ANNA UNIVERSITY, CHENNAI

UNIVERSITY DEPARTMENTS

VALUE ADDED COURSES

SL. NO	COURSE CODE	COURSE NAME	COURSE OFFERED DEPARTMENT
1.	VA7001	Tools for Sustainable Design	Department of Architecture
2.	VA7002	Monsoon Assemblages Student Design Workshop	Department of Architecture
3.	VA7003	Basics of Machine Learning using Python	Department of Industrial Engineering
4.	VA7004	Big Data Analytics & Business Intelligence	Department of Computer Science and Engineering
5.	VA7005	Design of Electrical Apparatus using Cad Software	Department of Electrical and Electronics Engineering
6.	VA7006	Advances in Aquifer Characterization and Parameter Estimation	Department of Geology
7.	VA7007	Life cycle testing of Refrigerant Compressors	Department of Mechanical Engineering

Attested

DIRECTOR
Centre For Academic Courses
Anna University, Chennai-600 025.

VA7001 **TOOLS FOR SUSTAINABLE DESIGN**

Industry standards and benchmarks shall be discussed where appropriate. Simple and effective tools such as Climate Consultant and Solar Tool will be showcased. The workshop will give an opportunity to validate their intuitive design thinking with objective analysis to test the intended building performance.

LEARNING OBJECTIVES

Key take-away from the course will be

1. Clarity in building science fundamentals.
2. Confidence in using technical terms.
3. Undertake comprehensive climate analysis.
4. Identify appropriate passive design strategies for a climate.
5. Clarity of solar geometry.
6. Know-how to determine shading requirements.
7. Rules-of-thumb for daylighting.
8. Correlate theory and practical applications.

COURSE MODULES

Climate Analysis and Building Physics
Module 1 – Climate Analysis o Climate Variables o Fundamentals of Psychometric chart o Use bio climatic chart to identify passive design measures o Heat load Vs Energy use o Application of intuitive passive design strategies **Module 2 – Building Physics** o Heat transfer in Buildings o Key material properties o Glazing & design criteria o Quiz

Attested

DIRECTOR
Centre For Academic Courses
Anna University, Chennai-600 025.

PASSIVE DESIGN: SOLAR SHADING FOR BUILDINGS

DAY 2: Solar Shading for Buildings

DURATION: 9:30am to 1:00pm

EDS RESOURCE: 2 Faculty for a class size of 40 students.

COURSE REQUIREMENT: Class room set up with LCD projector and screen. All participants should bring their laptops or have access to a computer.

ANALYTIC METHODOLOGY: Prescriptive and Software

COURSE DESCRIPTION

This course covers fundamentals of solar geometry, shading strategies using quick calculations, rules of thumb and software tools that will have direct application in practice. It will further strengthen the concepts of passive solar design.

This course will cover two software tools – Ecotect for the purpose of analysis. The interface & interoperability of the tool will be explained in detail along with a step by step guide on how generate shading masks, sun paths and run isolation analysis.

This course is designed to be highly interactive and hands-on. Participants will work on many exercises using our custom worksheets, physical models and software tools switching between pen –paper media and the computer. This method will ensure effective learning of theory and introduce a new perspective of using a software tool.

LEARNING OBJECTIVES

At the end of this course, participants will be able to conduct a complete daylight assessment for simple geometries. Key take-away from the course will be

1. Clarity of basic theory on solar geometry.
2. Understanding of impact of shading devices on daylighting.
3. Optimizing shading elements.
4. Awareness on different daylighting techniques.
5. Framing queries and developing methodology for analysis.
6. Inferring simulation results to provide meaningful inputs for design.
7. Identifying recommendations to improve daylighting in buildings.

Participants will learn tools & techniques required to setup, run simulations, extrapolate and analyse the results. Prescriptive methods using various quick calculations, rules of thumb will be taught to check the reliability of software tools and results generated which will prove useful in practice.

