MIT | Academy of Engineering

# MIT ACADEMY OF ENGINEERING, ALANDI

An Autonomous Institute Affiliated to

## Savitribai Phule Pune Univeristy

# Curriculum

# For

# Bachelor of Technology

## In

# Information Technology

## (Choice Based Credit System)

## 2016-2020

BoS Chairman
(Dean, SCET)

DEAN
School of Computer Engineering
& Technology
MIT Academy of Engineering
Alandi (D.), Pune-412 105.

Member Secretary
Academic Council
(Dean, Academics)

Chairman
Academic Council
(Director, MITAoE)

MIT ACADEMY OF ENGINEERING ALANDI (D), DIST. PUNE

# MIT Academy of Engineering

## An autonomous institute affiliated to SavitribaiPhule Pune University

### CURRICULUM FRAMEWORK (Information Technology)

The BTECH Program shall be based on the following type of courses

| SL. NO. | TYPE OF COURSE | ABBREVIATION |
|---|---|---|
| 1. | Natural Science | NSC |
| 2. | Engineering Science | ESC |
| 3. | Program Core | PC |
| 4. | Discipline Core | DC |
| 5. | Department Elective | DE |
| 6. | Open Elective | OE |
| 7. | Humanities and Social Science | HSS |
| 8. | Skill Development and Project | SDP |

The Course and Credit Distribution shall be as under,

| SL. NO. | TYPE OF COURSE | NO. OF COURSES | TOTAL CREDITS | |
|---|---|---|---|---|
| | | | NO. | % |
| 1. | Natural Science | **4** | **18** | **10.98** |
| 2. | Engineering Science | **4** | **16** | **9.76** |
| 3. | Program Core | **5** | **20** | **12.20** |
| 4. | Discipline Core | **12** | **48** | **29.26** |
| 5. | Department Elective | **2** | **6** | **3.66** |
| 6. | Open Elective | **4** | **16** | **9.76** |
| 7. | Humanities and Social Science | **8/9** | **16** | **9.76** |
| 8. | Skill Development and Project | **10/9** | **24** | **14.62** |
| **TOTAL** | | **49** | **164** | **100** |

| COURSE DISTRIBUTION: SEMESTER WISE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SL. NO. | TYPE OF COURSE | NO. OF COURSES/SEMESTER | | | | | | | | TOTAL |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |
| 1. | Natural Science | 2 | 2 | | | | | | | **4** |
| 2. | Engineering Science | 2 | 2 | | | | | | | **4** |
| 3. | Program Core | | | 3 | 2 | | | | | **5** |
| 4. | Discipline Core | | | 2 | 2 | 3 | 3 | 1 | 1 | **12** |
| 5. | Department Elective | | | | | | | 1 | 1 | **2** |
| 6. | Open Elective | | | | | 1 | 1 | 1 | 1 | **4** |
| 7. | Humanities & Social Science | 1 | 1 | | 1 | 1 | 2 | 1/2 | 1 | **8/9** |
| 8. | Skill Development & Project | 1 | 1 | 1 | 1 | 1 | 1 | 3/2 | 1 | **10/9** |
| **TOTAL** | | **6** | **6** | **6** | **6** | **6** | **7** | **7** | **5** | **49** |

| CREDIT DISTRIBUTION: SEMESTER WISE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **1 Lecture hour =1Credit** **2 Lab Hours =1 Credit** **1 Tutorial Hour = 1Credit** | | | | | | | | | | |
| SL. NO. | TYPE OF COURSE | NO. OF CREDITS/SEMESTER | | | | | | | | TOTAL |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |
| 1. | Natural Science | 9 | 9 | | | | | | | **18** |
| 2. | Engineering Science | 8 | 8 | | | | | | | **16** |
| 3. | Program Core | | | 12 | 8 | | | | | **20** |
| 4. | Discipline Core | | | 8 | 8 | 12 | 12 | 4 | 4 | **48** |
| 5. | Department Elective | | | | | | | 3 | 3 | **6** |
| 6. | Open Elective | | | | | 4 | 4 | 4 | 4 | **16** |
| 7. | Humanities & Social Science | 2 | 2 | | 2 | 2 | 3 | 3 | 2 | **16** |
| 8. | Skill Development & Project | 2 | 2 | 2 | 2 | 2 | 2 | 8 | 4 | **24** |
| **TOTAL** | | **21** | **21** | **22** | **20** | **20** | **21** | **22** | **17** | **164** |

| MIT Academy of Engineering | CURRICULUM STRUCTURE (2016 - 2020) | | |
|---|---|---|---|
| SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY | W.E.F | : | 2016-17 |
| FIRST YEAR BACHELOR OF TECHNOLOGY INFORMATION TECHNOLOGY | RELEASE DATE | : | 01/06/2016 |
| | REVISION NO. | : | 0.0 |

**SEMESTER: I**

| SL. No. | COURSE TYPE | COURSE CODE | COURSE | TEACHING SCHEME | | |
|---|---|---|---|---|---|---|
| | | | | L | P | CREDIT |
| 1. | NSC1 | AS101 | Mathematics – 1 | 4 | 1 | 5 |
| 2. | NSC2 | AS102 / AS103 | Physics / Chemistry | 3 | 2 | 4 |
| 3. | ESC1 | EX101 / CV101 | Electrical & Electronics Engg. / Applied Mechanics | 3 | 2 | 4 |
| 4. | ESC2 | ME101 / IT101 | Engineering Graphics/Computer Programming | 2 | 4 | 4 |
| 5. | HSS1 | HP101 | Language & Communication – 1 | 1 | 2 | 2 |
| 6. | SDP1 | ME102 / ME103 | Engineering Tools & Techniques / Design Thinking | --- | 4 | 2 |
| **TOTAL** | | | | **13** | **15** | **21** |

**SEMESTER: II**

| SL. No. | COURSE TYPE | COURSE CODE | COURSE | TEACHING SCHEME | | |
|---|---|---|---|---|---|---|
| | | | | L | P | CREDIT |
| 1. | NSC3 | AS104 | Mathematics – 2 | 4 | 1 | 5 |
| 2. | NSC4 | AS103 / AS102 | Chemistry / Physics | 3 | 2 | 4 |
| 3. | ESC3 | CV101 / EX101 | Applied Mechanics / Electrical& Electronics Engg. | 3 | 2 | 4 |
| 4. | ESC4 | IT101 / ME101 / | Computer Programming / Engineering Graphics | 2 | 4 | 4 |
| 5. | HSS2 | HP102 | Language & Communication – 2 | 1 | 2 | 2 |
| 6. | SDP2 | ME103 / ME102 | Design Thinking / Engineering Tools & Techniques | --- | 4 | 2 |
| **TOTAL** | | | | **13** | **15** | **21** |

L: Lecture, P: Practical, T: Tutorial; *Applicable for FY BTech

| MIT Academy of Engineering (An Autonomous Institute) | CURRICULUM STRUCTURE (2016 - 2020) | | |
|---|---|---|---|
| SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY | W.E.F | : | 2017-18 |
| SECOND YEAR BACHELOR OF TECHNOLOGY INFORMATION TECHNOLOGY | RELEASE DATE | : | 01/06/2017 |
| | REVISION NO. | : | 0.0 |

**SEMESTER: III**

| SL. No. | COURSE TYPE | COURSE CODE | COURSE | TEACHING SCHEME | | |
|---|---|---|---|---|---|---|
| | | | | L | P | CREDIT |
| 1. | PC1 | CH201 | Environmental Science | 2 | 2 | 3 |
| 2. | PC2 | AS202 | Applied Mathematics | 3 | 2 | 4 |
| 3. | PC3 | ET201 | System Engineering | 3 | 2 | 4 |
| 4. | DC1 | IT202 | Object Oriented Technology | 3 | 2 | 4 |
| 5. | DC2 | IT203 | Computer Network Technology | 3 | 2 | 4 |
| 6. | SDP3 | ET206 | Prototyping | -- | 4 | 2 |
| **TOTAL** | | | | **14** | **14** | **21** |

**SEMESTER:IV**

| SL. No. | COURSE TYPE | COURSE CODE | COURSE | TEACHING SCHEME | | |
|---|---|---|---|---|---|---|
| | | | | L | P | CREDIT |
| 1. | HSS3 | HP201 | Psychology | 3 | -- | 3 |
| 2. | PC4 | IT201 | Engineering Informatics | 3 | 2 | 4 |
| 3. | PC5 | ME201 | Material Engineering | 3 | 2 | 4 |
| 4. | DC3 | IT211 | Data Structures and Applications | 3 | 2 | 4 |
| 5. | DC4 | IT212 | Database Systems | 3 | 2 | 4 |
| 6. | SDP4 | IT213 | Minor Project | -- | 4 | 2 |
| **TOTAL** | | | | **15** | **12** | **21** |

| MIT \| Academy of Engineering (An Autonomous Institute) | CURRICULUM STRUCTURE (2016 - 2020) | | |
|---|---|---|---|
| SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY | W.E.F | : | 2018-19 |
| THIRD YEAR BACHELOR OF TECHNOLOGY INFORMATION TECHNOLOGY | RELEASE DATE | : | 01/12/2017 |
| | REVISION NO. | : | 0.0 |

**SEMESTER: V**

| SL. No. | COURSE TYPE | COURSE CODE | COURSE | TEACHING SCHEME | | |
|---|---|---|---|---|---|---|
| | | | | L | P | CREDIT |
| 1. | DC5 | IT301 | Computability Theory | 3 | 2 | 4 |
| 2. | DC6 | IT302 | Operating System | 3 | 2 | 4 |
| 3. | DC7 | IT303 | Web Technology | 3 | 2 | 4 |
| 4. | OE1 | IT311<br>CS311<br>CS312 | Open Elective - Refer Annexure. | 3 | 2 | 4 |
| 5. | HSS4 | HP301 | Project Management | 1 | 2 | 2 |
| 6 | HSS6 | HP303 | Basics of Entrepreneurship | -- | 2 | 1 |
| 7 | SDP5 | CS305<br>CS306<br>CS307 | Skill Development Lab | -- | 4 | 2 |
| **TOTAL** | | | | **13** | **16** | **21** |

**SEMESTER:VI**

| SL. No. | COURSE TYPE | COURSE CODE | COURSE | TEACHING SCHEME | | |
|---|---|---|---|---|---|---|
| | | | | L | P | CREDIT |
| 1. | DC8 | IT321 | Computational Intelligence | 3 | 2 | 4 |
| 2. | DC9 | IT322 | Cloud Services and Applications | 3 | 2 | 4 |
| 3. | DC10 | IT323 | Mobile Application Development | 3 | 2 | 4 |
| 4. | OE2 | IT331<br>CS331<br>CS332 | Open Elective - Ref er Annexure. | 3 | 2 | 4 |
| 5. | HSS5 | HP302 | Prof essional Skills | 1 | 2 | 2 |
| 6. | SDP6 | IT324 | Mini Project | | 4 | 2 |
| **TOTAL** | | | | **13** | **14** | **20** |

| MIT \| Academy of Engineering (An Autonomous Institute) | CURRICULUM STRUCTURE (2016 - 2020) | | |
|---|---|---|---|
| SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY | W.E.F | : | 2019-20 |
| FINAL YEAR BACHELOR OF TECHNOLOGY INFORMATION TECHNOLOGY | RELEASE DATE | : | 01/12/2017 |
| | REVISION NO. | : | 0.0 |

**SEMESTER: VII**

| SL. No. | COURSE TYPE | COURSE CODE | COURSE | TEACHING SCHEME | | |
|---|---|---|---|---|---|---|
| | | | | L | P/T* | CREDIT |
| 1. | DC – 11 | CS401 | Software Engineering, Testing and Quality Assurance | 3 | 2 | 4 |
| 2. | DE – 1 | IT41# | Department (Program) elective - Ref er Annexure | 3 | -- | 3 |
| 3. | OE – 3 | IT421<br>CS421<br>CS422 | Open elective - Ref er Annexure | 3 | 2 | 4 |
| 4. | HSS – 7 | HP401 | Engineering Economics | 2 | -- | 2 |
| 5. | HSS – 8 /SDP–7 | HP403/CS40# | Business Strategies / Advance skill development lab (Adv. Java/ R programming/Python with kali Linux) | -- | 2 | 1 |
| 6. | SDP – 8 | IT402 | Project - I | -- | 8 | 4 |
| 7. | SDP-9 | CS406 | Summer Internship | -- | -- | 4 |
| TOTAL | | | | 11 | 14 | 22 |

**SEMESTER: VIII**

| SL. No. | COURSE TYPE | COURSE CODE | COURSE | TEACHING SCHEME | | |
|---|---|---|---|---|---|---|
| | | | | L | P/T* | CREDIT |
| 1. | DC – 12 | CS431 | Human Computer Interactions | 3 | 2 | 4 |
| 2. | DE – 2 | IT44# | Department (Program) elective - Ref er Annexure | 3 | -- | 3 |
| 3. | OE – 4 | IT451<br>CS451<br>CS452 | Open elective - Ref er Annexure | 3 | 2 | 4 |
| 4. | HSS – 9 | HP402 | Sociology | 2 | -- | 2 |
| 5. | SDP –10 | IT432 | Project - II | -- | 8 | 4 |
| TOTAL | | | | 11 | 12 | 17 |

| | | CREDITS | | |
|---|---|---|---|---|
| | | 1 Lecture hour = 1 Credit 2 Lab Hours = 1 Credit 1 Tutorial Hour | | |
| SL. NO. | YEAR | SEMESTER | | TOTAL |
| | | 1 | 2 | |
| 1. | First Year | 21 | 21 | **42** |
| 2. | Second Year | 21 | 21 | **42** |
| 3. | Third Year | 21 | 20 | **41** |
| 4. | Final Year | 22 | 17 | **39** |
| **TOTAL** | | | | **164** |

| CONTACT HOURS | | | | |
|---|---|---|---|---|
| SL. NO. | YEAR | SEMESTER | | TOTAL |
| | | 1 | 2 | |
| 1. | First Year | 28 | 28 | **56** |
| 2. | Second Year | 28 | 27 | **55** |
| 3. | Third Year | 29 | 27 | **56** |
| 4. | Final Year | 25 | 23 | **48** |
| **TOTAL** | | | | **215** |

**ANNEXURE**

| **Natural Science (NSC) : 4 Courses** | | |
|---|---|---|
| 1. | AS101 | Mathematics – 1 |
| 2. | AS102 | Mathematics – 2 |
| 3. | AS103 | Physics |
| 4. | AS104 | Chemistry |

| **Engineering Science (ESC) : 6 Courses** | | |
|---|---|---|
| 1 | EX101 | Electrical and Electronic Engineering |
| 2 | CV101 | Applied Mechanics |
| 3 | ME101 | Engineering Graphics |
| 4 | IT101 | Computer Programming |

| **Program Core (PC) : 5 Courses** | | |
|---|---|---|
| 1. | CH201 | Environmental Science |
| 2. | AS201 | Applied Mathematics |
| 3. | ET201 | System Engineering |
| 4. | IT201 | Engineering Informatics |
| 5. | ME201 | Material Engineering |

| Discipline Core (DC) : 12 Courses | | |
|---|---|---|
| 1. | IT202 | Object Oriented Technology |
| 2. | IT203 | Computer Network Technology |
| 3. | IT211 | Data Structures and Applications |
| 4. | IT212 | Database Systems |
| 5. | IT301 | Computability Theory |
| 6. | IT302 | Operating System |
| 7. | IT303 | Web Technology |
| 8. | IT321 | Computational Intelligence |
| 9. | IT322 | Cloud Services and Applications |
| 10. | IT323 | Mobile Application Development |
| 11. | CS401 | Software Engineering Testing & Quality Assurance |
| 12. | CS431 | Human Computer Interaction |

| Department Elective (DE) : 6 Courses | |
|---|---|
| IT411 | Operating System Administration |
| CS412 | Wireless and Mobile Network |
| CS413 | Information Retrieval |
| | |
| CS441 | Distributed System |
| IT442 | IoT and Wireless Sensor Network |
| IT443 | Computer Graphics & Multimedia Techniques |
| | |

| Open Elective (OE) : 4 Courses | | |
|---|---|---|
| **Sl. No.** | **Course Code** | **Course** |
| 1 | IT311 | Cryptography and System Security |
| 2 | IT331 | Cyber Security |
| 3 | IT421 | Ethical Hacking & Cyber Laws |
| 4 | IT451 | Digital Forensics |
| | | |
| 5 | CS311 | Descriptive Analytics |
| 6 | CS331 | Predictive Analytics |
| 7 | CS421 | Big Data Analytics |
| 8 | CS451 | Practitioner's approach for Data Analytics |
| | | |
| 9 | CS312 | Artificial Intelligence & Neural Network |
| 10 | CS332 | Machine Learning |
| 11 | CS422 | Deep Learning |
| 12 | CS452 | Pattern Learning |

