able to:

1. Realize the importance of NDT in various engineering fields.
2. Have a basic knowledge of surface NDT techniques which enable to carry out various inspection in accordance with the established procedures.
3. Calibrate the instrument and inspect for in-service damage in the components by means of Eddy current testing as well as Thermography testing.
4. Differentiate various techniques of UT and AE and select appropriate NDT methods for better evaluation.
5. Interpret the results of Radiography testing and also have the ability to analyse the influence of various parameters on the testing.

TEXTBOOKS:

1. Baldev Raj, T. Jayakumar and M. Thiravandhan, Practical Non Destructive Testing, Alpha Science International Limited, 3rd edition, 2002.
2. J. Prasad and C. G. K. Nair, Non-Destructive Test and Evaluation of Materials, Tata McGraw- Hill Education, 2nd edition, 2011.
3. Ravi Prakash, "Non-Destructive Testing Techniques", 1st revised edition, New Age International Publishers, 2010.

REFERENCES:

1. ASME Metals Handbook, V-17, "Nondestructive Evaluation and Quality Control", American Society of Metals, USA, 2001.
2. Barry Hull and Vernon John, "Nondestructive Testing", Macmillan, 1989.
3. Chuck Hellier, "Handbook of Nondestructive Evaluation", McGraw Hill, 2012.
4. Louis Cartz, "Nondestructive Testing", ASM International, USA, 1995.



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COURSE OBJECTIVES:

- To understand the concept of production planning and control act work study,
- To apply the concept of product planning,
- To analyze the production scheduling,
- To apply the Inventory Control concepts.
- To prepare the manufacturing requirement Planning (MRP II) and Enterprise Resource Planning (ERP).

UNIT-I INTRODUCTION

9

Objectives and benefits of planning and control-Functions of production control-Types of production-job- batch and continuous-Product development and design-Marketing aspect - Functional aspects-Operational aspect-Durability and dependability aspect aesthetic aspect. Profit consideration-Standardization, Simplification & specialization- Break even analysis-Economics of a new design.

UNIT-II WORKSTUDY

9

Method study, basic procedure-Selection-Recording of process - Critical analysis, Development - Implementation - Micro motion and memo motion study —work measurement - Techniques of work measurement - Time study - Production study - Work sampling - Synthesis from standard data - Predetermined motion time standards.

UNIT-III PRODUCT PLANNING AND PROCESS PLANNING

9

Product planning-Extending the original product information-Value analysis-Problems in lack of product planning-Process planning and routing-Prerequisite information needed for process planning-Steps in process planning-Quantity determination in batch production-Machine capacity, balancing- Analysis of process capabilities in a multi product system

UNIT-IV PRODUCTION SCHEDULING

9

Production Control Systems-Loading and scheduling-Master Scheduling-Scheduling rules-Gantt charts-Perpetual loading-Basic scheduling problems-Line of balance—Flow production scheduling-Batch production scheduling-Product sequencing—Production Control systems-Periodic batch control-Material requirement planning kanban—Dispatching-Progress reporting and expediting-Manufacturing leadtime-Techniques for aligning completion times and due dates.

UNIT-V INVENTORY CONTROL AND RECENT TRENDS IN PPC

9

Inventory control-Purpose of holding stock-Effect of demand on inventories-Ordering procedures. Two bin system - Ordering cycle system-Determination of Economic order quantity and economic lot size-ABC analysis - Recorder procedure-Introduction to computer integrated production planning systems-elements of JUST IN TIME SYSTEMS-Fundamentals of MRP II and ERP.

TOTAL:45 PERIODS

COURSE OUTCOMES:

Upon completion of this course,

CO1: The students can able to prepare production planning and control act work study, CO2: The students can able to prepare product planning,

CO3: The students can able to prepare production scheduling,

CO4: The students can able to prepare Inventory Control.

CO5: They can plan manufacturing requirements manufacturing requirement Planning (MRP II) and Enterprise Resource Planning (ERP).

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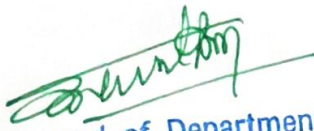


TEXTBOOKS:

1. James. B. Dilworth, "Operations management – Design, Planning and Control for manufacturing and services" McGrawHill International edition 1992.
2. Martand Telsang, "Industrial Engineering and Production Management", First edition, S. Chand and Company, 2000.

REFERENCES

1. Chary. S.N., "Theory and Problems in Production & Operations Management", Tata McGraw Hill, 1995.
2. Elwood S. Buffa, and Rakesh K. Sarin, "Modern Production / Operations Management", 8th Edition John Wiley and Sons, 2000
3. Jain. K.C. & Aggarwal. L.N., "Production Planning Control and Industrial Management", Khanna Publishers, 1990
4. Kanishka Bedi, "Production and Operations management", 2nd Edition, Oxford university press, 2007.
5. Melynk, Denzler, "Operations management – A value driven approach" Irwin McGraw hill.
6. Norman Gaither, G. Frazier, "Operations Management" 9th Edition, Thomson learning IE, 2007
7. Samson Eilon, "Elements of Production Planning and Control", Universal Book Corp. 1984
8. Upendra Kachru, "Production and Operations Management – Text and cases" 1st Edition, Excel books 2007


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