1.2.2 – Add on/Certificate Programs

Value Added Course

Curriculum & Syllabus

GOJAN SCHOOL OF BUSINESS AND TECHNOLOGY
REDHILLS, CHENNAI - 600 052

VALUE ADDED COURSES CURRICULUM

Offered by Aeronautical Engineering Department

SL.NO	COURSE CODE	COURSE TITLE	L	T	P	C
1	VAE601	Finite Element Simulation Using ANSYS	15	0	30	2
2	VAE701	RC Flight Control	15	0	30	2
3	VAE702	ANSYS Fluent for Aerodynamicist	15	0	30	2

Offered by Civil Engineering Department

SL.NO	COURSE CODE	COURSE TITLE	L	T	P	C
1	VCE001	STAAD PRO	15	0	30	2

Offered by Computer Science Engineering Department

SL.NO	COURSE CODE	COURSE TITLE	L	T	P	C
1	VCS001	Robotics Programming	15	0	30	2

Offered by Electrical and Electronic Engineering Department

SL.NO	COURSE CODE	COURSE TITLE	L	T	P	C
1	VEE001	Embedded and Automation Systems Design	15	0	30	2

Offered by Mechanical Engineering Department

SL.NO	COURSE CODE	COURSE TITLE	L	T	P	C
1	VME001	CNC Programing	15	0	30	2

VALUE ADDED COURSES SYLLABUS

VAE601 FINITE ELEMENT SIMULATION USING ANSYS **L T P C**
15 0 30 2

COURSE OBJECTIVES:

To impart knowledge on

- Basic solid mechanics concept.
- ANSYS Structural Training.
- ANSYS 1D, 2D& 3D FEAnalysis.
- ANSYS Workbench FEAnalysis.

UNIT I BASIC SOLID MECHANICS **9**

Concept of FBD, Different Sources of Loads, Load Path, Concepts of Stress & Strain, Engineering Materials. Stress Designation, Combined Stresses, Stress Transformation, Principal Stresses, Theories of Failure, Stress Concentration.

UNIT II ANSYS 16.0 – STRUCTURAL TRAINING (1D PROBLEMS) **9**

Demonstration on Various Menu's in ANSYS® GUI. Workshops on 1D Problems. Hands-on Training in various 1D problems like bar, beam, spring, truss etc.,

UNIT III ANSYS 16.0 – STRUCTURAL TRAINING (2D PROBLEMS) **9**

Workshops on 2D Meshing and Workshops on 2D Analysis. Hands -on Training in various 2D problems like Planar symmetry problems, plane stress problems, plane strain problems &axi-symmetric problems.

UNIT IV ANSYS 16.0 – STRUCTURAL TRAINING (3D PROBLEMS) **9**

Workshops on 3D Meshing and Workshops on 3D Analysis. Hands -on Training in various 3D problems, 3DThermal problems and Coupled Field Analysis.

UNIT V ANSYS 16.0 – WORKBENCH TRAINING **9**

Workshops on ANSYS Workbench. Hands-on Training in ANSYS Workbench. Introduction to Composite Modeling in ANSYS® Workbench.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

Upon completion of this course the students would be able to

- Get familiarized with the basic concepts of solid mechanics.
- Use ANSYS FEA for numerical simulation.
- Demonstrate the 1D, 2D and 3D ANSYS FEA.
- Understand ANSYS® Workbench platform.
- Use ANSYS for the new product development.

TEXTBOOKS:

1. Erdogan Madenei, Ibrahim Guven, "The Finite Element Method and Applications in Engineering Using ANSYS", Springer, 2011.
2. Srinivas Paleti, Sambana Krishna Chaitanya, Datti Rajesh Kumar, "Finite element analysis using ANSYS 11.0", PHI, 2010.

REFERENCE BOOK:

1. Sham Tickoo, "ANSYS Workbench 14.0 for Engineers and Designers", DreamTech Press, 2013.

VAE701 ANSYS FLUENT FOR AERODYNAMICIST L T P C
15 0 30 2

OBJECTIVES

- To make the students to solve external flow over body

UNIT I INTRODUCTION TO ANSYS FLUENT 15

Introduction to Ansys workbench- Fluent Solver-Fluid flow system- geometry creation using design modeler- meshing techniques- solver setup- setting up material properties- setting up solver with cell zone and boundary conditions- convergence criteria- mesh metrics- residuals monitoring- iteration- solution- post processing of results.