| Open Elective (OE) :Term - I<br>(List of courses for Academic Year 2018-19 ) | | |
|---|---|---|
| **Chemical** | | |
| 1 | CH311 | Process Modeling and Simulation. |
| 2 | CH312 | Piping Engineering |
| **Civil** | | |
| 3 | CV311 | Construction Planning & Management |
| **Computer** | | |
| 4 | CS311 | Descriptive Analytics |
| 5 | CS312 | Artificial Intelligence & Neural Network |
| **Electronics** | | |
| 6 | EX311 | Fundamentals of Robotics |
| **E & TC** | | |
| 7 | ET311 | Embedded System Programming (ESP) |
| 8 | ET312 | IoT Architecture and Sensors |
| **IT** | | |
| 9 | IT311 | Cryptography & System Security |
| **Mechanical** | | |
| 10 | ME311 | Geometric Modeling & Design |
| 11 | ME312 | Fundamentals of Robotics |
| 12 | ME313 | Work Process Assessment |

| Open Elective (OE) :Term - II<br>(List of courses for Academic Year 2018-19 ) | | |
|---|---|---|
| **Chemical** | | |
| 1 | CH331 | Process Engineering. |
| 2 | CH332 | Piping Layout |
| **Civil** | | |
| 3 | CV331 | Operation Research |
| **Computer** | | |
| 4 | CS331 | Predictive Analysis |
| 5 | CS332 | Machine Learning |
| **Electronics** | | |
| 6 | EX331 | Kinematics and Dynamics of Robotics |
| **E & TC** | | |
| 7 | ET331 | Embedded Processor |
| 8 | ET332 | IoTNetworks & Protocols |
| **IT** | | |
| 9 | IT331 | Cyber Security |
| **Mechanical** | | |
| 10 | ME331 | Finite Element Analysis |
| 11 | ME332 | Kinematics & Dynamics of Robots |
| 12 | ME333 | Facility Planning & Design |

| Open Elective (OE) :Term - I<br>(List of courses for Academic Year 2019-20 ) | | |
|---|---|---|
| **Chemical** | | |
| 1 | CH421 | Process Optimization |
| 2 | CH422 | Piping Design & Engineering |
| **Civil** | | |
| 3 | CV421 | Financial Management |
| **Computer** | | |
| 4 | CS421 | Big Data Analytics |
| 5 | CS422 | Deep Learning |
| **Electronics** | | |
| 6 | EX421 | Robotics Vision and Control |
| **E & TC** | | |
| 7 | ET421 | Low-Power SoC Architecture & Applications (SoC&A) |
| 8 | ET422 | Privacy and Security in IoT |
| **IT** | | |
| 9 | IT421 | Ethical Hacking & Cyber Laws |
| **Mechanical** | | |
| 10 | ME421 | Computational Fluid Dynamics |
| 11 | ME422 | Robotics Vision and Control |
| 12 | ME423 | Operations Management |

| Open Elective (OE) :Term - II<br>(List of courses for Academic Year 2019-20 ) | | |
|---|---|---|
| **Chemical** | | |
| 1 | CH451 | Process Intensification & Integration |
| 2 | CH452 | Pipeline Engineering |
| **Civil** | | |
| 3 | CV451 | Visualization and Information Exchange |
| **Computer** | | |
| 4 | CS451 | Practitioner's approach for Data analytics |
| 5 | CS452 | Pattern Recognition |
| **Electronics** | | |
| 6 | EX451 | Intelligent and High-Performance Robotics |
| **E & TC** | | |
| 7 | ET451 | Real-Time Embedded System (RES) |
| 8 | ET452 | Energy Management for IoT Devices |
| **IT** | | |
| 9 | IT451 | Digital Forensics |
| **Mechanical** | | |
| 10 | ME451 | Advanced Analysis |
| 11 | ME452 | Intelligent and High Performance Robotics |
| 12 | ME453 | Supply Chain Management |

| Humanities and Social Science (HSS) : 9 Courses | | |
|---|---|---|
| **Sl. No.** | **Course** | |
| 1. | HP101 | Language & Communication – I |
| 2. | HP102 | Language & Communication – II |
| 3. | HP201 | Psychology |
| 4. | HP301 | Project Management |
| 5. | HP302 | Professional Skills |
| 6. | HP303 | Basics of Entrepreneurship |
| 7. | HP401 | Engineering Economics |
| 8 | HP402 | Sociology |
| 9 | HP403 | Business Strategies / Programming in Java |

| Skill Development and Project (SDP) : 9 Courses | | |
|---|---|---|
| **Sl. No.** | **Course Code** | **Course** |
| 1. | ME102 | Engineering Tools and Techniques |
| 2. | ME103 | Design Thinking |
| 3. | ET206 | Prototyping |
| 4. | IT 213 | Minor Project |
| 5. | IT 302 | Skill development Lab. |
| 6. | IT 324 | Mini Project |
| 7. | CS 402 | Skill development Lab 2 |
| 8. | IT 403 | Project - I |
| 9. | IT 432 | Project - II |

MIT | Academy of Engineering

# MIT ACADEMY OF ENGINEERING, ALANDI

**An Autonomous Institute Affiliated to**

## Savitribai Phule Pune University

# Curriculum

# For

# First Year

# Bachelor of Technology

## 2016-2020

(With Effect from Academic Year: 2016-2017)

MIT | Academy of Engineering
(An Autonomous Institute)

# CURRICULUM STRUCTURE (2016 - 2020)

| | | | |
|---|---|---|---|
| **SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY** | **W.E.F** | **:** | **2016-2017** |
| **FY BTECH- INFORMATION TECHNOLOGY** | **RELEASE DATE** | **:** | **1/06/2016** |
| | **REVISION NO.** | **:** | **1.0** |

**SEMESTER: I**

| SL. No. | COURSE TYPE | COURSE CODE | COURSE | TEACHING SCHEME | | |
|---|---|---|---|---|---|---|
| | | | | L | P/T* | CREDIT |
| 1. | NSC1 | AS 101 | Mathematics -1 | 4 | 1 | 5 |
| 2. | NSC2 | AS 102/ AS 103 | Physics/Chemistry | 3 | 2 | 4 |
| 3. | ESC1 | EX 101/ CV 101 | Electrical & Electronics Engg/Applied Mechanics | 3 | 2 | 4 |
| 4. | ESC2 | ME 101/ IT 101 | Engineering Graphics/Computer programming. | 2 | 4 | 4 |
| 5. | HSS1 | HP 101 | Language &Communication -1 | 1 | 2 | 2 |
| 6. | SDP1 | ME 102/ ME 103 | Experimental Tools &Techniques/Design Thinking | -- | 4 | 2 |
| **TOTAL** | | | | 13 | 15 | 21 |

**SEMESTER:II**

| SL. No. | COURSE TYPE | COURSE CODE | COURSE | TEACHING SCHEME | | |
|---|---|---|---|---|---|---|
| | | | | L | P/T* | CREDIT |
| 1. | NSC3 | AS 104 | Mathematics -2 | 4 | 1 | 5 |
| 2. | NSC4 | AS 103/ AS 102 | Chemistry/ Physics | 3 | 2 | 4 |
| 3. | ESC3 | CV 101/ EX 101 | Applied Mechanics/ Electrical & Electronics Engg | 3 | 2 | 4 |
| 4. | ESC4 | IT 101/ ME 101 | Computer programming/ Engineering Graphics | 2 | 4 | 4 |
| 5. | HSS2 | HP 102 | Language &Communication -2 | 1 | 2 | 2 |
| 6. | SDP2 | ME 103/ ME 102 | Design Thinking/ Experimental Tools &Techniques | -- | 4 | 2 |
| **TOTAL** | | | | 13 | 15 | 21 |

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF HUMANITIES AND ENGINEERING SCIENCES** | **W.E.F** | **AY:** 2016 - 2017 |
| **FIRST YEAR BACHELOR OF TECHNOLOGY** | **COURSE NAME** | Mathematics I |
| | **COURSE CODE** | AS101 |
| | **COURSE CREDITS** | 5 |
| **RELEASED DATE :** 01/06/2016 | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | TUTORIAL/ | PRESENTATION/ | TOTAL |
| LECTURE | PRACTICAL | MSE | ESE | IA | PRACTICAL | DEMONSTRATION | |
| 4 | 1 | 40 | 50 | 10 | 25 | Nil | 125 |

**PRE-REQUISITE :** Basic elementary Mathematics of XI & XII

**COURSE OBJECTIVES :**

AS101.CEO.1:To recall and apply the methods of solving system of equations using matrices.
AS101.CEO.2:To find nth derivative and expansion of different functions.
AS101.CEO.3:To classify and solve first order ordinary differential equations.
AS101.CEO.4:To categorize and inspect the applications of first order differential equations.
AS101.CEO.5:To apply the concepts of partial differentiation.
AS101.CEO.6:To demonstrate an understanding towards the applications of partial differentiation.

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

AS101.CO.1:Inspect system of equations using matrices. [L4]
AS101.CO.2:Illustrate problems based on nth derivative and expansion of functions. [L2]
AS101.CO.3:Solve first order ordinary differential equations. [L3]
AS101.CO.4:Analyze simple real world phenomenon governed by first order ordinary differential equations. [L4]
AS101.CO.5:Infer the problems based on properties of partial differentiation. [L2]
AS101.CO.6:Examine the applications of partial differentiation. [L4]

| THEORY | | |
|---|---|---|
| **UNIT 1** | **Matrices** | **12 HOURS** |
| Rank, Solutions of system of linear equations: Homogeneous and Non Homogeneous systems,Linear dependence and independence of vectors, Eigen Values and Eigen vectors, Cayley Hamilton Theorem | | |
| **UNIT 2** | **Successive Differentiation** | **8 HOURS** |
| Finding nth derivative of functions, Leibnitz theorem for finding nth derivative, Taylors and Maclaurins theorem for expansion of functions . | | |
| **UNIT 3** | **First order ordinary differential equations** | **10 HOURS** |
| Exact differential equations, Differential equations reducible to exact by finding integrating factors, linear differential equations, Differential equations reducible to linear form . | | |
| **UNIT 4** | **Applications of ftrst order ordinary differential equation** | **10 HOURS** |
| Newtons law of cooling, Electrical circuits, rectilinear motion, one dimensional heat conduction, Chemical applications- Mixing problems . | | |
| **UNIT 5** | **Partial Differentiation** | **8 HOURS** |
| Partial Differentiation: Introduction, Chain rule, Total derivative and differential, Homogeneous functions, Eulers Theorem, Differentiation of Implicit functions. | | |
| **UNIT 6** | **Applications of Partial Differentiation** | **8 HOURS** |
| Jacobian, properties of Jacobian, Jacobian of Implicit functions, Finding partial derivative using Jacobians, Functional dependence, maxima and minima of functions of two variables. | | |

| TUTORIAL | | |
|---|---|---|
| **TUTORIAL NO.01** | | **1 HOURS** |
| Rank, System of Linear equations: Homogeneous and Non Homogeneous systems. | | |
| **TUTORIAL NO.02** | | **1 HOURS** |
| Linear Dependence and Independence of vectors, Eigen Values and Eigen vectors, Cayley Hamilton Theorem. | | |
| **TUTORIAL NO.03** | | **1 HOURS** |
| Finding nth derivative of functions, Leibnitz theorem for finding nth derivative. | | |
| **TUTORIAL NO.04** | | **1 HOURS** |
| Expansion of functions using Taylors and Maclaurins theorems. | | |
| **TUTORIAL NO.05** | | **1 HOURS** |
| Finding solutions to exact differential equations, Differential equations reducible to exact by finding integrating factors | | |
| **TUTORIAL NO.06** | | **1 HOURS** |
| Linear differential equations,Differential equations reducible to linear. | | |
| **TUTORIAL NO.07** | | **1 HOURS** |
| Newtons law of cooling, Kirchoffs law of electrical circuits, rectilinear motion | | |
| **TUTORIAL NO.08** | | **1 HOURS** |
| One dimensional heat conduction, Chemical applications Mixing Problems | | |
| **TUTORIAL NO.09** | | **1 HOURS** |
| Examples on Partial Differentiation and Chain rule,Total derivative and differential | | |
| **TUTORIAL NO.10** | | **1 HOURS** |
| Examples on Eulers Theorem, Differentiation of an implicit function | | |
| **TUTORIAL NO.11** | | **1 HOURS** |
| Examples on Jacobian, properties of Jacobian, Functional dependence | | |
| **TUTORIAL NO.12** | | **1 HOURS** |
| Examples on Functional dependence,Maxima and minima of functions of two variables | | |

**TEXT BOOK**


1. Higher Engineering Mathematics by Dr. B.V. Ramana; Tata McGraw Hill, ISBN: 978-0-07-063419-2
2. Higher Engineering Mathematics by B.S. Grewal, Khanna Publications, 39th edition, ISBN: 81-7409- 195-5


**REFERENCE BOOK**


1. Thomas Calculus by G.B. Thomas, Maurice D. Weir, Joel R. Hass (ISBN:9789332519091, Pearson Education, 12th edition)
2. Advanced Engineering Mathematics by Erwin Kreyszig(ISBN-13: 9788126554232, Wiley Eastern Ltd., 10th edition)
3. Advanced Engineering Mathematics by R.K. Jain& S.R.K. Iyengar (ISBN No.: 8173194203, Narosa Publishing house)
4. Advanced Engineering Mathematics by Peter V. ONeil (ISBN-13: 9788131503102, Cenage Learning, 7th Edition)
5. Advanced Engineering Mathematics by Dennis G. Zill& Warren S.Wright (ISBN-10: 0-7637-7966-0, ISBN 13: 978-0-7637-7966-5, Jones and Bartlett Publishers, 4th edition)

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF HUMANITIES AND ENGINEERING SCIENCES** | **W.E.F** | **AY:** 2016 - 2017 |
| **FIRST YEAR BACHELOR OF TECHNOLOGY** | **COURSE NAME** | Physics |
| | **COURSE CODE** | AS102 |
| | **COURSE CREDITS** | 4 |
| **RELEASED DATE :** 01/06/2016 | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | TUTORIAL/ | PRESENTATION/ | TOTAL |
| LECTURE | PRACTICAL | MSE | ESE | IA | PRACTICAL | DEMONSTRATION | |
| 3 | 2 | 40 | 50 | 10 | 25 | NIL | 125 |

**PRE-REQUISITE :** NIL

**COURSE OBJECTIVES :**

AS102.CEO.1:To make students identify the basic concept of measurements and to formulate problems in physical and mathematical terms.(L3).

AS102.CEO.2:To analyze and understand the behavior of light as a wave and get acquaint with different applications in Physics.(L4).

AS102.CEO.3:To apply the concept of behavior of light and understand the polarization phenomena.(L3) .

AS102.CEO.4:To classify and understand the difference of classical mechanics and quantum mechanics.(L2).

AS102.CEO.5:To derive the basic laws governing the motion of quantum particles.(L4).

AS102.CEO.6:To apply the concept of quantum mechanics to different applications and supplement the reasoning vis--vis understanding of different branches of Physics.(L3).

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

AS102.CO.1:Evaluate the importance of order of all physical quantities and compare the order of size of different objects.(L5).

AS102.CO.2:Apply the theoretical knowledge of optics to understand the physics behind engineering applications.(L3).

AS102.CO.3:Apply that light is transverse in nature. (L3) .

AS102.CO.4:Demonstrate the necessity of quantum mechanics and the distinction between the domains of classical and quantum mechanics.(L2).

AS102.CO.5:Evaluate and apply the Schrdingers equation to the motion of an electron orbiting round the shell.(L5) .

AS102.CO.6:Apply the concepts of Quantum Physics in different branches of engineering.(L3) .