Attested

DIRECTOR
Centre For Academic Courses
Anna University, Chennai-600 025.

LEARNING OBJECTIVES

At the end of the course, participants will be able to conduct a complete daylight simulation & read results using a simple building model. Key take-away from the course will be

1. Clarity of basic theory on illuminance & daylight factor.
2. Understanding of impact of envelope & facade design on daylight.
3. Basic modelling, setting up & conducting daylight simulation using Radiance.
4. Aptitude in conducting simulations and troubleshooting.
5. Result extrapolating, examination & quantification of results.
6. Inferring simulation results to provide meaningful inputs for daylight design.
7. Identifying recommendations to optimise performance through design solutions.

COURSE MODULES

Daylight design & Guidelines

Module 1 – Working Session I – Daylighting Terminologies

- Introduction to basic terminologies in lighting – illuminance, illuminance, daylight factor, glare
- Glazing – types, properties and criteria for selection
- Design strategies for daylighting & Design guidelines for fenestrations
- Quiz, Exercise
- Demonstration of building simulation tool – GUI, geometry set up, material applications
- Demonstration of Radiance simulations – Importing geometry, simulations, visualization options

Module 2 – Working Session II – Shading Devices

- Build a model as per given data
  - Run Radiance simulations
  - Visualization options
  - Parametric runs, discussion of results
- Exercise: daylight assessment for a given project
  - Derive recommendations for better daylighting design
- Discussion of results, inferences Daylight requirements in LED, GRIHA, IGBC Green Homes
- Compliance methods
- Q&A session

Attested

DIRECTOR
Centre For Academic Courses
Anna University, Chennai-600 025.

PASSIVE DESIGN: REVIEW & STUDIO PROJECT APPLICATION

DAY 4: Review & Studio Project application

DURATION: 9:30am to 1:00pm

EDS RESOURCE: 2 Faculty for a class size of 40 students

COURSE REQUIRMENT: Class room set up with LCD projector and screen. All participants should bring their laptops or have access to a computer.

ANALYTIC METHODOLOGY: Software

COURSE DESCRIPTION

After a brief review, a studio sample project will be introduced in this working session encouraging participants to utilize tools covered over the past 3 days. Students will be tasked to analyse a given sample project introduce a shading device, optimise shading performance, setup & run interior daylight simulations and present their findings to the class. In doing this students learnt to critically analyse a given design problem and apply tools and technique to quantify their solutions by generating clear data outcomes.

6. PROPOSED FEE AND TERMS

EDS Pvt Ltd. Shall conduct the Tools for sustainable design training program for School of Architecture & Planning, Anna University as per the following.

Task	Fee
Tool for Sustainable design program – DAY 1 – Passive Design: Climatic Analysis DAY 2 – Passive Design: Solar Shading for buildings DAY 3 – Passive Design: Daylight design in buildings DAY 4 – Review & Studio project application **Conducting 4 day training program (INR 20,000 per day)**	INR 80,000

Roles and Responsibilities of EDS:

1. Develop the course content.
2. Provide appropriate number of faculty for the course.
3. Provide exercise worksheets and reference material as appropriate for the program.
4. A copy of all course materials at the end of the course.
5. E-Certificate of completion to all participants.

Roles and Responsibilities of College:

1. Travel and accommodation for EDS faculty.
2. Arrange for photographic documentation of the program.
3. Coordination of participants to attend.
4. Logistics including venue and food.
5. Program requirements as outlined in the ‘Course Requirements’ section.

Attested

DIRECTOR
Centre For Academic Courses
Anna University, Chennai-600 025.

VA7002 MONSOON ASSEMBLAGES STUDENT DESIGN WORKSHOP

Overall Description

This is a one credit course, structured over 5 days, totaling 6 hours of lectures and 18 hours of field surveys and studio work. Its overall aim is to survey and map how monsoon rain enters the physical and social fabric on 5 sites in Chennai, the infrastructures and institutions that channel, mediate and manage this, and the publics they give rise to; to expose points at which they are under stress or failing, whom they are failing and why, and to intervene at these points through design.