UNIT II INCOMPRESSIBLE AND COMPRESSIBLE FLOWS 15

Basics of flow- incompressible and compressible fluids- fluid flow equations- turbulence models- Two equation k-£ model- turbulent kinetic energy- rate of dissipation- advantages and applications of two equation model.

UNIT III FLOW OVER AN AIRFOIL 15

Airfoil nomenclature- NACA airfoil data- creation of airfoil section using design modeler- fluid volume domain creation over the airfoil- Boolean operation- labelling faces- meshing methods- Edge sizing- Solver model- cell zone and boundary conditions- convergence criteria- mesh refinement.

TOTAL: 45 PERIODS

OUTCOMES

- Students will be able to analyze fluid flow over wings

TEXTBOOKS

1. An introduction to Ansys Fluent by John Matsson

REFERENCES

1. Introduction to aerodynamics by John D Anderson
2. Modern compressible flows by John D Anderson

VAE702 RC FLIGHT CONTROL L T P C

15 0 30 2

OBJECTIVES:

- To make the students to understand the basic concepts of RC Flight control system design.

UNIT I INTRODUCTION TO RC PLANES 15

Introduction to RC Plane Systems--models and prototypes – System Composition-applications--Introduction to Design and Selection of the System- Aerodynamics and Airframe Configurations-control surfaces-specifications.

UNIT II HARDWARE AND PAYLOADS 15

Autopilot – AGL-pressure sensors-servos-accelerometer –gyros-actuators- power supply-processor, integration, installation, configuration, and testing-- Payloads-Telemetry-tracking-Aerial photography-controls-PID feedback-radio control frequency range –modems-memory system-simulation-ground test-analysis-trouble shooting

UNIT III THE DEVELOPMENT OF RC FLIGHT CONTROLS 15

Waypoints navigation-ground control software- System Ground Testing- System In-flight Testing-Future Prospects and Challenges-Case Studies – Mini and Micro UAVs.

TOTAL: 45 PERIODS

OUTCOMES:

- Ability to design RC Planes
- Ability to identify different hardware for RC planes

REFERENCES:

1. Reg Austin “Unmanned Aircraft Systems UAV design, development and deployment”, Wiley, 2010.

2. Robert C. Nelson, Flight Stability and Automatic Control, McGraw-Hill, Inc, 1998.

VCE001 **STAAD PRO** **L T P C**
15 0 30 2

Objectives:

- The course objective is to train the students in structural Modeling, Designing and Analysis, Integrated Design and Finite Element Analysis.
- This course will help the students to familiarize on the analysis and design of different kinds of structures.

UNIT-I Modelling **9**

Introduction to STAAD - Starting a project - Modeling a structure Creating Nodes & Members Geometry wizard -Property definition - Material definition - Support definition – Specifications

UNIT-II Loading **9**

Nodal load - Member loads - Uniform Force and Moment - Concentrated Force and Moment - Linear Varying Load - Trapezoidal Load - Hydrostatic Load - Area load - Floor load

UNIT-III Load definitions **9**

Wind load - Creating Load Combination - Automatic Load Combination - Edit Auto Load Rules - Moving load - Seismic load

UNIT-IV Analysis and Design **9**

Frame Analysis – Truss Analysis – Concrete Design – Steel Design

UNIT-V Project report **9**

Importing CAD Models - Report Setup – Plotting from STAAD.Pro – Final Project

TOTAL: 45 PERIODS

VCS001 **ROBOTICS PROGRAMMING** **L T P C**

15 0 30 2

COURSE OBJECTIVES:

To impart knowledge on

- Fundamentals of robot working, programming and integration in a manufacturing process
- Working of robot mechanical, power, measuring and control system, robot kinematics, dynamic, control and programming, Kinematics, path planning and control.
- Visualization on the view of the robotics impact in human future

MODULE I **10**

- Fundamentals of robot programming
- Robot – Definition
- Robot Anatomy
- Co-ordinate Systems,
- Pitch, Yaw, Roll, Joint Notations, Speed of Motion, Pay Load
- Robot Parts and Functions
- Need for Robots
- Different Applications

MODULE II **10**

- Introduction to Robo DK
- 3D Mouse Navigation
- Keyboard Shortcuts
- Menu icons
- Robot controls and Simulation