**THEORY**

| **UNIT 1** | **Measurement and importance of span (order) of physical quantities** | **7 HOURS** |
|---|---|---|

Concept of (i)significant numbers, (ii) accuracy versus precision (iii)error versus uncertainty (iv)systematic error versus random error (v) quantifying the uncertainty. Least-count of an apparatus, Methods to measure least-count with specific examples of vernier-calipers, screw-gauge, travelling microscope and spectrometer. Span (orders of magnitude) of prominent physical parameters with specific examples of Gravitational constant(G), Speed of light(c),Planks constant(h), Boltzmann constant(k) and wavelengths of electromagnetic spectrum. Importance of the orders of G, c, h and k alongwith hypothetical picture of world in case of their order becomes unity ( 1). Length-scale and time-scale of specific physical phenomenon.

| **UNIT 2** | **Optics (Interference and diffraction of Light)** | **7 HOURS** |
|---|---|---|

Particle nature and wave-nature with examples of wave and particle behavior of light, Introduction to wave nature, Concept of thin film, Stokes law of phase-change on reflection from a thin film, Thin film interference, Coating of lenses as an application of thin film interference, Interference in films of uniform and non-uniform thickness (with derivation), Applications of thin-film interference, Newton Ring Experiment and its applications, Diffraction as a particular case of interference.

| **UNIT 3** | **Polarization of Light** | **6 HOURS** |
|---|---|---|

Polarization of light, Production and analysis of polarized light (Brewsters law, Law of Malus), Optical Activity, Specific Rotation due to optically active solutions, Application of Polarized light.

| UNIT 4 | Quantum Mechanics-I . | 8 HOURS |
|---|---|---|
| Shortcomings or failure of Classical Mechanics with specific example of blackbody radiation, Plancks quantum law of blackbody radiation, Matter-waves, De-Broglies concept of matter waves, Heisenbergs Uncertainty Principle, Operators, Eigen values and Eigen functions, Expectation Values, Wave-function, Physical significance of wave function. | | |
| **UNIT 5** | **Quantum Mechanics-II .** | **8 HOURS** |
| Schrodingers equations, Time Dependent and Time Independent forms of Schrodinger Equations, Applications of Schrodinger Equation, Electron in an infinite potential well (rigid box), Electron in a finite deep potential well (non-rigid box) and concept of quantum mechanical tunneling, Application of electron in a potential well in case of Bohrs atomic model. | | |
| **UNIT 6** | **Applications of Quantum Mechanics-LASER .** | **6 HOURS** |
| Stimulated Emission of light and its comparison with spontaneous emission, Probabilities of stimulated absorption and emission of light (Einsteins coefficients), Principle and working of LASER with example, Application of LASER in optical fibre communication. | | |

| | | |
|---|---|---|
| **PRACTICALS** | | |
| **PRACTICAL NO.01** | | **2 HOURS** |
| Determination of the mass of electron (me) upto specified significant numbers. | | |
| **PRACTICAL NO.02** | | **2 HOURS** |
| Determination of the refractive index of a given liquid using Newton Rings Experiment. | | |
| **PRACTICAL NO.03** | | **2 HOURS** |
| Determination of the line density of a diffraction grating using Laser. | | |
| **PRACTICAL NO.04** | | **2 HOURS** |
| Determination of the wavelength of Sodium light source using Michelson Interferometer. | | |
| **PRACTICAL NO.05** | | **2 HOURS** |
| Determination of the phase-difference between two given positions on the path of simple pendulum in periodic motion. | | |
| **PRACTICAL NO.06** | | **2 HOURS** |
| Verification of Bohrs atomic model using Frank and Hertz experiment. | | |
| **PRACTICAL NO.07** | | **2 HOURS** |
| Determination of the specific rotation of a sugar solution of a given concentration. | | |
| **PRACTICAL NO.08** | | **2 HOURS** |
| Determination of wavelength of a laser beam using Lloyds mirror arrangement. | | |
| **PRACTICAL NO.09** | | **2 HOURS** |
| Determination of Radius of Curvature of a given planoconvex lens using Newtons Rings apparatus. | | |
| **PRACTICAL NO.10** | | **2 HOURS** |
| Determination of wavelength of different colours present in a white light. | | |

**TEXT BOOK**


1. The Feynman Lectures on Physics: Volume-1-Richard. P. Feynman, R.B. Leighton, M.Sands,ISBN:978-81-85015-82-8.(Narosa Publisher)
2. The Feynman Lectures on Physics: Volume-3-Richard. P. Feynman, R.B. Leighton, M.Sands,ISBN:978-81-85015-84-2. (Narosa Publisher)


**REFERENCE BOOK**


1. Measurement and Instrumentation Principles: Alan S Morris, Butterworth Heinemann, ISBN 07506508184
2. AjoyGhatak ,Optics, Tata Mc Graw Hill Publishing Company. Ltd., 2nd Edition, ISBN- 0-07058583-0
3. Jenkins White, Fundamentals of Optics, Mc Graw Hill Science, ISBN-0070853460.
4. Arthur Beiser, Shobit Mahajan, S. Rai. Choudhary ,Concepts of Modern Physics-, Mc Graw Hill Education (India) Pvt. Ltd., 6th Edition, ISBN-10- 0070151555,
5. L. I. Schiff ,Quantum Mechanics, Tata Mc Graw Hill Education (India) Pvt. Ltd., 3rd Edition, ISBN-10- 0070856435, ISBN- 13- 9780070856431.
6. PAM Dirac,Principles of Quantum Mechanics Cbs publishers and Distributors, ISBN-10-0195671074, ISBN- 13- 978019567107
7. D J Griffiths, Introduction to Quantum Mechanics, Pearson Prentice Hall Publishers.
8. Serway and Jewett, University Physics for Scientists and Engineers, Cengage Learning Publishers.
9. K. Thyagarajan and AjoyGhatak, Lasers: Fundamentals and applications, Springer, ISBN 9781441964410.
10. Worsnop and Flint; Advanced Practical Physics, Little Hampton book service Ltd., ISBN-10: 0423738909, ISBN-13: 978-0423738902.
11. Robert Eisberg and Robert Resnick; Quantum Mechanics: Of Atoms, Molecules, Solids, Nuclei and Particles; Wiley

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF HUMANITIES AND ENGINEERING SCIENCES** | **W.E.F** | **AY:** 2016 - 2017 |
| **FIRST YEAR BACHELOR OF TECHNOLOGY** | **COURSE NAME** | Electrical & Electronics Engineering |
| | **COURSE CODE** | EX101 |
| | **COURSE CREDITS** | 4 |
| **RELEASED DATE :** 01/06/2016 | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | TUTORIAL/ PRACTICAL | PRESENTATION/ DEMONSTRATION | TOTAL |
| LECTURE | PRACTICAL | MSE | ESE | IA | | | |
| 3 | 2 | 40 | 50 | 10 | 25 | Nil | 125 |

**PRE-REQUISITE :**

**COURSE OBJECTIVES :**

EX101.CEO.1:To impart knowledge of energy scenario and use of renewable energy systems.
EX101.CEO.2:To explain the fundamentals of single-phase and three-phase systems.
EX101.CEO.3:To explain power supply components, electronic devices.
EX101.CEO.4:To summarize various Digital systems and application.
EX101.CEO.5:To build the knowledge of measuring system and signal conditioning circuits.
EX101.CEO.6:To get acquainted with different electrical machines.

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

EX101.CO.1:Develop the Renewable energy system (PV) as per given specifications [L3]
EX101.CO.2:Illustrate behavior of single phase A.C. circuits and three phase A.C. circuits. [L2]
EX101.CO.3:Analyze analog circuit applications.[L3]
EX101.CO.4:Design Digital applications.[L5]
EX101.CO.5:the use of Instrumentation system in various fields.[L2]
EX101.CO.6:Identify electrical machines used in typical domestic and industrial sector based on application. [L2]

| THEORY | | |
|---|---|---|
| **UNIT 1** | **Energy Resources & Technology** | **6 HOURS** |
| Energy Scenario, Energy Resources, Basic concepts about thermal, hydro and nuclear power stations (block diagram approach only).Energy conversion from thermal and mechanical energy, Energy Conservation, Use of Energy Efficient Technologies, Application of Renewable Energy Systems, Battery technology, Introduction to power quality: Definition, causes, effects, Introduction to energy audit. | | |
| **UNIT 2** | **A.C. Circuits** | **7 HOURS** |
| A.C. fundamentals, RMS and average value, R-L,R-C,RLC series parallel circuits, phasor diagram, power and power factor. Three phase voltage generation and their waveforms, Star and delta balanced systems, Relationship between phase and line quantities, phasor diagram, power in a three phase circuits, Difference between neutral and ground conductors. | | |
| **UNIT 3** | **Power Supply and Electronics Devices** | **7 HOURS** |
| Rectifiers and Power Supplies, Elements of IC Regulated Power Supply. BJT - structure and operation, CE, CB, CC configurations, Transistor as a switch and Amplifier. MOSFET- structure (enhancement), operation and application as a switch. Opto-electronic devices Photo conductive cell, Photo Voltaic cell. | | |
| **UNIT 4** | **Digital Systems** | **7 HOURS** |
| Digital: Logic gates, Boolean algebra, SOP representation, Combinational circuit Design: Half Adder, Full Adder, MUX, DMUX, Comparator, Code converter, Decoder Sequential circuit: Flip-Flop, Registers and Synchronous & Asynchronous Counters. Microprocessor based systems, Embedded systems | | |
| **UNIT 5** | **Measuring System** | **6 HOURS** |
| Elements of measuring system, Sensors & Transducers Temperature, Flow, Pressure, IR, Speed & LVDT. Op-Amp IC 741 pin configuration, Op-amp parameters, Inverting, Non- Inverting & Differential configuration Applications: Summing & Difference amplifier, Comparator, Voltage follower. | | |
| **UNIT 6** | **Electrical Machines** | **7 HOURS** |
| Construction of Transformer, principle of operation, EMF equation. Construction, principle of operation and types of three-phase Induction motor and DC motor, PMDC, BLDC, servo motor, stepper motor, Universal motor, Application of Electrical Motors in domestic and Industrial sector. | | |

| PRACTICALS : Total 8 Experiments from two groups. | | |
|---|---|---|
| **PRACTICAL NO.01** | **Kirchhoffs laws and Superposition theorem** | **2 HOURS** |
| To develop a circuit for Kirchhoffs laws and Superposition theorem. To build and test it. | | |
| **PRACTICAL NO.02** | **Single Phase Energy (Watt-hour) measurement.** | **2 HOURS** |
| To measure energy and power factor. To examine improvement in the power factor. To estimate and compare energy consumption with energy meter. | | |
| **PRACTICAL NO.03** | **R-L-C series A.C. circuit** | **2 HOURS** |
| To calculate exact values of R, L and C for lagging and leading power factor To find power losses in R, L and C. | | |
| **PRACTICAL NO.04** | **Veriftcation of relation between Line and Phase quantities in Star and Delta circuits** | **2 HOURS** |
| To understand Line & Phase quantities and types of connection along with Three phase supply To connect Bulb load in Star connection and verify the relation. To connect Bulb load in Delta connection and verify the relation. | | |
| **PRACTICAL NO.05** | **Open circuit & Short circuit test on a Single Phase transformer** | **2 HOURS** |
| To find iron loss and no load current To find full load copper loss and winding parameters To determine efficiency and regulation of transformer | | |
| **PRACTICAL NO.06** | **Load test on D.C. Shunt Motor.** | **2 HOURS** |
| To find the torque and output power of motor To calculate the efficiency of motor. | | |
| **PRACTICAL NO.07** | **Step angle control of Stepper motor.** | **2 HOURS** |
| To gain familiarity with the properties of stepper motors. To calculate the step angle of motor. | | |
| **PRACTICAL NO.08** | **Speed control of BLDC/PMDC Motor.** | **2 HOURS** |
| To find the relation between voltage and speed of motor To develop any small application. | | |
| **PRACTICAL NO.09** | **Electronics Components and Measuring instruments:** | **2 HOURS** |
| To study Passive components Resistors, Capacitors & Inductor. To test semiconducting components Diode, BJT To measure various electronic quantities using CRO, Function generator, DMM | | |
| **PRACTICAL NO.10** | **DC Regulated Power Supply:** | **2 HOURS** |
| To design 12V IC based DC regulated power supply (Theoretically). To test and observe waveforms at various stages on CRO and measure the voltage using DMM. | | |
| **PRACTICAL NO.11** | **BJT as a switch and Amplifter.** | **2 HOURS** |
| To adapt BJT as a switch On/Off the LED at the output by switching BJT. To adapt BJT as an Amplifier Measure voltages and observe waveforms at input and output of the single stage CE amplifier. | | |

| | | |
|---|---|---|
| **PRACTICAL NO.12** | **Combinational Digital Circuits:** | **2 HOURS** |
| To design and implement Half adder and Full adder (using Half adder). To design and implement 8:1 MUX using IC-74LS153 and verify its truth table. | | |
| **PRACTICAL NO.13** | **Sequential Digital Circuits:** | **2 HOURS** |
| To design and implement Half adder and Full adder (using Half adder). To design and implement 8:1 MUX using IC-74LS153 and verify its truth table. | | |
| **PRACTICAL NO.14** | **OP-AMP Applications** | **2 HOURS** |
| To verify operations of inverting and non-inverting amplifier for various gain factors. To verify application of OPAMP as summing and difference amplifier. To verify the application of OPAMP as voltage follower. | | |
| **PRACTICAL NO.15** | **Sensors and Transducer** | **2 HOURS** |
| To study and verify operation of LVDT. To study and verify the operation of Temperature sensors. ( PT100, LM35) | | |
| **PRACTICAL NO.16** | **Design and Simulate using MULTISIM(Minimum 2)** | **2 HOURS** |
| To design a counter to display 2-digit Decimal Number (00 to 99) on 7-Segment Display. To design a Flashing LED Display for a specific Pattern using MUX. To design of Inverting/Non-Inverting Amplifier using Op-Amp IC-741 for a specific gain. | | |

**TEXT BOOK**


1. B. H. Khan,Non-Conventional Energy Resources, Tata McGraw Hill, 2nd Edition, 2009, 978-0070142763.
2. Edward Hughes, Electrical and Electronic Technology Pearson India, 10th Edition, 2011, ISBN-978-8131733660
3. Neil Storey, Electronics A Systems Approach, Pearson Education Asia, 5th Edition,2013, ISBN-978-0273773276


**REFERENCE BOOK**


1.1. V. N. Mittle and ArvindMittal, Basic Electrical Engineering, McGraw Hill Education, 2ndEdition,2005,ISBN- 978-0070593572.
2. D. P. Kothari, I. J. Nagrath, Electric Machines, McGraw Hill, 4th Edition, 2010, 978-0070699670.
3. Thomas L. Floyd, Electronics Devices & Circuits, Pearson Education India, 5th Edition, 1998, 978-0136491385.
4. Paul Horowitz, Winfield Hill, The Art of Electronics, Cambridge University press, 3rd Edition, 978-0521809269.
5. Thomas E. Kissell, Industrial Electronics, Prentice Hall of India, 3rd Edition, 2003, 9788120322608

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF HUMANITIES AND ENGINEERING SCIENCES** | **W.E.F** | **AY:** 2016 - 2017 |
| **FIRST YEAR BACHELOR OF TECHNOLOGY** | **COURSE NAME** | Engineering Graphics |
| | **COURSE CODE** | ME101 |
| | **COURSE CREDITS** | 4 |
| **RELEASED DATE :** 01/06/2016 | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | TUTORIAL/ | PRESENTATION/ | TOTAL |
| LECTURE | PRACTICAL | MSE | ESE | IA | PRACTICAL | DEMONSTRATION | |
| 2 | 4 | 40 | 50 | 10 | 50 | Nil | 150 |

**PRE-REQUISITE :**

**COURSE OBJECTIVES :**

ME101.CEO.1:To impart knowledge about principles/methods related to projections of one, two and three-dimensional objects.

ME101.CEO.2:To develop & apply visualization skill to simple Objects.

ME101.CEO.3:To expose students to computer aided drafting tools.

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

ME101.CO.1:Recall fundamentals of projections (L1)

ME101.CO.2:Interpret engineering drawings (L2)

ME101.CO.3:Apply visualization skill to draw various views of object (L3)

ME101.CO.4:Analyzeengineeringdrawings (L4)

ME101.CO.5:Decide annotations for two dimensional drawings (L5)

ME101.CO.6:Develop and/or comprehend a simple engineeringdrawing in both First and Third angle orthographic projections(L4)

| THEORY | | |
|---|---|---|
| **UNIT 1** | **Visual Thinking & Solid Geometry** | **5 HOURS** |
| Essentials of engineering graphics including technical sketching, Projection of Line, Plane, Solid. | | |
| **UNIT 2** | **Orthographic Projections & Sectional Views** | **5 HOURS** |
| Reference Planes, Types of Orthographic Projections, Sectional Orthographic Projections, Sectional Views. | | |
| **UNIT 3** | **Isometric Projections** | **5 HOURS** |
| Isometric View, Isometric Scale, Non-isometric Lines, construction of Isometric View from the given orthographic view and construction of isometric View of Pyramid, Cone, Sphere. | | |
| **UNIT 4** | **Interpretation of given view/ missing view** | **5 HOURS** |
| Identification of lines/ edges and surfaces, visualization of given orthographic views, adding missing/ third view, adding a sectional view, to convert a given view into sectional view. | | |
| **UNIT 5** | **Auxiliary Projections** | **4 HOURS** |
| Auxiliary Planes- Auxiliary Vertical Plane, Auxiliary Inclined Plane, Symmetrical Auxiliary View, Unilateral Auxiliary View, bilateral Auxiliary View. | | |
| **UNIT 6** | **Freehand Sketching & Technical Drawing** | **4 HOURS** |
| Free hand sketching- FV & TV of standard machine part- Hexagonal headed nut and bolt, foundation bolts, shafts, keys, couplings, springs, screw thread forms, welded joints, riveted joints, nozzles. | | |

| | | |
|---|---|---|
| **PRACTICALS : Each Assignment contains 2 questions.** | | |
| **PRACTICAL NO.01** | | **10 HOURS** |
| Projection of Lines, Plane, Solids | | |
| **PRACTICAL NO.02** | | **8 HOURS** |
| Orthographic Projections, Missing Views | | |
| **PRACTICAL NO.03** | | **6 HOURS** |
| Isometric Projections | | |
| **PRACTICAL NO.04** | | **4 HOURS** |
| Auxiliary View | | |
| **PRACTICALS : Assignments to be drawn on modelling software package.** | | |
| **PRACTICAL NO.05** | | **4 HOURS** |
| Absolute and Incremental drawing. | | |
| **PRACTICAL NO.06** | | **6 HOURS** |
| Draw commands, Modify commands, Array, fillet, offset commands | | |
| **PRACTICAL NO.07** | | **2 HOURS** |
| Project drafting | | |
| **PRACTICAL NO.08** | | **12 HOURS** |
| Sketching, Solid Modeling, Assembly | | |
| **PRACTICAL NO.09** | | **4 HOURS** |
| Project modeling | | |

**TEXT BOOK**


1. Dhanajay A. Jolhe, Engineering Drawing with an introduction to Auto CAD, TMH Publishing co Ltd, 5th Edition, 2012, (ISBN 13: 9780070648371)
2. Basant Agarwal and C M Agarwal, Engineering Drawing, TMH Publishing co Ltd, 2nd Edition 2013, (ISBN13: 978-1-259-06288-9)
3. K C John, Engineering Graphics for Degree, PHI learning pvt. Ltd. New Delhi,2009, (ISBN: 97881-203-3788-6)
4. R. K. Dhavan, A Text Book of Engineering Drawing, S Chand and co ltd., New Delhi India, 5Th Edition, 2012, ISBN 13: 9788121914314


**REFERENCE BOOK**


1. Luzadder, Warren J., Duff, John M, Fundamentals of Engineering, Prentice Hall of India,11th Edition, 2010, (ISBN: 978-81-203-0885-5)
2. Basudev Bhattacharya, Machine Drawing includes Autocad Supplements, Oxford University Press India, First Edition, 2011, (ISBN 13: 9780198070771)
3. K. Venugopal, Prabhu Raja V., Engineering Drawing and Graphics, New age Publications, First Edition, 2008, (ISBN: 978-81-224-2457-7)
4. N B Shaha and B C Rana, Engineering Drawing, Pearson Education, 2012, (ISBN: 9788131798058)

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF HUMANITIES AND ENGINEERING SCIENCES** | **W.E.F** | **AY:** 2016 - 2017 |
| **FIRST YEAR BACHELOR OF TECHNOLOGY** | **COURSE NAME** | Language and Communication 1 |
| | **COURSE CODE** | HP101 |
| | **COURSE CREDITS** | 2 |
| **RELEASED DATE :** 01/06/2016 | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | TUTORIAL/ PRACTICAL | PRESENTATION/ DEMONSTRATION | TOTAL |
| LECTURE | PRACTICAL | MSE | ESE | IA | | | |
| 1 | 2 | 30 | 35 | 10 | 25 | Nil | 100 |

**PRE-REQUISITE :** Basic proficiency in English at the higher secondary school level

**COURSE OBJECTIVES :**

HP101.CEO.1:To introduce a variety of English texts to the students.
HP101.CEO.2:To teach basic English grammar.
HP101.CEO.3:To guide the students to write in English coherently and formally.
HP101.CEO.4:To improve the students overall communicative competence in English through activities like group discussions and debates.