The course will start with the questions: how does water enter and exit the boundaries of the site? Where does it come from and when? How has this changed over time? What are its seasonal variations? What are its shapes, uses and interactions with the cultural, social, political and economic life of the neighborhood? Who or what determine these interactions? It is anticipated that this will open up questions of geomorphology, water retention v flow, the dynamics of coastal and rain based flooding; political and economic organization and agency, overlapping national, state and urban politics, plans, policies and administrations; urbanization, globalization; neighborhood politics; water access, water scarcity, privatization of water and other issues involving water as a political medium. These questions will be discussed as they arise in the course of the five days.

The first two days of the program comprise lectures in the morning and field surveys in the afternoon; days three and four comprise four hours of supervised studio work undertaken in groups of four to six students; on day five, the strategies developed by these groups will be reviewed by a panel of experts.

Optional tours are offered as part of the program for an additional fee, to encourage social interaction between students of the two institutions.

Day 1 Introduction to Monsoon Assemblages, Methodologies and Techniques
Field Surveys 1
Day 2 Chennai Planning, Water and Waste Management Practices
Field Surveys 2
Day 3 Studio 1: Analysis and Problem Definition
Day 4 Studio 2: Design Strategy
Day 5 Studio 3: Final Review

	MONSOON ASSEMBLAGES CHENNAI ANNA UNIVERSITY, SCHOOL OF ARCHITECTRUE AND PLANNING UNIVERSITY OF WESTMINSTER, DEPARTMENT OF ARCHITECTURE, MONASS PROJECT				
	1 credit, 15 contact hour course, 05-09 December 2016				
	Monday 05 December	Tuesday 06 December	Wednesday 07 December	Thursday 08 December	Friday 09 December
9.30	Lecture 1:LB:Intro	Lecture 4:Chennai Plan Expert	Studio 1:Analysis + Problem Definition	Studio 2:Design strategy	Studio 3: Final Review
10.30	Lecture 2: MV:Site Mapping	Lecture 5: Chennai Water Expert		Studio 2:Design strategy	Studio 3: Final Review
11.30	Lecture 3: BC:Ethnography	Lecture 6: Chennai Waste Expert	Studio 1:Analysis+Problem Definition	Studio 2:Design strategy	Studio 3: Final Review
12.30	Lunch	Lunch	Studio 1:Analysis+Problem interim Review 1	Interim Review 2	Lunch
13.30	Divide into groups	Field Surveys 2	Lunch		
14.30	Field Surveys 1	Field Surveys 2	Free/additional field work	Free/additional presentation work	Optional Walking Tour Triplicane Heritage Walk, 3 hrs (http://www.chennaimagic.com
15.30	Field Surveys 1	Field Surveys 2			
16.30	Field Surveys 1	Field Surveys 2			
Evening	Free	Free	Optional Evening Walking Tour Mylapore Walk, 2 hrs (http://www.chennaimagic.com	Optional Evening Walking Tour Georgetown Bazaar, 2 hrs (http://www.chennaimagic.com	Free

Attested

DIRECTOR
Centre For Academic Courses
Anna University, Chennai-600 025.

Detailed description of the program is given below. One SAP faculty supervisor will be required for the duration of the course, with 2 for field surveys on Day 1.

Day 1 a.m. Introduction to Monsoon Assemblages, Methodologies and Techniques

Duration : 9.30 – 12.30, with lunch, 12.30 – 13.30.
Faculty : Professor Lindsay Bremner, Dr Michele Vianello, Dr Beth Cullen + 1 SAP faculty Supervisor, for class size of 30 (20 UofW students, 10 SAP students).
Requirements: Classroom set up with LCD projector and screen; lunch for 34 people.
Delivery: Presentations with question and discussion time.
Description: Three lectures to introduce participants to the Monsoon Assemblages project, its research and design methodologies and its field survey techniques, to be put into practice over the remainder the five day course.