MODULE III **10**

- Robotics
- Computer Vision
- Microworld Simulation
- Introduction to dLife
- ControlCenter
- dLife Examples

MODULE IV **15**

- Vision
- Introduction to Python and Pyro
- Control Paradigms
- Manipulation
- Learning
- Mapping

- Multi-robot communication

TOTAL: 45 PERIODS

COURSE OUTCOMES:

Upon completion of the course students will be able to

- Identify the importance of robotics in today and future goods production
- Explore knowledge on basics of robotics programming like VAL, AML
- Perform robot configuration and subsystems
- Analyze the principles of robot programming and handle with typical robot

WEB REFERENCES:

1. http://www.robotc.net/
2. http://www.toptal.com/robotics/programming-a-robot-an-introductory-tutorial
3. http://www.robotmaster.com/en/why-robotmaster

VEE001 EMBEDDED AND AUTOMATION SYSTEMS DESIGN L T P C
15 0 30 2

COURSE OBJECTIVES:

- To expose students to the field of Embedded Systems
- To enable students to implement their creative concepts to work

COURSE OUTCOMES:

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

- Apply engineering fundamentals and an engineering specialization to the conceptualization of embedded engineering design models.
- Identify, formulate, research literature and solve complex embedded system engineering problems.
- Design solutions for by developing and debugging embedded system hardware and firmware

UNIT I INTRODUCTION TO EMBEDDED SYSTEMS 15

Overview of Microprocessors & Microcontrollers–Embedded Systems Design Issues– Challenges and Trends in Embedded Systems, Memory (RAM, ROM, EPROM, EEPROM, FLASH) – I/O Interfacing, Programming Environment- Review of C Programming, Host & Target Development environment, Embedded C Programming, Simulation and Debugging, Downloading into target system.

UNIT II BASIC MICROCONTROLLER BASED EMBEDDED SYSTEM DESIGN 15

8051 Microcontroller –Architecture, Peripheral interfacing and Programming. AVR Microcontroller –Architecture,Peripheral interfacing and Programming. PIC Microcontroller - Architecture, Peripheral interfacing and Programming.

UNIT III ADVANCED MICROCONTROLLER BASED EMBEDDED SYSTEM DESIGN 15

Stream1: TIVA ARM Processor- Architecture, ARM Peripheral interfacing and Programming - Introduction to TIVA C Series Architecture. TIVA Programming, I/O Port Programming, LED, PWM and Switch Interfacing. Analog to Digital Converter Programming, UART, DMA Controller Programming, Timer Interfacing, EEPROM Interfacing, JTAG and Interrupt Handling

Stream2: C2000 Introduction to Real Time Controllers - C2000 Series Architecture – C2000 Libraries. C2000 Programming. I/O Port Programming, LED, Interrupts and keyboard Interfacing, Sensors Interfacing, Motor Contol, Switch Interfacing. ePWM Programming, Flash Memory Interfacing

(PRACTICAL) - EXPERIMENTS

- 8051/PIC/AVR/ARM/PSoC based Interfacing and Programming of LEDs and Switches
- 8051/PIC/AVR/ARM/PSoC based Interfacing and Programming of LCD and Seven Segment Displays
- 8051/PIC/AVR/ARM based Interfacing and Programming of matrix keyboard
- 8051/PIC/AVR/ARM/PSoC based Interfacing and Programming of ADC/DAC and Temperature Sensor/Humidity Sensor/ Ultrasonic Sensor/ Accelerometer
- 8051/PIC/AVR/ARM based Interfacing and Controlling of DC Motors/Stepper Motors/Servo Motors using PWM

- 8051/PIC/AVR/ARM/PSoC based Interfacing and Programming for establishing serial communication using RS232,I2C,SPI,CAN
- 8051/PIC/AVR/ARM based Interfacing and Programming of Relay and Real Time Clock
- 8051/PIC/AVR/ARM based Interfacing and Programming of Wireless Zigbee Modules, GSM and GPS
- RTOS based embedded application using ARM
- AVR/Arduino based Robot Programming for Line Follower, Obstacle detector
- Qu-bot based Robot Programming for Line Follower, Obstacle detector
- TIVA/C2000 based I/O Port LED Interface and Programming
- TIVA based PWM and C2000 based ePWM Interface and Programming
- TIVA/C2000 based control of Switch & Keypad Interfacing
- TIVA/C2000 based control Analog to Digital Converter and Programming
- TIVA/C2000 based UART Interface and Programming
- TIVA based DMA Controller Interface and Programming
- C2000 based DC and stepper motor control
- TIVA/C2000 based TIVA based Timer Programming8
- TIVA based EEPROM Memory Interfacing and Programming
- C2000 based Flash Memory write Programming