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

HP101.CO.1:Interpret texts written in English. [L2, L5]
HP101.CO.2:Apply English grammar rules correctly. [L3]
HP101.CO.3:Develop sentences and texts in English coherently and formally. [L3, L6]
HP101.CO.4:Demonstrate overall improvement in communication skills. [L 2]

| THEORY | | |
|---|---|---|
| **UNIT 1** | **Functional Grammar** | **4 HOURS** |
| Use of tenses in day to day communication and academic writing, Direct and Indirect Speeches, Active and Passive voices, Degrees of comparison, Use of the parts of speech in sentence composition, Verb forms and Modal auxiliaries | | |
| **UNIT 2** | **Communication** | **8 HOURS** |
| Concept of communication, Types-verbal and non-verbal, principles of effective communication, barriers to communication, cross-cultural communication | | |
| **UNIT 3** | **Academic Writing** | **6 HOURS** |
| Essentials of good writing, Review writing, Letter writing, Report writing, Prcis writing, and Essay writing | | |

| PRACTICALS | | |
|---|---|---|
| **PRACTICAL NO.01** | **Common Errors in Communicative English** | **6 HOURS** |
| A task of identifying and correcting the common errors in general as well as academic English by using audios and relevant academic texts; tips on punctuation. | | |
| **PRACTICAL NO.02** | **Debate** | **4 HOURS** |
| Concept, Dos & Donts, Guidelines for participation and success, Expression of thoughts and ideas, body language and interpersonal & analytical skills | | |
| **PRACTICAL NO.03** | **Group Discussion** | **4 HOURS** |
| Concept of GD, Criteria for evaluation, types of GD General, Creative and Technical, Dos & Donts, Guidelines for participation and success, Group Dynamics, Expression of thoughts and ideas, body language and interpersonal & analytical skills | | |
| **PRACTICAL NO.04** | **Role Play** | **4 HOURS** |
| Role-play for verbal communication, team building and group dynamics, decision making, leadership, analytical and creative thinking, group presentation | | |
| **PRACTICAL NO.05** | **Review and Letter Writing** | **4 HOURS** |
| How to write a review, characteristics and essentials of a good review, writing a review on a book or short story, types of letters- formal, informal; layout of business letters | | |
| **PRACTICAL NO.06** | **Report Writing and Prcis Writing** | **4 HOURS** |
| Types of reports, format and writing a report, What is prcis writing? Rules of prcis writing | | |
| **PRACTICAL NO.07** | **Essay Writing** | **2 HOURS** |
| What is an essay? Tips to write a good essay, Types of essays | | |

**REFERENCE BOOK**


1. Michael Swan: Practical English Usage, Oxford, 3rd Edition, ISBN-13: 978-0194420983
2. Raymund Murphy: Essential Grammar in Use, Cambridge, 3rd Edition, ISBN-13: 9780521133890
3. William Sanborn Pfeiffer: Technical Communication A Practical Approach, 6th Edition, Pearson Education, ISBN-13: 978-8131700884
4. Dutt et.al. : A Course in Communication Skills, Foundation, 1st Edition
5. Lynch: Listening, Cambridge, 1st edition, ISBN- 0521707757
6. Malcom Goodale: Professional Presentations, Cambridge, ISBN- 8175962577
7. S. Aggarwal: Essential Communication Skills, Ane Books pvt. Ltd, ISBN- 8180522806
8. Jennings: Communication Basics, Cengage Learning, 1st edition, ISBN- 8131515206

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF HUMANITIES AND ENGINEERING SCIENCES** | **W.E.F** | **AY:** 2016 - 2017 |
| **FIRST YEAR BACHELOR OF TECHNOLOGY** | **COURSE NAME** | Experimental Tools and Techniques- I |
| | **COURSE CODE** | ME102 |
| | **COURSE CREDITS** | 2 |
| **RELEASED DATE :** 01/06/2016 | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | TUTORIAL/ PRACTICAL | PRESENTATION/ DEMONSTRATION | TOTAL |
| LECTURE | PRACTICAL | MSE | ESE | IA | | | |
| - | 4 | - | - | 30 | - | 20 | 50 |

**PRE-REQUISITE :** NIL

**COURSE OBJECTIVES :**

ME102.CEO.1:To introduce different tools and study the various measurement techniques.
ME102.CEO.2:To study different parts of the system along with its functions and applications.
ME102.CEO.3:To list various tools used for the said application.
ME102.CEO.4:To identify the function of various parts of system.
ME102.CEO.5:To impart comprehensive knowledge for selection of appropriate techniques to the said application.
ME102.CEO.6:To apply the knowledge to find the solutions for basic engineering problems.

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

ME102.CO.1:Recall the tools required for measurements. (L1)
ME102.CO.2:Summarize the applications of various engineering tools used. (L2)
ME102.CO.3:Identify the right tool for selected purpose. (L3)
ME102.CO.4:Inspect various parts of the system .(L4)
ME102.CO.5:Justify the most appropriate technique which can be compatible with the existing environment. (L5)
ME102.CO.6:Develop the system which will give appropriate solution to the identified problem. (L6)

| PRACTICALS | | |
|---|---|---|
| **PRACTICAL NO.01** | **Information Technology/Computer Engineering (Minimum 6 practicals from the following** | **12 HOURS** |
| 1. Study and analysis of various components on the motherboard of a standard desktop computer.<br>2. Installation of various components like hard disk drive on the motherboard and check the system setup for verification.<br>3. Formatting the hard disk drive and installation of Windows and Linux operating system making the system dual boot<br>4. Study of various network components like switch, Router and configure the devices.<br>5. Crimping of Unshielded Twisted Pair cable. (Cat-6) 6. Study of TCP/IP Stack, and configure as well as develop a Local Area Network.<br>7. Configuration of Network Monitoring tool and checking the results<br>8. Installation of DHCP server and checking the results.<br>9. Installation of web server and checking the results.<br>10. Configuration of MS Access and Deploying Access 2007 Runtime-Based Solutions<br>11. Study and usage of Google Tools (creating Forms, Blog).<br>12. Using the Google form with add on, create a PDF file of the form.<br>13. Designing a static HTML page<br>14. Uploading the pages using FTP server on a web site<br>15. Deploy a simple web site using LAMP server creation of a web site using Google sites. | | |
| **PRACTICAL NO.02** | **Electronics Engineering (Minimum 6 practicals from the following** | **12 HOURS** |
| 1. Basic electronics component and switches<br>2. PCB and Soldering Tools And Technique<br>3. Relay and application<br>4. Manufacturing of extension board/Spike Guard<br>5. Series and parallel connection of Electrical Load<br>6. Actuators and application (Electrical and Mechanical).<br>7. PCB Wizard<br>8. Proteus<br>9. Virtual Instrumentation.<br>10. Cathode Ray Oscilloscope<br>11. Power Supply | | |

| PRACTICAL NO.03 | Mechanical Engineering Laboratories (Minimum 6practicals from the following | 12 HOURS |
|---|---|---|

1. Linear and angular measurements.
2. Types of mechanism and making any one mechanism containing four links using card board.
3. Open a household component and explain it with free hand sketches.
4. Draw the outline of the problem identified for project on software package.
5. Measurement of RPM of rotating machine using contact and non-contact type tachometer.
6. Measurement of transmission ratio in Belt drive, Chain drive, and Gear drive.
7. Measurement of Barometric pressure, introduction to pressure measuring devices like bourdon tube pressure gauge and manometer. Fabrication of simple type manometer.
8. Introduction to temperature measuring devices. Making and calibration of thermo couple and using it with temperature indicator.
9. Measurement of Relative humidity of air in the lab.
10. Measurement of hardness of Steel and Aluminum.
11. Measurement of stiffness of helical spring (compression or tension). Open IT
12. Mixer or kitchen machine/ Printer.
13. Refrigerator/ Window Air Conditioner.
14. Boiler and accessories / thermal power plant (Mini).
15. Two stroke or four stroke engine.
16. Assembly and Disassembly of parts in any software package.
17. Introduction to threaded fasteners and joints using threaded fasteners.

| PRACTICAL NO.04 | Chemical Engineering (Minimum 3 practicals from the following | 06 HOURS |
|---|---|---|

1. Determination of specific gravity of liquid
2. Study of molecular diffusion
3. Liquid liquid extraction: Separation of one liquid component from the solution.
4. Solid-liquid separation from filtration
5. Membrane Separation process
6. Fuel from Plastic
7. Demonstration of mechanical operation models.
8. Production of Biodiesel
9. Open and Study Heat Exchangers.
10. Water purifier (Household)

| PRACTICAL NO.05 | Civil Engineering (Mimimum 3 Practicals from the following) | 06 HOURS |
|---|---|---|

1. To find the area and included angle of given plot and fix boundary from given plan.
2. To determine the level difference between 5 points with level tube and determine height of tower with trigonometry.
3. To draw the plan of given housing to a given scale.
4. To draw line diagram of household water supply line and sewage line with list of materials used.
5. To draw line diagram of rain water harvesting unit with all details and its importance.
6. To make report on daily water requirement in public building and its waste water disposal, and reuse.
7. To identify and make report on the earthquake resisting structural members of building and its role.
8. To demonstrate the lifesaving dos and donts during the different natural calamities.
9. To demonstrate the dos and donts after different natural calamities.

**TEXT BOOK**


1. Bruce Hallberg, Networking A Beginners Guide , 4th edition, Tata McGraw-Hill,2005, ISBN 0-07-060791-5
2. R.S. Khandpur, Printed Circuit Boards Design, Fabrication, Assembly and Testing, Tata McGraw-Hill Education, 2005, ISBN 0070588147, 9780070588141.
3. S R Dara, Engineering Chemistry, 5th edition, S.Chand , ISBN 81-219-0359-9


**REFERENCE BOOK**


1. Mackenzie L. Davis, Water and Wastewater Engineering, 13th edition, Tata McGraw- Hill, ISBN 978-1-25-906483-8
2. R. S. Khurmi, J. K. Gupta, Theory of Machines, 14th edition, S. Chand, ISBN 81-219-2524-X
3. Philip Wankat, Seperation Process Engineering , 3rd edition, Pearson, ISBN 978-93-325-2484-2
4. N.V. Ragvendra, L. Krishnamurthy, Engineering Metrology and Measurements, Oxford University Press, ISBN 978-0-19-808549-2.
5. Dr. Vinod Hosur, Earthquake- Resistant Design of Building Structures, Wiley, ISBN 978-81265-3859-1
6. M. S. Shetty, Concrete Technology, S. Chand, 2008, ISBN 9788121900034.

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF HUMANITIES AND ENGINEERING SCIENCES** | **W.E.F** | **AY:** 2016 - 2017 |
| **FIRST YEAR BACHELOR OF TECHNOLOGY** | **COURSE NAME** | Mathematics II |
| | **COURSE CODE** | AS104 |
| | **COURSE CREDITS** | 5 |
| **RELEASED DATE :** 01/06/2016 | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | TUTORIAL/ PRACTICAL | PRESENTATION/ DEMONSTRATION | TOTAL |
| LECTURE | PRACTICAL | MSE | ESE | IA | | | |
| 4 | 1 | 40 | 50 | 10 | 25 | Nil | 125 |

**PRE-REQUISITE :** Basic elementary Mathematics of XI & XII, Mathematics I

**COURSE OBJECTIVES :**

AS104.CEO.1:To identify different methods to evaluate integrals.
AS104.CEO.2:To classify and solve linear differential equations of higher order
AS104.CEO.3:To demonstrate an understanding towards evaluating multiple integrals.
AS104.CEO.4:To relate and examine the applications of multiple integrals.
AS104.CEO.5:Analyse different probability distribution functions.
AS104.CEO.6:To study different statistical methods for solving problems

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

AS104.CO.1:Distnguish different methods to evaluate integrals.(L4)
AS104.CO.2:Conclude solutions for higher order lineardifferential equations(L4)
AS104.CO.3:Evaluate the multiple integrals(L5)
AS104.CO.4:Apply the knowledge of multiple integrals wherever required(L3)
AS104.CO.5:Solve the probability distribution problems(L3)
AS104.CO.6:Assess statistical problems(L5)

| THEORY COURSE CONTENT | | |
|---|---|---|
| **UNIT 1** | **Integral Calculus** | **8 HOURS** |
| Reduction Formulae , Beta - Gamma functions and Differentiation under integral sign. | | |
| **UNIT 2** | **Linear Differential Equations of higher order** | **8 HOURS** |
| General solution of Linear Differential equations with constant coefficients, Method of Variation of parameters, Equations reducible to Linear Differential equation with constant coefficients: Cauchy&Legendres linear differential equations | | |
| **UNIT 3** | **Multiple Integrals** | **8 HOURS** |
| Tracing ofCurves: Cartesian curves, Polar curves, Parametric curves ,Double Integration, Evaluation of Double Integration, Change of order of integration, Integration by transforming Cartesian to Polar Coordinate system, Triple integration, Integration by transforming to spherical and cylindrical polar coordinates | | |
| **UNIT 4** | **Applications of Multiple Integrals** | **8 HOURS** |
| Applications of multiple integrals to find Area, Volume, Centre of Gravity, and Moment of Inertia | | |
| **UNIT 5** | **Probability** | **8 HOURS** |
| Probability, probability density function, probability distribution:Binomial, Poisson, Normal . | | |
| **UNIT 6** | **Statistics** | **8 HOURS** |
| Measures of central tendency, standard deviation, coefficient of variation, moments, skewness and kurtosis, correlation(Karl Pearsons coefficient of correlation) and regression. | | |

| TUTORIAL | | |
|---|---|---|
| **TUTORIAL NO.01** | | **1 HOURS** |
| Examples on Reduction Formulae, Beta and Gamma functions. Examples on Differentiation under integral sign | | |
| **TUTORIAL NO.02** | | **1 HOURS** |
| General solution of Linear Differential equations with constant coefficients , Method of Variation of parameters. | | |
| **TUTORIAL NO.03** | | **1 HOURS** |
| Equations reducible to Linear Differential equation with constant coefficients: Cauchy- Euler equations | | |
| **TUTORIAL NO.04** | | **1 HOURS** |
| Tracing of Cartesian curves .Tracing of Polar and Parametric curves .Double Integration, Evaluation of Double Integration, Change the order of integration. | | |
| **TUTORIAL NO.05** | | **1 HOURS** |
| Integration by transforming Cartesian to Polar Coordinate system, Triple integration,Integration by transforming to spherical and cylindrical polar coordinates.Applications of multiple integrals:To find Area, Volume | | |
| **TUTORIAL NO.06** | | **1 HOURS** |
| Applications of multiple integrals: To find Centre of Gravity of an arc, plane lamina and a solid. | | |
| **TUTORIAL NO.07** | | **1 HOURS** |
| Applications of multiple integrals: To find Moment of Inertia about an arc, plane and solid | | |
| **TUTORIAL NO.08** | | **1 HOURS** |
| Probability, probability density function, Probability distribution:Binomial | | |
| **TUTORIAL NO.09** | | **1 HOURS** |
| Probabilitydistribution :Poisson, Normal. Measures of central tendency, standard deviation, coefficient of variation | | |
| **TUTORIAL NO.10** | | **1 HOURS** |
| Moments, skewness and kurtosis,correlation and regression. | | |