Learning Objectives:

Understanding of objectives and methodologies of the Monsoon Assemblages project.
Understanding of measurements and types of data to be gathered.
Understanding of appropriate field survey and measurement techniques.
Awareness of ethics of field work and community engagement.

Pm. Field Surveys 1.

Duration: 13.30 – 17.00
Faculty Professor Lindsay Bremner, Dr. Michele Vianello, Dr Beth Cullen + 2 SAP faculty supervisors for visits to 5 sites simultaneously (4-6 students +1 faculty / site).

Requirements: Identification of sites; authorization for visits to each site from community organizations/NGO's/municipal authorities; transportation to and from 5 sites for 4-6 students +1 faculty/site; participants to bring their own cameras, video cameras, sketch books, note books or other measuring and recording equipment.
Delivery: Authorised, supervised field surveys of 5 sites in Chennai.
Description: Site visits for purposes of field surveys of 5 sites in Chennai
.
Learning Objectives:

Self-organisation of the participant group for survey purposes.
Gathering of field data and measurements of various sorts (Visual, audio, affective, social, institutional) using appropriate techniques.
Practice of ethical field work practice.

Day 2 am. Chennai Planning, Water and Waste Management Practices

Duration: 9.30 – 12.30, with lunch, 12.30 – 13.30.
Faculty : Professor Lindsay Bremner, Dr Michele Vianello, Dr Beth Cullen + 1 SAP faculty supervisor +3 Chennai experts, for class size of 30 (20 UofW students, 10 SAP students).
Requirements: Class room set up with LCD projector and screen; lunch for 37 people.
Delivery: Presentations with question and discussion time.
Description: Three lectures by experts to introduce students to planning, water and waste management institutions, instruments and practices in Chennai.

Attested

DIRECTOR
Centre For Academic Courses
Anna University, Chennai-600 025.

Learning Objectives:

Introduction to planning institutions, instruments and practices in Chennai.
Introduction to water and waste management institutions, instruments and practices in Chennai.

Pm. Field Surveys 2

Duration: 13.30 – 17.00
Faculty Professor Lindsay Bremner, Dr Michele Vianello, Dr Beth Cullen + 1 SAP faculty supervisor
Requirements: Identification of sites; planning of and authorization for visits to water and waste management facilities in Chennai; transportation to and from sites for 30 students and 4 faculty.
Delivery: Authorised, supervised site visits conducted by relevant authority
Description: Site visits to 1-3 water and waste management facilities in Chennai.

Learning Objectives:

First hand exposure to water and waste management facilities in Chennai.
Gathering of field data and measurements of various sorts (visual, audio, affective, social, institutional) using appropriate techniques.
Practice of ethical field work practice.

Day 3

Studio 1: Analysis and Problem Definition
Duration 9.30 -13.30, with lunch, 13.30 – 14.30.
Faculty Professor Lindsay Bremner, Dr Michele Vianello + 1 SAP faculty supervisor
Requirements: Studio space for 30 students in 5 groups; site maps; newsprint; internet access; printing facilities; pin-up facilities; participants to bring their own laptops and drawing instruments; lunch for 33 people.
Delivery: Supervised design workshops, concluding with an interim review.
Description: Students to work in groups on sites visited on Day 1 to identify, on the basis of data gathered and internet surveys, how water enters and exits the boundaries of the site; where it comes from and when; how has this changed over time; what its seasonal variations are; what its shapes, uses and interactions with the cultural, social, political and economic life of the neighborhood are; and who or what determine these interactions; points at which these interactions are under stress or failing, whom they are failing and why.

Learning Objectives:

Productive self-organisation of the participant group so that all members have a role and are able to contribute to the analytical project.
Archiving of site data for group to access.
Identification of scenarios for design intervention i.e. sites where interactions between water and the social, political and economic life of a neighborhood are failing or under stress.
Pin-up presentation of design scenarios through analytical drawings and diagrams. Identification of missing data for gathering before Day 4 and who responsible for this.