TOTAL: 45 PERIODS

REFERENCES

1. Andrew Sloss , Dominic Symes and Chris Wright, “ARM System Developer's Guide: Designing and Optimizing System Software”, Morgan Kaufmann Publishers, 2004
2. Muhammad Ali Mazidi, “8051 Microcontroller embedded systems using assembly and C”, Pearson, Second edition, 2008
3. Muhammad Ali Mazidi, “PIC microcontroller embedded systems using assembly and C”, Pearson,2008

WEB REFERENCES

1. http://software-dl.ti.com/trainingTTO/trainingTTO_public_sw/c28x2812/C28x%20Workshop.pdf
2. http://software-dl.ti.com/trainingTTO/trainingTTO_public_sw/GSW-TM4C123GLaunchPad/TM4C123G_LaunchPad_Workshop_Workbook.pdf

VME001 CNC TRAINING L T P C
15 0 30 2

COURSE OBJECTIVES:

- To understand the concepts G and M codes and manual part programming.
- To know the application of various CNC machines
- To impart CNC part programming skills for turning and milling applications.
- To give a good exposure of CAM software in order to perform simulation and to generate CL data.

UNIT I MANUAL CNC PART PROGRAMMING – CNC LATHE 15

Manual CNC Part Programming Using Standard G and M Codes for CNC Lathe - Tool Path Simulation – Exposure to Various Standard Control Systems- Machining simple components by Using CNC Production Lathe.

UNIT II MANUAL CNC PART PROGRAMMING – CNC MILLING 15

Manual CNC Part Programming Using Standard G and M Codes for CNC Milling Machine - Tool Path Simulation – Exposure to Various Standard Control Systems- Machining simple components by Using CNC trainer milling machines.

UNIT III COMPUTER AIDED PART PROGRAMMING – STL FILE GENERATION 15

CL Data Generation by Using CAM Software– Post Process Generation for Different Control System.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

- Students will be familiar with CNC part programming using G & M codes.
- Course would be helpful to understand the basic concepts in NC technology.
- This course would make familiar of the use of CAM software.
- Students would be able to apply the concepts of CNC parts programming in various Industrial applications.
- Students would be trained to write and execute NC program on CNC production machines for different jobs.

HARDWARE

- Computer Server
- Computer nodes or systems (High end CPU with at least 1 GB main memory) networked to the server

SOFTWARE

- CAM Software (CNC Programming and tool path simulation for FANUC /Sinumeric and Hoyden controller)
- Licensed operating system

TEXTBOOK:

1. Zeid I, “CAD/CAM Theory and Practice”, McGraw-Hill, 1991.

1.2.2 – Add on/Certificate Programs

Value Added Course

Minutes of Meeting

Gojan School of Business and Technology
Redhills, Chennai-600052

To,

Date: 21-06-2017

All HODs
Gojan School of Business and Technology,
Redhills.

Sir,

Subject: Introduction of value added courses for the academic year 2017-18 –Reg.

Ref: Minutes of meeting of HODs on 09/06/2017.

This is to inform about the introduction of value added courses in various departments of our institution based on the discussions made by the forum of HODs on 09/06/2017. The following courses has been introduced accordingly:

Name of the programme	Course Code	Name of Value added programme	Duration
B.E Aeronautical Engineering	VAE601	Finite Element Simulation Using ANSYS	3 months
B.E Aeronautical Engineering	VAE701	RC Flight Control	3 months
B.E Aeronautical Engineering	VAE702	ANSYS Fluent for Aerodynamicist	3 months
B.E Civil Engineering	VCE001	STAAD PRO	3 months
B.E Electrical and Electronics Engineering	VEE001	Embedded and Automation Systems Design	3 months
B.E Computer Science Engineering	VCS001	Robotics Programming	3 months
B.E Mechanical Engineering	VME001	CNC Programing	3 months

Herewith, the relevant records of Curriculum and syllabi has been attached

Principal

GOJAN SCHOOL OF BUSINESS AND TECHNOLOGY
NAAC Accredited
REDHILLS, CH-52.

Copy to:

The Vice chairman, GSBT

All HODs