**TEXT BOOK**


1. Higher Engineering Mathematics by Dr. B.V. Ramana; Tata McGraw Hill, ISBN: 978-0-07-063419-2
2. Higher Engineering Mathematics by B.S. Grewal, Khanna Publications, 39th edition, ISBN: 81-7409- 195-5


**REFERENCE BOOK**


1. Calculus by G.B. Thomas &R.L.Finney (ISBN:81-7758-325-5, Pearson Education, 9th edition)
2. Advanced Engineering Mathematics by Erwin Kreyszig, Volume I & II (ISBN-10: 8126543132, ISBN-13: 978-8126543137, Wiley Eastern Ltd.)
3. Advanced Engineering Mathematics by R.K. Jain & S.R.K. Iyengar (ISBN No.: 8173194203, Narosa Publishing house)
4. Advanced Engineering Mathematics by Peter V. ONeil (ISBN-13: 9788131503102, Cenage Learning, 7th Edition)
5. Advanced Engineering Mathematics by Dennis G. Zill& Warren S. Wright; Jones and Bartlett Publishers, 4th edition, ISBN-10: 0-7637-7966-0, ISBN 13: 978-0-7637-7966-5.
6. Higher Engineering Mathematics by B.S. Grewal (ISBN:81-7409-195-5,Khanna Publications,39 th edition)
7. Applied statistics and probability for engineers fourth edition by Douglas C. montgomery , George C runger(ISBN No:978-81-265-2315-3 wiley )
8. Miller& Freunds Probability and statistics for engineers by richard A johnson, irwin-miller,johnfreund(ISBN no:978-93325-5041-4,Pearson)

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF HUMANITIES AND ENGINEERING SCIENCES** | **W.E.F** | **AY:** 2016 - 2017 |
| **FIRST YEAR BACHELOR OF TECHNOLOGY** | **COURSE NAME** | Chemistry |
| | **COURSE CODE** | AS103 |
| | **COURSE CREDITS** | 4 |
| **RELEASED DATE :** 01/06/2016 | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | TUTORIAL/ PRACTICAL | PRESENTATION/ DEMONSTRATION | TOTAL |
| LECTURE | PRACTICAL | MSE | ESE | IA | | | |
| 3 | 2 | 40 | 50 | 10 | 25 | NIL | 125 |

**PRE-REQUISITE :** Basic Chemistry of XI and XII

**COURSE OBJECTIVES :**

AS103.CEO.1:To summarize the basic chemistry and classic methods of analysis, which includes solution, concentrations and indicators.

AS103.CEO.2:To outline the technology involved in improving quality of water for its industrial use.

AS103.CEO.3:To illustrate the basic concepts of analytical techniques that facilitates rapid and reliable measurements.

AS103.CEO.4:To demonstrate the use of ultra violet visible spectroscopy as invaluable tools in synthetic chemistry.

AS103.CEO.5:To list and explain the principle & techniques of separation methods.

AS103.CEO.6:To define the basic aspects of advanced materials & their applications.

**COURSE OUTCOMES :**

On successful completion of the course the student will be able to

AS103.CO.1:Relate classic methods of analysis by preparing solutions of desired concentrations & carrying out quantitative analysis by volumetric methods. (L1)

AS103.CO.2::Identify different methodologies for water quality analysis for industrial application. (L3)

AS103.CO.3:Apply basic concepts of electro-analytical techniques for analysis of various chemical compounds and solutions. (L3)

AS103.CO.4:Extend the knowledge of calculating wavelength of absorption of various chemical compounds using UV-Visible spectroscopy. (L2)

AS103.CO.5:Outline the different methods for separation of mixtures of various chemical compounds.(L2)

AS103.CO.6:Categorize the different engineering materials and to solve engineering problems.(L4)

**THEORY**

| | | |
|---|---|---|
| **UNIT 1** | **Instrumental volumetric analysis** | **7 HOURS** |

Introduction, methods of expressing concentrations (Self-study), primary and secondary standard solutions. Instrumental & non instrumental analysis principles & types; Types of Titrations based on reaction, AcidBase titrations: Indicatorstheory of indicators, acid base indicators, mixed and universal indicators; Titration curve for Strong acidStrong base type, Introduction to Weak acidStrong base, Strong acid-Weak base titration, Precipitation titration, Applications in quantitative analysis.

| | | |
|---|---|---|
| **UNIT 2** | **Water treatment and effluent management** | **7 HOURS** |

Introduction to conventional water treatment: Complexometric titrations: Principle, EDTA titrations, choice of indicators, Hardness of water & Alkalinity of water, causes, types, numerical, internal methods of water softening, Advanced wastewater & water Treatment: i) filtration method: Carbon adsorption ii) ion-exchange method iii) membrane techniques: reverse osmosis and electro-dialysis & their applications in water purification.

| | | |
|---|---|---|
| **UNIT 3** | **Electroanalytical Techniques** | **7 HOURS** |

Introduction to electrodes, pH metry: Standardization of pH meter, titration curve for the mixture of acids Vs strong base, differential plots, Conductometry: Introduction, Kohlrauschs law, measurement of conductance, Application of conductometer in Acid-Base titrations & Precipitation titrations. Potentiometry: Introduction, application in redox titrations example of Fe/Ce titration.

| UNIT 4 | Ultra Violet Spectroscopy | 7 HOURS |
|---|---|---|
| Introduction, nature of UV, Beers law, absorption of UV radiation by organic molecule leading to different excitation, Terms used in UV Spectroscopy- Chromophore, Auxochrome, Bathochromic shift(Red shift), hypsochromic shift(Blue shift), hyperchromic and hypochromic effect. Instrumentation,Effect of conjugation on position of UV band. Calculation of max by Woodward and Fisher rules for dienes and enone systems, Applications of UV Spectroscopy- Determination of structure, Determination of stereo chemistry (Cis and trans) | | |
| **UNIT 5** | **: Chromatography** | **6 HOURS** |
| Introduction and classification of chromatographic methods, Theory, Principle, technique and applications of-Column Chromatography, Thin layer Chromatography, Paper Chromatography, Gas Chromatography. Applications of chromatographic techniques | | |
| **UNIT 6** | **: Engineering Materials.** | **8 HOURS** |
| Introduction to Material Sciences, Polymers: Introduction, Specialty polymers, Applications in electronic gadgets, housing & construction, automobiles etc. Biomaterials: Introduction, characteristics, examples, challenges, Carbon nano materials: Introduction, types & applications. Smart materials: Introduction, types, examples like piezo materials, shape memory, thermo responsive etc.. | | |

| | | |
|---|---|---|
| **PRACTICAL** | | |
| **PRACTICAL NO.01** | | **2 HOURS** |
| Preparation and Standardization of solutions | | |
| **PRACTICAL NO.02** | | **2 HOURS** |
| Estimation of ions from given solution by Redox titration | | |
| **PRACTICAL NO.03** | | **2 HOURS** |
| Determination of the total hardness of a given water sample by EDTA method | | |
| **PRACTICAL NO.04** | | **2 HOURS** |
| Adsorption: Removal of organic dyes by activated charcoal | | |
| **PRACTICAL NO.05** | | **2 HOURS** |
| Determination of the dissociation constant of a weak acid using pH meter | | |
| **PRACTICAL NO.06** | | **2 HOURS** |
| Conduct metric titrations | | |
| **PRACTICAL NO.07** | | **2 HOURS** |
| Verification of Beers law & colorimetric estimation | | |
| **PRACTICAL NO.08** | | **2 HOURS** |
| Determination of max of organic/ inorganic compound using UV-visible spectrophotometer | | |
| **PRACTICAL NO.09** | | **2 HOURS** |
| Separation of mixture of two organic compounds by Thin Layer Chromatography | | |
| **PRACTICAL NO.10** | | **2 HOURS** |
| Separation of two cations by paper chromatography | | |
| **PRACTICAL NO.11** | | **2 HOURS** |
| Separation & purification of chemical compounds by Gas chromatography | | |

**TEXT BOOK**


1.Jain & Jain, Engineering Chemistry, 15th Edition, Dhanpat Rai Publications company

2.S.M. Khopkar , Basic Concept of Analytical Chemistry,2nd edition, New Age Science Ltd ISBN-10: 1906574006 ISBN-13: 978- 1906574000

3.Dr. B. S. Chauhan , Engineering Chemistry, 3rd Edition, Laxmi Publications Pvt. Ltd.


**REFERENCE BOOK**


1.V.M.Parikh , Absorption Spectroscopy of Organic Molecules, Addison Wesley Longman Publishing Co, ISBN 10: 0201057085,ISBN 13: 9780201057089.

2. Skoog, Fundamentals of Analytical Chemistry, Cengage Learning, ISBN-13: 978-0495558286, ISBN-10: 0495558281

3. Willard, Merritt, Dean and Settle, Instrumental Methods of chemical analysis, 6th edition, Wadsworth Publishing Co. ISBN-10: 0534081428, ISBN-13: 978-0534081423.

4. Donald R. Askeland, Pradeep Fulay, W. J. Wright, The Science & Engineering of Materials, 6th Edition, Cengage Learning, 2010

5. O. P. Virmani & A. K. Narula , Applied Chemistry: Theory and Practice , New Age International Pvt. Ltd. Publishers, ISBN-10: 8122408141, ISBN-13: 978-8122408140

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | COURSE SYLLABI (2016 – 2020) | |
|---|---|---|
| SCHOOL OF HUMANITIES AND ENGINEERING SCIENCES | **W.E.F** | **AY:** 2016 - 2017 |
| **FIRST YEAR BACHELOR OF TECHNOLOGY** | **COURSE NAME** | Applied Mechanics |
| | **COURSE CODE** | CV101 |
| | **COURSE CREDITS** | 4 |
| **RELEASED DATE :** 01/06/2016 | **REVISION NO** | 0.0 |

| TEACHING SCHEME (HOURS/WEEK) | | EXAMINATION SCHEME AND MARKS | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | TUTORIAL/ PRACTICAL | PRESENTATION/ DEMONSTRATION | TOTAL |
| LECTURE | PRACTICAL | MSE | ESE | IA | | | |
| 3 | 2 | 40 | 50 | 10 | 25 | Nil | 125 |

**PRE-REQUISITE :** Physics and Mathematics of XI & XII

**COURSE OBJECTIVES :**

CV101.CEO.1:To classify force systems and explain the conditions of equilibrium.
CV101.CEO.2:To illustrate laws of friction.
CV101.CEO.3:To demonstrate the concepts of centroid and moment of inertia.
CV101.CEO.4:To describe kinematic parameters of motion.
CV101.CEO.5:To make use of laws of motion for kinetics.
CV101.CEO.6:To explain energy and momentum methods.

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

CV101.CO.1:Determine the resultant and support reactions.(L5)
CV101.CO.2:Analyze bodies involving frictional forces. (L4)
CV101.CO.3:Evaluate centroids of bodies and moment of inertia of sections. (L5)
CV101.CO.4:Identify the type of motion and its kinematic parameters. (L3)
CV101.CO.5:Analyze the motion under action of constant and variable forces. (L4)
CV101.CO.6:Apply energy and momentum methods for kinetics. (L3)

| THEORY | | |
|---|---|---|
| **UNIT 1** | **Fundamentals of statics** | **8 HOURS** |
| Basic concepts and fundamental principles, force, moment of a force, couple, resolution and composition of forces, Free body diagrams, equations of equilibrium, equilibrium of coplanar and non-coplanar force system, applications to jib crane, beams, and cables. | | |
| **UNIT 2** | **Friction** | **6 HOURS** |
| Introduction, types of friction, laws of friction, angle of friction, angle of repose, cone of friction, engineering applications - blocks and wedges, ladder friction, screw jack, pulley and belt drives, band brakes. | | |
| **UNIT 3** | **Properties of surfaces** | **6 HOURS** |
| Concept of Centroid and centre of gravity, centroids of composite 1D and 2D objects. Introduction to moment of inertia, radius of gyration, parallel axes theorem, perpendicular axis theorem, MI of composite objects. Distributed loading, fluid pressure-application to dams and gates. | | |
| **UNIT 4** | **Kinematics** | **8 HOURS** |
| Basic concepts in kinematics, Motion with uniform and variable acceleration, Motion curves, Curvilinear Motion in Rectangular coordinates, path coordinates, polar coordinates. Kinematic Link and Kinematic Pair, Kinematic Chain, Mechanisms and its inversions, instantaneous centre of rotation, Kennedy's Theorem, Applications- slider and crank mechanism, Railway engine and its supporting flywheel motions, Linkage mechanism of excavator and its system. | | |
| **UNIT 5** | **Kinetics** | **6 HOURS** |
| Kinetics of rectilinear and circular motion of a particle acted upon by a constant and variable force system, Newtons second laws of Motion, Equations of motion, concept of dynamic equilibrium, and motion of connected bodies. Basic principles of vehicle dynamics, Forces acting on a vehicle, tire mechanics, Dynamics of linear and lateral motion. | | |
| **UNIT 6** | **Applications of Partial Differentiation** | **8 HOURS** |
| Work, power and energy, Principles of work and Energy,Motion under a ConservativeCentral Force. Application to Space Mechanics. Impulse, momentum, Principle of Impulse and Momentum, Collisions-elastic and plastic, Direct central impact, coefficients of restitution.Applications-vehicle collisions, sports viz. cricket, tennis, billiard. | | |

| PRACTICALS | | |
|---|---|---|
| **PRACTICAL NO.01** | **Group 1] Basic principles/laws** | **2 HOURS** |
| 1. To verify triangle law/ Lami's theorem<br>2. To verify polygon law of forces.<br>3. To verify law of moments.<br>4. To verify equilibrium of parallel forces. (Beam Reactions)<br>5. To verify equilibrium of concurrent forces in space. | | |
| **PRACTICAL NO.02** | **Group 2] Friction** | **2 HOURS** |
| 1. To verify laws of friction.<br>2. To determine angle of repose for a given block and surface.<br>3. To determine static coefficient of friction for a block on horizontal plane.<br>4. To determine static coefficient of friction for a block on inclined plane.<br>5. To determine static coefficient of friction for flat belt and drum. | | |
| **PRACTICAL NO.03** | **Group 3] Centroid/centre of gravity** | **2 HOURS** |
| 1. To determine centroid of irregular triangular lamina.<br>2. To determine centroid of polygonal lamina.<br>3. To determine centre of gravity of a wire bend.<br>4. To determine centroid of a composite lamina.<br>5. To find the shift of centroid after cutting some part of lamina. | | |
| **PRACTICAL NO.04** | **Group 4] Motion(Dynamics)** | **2 HOURS** |
| 1. To study curvilinear motion of a particle.<br>2. To verify value of g using compound pendulum.<br>3. To determine coefficient of restitution.<br>4. To determine mass moment of inertia of a fly wheel.<br>5. To verify law of conservation of momentum. | | |
| **PRACTICAL NO.05** | **Group 5] Graphical Exercises** | **2 HOURS** |
| 1. To determine resultant of concurrent forces.<br>2. To determine resultant of parallel/general forces.<br>3. To determine reactions for a simple beam.<br>4. To draw motion curves for given kinematics problem.<br>5. To determine relative velocity by graphical method.<br>Part B] Students will have to complete a task/activity after each practical which will be based on the theme of that group. (10 Hrs) | | |

**TEXT BOOK**


1. A. Nelson ”Engineering Mechanics: Statics and Dynamics”, Tata McGraw-Hill Education, ISBN: 978-0-07-014614-3
2. R.C Hibbeler ”Engineering Mechanics”, Pearson Education, ISBN: 978-0136077909


**REFERENCE BOOK**


1. F. P. Beer and E. R. Johnston ”Vector Mechanics for Engineers Vol.I and II”, Tata Mc-Graw, ISBN: 978-0077402327
2. Ferdinand Singer, Harper and Row ”Engineering Mechanics Statics and Dynamics”, ISBN:0063506610
3. Manoj K Harbola ”Engineering Mechanics”, Cengage Learning, ISBN:8131509907

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF HUMANITIES AND ENGINEERING SCIENCES** | **W.E.F** | **AY:** 2016 - 2017 |
| **FIRST YEAR BACHELOR OF TECHNOLOGY** | **COURSE NAME** | Computer Programming |
| | **COURSE CODE** | IT101 |
| | **COURSE CREDITS** | 4 |
| **RELEASED DATE :** 01/06/2016 | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | TUTORIAL/ PRACTICAL | PRESENTATION/ DEMONSTRATION | TOTAL |
| LECTURE | PRACTICAL | MSE | ESE | IA | | | |
| 2 | 4 | 40 | 50 | 10 | 25 | NIL | 125 |

**PRE-REQUISITE :** Knowledge of computer system.

**COURSE OBJECTIVES :**

IT101.CEO.1:To define and summarize the basic terminologies used in computer programming.
IT101.CEO.2:To develop and demonstrate logic for a given problem using algorithms and Flowcharts.
IT101.CEO.3:To evaluate solutions for the given problem using problem solving tools.
IT101.CEO.4:To identify and analyze different control structures.
IT101.CEO.5:To understand and use of simple data structures using Python.
IT101.CEO.6:To demonstrate and understand different computer applications in engineering.