Attested

DIRECTOR
Centre For Academic Courses
Anna University, Chennai-600 025.

Day 4

Studio 2: Design Strategy

Duration: 9.30 – 13.30, with lunch, 13.30 – 14.30.

Faculty Professor Lindsay Bremner, Dr Michele Vianello + 1 SAP faculty supervisor

Requirements: Studio space for 30 students in 5 groups; site maps; newsprint; internet access; printing facilities; pin-up facilities; participants to bring their own laptops and drawing instruments; lunch for 33 people.

Delivery: Supervised design workshops, concluding with an interim review.

Description: Students to work in groups on sites visited on Day 1 to develop, design strategies that intervene at points where interactions between water and urban life are failing or under stress; this will require developing design interventions within an only partially knowable set of circumstances, not through large scale plans, but through plans arising from spatial narratives, social interactions and urban experiences on the ground.

Learning Objectives:

Productive self-organisation of the participant group so that all members have a role and are able to contribute to the design strategy.

Speculation on how design might reassemble relations between water, wing, topography, buildings, people, animals, politics, economics, community organization etc. towards more resilient forms of urban life.

Pin-up interim presentation of design strategy in diagrams, drawings or other media. Identification of additional presentation material required for Day 5 and who responsible for this.

Day 5

Studio 3 final Review

Duration: 9.30 – 12.30, with lunch, 12.30 – 13.30.

Faculty Professor Lindsay Bremner, Dr Michele Vianello, Dr Beth Cullen + 1 SAP faculty supervisor and guest reviewers.

Requirements: Pin-up facilities; LCD projector and screen; morning coffee/tea for faculty and guests, lunch for 40 people.

Delivery: Student presentations, review by faculty and guests.

Description: Students to present field work, analytical drawings and diagrams and diagrams and drawings of design strategies for discussion and review.

Learning Objectives:

Productive self-organisation of the group so that all members contribute to the group presentation.

Coherent verbal and graphic presentation of group field work, analytical drawings and diagrams and design strategy using a range of media.

4. PROPOSED FEE AND TERMS

Course Fee:

Numbers: A maximum of 10 places are available for this course, along with 20 students from the M.Arch. course at the University of Westminster.

Attested

DIRECTOR
Centre For Academic Courses
Anna University, Chennai-600 025.

Roles and responsibilities of Visiting Faculty:
Development and delivery of course content.

Roles and Responsibilities of Anna SAP:
Marketing of course to Anna students.
Logistics of venues, lunches (all days) and tea/coffee (Day 5)
Assistance in identification of sites, authorization for site visits and expert speakers.
Transport arrangements for site visits.
One SAP faculty supervisor for the duration of the course, with 2 for field surveys on Day 1.
Certificate of Completion to Anna students.

Professor Lindsay Bremner
I.bremner@westminster.ac.uk
15 July 2016

Attested

DIRECTOR
Centre For Academic Courses
Anna University, Chennai-600 025.

VA7003 BASICS OF MACHINE LEARNING USING PYTHON

OBJECTIVES

- To improve programming proficiency of the students with respects to data analytics in python
- To introduce statistical methods like regression and classification and how it can be applied to industry related problems using Python.

UNIT I INTRODUCTION TO DATA ANALYTICS 2+1=3

Evolution of Data Analytics – Tools and Techniques – Industrial Applications (Hands on) – Case Studies on Large Implementation.

UNIT II PROGRAMMING IN PYTHON 2+1=3

Python Environment Basics – Ipythonnotebook – Data Types – Control Structure – Loops – List Comprehensions – Functional Programming (Hands on) – Basic Libraries – Dataframes – Filtering – Joins

UNIT III LINEAR REGRESSION 2+1=3

Regression Concepts – Case Discussion – Hypothesis Formation – Data Exploration – Feature Engineering – Model Building (Hands on) – Visualizing Results – Creating Business Rules – Communication Results

UNIT IV LOGISTIC REGRESSION 2+1=3

Logistic Regression Concepts – Case Discussion – Hypothesis Formation – Data Exploration – Feature Engineering – Model Building – Visualizing Results – Introduction to Data Science Competition – Submitting Results – Hands-On – Assessment.