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

IT101.CO.1:Analyze a problem and identify and define the computing requirements appropriate to its solution[L3][L4].
IT101.CO.2:Apply the knowledge and strategies for structuring code, dividing problems up into pieces that can be solved independently, then integrating the pieces into a whole to solve a large problem [L3].
IT101.CO.3:Analyze when to select the different types of data structures such as arrays and lists as a framework for solving a problem [L4].
IT101.CO.4:Design, correctly implement and document solutions to problems using Python [L6].
IT101.CO.5:Analyze and compare alternative solutions to computing problems [L2][L4]
IT101.CO.6:Adapt to new developments in the field of computer science [L6].

| THEORY | | |
|---|---|---|
| **UNIT 1** | **Problem Solving Concepts** | **6 HOURS** |
| General Problem Solving Concepts-types of problems, problem solving with computers, difficulties with problem solving, Problem solving concepts for the computer: Constants, Variables, Data types, operators, Expressions, Equations, Problem solving tools.Programming structure-Modules and their functions, Cohesion and Coupling, Local and Global Variables, Parameters, return values | | |
| **UNIT 2** | **Problem solving and Logic structure** | **8 HOURS** |
| Logic structures, Problem solving with sequential logic structure - The sequential logic structure, solution development. Problem Solving with Decisions decision logic structure, multiple Decision instructions, straight-through logic, positive logic, negative logic, logic conversion, Problem solving with loops and case logic structures. | | |
| **UNIT 3** | **Arrays, Strings and File Processing** | **8 HOURS** |
| One dimensional, multidimensional array,finding maximum number in a set, Partitioning of array, finding smallest element, searching an array for a range. String Handling Operations: Concatenation, Copy, Substring, Compare, Length, Case Change, and Reverse. File handling and file handling operations, File Handling Modes. | | |
| **UNIT 4** | **Programming Applications** | **6 HOURS** |
| Programming applications, Predictive analysis with examples, Graphics and animation, working with matrices, Graphics & Visualization, Differential Equation: Linear Differential Equations, Digital Signal Processing: Plotting different waveforms. | | |

| PRACTICALS | | |
|---|---|---|
| **PRACTICAL NO.01** | | **6 HOURS** |
| 1. Find the result of allthe arithmetic operations (Addition,Subtraction,Multiply, Division and modulo) in Python.<br>2. Show the distance in miles per gallon with respect user defined value in Python.<br>3. Find the kinetic energy of an object. | | |
| **PRACTICAL NO.02** | | **6 HOURS** |
| 1. Write a Python program for printing result of five subjects for five students.<br>2. Choose any value and find whether the number is even or odd.<br>3. Identify whether the number entered by user is prime or not. | | |
| **PRACTICAL NO.03** | | **6 HOURS** |
| 1. Solve the Fibonacci sequence using recursive function in Python.<br>2. Illustrate factorial of non-negative numbers in Python.<br>3. Build asterisk (*) graph in Python | | |
| **PRACTICAL NO.04** | | **6 HOURS** |
| Electric circuits, Chemical applications- Mixing problems. | | |
| **PRACTICAL NO.05** | | **6 HOURS** |
| 1. Select the number from the entered list and find its position in Python (use Linear Search).<br>2. Select the number and find its position of in Python (use Binary search).<br>3. Choose cricket team of eleven players find the captain of the team (consider tallest person as a captain) | | |
| **PRACTICAL NO.06** | | **6 HOURS** |
| 1. Select a text file and count number of words, repeated words in a file.<br>2. Choose the words from the file, store in the list and sort the list is ascending order.<br>3. Create duplicate the file from an original file. | | |
| **PRACTICAL NO.07** | | **6 HOURS** |
| 1. Predict whether the entered string is palindrome or not.<br>2. Compare two strings and convert in opposite case in Python.<br>3. Select any two words and perform concatenation operation | | |
| **PRACTICAL NO.08** | | **14 HOURS** |
| 1. Create a simple picture in python using graphics package.<br>2. Construct 2D and 3D plotting the Objects.<br>3. Create Sine waveform, Cosine waveform, Square waveform, Saw-tooth waveform, using MATLAB and discrete the same.<br>4. Solve the matrix operations (Addition, Multiplication, and Transverse) in MATLAB.<br>5. Design an application to display student result using predictive analysis | | |

**TEXT BOOK**


1.1. Problem Solving and Programming Concepts ,Maureen Sprankle , Pearson Publication, Seventh Edition, ISBN 81-317-0711-3.

2.How to think like a Computer Scientist, Learning with Python Allen Downey, Jeffrey Elkner, Chris Meyers, Green Tea Press ISBN: 0-9716775-0-6.


**REFERENCE BOOK**


1.1. Learning Python Mark Lutz Oreilly Publication 5th Edition ISBN-13: 978-1449355739.

2. A MATLAB Exercise Book LudmilaKuncheva, Cameron Gray, Perfect-bound Paperback, ISBN 9781291784794.

3. How to solve it by Computer, R.G.Dromey, First Edition, Pearson Publication, ISBN 978-81-315-0562-9.

4. Introduction To Computation And Programming Using Python ”Guttag John V, PHI(2014), ISBN-13 : 978-8120348660.

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF HUMANITIES AND ENGINEERING SCIENCES** | **W.E.F** | **AY:** 2016 - 2017 |
| **FIRST YEAR BACHELOR OF TECHNOLOGY** | **COURSE NAME** | Language and Communication 2 |
| | **COURSE CODE** | HP102 |
| | **COURSE CREDITS** | 2 |
| **RELEASED DATE :** 01/06/2016 | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | TUTORIAL/ PRACTICAL | PRESENTATION/ DEMONSTRATION | TOTAL |
| LECTURE | PRACTICAL | MSE | ESE | IA | | | |
| 1 | 2 | 30 | 35 | 10 | 25 | Nil | 100 |

**PRE-REQUISITE :** Basic proficiency in English at the higher secondary school level; Language and Communication- 1

**COURSE OBJECTIVES :**

HP102.CEO.1:To familarise the students with sounds in English and introduce phonemic transcription.
HP102.CEO.2:CEO.2: To enrich the vocabulary of the students with AWL and NAWL.
HP102.CEO.3:To acquaint the students with public speaking, presentation and interview skills in English.
HP102.CEO.4:To develop the students reading and listening skills with the use of written audio and video texts.

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

HP102.CO.1:Recognise and reproduce the sounds in English effectively. [L1]
HP102.CO.2:Choose and employ appropriate words from AWL and NAWL in communication. [L1, L3]
HP102.CO.3:Express their ideas effectively and demonstrate skills in interpersonal communication. [L2, L3]
HP102.CO.4:Analyse and infer from written, audio and video texts. [L 2, L4]

| THEORY | | |
|---|---|---|
| **UNIT 1** | **Phonetics and Vocabulary** | **3 HOURS** |
| Phonemes in English and phonemic transcription; Essential academic vocabulary (Academic Word List and New Academic Word List); Dictionary Skills; Phrasal verbs and collocations | | |
| **UNIT 2** | **Oral Communication** | **4 HOURS** |
| Public Speaking; Presentation Skills; Interview Skills and telephonic communication; Meetings (types, agenda and minutes) | | |
| **UNIT 3** | **Active Listening and Reading with Comprehension** | **5 HOURS** |
| Concept and types of listening; Steps in listening with comprehension; Essentials of good listening; Concept and types of reading; Guidelines for reading with comprehension; Analytical reading | | |

| PRACTICALS | | |
|---|---|---|
| **PRACTICAL NO.01** | **Pronunciation and Phonemic Transcription** | **2 HOURS** |
| Identification of correct pronunciation of words by decoding phonemic scripts; writing phonemic transcriptions of the given words | | |
| **PRACTICAL NO.02** | **Vocabulary Enrichment** | **2 HOURS** |
| Online exercises on AWL and NAWL using web-based applications; Dictionary Skills | | |
| **PRACTICAL NO.03** | **Phrasal Verbs and Collocations** | **2 HOURS** |
| Use of phrasal verbs and collocations; reading literary pieces, essays to identify phrasal verbs in context; story-telling | | |
| **PRACTICAL NO.04** | **Public Speaking** | **2 HOURS** |
| Attributes of a good public speaker; prepared and extemporaneous speech; Listening to and Reading famous speeches | | |
| **PRACTICAL NO.05** | **: Presentations** | **2 HOURS** |
| Essentials of effective presentations; Data collection and compilation; Preparation of outlines; PPT and Prezi | | |
| **PRACTICAL NO.06** | **Interview Skills and Telephonic Communication** | **2 HOURS** |
| Etiquettes of attending interviews; Preparation; Telephonic communication; Mock Interviews | | |
| **PRACTICAL NO.07** | **Mock Meetings** | **2 HOURS** |
| Importance of effective interpersonal communication; working in teams; Mock Meetings | | |
| **PRACTICAL NO.08** | **Active Listening** | **6 HOURS** |
| Active listening; Conversations, audio and video clips; Listening with comprehension | | |

| PRACTICAL NO.09 | Reading with Comprehension | 4 HOURS |
|---|---|---|
| Techniques of reading- Intensive, Extensive, Skimming and Scanning; Reading Comprehensions | | |

**REFERENCE BOOK**


1.Michael Swan: Practical English Usage, Oxford, 3rd Edition, ISBN-13: 978-0194420983
2.Dutt et.al. : A Course in Communication Skills, Foundation, 1 edition
3.Peter Roach: English Phonetics and Phonology, 4th Edition, Cambridge, ISBN-0521149215
4.Lynch: Listening, Cambridge, 1st edition, ISBN- 0521707757
5.Malcom Goodale: Professional Presentations, Cambridge, ISBN- 8175962577
6.S. Aggarwal: Essential Communication Skills, Ane Books pvt. Ltd, ISBN- 8180522806
7.Jennings: Communication Basics, Cengage Learning, 1st edition, ISBN- 8131515206

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF HUMANITIES AND ENGINEERING SCIENCES** | **W.E.F** | **AY:** 2016 - 2017 |
| **FIRST YEAR BACHELOR OF TECHNOLOGY** | **COURSE NAME** | Design Thinking |
| | **COURSE CODE** | ME103 |
| | **COURSE CREDITS** | 2 |
| **RELEASED DATE :** 01/06/2016 | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | TUTORIAL/ PRACTICAL | PRESENTATION/ DEMONSTRATION | TOTAL |
| LECTURE | PRACTICAL | MSE | ESE | IA | | | |
| - | 4 | - | - | 25 | - | 25 | 50 |

**PRE-REQUISITE :** -

**COURSE OBJECTIVES :**

ME103.CEO.1:Disseminate the philosophy of design thinking.
ME103.CEO.2:Impart the information regarding User centric approach.
ME103.CEO.3:Give exposure to information collection tools to clearly define user centric problem.
ME103.CEO.4:Enhancethinking in order to inspect diverse solutions.
ME103.CEO.5:Sensitize about the feasibility, desirability and viability criterias for selection of appropriate solution.
ME103.CEO.6:Educate about different types of prototyping.

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

ME103.CO.1:Recall fundamental principles of design thinking (L1)
ME103.CO.2:Explain all the dimensions of user and his needs using design thinking approach (L2)
ME103.CO.3:Identify user centric problem by using information gathering techniques (L3)
ME103.CO.4:Compare multiple solutions through ideation process (L4)
ME103.CO.5:Justify most appropriate solution for defined user centric problem (L5)
ME103.CO.6:Develop the most optimum solution (L6)

| SESSION | | |
|---|---|---|
| **SESSION 1** | | **2 HOURS** |
| Design thinking Methodology General Problem Statement, Random check list, mind mapping, Categorization of random check list. | | |
| **SESSION 2** | | **2 HOURS** |
| Brainstorming of problem areas, Research Methodology Information gathering Primary, Secondary Sources, data presentation, Preparation of survey forms | | |
| **SESSION 3** | | **2 HOURS** |
| SWOT analysis, drawing inferences, translation of inferences into design criteria, specific problem statement, Ideation free hand sketching drawing of cuboids, cylinders, simple form products (Isometric views) Ideation sketches, Ergonomic and aesthetic consideration in design | | |
| **SESSION 4** | | **2 HOURS** |
| Concept validation, evaluation and detailing, prototyping | | |

| PROJECT | | |
|---|---|---|
| **PHASE NO.01** | | **4 HOURS** |
| General Problem Statement and problem background | | |
| **PHASE NO.02** | | **4 HOURS** |
| Research methodology | | |
| **PHASE NO.03** | | **4 HOURS** |
| Design Brief | | |
| **PHASE NO.04** | | **8 HOURS** |
| Ideation | | |
| **PHASE NO.05** | | **4 HOURS** |
| Concept Evaluation, Validation and Concept detailing | | |
| **PHASE NO.06** | | **8 HOURS** |
| Prototyping | | |
| **PHASE NO.07** | | **8 HOURS** |
| Report Writing | | |

**TEXT BOOK**


1. Engineering Design Process, Second Edition Yousef Haik and Tamer ShahinPublisher, Global Engineering. Cengage Learning. ISBN-13: 978-0-495-66814-5.
2. Product Design and Development, Kevin Otto and Kristin Wood, Product Design: Techniques in Reverse Engineering and New Product Development, Pearson Education Inc. ISBN-10: 0130212717.
3. Product Lifecycle Management, Grieves, Michael, McGraw-Hill, 2006. ISBN 0071452303.
4. Lateral Thinking: Creativity Step by Step Harper Perennial; Reissue edition (24 February 2015) (Perennial Library) Six Thinking Hats by Edward de Bono Paperback ISBN-10: 0060903252.
5. Design Methods, John Chris Jones., John Wiley & Sons, David Fulton Publishers, London, ISBN 0-471-28496-3.


**Web references**

1. www.designcouncil.org.uk
2. www.surveymonkey.com
3. http://en.red-dot.org

MIT | Academy of Engineering

# MIT ACADEMY OF ENGINEERING, ALANDI

**An Autonomous Institute Affiliated to**

## Savitribai Phule Pune University

# Curriculum

# For

# Second Year

# Bachelor of Technology in Information Technology

**2016-2020**

(With Effect from Academic Year: 2017-2018)

| MIT \| Academy of Engineering (An Autonomous Institute) | CURRICULUM STRUCTURE (2016 - 2020) | | |
|---|---|---|---|
| SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY | W.E.F | : | 2017-18 |
| SECOND YEAR BACHELOR OF TECHNOLOGY INFORMATION TECHNOLOGY | RELEASE DATE | : | 01/06/2017 |
| | REVISION NO. | : | 0.0 |

**SEMESTER: III**

| SL. No. | COURSE TYPE | COURSE CODE | COURSE | TEACHING SCHEME | | |
|---|---|---|---|---|---|---|
| | | | | L | P | CREDIT |
| 1. | PC1 | CH201 | Environmental Science | 2 | 2 | 3 |
| 2. | PC2 | AS202 | Applied Mathematics | 3 | 2 | 4 |
| 3. | PC3 | ET201 | System Engineering | 3 | 2 | 4 |
| 4. | DC1 | IT202 | Object Oriented Technology | 3 | 2 | 4 |
| 5. | DC2 | IT203 | Computer Network Technology | 3 | 2 | 4 |
| 6. | SDP3 | ET206 | Prototyping | -- | 4 | 2 |
| **TOTAL** | | | | **14** | **14** | **21** |

**SEMESTER:IV**

| SL. No. | COURSE TYPE | COURSE CODE | COURSE | TEACHING SCHEME | | |
|---|---|---|---|---|---|---|
| | | | | L | P | CREDIT |
| 1. | HSS3 | HP201 | Psychology | 3 | -- | 3 |
| 2. | PC4 | IT201 | Engineering Informatics | 3 | 2 | 4 |
| 3. | PC5 | ME201 | Material Engineering | 3 | 2 | 4 |
| 4. | DC3 | IT211 | Data Structures and Applications | 3 | 2 | 4 |
| 5. | DC4 | IT212 | Database Systems | 3 | 2 | 4 |
| 6. | SDP4 | IT213 | Minor Project | -- | 4 | 2 |
| **TOTAL** | | | | **15** | **12** | **21** |

| MIT Academy of Engineering (An Autonomous Institute Affiliated to SPPU) | COURSE SYLLABI (2016 – 2020) | |
|---|---|---|
| SCHOOL OF CHEMICAL ENGINEERING | **W.E.F** | **AY:** 2017 - 2018 |
| SECOND YEAR BACHELOR OF TECHNOLOGY INFORMATION TECHNOLOGY | **COURSE NAME** | Environmental Science |
| | **COURSE CODE** | CH201 |
| | **COURSE CREDITS** | 4 |
| **RELEASED DATE :** 01/06/2017 | **REVISION NO** | 0.0 |

| TEACHING SCHEME (HOURS/WEEK) | | EXAMINATION SCHEME AND MARKS | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | TUTORIAL/ | PRESENTATION/ | TOTAL |
| LECTURE | PRACTICAL | MSE | ESE | IA | PRACTICAL | DEMONSTRATION | |
| 3 | 2 | 20 | 40 | 15 | - | 50 | 125 |

**PRE-REQUISITE :** AS103: Chemistry

**COURSE OBJECTIVES :**

CH201.CEO.1:Give an overview of exploitation of various natural resources and its impact on the environment.
CH201.CEO.2:Understand the ecosystem and biodiversity.
CH201.CEO.3:Understand the importance of environment and its conservation.
CH201.CEO.4:Learn about the environmental pollution sources, effects and control measures.
CH201.CEO.5:Make aware of the national and international issue for the environment.
CH201.CEO.6:Make aware about the social and environmental responsibility.