UNIT V ENSEMBLE METHODS 2+1=3

Decision Trees – Ensemble Concepts – Random Forest – Parameter Tuning – Case Discussion – Model Building – Hands – On – Assessment

Total=10+5+15 hrs

TEXT BOOKS:

1. David Beazley and Brain K. Jones, Python Cookbook, Third Edition O'Reilly Publication (2015).
2. Allen B Downey, Think Stats – Probability and Statistics for Programmers, Second Edition O'Reilly Publication(2014)

Attested

DIRECTOR
Centre For Academic Courses
Anna University, Chennai-600 025.

VA7004 BIG DATA ANALYTICS & BUSINESS INTELLIGENCE

UNIT I

Business Intelligence (BI) – Business Pressure responses – Support Model. Business Environment Factors – Organizational Responses – Decision Making Process – BI Framework – Analytical Applications – Business Analytics. Basics Analytics – Correlation and Regression – Anova – Regression Analysis – Two Sample Unequal variance. Business Intelligence Modelling – Modelling Process – Heuristics of BI – Taxonomy of Data – Art and Science of Data preprocessing – Statistical Modelling for Business Analytics – Descriptive Statistics – Technology Insights – Inference Statistics – Regression Modelling – Applications.

UNIT II

Data warehousing – Characteristics – Data Mart – Generation Framework – Web based Architecture – Data Integration (ETL) – OLAP Vs OLTP – Data Lakes – Applications – Business Performance Management. Data Provisioning – data cube – Conceptual Modelling – Star Schema – Modelling – ETL Overview – Staging – Requirements – Package – Extraction – Analysis – Data Discovery – Transformation - Loading. Data Mining – Characteristics and Objectives – Applications.

UNIT III

Data Visualization - Business Report – Data Visualization and Visual Analytics – Applications – Visualization Taxonomy – Chart Taxonomy – Tools and Demos. Applications of BI – Big Data Analytics – Benefits – Technologies and Tools – Cloud Based Solutions and Challenges – Business Priority – Research issues – Case Studies and Evaluation.

UNIT IV

Data Mining – Temporal DM – Associative Analysis – Apriori Algorithm – FP Tree – Sequence Mining – Sequential Pattern Mining – Case Studies – Episode Mining. Linear Models in R – Variable Selection – Im Fit – Statistical Learning – Examples – Estimates and Prediction – Parametric methods and Non-parametric Methods. Linear Regression – Least Square fit – Classification Methods – Multiple Logistic Regression – LDA and QDA – Resampling methods – Validation Approaches – Decision trees – Classification Trees – Bagging and Random Forests – Support Vector Machines and Clustering.

UNIT V

Big Data Analytics – Types of Analytics – Business Intelligence Use Cases – Industry Perspective. Machine Learning – Design – Challenges – Tools and Techniques – Frequent Item set Mining and Association Rules – Finding Similar Items – Shingling, set and Boolean Matrix. Text Mining – Features – Classification and Clustering – Business Applications. NLP – NLP for web – Big Data – Business Intelligence Application – CRM – NLP operations in Text Mining – Stages in NLP – Entity Search and Linked Open data.

Attested

DIRECTOR
Centre For Academic Courses
Anna University, Chennai-600 025.

VA7005 DESIGN OF ELECTRICAL APPARATUS USING CAD SOFTWARE

OBJECTIVES:

- To impart knowledge on design of various electrical apparatus using computer based design.
- To introduce the finite element software package for the design of electrical apparatus.
- To develop the 2D and 3D modelling skills of electrical machines.
- To get familiarized with the 2D and 3D thermal modelling of electrical machines.

UNIT I INTRODUCTION TO CAD PACKAGE T=2 P=2

Elements of CAD System – Pre-processing – Modelling – Meshing – Material properties.

UNIT II TWO DIMENSIONAL AND THREE DIMENSIONAL ANALYSIS OF ELECTRICAL MACHINES T=6 P=6

2D modelling: Modelling – Material Modelling – Boundary Conditions – Coils and Circuits, Modelling Tool box – Design and Performance analysis of permanent magnet DC motor and Induction motor using MagNet 2 D

3D modelling: Modelling – Meshing and Mesh Adaption – Solving and Post Processing, Results & Accuracy-Parameterization – Scripting – Design of permanent magnet dc motor and Induction motor using MagNet 3D-Performance analysis of permanent magnet DC motor and Induction motor using magnet 3D

UNIT III THERMAL ANALYSIS OF ELECTRICAL MACHINES T=2 P=2

Thermal Modelling of electrical machines – Applying Boundary Conditions – Result analysis

OUTCOMES:

Ability to develop the design and modelling of electrical machines and improve the thermal analysis of electrical machines.

VA7006 ADVANCES IN AQUIFER CHARACTERIZATION AND PARAMETER ESTIMATION

Aquifer characterization methods – Electrical resistivity methods – Self potential methods, Induced potential methods – Wenner methods – Schlumberger methods. Electrical profiling – vertical electrical sounding – case studies. Electromagnetic methods – Ground Penetrating Radar and Gravity methods – Gravity Recovery and Climate Experiment – Nuclear Magnetic Resonance. Electrical logging methods – lateral log – latero log, guard and micro resistivity log.

Groundwater resource management – case studies – Estimation of hydraulic conductivity – experimental methods – tracer tests –pumping tests – steady flow – unconfined aquifers – confined aquifers; unsteady flow – confined aquifers – leaky confined aquifers –unconfined aquifers – Thesis methods – Cooper Jacob methods – Chow methods – Thesis recovery methods – variable discharge methods – distance v/s drawdown methods – step drawdown tests – infiltration tests – parameter estimation in partly penetrating wells – semi confined aquifers and large diameter wells – image well theory – well loss and well efficiency – specific capacity – groundwater modeling and applications.

Number of theory sessions and duration : 28 & 32 hours

Number of tutorial sessions and duration : 8 & 20 hours

Number of Laboratory sessions and duration : 1& 3 hours

Attested

DIRECTOR
Centre For Academic Courses
Anna University, Chennai-600 025.

VA7007 LIFE CYCLE TESTING OF REFRIGERANT COMPRESSORS

(in collaboration with M/s Emerson Climate Technologies (India) Limited, Pune)

(Offered during Vacation (June) after II semester Examinations)

OBJECTIVES

To impart theoretical and practical skills in

- Refrigerant compressors working principle and construction
- Part load performance of the compressors
- Accessories for the compressors for safe operation
- Load, compression, flooded and defrost tests on reciprocating compressors

DESCRIPTION

1. Study on working principle of refrigerant compressors of various types, Effect of operational parameters on compressor performance, Part load behavior, Compressor accessories for safe operation and control

2. Life and Reliability testing of Reciprocating compressor
   a) High Load Test
   b) High Compression Ratio
   c) Flooded Start Test
   d) Start-Stop Test
   e) Blocked Fan Test and
   f) Defrost Test

3. Energy Efficiency Study as per BIS standards

OUTCOMES

- Gain hands on experience in working with refrigerant compressors life cycle testing
- Get acquainted with performance issues of the compressors and be able to tune the same.
- Be able to understand the procedure for Energy Efficiency Ratio study of Vapour Compression Refrigeration Systems

REFERENCES:

1. Dossat R. J., Principles of refrigeration, John Wiley, S.I. Version, 2001.
2. Ashrae, Fundamentals and equipment, 4 volumes – ASHRAE Inc.2013-2017.