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

CH201.CO.1:Identify the various human activities adversely affecting the natural resources and the balance ecosystem.
CH201.CO.2:Observe the various aspects of ecosystems and suggest ways to protect them.
CH201.CO.3:Experiment the pollution of given locality and suggest steps to mitigate pollution.
CH201.CO.4:Record the sources of pollution and their controls.
CH201.CO.5:Compare laws and standards for pollution.
CH201.CO.6:Categorize the social and professional responsibility towards environment.

| THEORY COURSE CONTENT | | |
|---|---|---|
| **UNIT 1** | **Environment** | **5 HOURS** |
| Importance of environment, Biosphere, Structure and function of an ecosystem, ecological pyramids, effects of population growth on environment. Natural cycles: hydrologic, carbon, nitrogen, phosphorus and Sulphur cycle. Understanding carbon foot prints, Role of the environmental engineer. Need of environmental legislations and environmental Acts in India. Functions of central and state pollution control boards. | | |
| **UNIT 2** | **Resources** | **4 HOURS** |
| Natural, conventional and non-conventional, Natural and manmade disasters on environment. Case studies on use and Impact of overutilization of natural resources: Food, forest, water, energy, land. | | |
| **UNIT 3** | **Pollution** | **4 HOURS** |
| Structure and composition of atmosphere, Pollution, types of pollution, causes of pollution effects, control and prevention. Air, solid and water waste management Pollution prevention and control act. | | |
| **UNIT 4** | **Pollution Impact** | **5 HOURS** |
| Case study on Nuclear Accidents; floods; land slid; climate change; air pollution in cities, water pollution; noise pollution. Case study on drought situation in Vidarbha-Marathwada. | | |
| **UNIT 5** | **Social Issues** | **5 HOURS** |
| Case study on Plastic waste management, domestic waste issue, food problem in India & globally. Modernization of agriculture, traffic and pollution, e-waste disposal. | | |
| **UNIT 6** | **Sustainable Development** | **5 HOURS** |
| Concept of sustainable development. Utilization and conservation of natural resources. Rainwater harvesting & Water management techniques. Role of an individual in environment protection. Energy audit, disaster management. | | |

| PRACTICAL | | |
|---|---|---|
| **PRACTICAL NO.01** | **Title: Fukushima Japan Nuclear Accident** | **2 HOURS** |
| Details of the accident will be discussed with the students. Students are supposed to write a case study report on the incident w. r. t. causes, effects & preventive measures to avoid such type of accidents. | | |
| **PRACTICAL NO.02** | **Title: Malin Land Slide** | **2 HOURS** |
| Details of the accident will be discussed with the students. Students are supposed to write a case study report on the incident w. r. t. causes, effects & preventive measures to avoid such type of accidents. | | |
| **PRACTICAL NO.03** | **Title: Drought Situation in Vidarbha & Marathwada** | **2 HOURS** |
| Details of the drought situation will be discussed with the students. Students are supposed to write a case study report on the incident w. r. t. causes, effects & preventive measures to avoid such type of situations. | | |
| **PRACTICAL NO.04** | **Title: River water pollution case study** | **2 HOURS** |
| Details of the River pollution of Ganga, Indrayani etc. will be discussed with the students. Students are supposed to write a case study report on the various causes of river pollution, preventive measures to avoid this & water treatment methodologies forriver water treatment. | | |
| **PRACTICAL NO.05** | **Title: Project** | **16 HOURS** |
| General solutions of linear differential equations with constant coefficients, Method of variation of parameters. | | |

**TEXT BOOKS**


1. Rao C.S. Environmental Pollution Control Engineering, Wiley Eastern Publications. ISBN: 9780470217634.
2. Kamaraj. P & Arthanareeswari .M, Environmental Science Challenges and Changes, 4th Edition, Sudhandhira Publications, 2010.
3. Sharma. B.K. and Kaur, Environmental Chemistry, Goel Publishing House, Meerut, 1994 ISBN:8182830125.
4. Miller T. G. Jr., Environmental Science, Wadsworth Publishing Co. ISBN-10: 1111988935 ISBN: 9781111988937
5. Metcalf Eddy Wastewater engineering: Treatment and reuse, McGraw Hill, ISBN: 007041878.

**REFERENCE BOOKS**


1. Garg, S.K and Garg, R., Ecological and Environmental Studies, Khanna Publishers, Delhi, 2006.ISBN: 9788174092182.
2. H. S. Peavy, D. R. Rowe, G. Tchobanoglous, Environmental Engineering, McGraw Hill, ISBN: 8428204470.
3. Helen Kavitha. P Principles of Environmental Science, Sci tech Publications, 2nd Edition, 2008. ISBN: 9780444430243.
4. Henry J.G. and Heinke G.W., Environmental Science and Engineering, 2nd Edition, Prentice Hall of India, New Delhi, 2004, ISBN: 978-0131206502.
5. Masters G.M., Introduction to Environmental Engineering and Science, 2nd Edition, Prentice Hall of India, New Delhi, 2004. ISBN: 0131481932 ISBN: 9780131481930.

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF HUMANITIES AND ENGINEERING SCIENCES** | **W.E.F** | **AY:** 2017 - 2018 |
| **SECOND YEAR BACHELOR OF TECHNOLOGY IT/Comp/ETC/ETX ENGG** | **COURSE NAME** | Applied Mathematics |
| | **COURSE CODE** | AS202 |
| | **COURSE CREDITS** | 4 |
| **RELEASED DATE :** 01/06/2017 | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | TUTORIAL/ PRACTICAL | PRESENTATION/ DEMONSTRATION | TOTAL |
| LECTURE | PRACTICAL | MSE | ESE | IA | | | |
| 3 | 2 | 30 | 50 | 20 | 50 | - | 150 |

**PRE-REQUISITE :** NIL

**COURSE OBJECTIVES :**

AS202.CEO.1:To find the Laplace transform of continuous time signals (functions).
AS202.CEO.2:To determine the Fourier constants and construct the Fourier series.
AS202.CEO.3:To construct the integral representation of functions using Fourier transform.
AS202.CEO.4:To find the Z transform of discrete time signals (functions).
AS202.CEO.5:To apply numerical methods for constructing functions and solving Differential Equations.
AS202.CEO.6:To write and execute the program on problems of Laplace, Fourier and numerical methods using MATLAB.

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

AS202.CO.1:Analyze the output response of given linear system using Laplace Transform.
AS202.CO.2:Analyze the frequency response of the system using appropriate Fourier transform.
AS202.CO.3:Determine the stability of discrete system and the solution of difference equation using Z-Transform .
AS202.CO.4:Justify the selection of appropriate transform for a given system.
AS202.CO.5:Determine the solution of ordinary differential equations using Eulers, Runge-Kutta 4th order and the interpolation using Newtons and Lagranges interpolating methods.
AS202.CO.6:Implement Laplace Transform, Fourier transform and Numerical methods to find the solution of given problem using MATLAB.

| THEORY | | |
|---|---|---|
| **UNIT 1** | **Laplace Transform I** | **6 HOURS** |
| Introduction of Laplace Transform, Properties: First shifting, Second shifting, Change of scale, Linearity, Multiplication by t, Division by t. Laplace Transform of derivatives, integration, Unit Step function, Impulse Function and Periodic Functions. | | |
| **UNIT 2** | **Laplace Transform II** | **6 HOURS** |
| Introduction of Inverse Laplace Transform, Properties: First shifting, Second shifting, Change of scale, Linearity, Multiplication bys, Division bys. Inverse Laplace Transform of elementary functions, Derivatives, Integration. Use of partial fractions to find Inverse Laplace Transform. Solution and analysis of linear differential equation to linear system. | | |
| **UNIT 3** | **Fourier Series** | **6 HOURS** |
| Periodic functions, Fourier series, Dirichlets conditions, determination of Fourier constants, Half ranges series, Even function series, odd function series, arbitrary period functions series. | | |
| **UNIT 4** | **Fourier Transform** | **6 HOURS** |
| Introduction of Fourier Transform, Complex exponential form of Fourier series, Fourier Integral Theorem (without proof), Fourier transform and its properties, Fourier Sine Transform, Fourier Cosine Transform, and Inverse Fourier transforms, Fourier Transform of derivatives of a function, Analysis of frequency response. | | |
| **UNIT 5** | **Z- Transform and Inverse Z-Transform** | **6 HOURS** |
| Z-transform: Introduction, Definition, Z-transform of standard functions, Properties of Z- transform: Linearity, change of scale, shifting, multiplication by k, division by k. One sided Z-transform, Pole-zero plot and stability of a system. Inverse Z- transform: Introduction, Basic results, Partial fraction method, Inversion integral method, Solution to the difference equation. | | |
| **UNIT 6** | **Numerical Methods** | **6 HOURS** |
| Interpolation: Finite Differences, Newtons and Lagranges Interpolation. Numerical solution of System of linear equations by Gauss elimination method and Ordinary differential equations by Eulers, Modified Eulers, Runge-Kutta 4th order methods. | | |

| | | |
|---|---|---|
| **PRACTICAL: Any 10 practicals are performed as per the requirement of a branch.** | | |
| **PRACTICAL NO.01** | | **2 HOURS** |
| Introduction to MATLAB: Syntax, keywords, matrices, polynomials, loops. | | |
| **PRACTICAL NO.02** | | **2 HOURS** |
| Introduction to MATLAB: In-built functions, 2D/3D plots, creating simple programs. | | |
| **PRACTICAL NO.03** | | **2 HOURS** |
| Finding Laplace transforms of functions, solution of differential equations using Laplace transforms. | | |
| **PRACTICAL NO.04** | | **2 HOURS** |
| Finding Fourier transforms of functions, Plotting of transforms. | | |
| **PRACTICAL NO.05** | | **2 HOURS** |
| Numerical Integration: Trapezoidal, Simpsons 1/3rd and Simpsons 3/8th rule. | | |
| **PRACTICAL NO.06** | | **2 HOURS** |
| Interpolation techniques: Lagranges Interpolation. | | |
| **PRACTICAL NO.07** | | **2 HOURS** |
| Interpolation techniques: Newtons Interpolation. | | |
| **PRACTICAL NO.08** | | **2 HOURS** |
| Solution of differential equation by modified Eulers method. | | |
| **PRACTICAL NO.09** | | **2 HOURS** |
| Solution of differential equation by Runge-Kutta method. | | |
| **PRACTICAL NO.10** | | **2 HOURS** |
| Curve Fitting: Linear, Quadratic. | | |
| **PRACTICAL NO.11** | | **2 HOURS** |
| Solution of algebraic equations: Newton- Raphson method. | | |
| **PRACTICAL NO.12** | | **2 HOURS** |
| Solution of algebraic equations: Bisection method. | | |
| **PRACTICAL NO.13** | | **2 HOURS** |
| Curve Fitting: Cubic, Exponential. | | |

**TEXT BOOK**


1. Dr. B.V. Ramana, Higher Engineering Mathematics, 5 th edition, Tata McGraw Hill, 2017, ISBN: 978-0-07-063419-0
2. Ram N. Patel and Ankush Mittal, Programming in MATLAB- A Problem solving approach, Pearson Education, 2014, ISBN-978-93-325-2481-1.


**REFERENCE BOOK**


1. B.S. Grewal, Higher Engineering Mathematics, 44 th edition, Khanna Publications, 2018, ISBN: 978-81-933284-9-1.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10 th edition, Wiley Eastern Ltd., 2015, ISBN: 13: 9788126554232
3. Amos Gilat, MATLAB: An Introduction with Applications, 4th edition, Wiley Publication, 2003, ISBN-13: 9788126537204, 8126537205.

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF ELECTRICAL ENGINEERING** | **W.E.F** | **AY:** 2017 - 2018 |
| **SECOND YEAR BACHELOR OF TECHNOLOGY INFORMATION TECHNOLOGY** | **COURSE NAME** | System Engineering |
| | **COURSE CODE** | ET201 |
| | **COURSE CREDITS** | 4 |
| **RELEASED DATE :** 01/06/2017 | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | | PRESENTATION/ | TOTAL |
| LECTURE | PRACTICAL | ICE | ECE | IA | PRACTICAL | DEMONSTRATION | |
| 3 | 2 | 30 | 50 | 20 | NIL | 25 | 125 |

**PRE-REQUISITE :**

1:ME102 Engineering Tools and Techniques
2:ME103 Design Thinking

**COURSE OBJECTIVES :**

ET201.CEO.1:To describe the rationale for using systems thinking for complex adaptive systems
ET201.CEO.2:To prioritize with stakeholders in a participatory way for research study
ET201.CEO.3:To design system engineering frame work
ET201.CEO.4:To apply system engineering tools
ET201.CEO.5:To evaluate the system

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

ET201.CO.1:Explain the rationale for using systems thinking for complex adaptive systems.
ET201.CO.2:Analyze interaction with stakeholders in a participatory way for research study.
ET201.CO.3:Design System Engineering framework.
ET201.CO.4:Apply system engineering tools.
ET201.CO.5:Evaluate the system.

| THEORY COURSE CONTENT | | |
|---|---|---|
| **UNIT 1** | **Introduction to Systems Thinking** | **4 HOURS** |
| Introduction to Systems Thinking and Understanding simple systems, Complex and Complex Adaptive Systems, Stakeholders and their engagement.<br>**Further Reading :** Case studies - Public health system, transportation system, solid waste management system. | | |
| **UNIT 2** | **System Dynamics Simulation** | **6 HOURS** |
| Standard test system conceptualization and mapping: an introduction to causal loop diagrams (Systems Thinking Diagrams; Influence Diagrams), principles of stock-and-flow diagrams, Application of stock and flow diagrams to engineering problems, Analysis using agent-based models, Application of systems thinking to policy decision making.<br>**Further Reading :** Case studies - Understand how to use Vensim PLE / Netlogo (Free academic version) to develop causal loop diagrams. Application of Stock and Flow Diagram to Public Health. | | |
| **UNIT 3** | **Introduction to Systems Engineering** | **8 HOURS** |
| History and definitions, mission of system, types of system, system and its environment, System as a product, Systems Engineering as a profession, System Engineering Process and Management, Life cycle Integration.<br>**Further Reading:** Case studies - London Walkie-Scorchie Skyscraper, BRT system, garbage collection, Unmanned aerial vehicle, Washing machine etc. | | |
| **UNIT 4** | **System Engineering Design** | **8 HOURS** |
| System development process - Systems engineering method, Systems testing through out development. Requirement Engineering - Inputs, requirement types, purpose, Requirement analysis, requirement outputs. Case studies – Unmanned Aerial System. Functional Analysis - Schematic, Functional block diagram. Design Synthesis - Process, Product realization, Product implementation, Product Integration, Product verification, product validation, product transition.<br>**Further Reading:** Development approaches–Waterfall, incremental spiral, evolutionary acquisition. | | |
| **UNIT 5** | **System Engineering Tools** | **8 HOURS** |
| Context diagrams, QFD (Quality function deployment), House of quality, Timeline analysis sheet and requirement allocation sheet, Functional flow diagrams, Design synthesis tools- Concept description sheet (CDS), Functional matrix diagram, Requirement break down structure, N2 diagrams, data flow diagrams, control flow diagrams, behavioral diagrams.<br>**Further Reading:** Popular System Life Cycle models (DoDMIL STD 499B, IEEE1220 SEP,EIA 632 SEP, ISO/IEC 15288, Professional Engineering Model, NASA Model, Software Life Cycle model) | | |
| **UNIT 6** | **Partial Differential equations.** | **7 HOURS** |
| Verifying and validating the system, managing the configuration of the system, managing technical risk, project management, ILS (Integrated logistic support).<br>**Further Reading:** Case studies - Aircraft system. | | |

| PRACTICAL | | |
|---|---|---|
| **PRACTICAL NO.01** | | **2 HOURS** |
| Community based causal mapping – Developing causal loop diagrams for health care using Vensim. | | |
| **PRACTICAL NO.02** | | **2 HOURS** |
| Developing stock-and-flow diagrams for health care system using Vensim. | | |
| **PRACTICAL NO.03** | | **2 HOURS** |
| (Any 02)<br>1. Unmanned aerial vehicle<br>2. Conduct some research into the London building known as the Walkie Scorchie. Identify what circumstances led to the building earning that unfortunate name and suggest which aspects of the systems engineering process may not have been followed correctly (at least as the issues have been reported in the media).The following links may assist in your investigations.<br>http://www.dezeen.com/2013/09/06/we-made-a-lot-of-mistakes-with-this-building-says-walkie-scorchie- architect-vinoly/<br>http://www.ibtimes.co.uk/walkie-scorchie-talkie-building-sunlight-london-reflects-504342.<br>3. Examine in detail the BRT of New Delhi,Identify what circumstances led to the failure of the system.<br>4. Garbage collection<br>5. Washing machine | | |
| **PRACTICAL NO.04** | | **2 HOURS** |
| Determine the typical structure and contents of the system requirements specification (SyRS) for any one of the case study. | | |
| **PRACTICAL NO.05** | | **2 HOURS** |
| Choose an example related to your own discipline and then list and describe three detailed design tools to come up with a satisfactory design for anyone of the case study. | | |
| **PRACTICAL NO.06** | | **2 HOURS** |
| We want to modify our house (or from any one of the case studies) by for futuristic requirement to accommodate your children after marriage.Explain how accurate technical data on the house (as confirmed by PCA and FCA ) supports this modification. Explain how the early design stages could have assisted with this modification if expandability/ future growth had been accounted for. | | |
| **PRACTICAL NO.07** | | **2 HOURS** |
| Mini project based on society, science and technology problem clubbed with Field visit and presentation (Define problem, data collection, requirement analysis,functional analysis.Design solution, progressive presentation of solution and final presentation).<br>Note: The group of students should be from different program (Multidisciplinary group). | | |

| PRACTICAL NO.08 | | 2 HOURS |
|---|---|---|
| Watch the movie The Pentagon wars and write a two page report to assess what aspects System Engineering went wrong. (https://www.youtube.com/watch?v=iDYpRhoZqBY) . | | |
| **PRACTICAL NO.09** | | **2 HOURS** |
| Field visit / Industrial visit from system engineering point of view. | | |
| **PRACTICAL NO.10** | | **2 HOURS** |
| Working model case study of Quad copter/ aero modeling from system engineering point of view. | | |

**TEXT BOOK**


1. John D Sterman, "Business dynamics- Systems Thinking and modelling for a complex world", McGrawHill, ISBN: 007238915X.
2. Weinberg, G.M., An Introduction to General Systems Thinking, New York, NY: Dorset House Publishing, 2001, ISBN-13: 978-0932633491.
3. Alexander Kossiakoff, William N.Sweet, Systems Engineering: Principles and Practice, Wiley, 2009, ISBN-13: 978-8126524532.


**TEXT BOOK**


1. R. C. Dorf Dennis M Buede,The Engineering Design of systems, Wiley; 2nd edition, 2002, ISBN-13: 978-0070530393.
2. International Council of Systems Engineering, Systems Engineering Handbook, A guide for System Life Cycle Processes and Activities, version 3.2.1, January 2011.
3. Department of defense, systems engineering fundamentals, defense acquisition university press (Free e-book), https://www.scribd.com/document/321957824/SEFGuide-01-01.
4. Michael Ryschkewitsch, The Art and Science of Systems Engineering, (free e-book), https://www.nasa.gov/pdf/311198main-Art-and-Sci-of-SE-LONG-1-20-09.pdf
5. EIA 632 standard - www.psconsultech.com/yahoo-site-admin/assets/docs/EIA632.9212432.pdf
6. MIL standard - www.product-lifecycle-management.com/download/mil-std-499b-draft1993.pdf.

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY** | **W.E.F** | **AY:** 2017 - 2018 |
| **SECOND YEAR BACHELOR OF TECHNOLOGY INFORMATION TECHNOLOGY** | **COURSE NAME** | Object Oriented Technology |
| | **COURSE CODE** | IT202 |
| | **COURSE CREDITS** | 4 |
| **RELEASED DATE :** 01/06/2017 | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | | PRESENTATION/ | TOTAL |
| LECTURE | PRACTICAL | ICE | ECE | IA | PRACTICAL | DEMONSTRATION | |
| 3 | 2 | 30 | 50 | 20 | 30 | 20 | 150 |

**PRE-REQUISITE :**

IT101 Computer Programing

**COURSE OBJECTIVES :**

IT202.CEO..1:To understand the basic concept of Object-Oriented programing technique.
IT202.CEO..2:To do best-practices of Object-Oriented programing.
IT202.CEO..3:To understand the use of OOT in other application software.
IT202.CEO..4:To build applications using object oriented concept.
IT202.CEO..5:To provide team collaboration and programing experience.

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

IT202.CO.1:Determine the domain object with its properties and behavior.
IT202.CO.2:Discover the relationship among the objects.
IT202.CO.3:Importance of polymorphism and explain usage of it.
IT202.CO.4:Inspect the type of exception occurred and how to handle them.
IT202.CO.5:Analyze the algorithm and determine the time complexity.

| THEORY : | | |
|---|---|---|
| **UNIT 1** | **Classes and Objects** | **8 HOURS** |
| **Application:** Google Script Introduction to object oriented approach, procedure V/s object oriented programming, features of Object-Orientedprogramming, object oriented design principle, defining a class, data members, instance of class, instantiation, state, behavior and identity of object, static data member and method.<br>**Self-Study:** Functional Procedural Programming.<br>**Further-Reading:** Class Objects in Java. | | |
| **UNIT 2** | **Inheritance** | **8 HOURS** |
| **Case Study:** C++ IOStreamClasses Concept of Inheritance, types of Inheritance, Base Class Derived Class, derived class constructors, class hierarchies, public and private inheritance, association, aggregation composition, abstract base class, abstract methods.<br>**Self-Study:** Functional Procedural Programing.<br>**Further-Reading:** Classes Objects in Java. | | |
| **UNIT 3** | **Polymorphism** | **8 HOURS** |
| **Application:** Function used in C++ Concept of polymorphism, types of polymorphism, overloading overriding of methods, operators overloading. Virtual function, Runtime polymorphism, dynamic binding.<br>**Self-Study:** Introduction to polymorphism. | | |
| **UNIT 4** | **Exception Handling AND File IO** | **7 HOURS** |
| **Application:** Creation of Multiple files like generation of Mark sheets Basics of Exception handling, Exception generation, type of exception, handling the exception, exception throw, catch, finally. File concept, performing I/O operation in the file, binary file read/write operation.<br>**Further-Reading:** Working with directories, exception handling in Java | | |
| **UNIT 5** | **Introduction to Algorithms** | **8 HOURS** |
| **Application:** Sorting and Searching of File and Data Introduction to algorithm, characteristics of an algorithm, Time and space complexity, Asymptotic notation, performance analysis, Best, average and worst case.<br>**Self-Study:** Sorting Algorithms: like bubble sort, insertion sort etc.<br>**Further-Reading:** Sorting searching strategies | | |

| PRACTICAL | | |
|---|---|---|
| **PRACTICAL NO. 01** | **Object and class creation** | **6 HOURS** |
| Create a class for storing the student information like, rollno, prn, name, dob, email, contact etc. define getter and setter method, constructor and destructor. Write a menu driven program to simulate the following information: 1. Add new student 2. Delete student by rollno, or prn give both the choice 3. Search student by prn, or name, or contact 4. Update the student information 5. List all the student Store the student objects in a list | | |
| **PRACTICAL NO. 02** | **Static data and method** | **2 HOURS** |
| Modify the program created in practical no. 1 add new option total no of student or instance of student class created. Make use of static data and method concept | | |
| **PRACTICAL NO.03** | **Inheritance** | **4 HOURS** |
| Extend the practical no 2 student class by Mark class where mark class used to store the marks of student in a dictionary which is private data, key-value pair is used to store the marks for example 'OOT':45, 'CN':40. Define getter and setter method with constructor and destructor. | | |
| **PRACTICAL NO. 04** | **Inheritance** | **4 HOURS** |
| Modify the practical no. 3 add new option to find out the topper of the class by declaring the static method used to in marks class and another option to find out the top three student. | | |
| **PRACTICAL NO.05** | **Method overriding** | **4 HOURS** |
| Override the display method of practical no 4, and display the grades of student with other information, Grade will be assigned as follows: 1. A for 100 to 75<br>2. B for 74 to 65<br>3. C for 64 to 55<br>4. D for 54 to 45<br>5. Fail if less than 44 | | |
| **PRACTICAL NO.06** | **Operator overloading** | **4 HOURS** |
| Write a menu driven program for converting the currency display at least 4 currency options for conversion, make use of operator overloading for doing the following operation:<br>1. 6 +50*Rs*<br>2. 3 + 1 −100*Rs*<br>3. 20 + 5 **£**<br>Consider the rupees as default currency or provide an option to set the default currency, all your result will be converted in to default currency. | | |
| **PRACTICAL NO.07** | **Exception AND File handling** | **4 HOURS** |
| Handle the various type of exception which you have studied, for the practical no 5. Also store the student in formation in file, whenever your program start it will fetch the student information from the file and whenever your program terminate store the student information in a file or for every update, delete or insert option update the data file. | | |

**TEXT BOOK**


1. Dusty Phillips ”Python 3 Object Oriented Programming”, Packt Publishing ISBN: 978-1-849511-26-1, 1849511268
2. Michael T. Goodrich “Data Structures and Algorithms in Python Wiley Student Edition ISBN: 978812652176


**REFERENCE**


1.Mark Lutz “Learning Python” O’reilly Publication 5th Edition, ISBN-13: 978-1449355739

2.Allen Downey, Jeffrey Elkner, Chris Meyers “How to think like a Computer Scientist, Learning with Pyhton” Green Tea Press, ISBN: 0-9716775-0-6

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY** | **W.E.F** | **AY:** 2017 - 2018 |
| **SECOND YEAR BACHELOR OF TECHNOLOGY INFORMATION TECHNOLOGY** | **COURSE NAME** | Computer Network Technology |
| | **COURSE CODE** | IT203 |
| | **COURSE CREDITS** | 4 |
| **RELEASED DATE :** 01/06/2017 | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | TUTORIAL/ PRACTICAL | PRESENTATION/ DEMONSTRATION | TOTAL |
| LECTURE | PRACTICAL | MSE | ESE | IA | | | |
| 3 | 2 | 30 | 50 | 20 | 30 | 20 | 150 |

**PRE-REQUISITE :**

1. ME102- Engineering Tools and Techniques

**COURSE OBJECTIVES :**

IT203.CEO.1: Introduce the fundamentals of a computer network.

IT203.CEO.2: To provide a conceptual foundation for the study of data transmission using the open system interconnection (OSI) layered architecture model.

IT203.CEO.3: Deploy the skills of network designing in the students which should enable exposure to solve real-life problems.

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

IT203.CO.1:Explain the core concepts of a computer network.

IT203.CO.2:Classify the network components on the basis of the services they provide.

IT203.CO.3:Measuring the performance of various protocols used in network designing.

IT203.CO.4:Compare the different architectures of a computer network for their performance.

IT203.CO.5:Articulate an enterprise network employing the common LAN technologies and be able to evaluate the advantages and disadvantages.

IT203.CO.6:Configure a PC to work as a host in a TCP/IP network and to use the IP based commands to facilitate the troubleshooting process.

| THEORY | | |
|---|---|---|
| **UNIT 1** | **Fundamentals of Network** | **7 HOURS** |
| **Application:** Case Study of Enterprise Network<br>**Contents:**<br>Use of Computer Network: Business Application, Home Application, Mobile Users, Social Issues. Type of Networks: Local Area Network, Metropolitan Area Network, Wide Area Network, Personal Area Network, Intranet. Network Performance: Bandwidth, Latency, Delay, Capacity, Bits Baud. Basic Administration Commands for Linux/Windows: IfConfig/IPConfig, PING, Traceroute/Tracert, NETSTAT, NSLOOKUP, ROUTE, HOST, OSI Reference Model, TCP/IP Protocol Suite<br>**Self-Study:** Analog Digital Modulation<br>**Further Study:** Multiplexing De-Multiplexing | | |
| **UNIT 2** | **Physical Access** | **7 HOURS** |
| **Application:** Case Study Physical Layer Services: Framing, Bit Oriented, Byte-Oriented, Clock-Based Error Detection: Two-dimensional parity, Checksum, Cyclic Redundancy Check Reliable Transmission: Stop Wait, Sliding Window Protocols, Go-Back-N Protocol, Selective Repeat Protocol Guided Transmission Media Devices: Unshielded Shielded Twisted Pair, Coaxial Cable, Optical Cable, Hub, and Repeater.<br>**Self-Study:**Circuit-Switched Network, Packet Switched Network<br>**Further Study:** Access Protocols | | |
| **UNIT 3** | **Link Layer** | **7 HOURS** |
| **Application:** Case Study of a College Network Bridges LAN Switches: Datagram, Learning Bridges, Spanning Tree Algorithm, Broadcast Multicast, Layer-2 Switch. LAN Protocol Stack: Media Access Control, Logical Link Control Wireless LAN-802.11/Wi-Fi, 802.15.1, (Bluetooth): Bluetooth Architecture, Bluetooth Protocol Stack, Frames, Bluetooth Operations Controlled Access: CSMA/CD, CSMA/CA<br>**Self-Study:** IEEE 802.X Standards<br>**Further Study:** Cell Phone Technologies | | |
| **UNIT 4** | **Internetworking** | **7 HOURS** |
| **Application:** Case Study Network Address, IP Address Format, Characteristics of IP, IP Packet Format: IPv4 IPv6, IP Addressing, CIDR, ARP, Proxy-ARP, Sub-netting, Fragmentation Routing Algorithms: Distance Vector Routing, Link State Routing Routing Protocols: Routing Information Protocol, Open Shortest Path First Protocol Network layer devices:Routers, Layer-3 switch.<br>**Self-Study:** Extended Interior Gateway Routing Protocol<br>**Further Study:** Network Address Translation | | |

| UNIT 5 | Transport Layer | 7 HOURS |
|---|---|---|
| **Application:** Chat Server System End-to-End packet delivery Issues TCP: Header Format, Connection establishment Termination, Handshaking TCP Sliding Window, TCP Sliding Window, Silly Window Syndrome, Nagle's Algorithm, Adaptive Retransmission Algorithms UDP: Header Format, UDP Encapsulation Multiplexing Port Addresses: Port, Socket<br>**Self-Study:**State Transition Diagram<br>**Further Reading:** TCP/UDP Socket primitives | | |
| **UNIT 6** | **Application Layer and Network Design** | **7 HOURS** |
| **Application:** Email System Domain Name System (DNS), TELNET, DHCP File Transfer: FTP, TFTP Electronic Mail: SMTP, POP3 The principle of Network Design Fundamental design goals: Scalability, Reliability, Maintainability, Availability. Requirement Analysis, Architecture design (Two-Tier Design Architecture, Three-Tier Design Architecture) Network Security: Firewall: Type of Firewalls, Packet Filters, Proxy servers,<br>**Self-Study:**IMAP, MIME<br>**Further Study:** Firewall Configurations, Restricting user access.Firewall Filtering policies | | |

| **PRACTICAL:** | | |
|---|---|---|
| **PRACTICAL NO.01** | | **4 HOURS** |
| Study of basic network utility commands: Help, Hostname, IPCONFIG, PING, ARP, GETMAC, NETSTAT, TRACERT, NSLOOKUP, ROUTE | | |
| **PRACTICAL NO.02** | | **4 HOURS** |
| Basic network cabling and router configurations: Create a basic topology in packet tracer using various media and configure a router with all basic configurations through the command line. | | |
| **PRACTICAL NO.03** | | **4 HOURS** |
| Simulate a small topology in using spanning tree and trunk protocol. Use packet tracer as a simulation tool. | | |
| **PRACTICAL NO.04** | | **4 HOURS** |
| Write a socket program in python to establish communication between multiple devices within the same network. | | |
| **PRACTICAL NO. 05** | | **6 HOURS** |
| Create a topology with minimum 3 networks and configurerouting protocols to enable network communication among all the networks. Analyze the routing table created on various devices and draw necessary conclusions. | | |
| **PRACTICAL NO.06** | | **4 HOURS** |
| Configure a Wireless LAN and enable static IP and DHCP to allocate IP addresses. Apply the various security filters to keep the WLAN secure. | | |
| **PRACTICAL NO.07** | | **2 HOURS** |
| Study of application layer protocols: FTP, EMAIL, SMTP, POP3, IMAP, MIME | | |

| Project | Mini Project | 8 HOURS |
|---|---|---|

**Project Guidelines:**

Follow the below guidelines for completing the mini project- Students have to complete a mini-project in a group of 4 students. Students can select their own problem statements after discussion with the course instructor. The finalization of the project statement has to be done in the first week of the semester. All the group must implement their project in python, however, students are free to use any simulation tool for simulating their work. Every group will have to prepare the project report based on the template given to them and the report must be submitted to the instructor before the final examination.

## TEXT BOOK


1. Dr. B.V. Ramana, Higher Engineering Mathematics, 5 th edition, Tata McGraw Hill, 2017, ISBN: 978-0-07-063419-0
2. B.S. Grewal, Higher Engineering Mathematics, 44 th edition, Khanna Publications, 2018, ISBN: 978-81-933284-9-1


## REFERENCE BOOK


1. G.B. Thomas, Maurice D. Weir, Joel R. Hass, Thomas' Calculus, 12 th edition, Pearson Education, 2002, ISBN: 9789332519091
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10 th edition, Wiley Eastern Ltd., 2015, ISBN: 13: 9788126554232
3. R.K. Jain & S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publishing house , 2010, ISBN: 8173194203.
4. Peter V. O'Neil, Advanced Engineering Mathematics, 7 th edition, Cenage Learning, 2012, ISBN: 13: 9788131503102.
5. Dennis G. Zill & Warren S. Wright, Advanced Engineering Mathematics, 4 th edition,Dennis G. Zill & Warren S. Wright, Advanced Engineering Mathematics, 2011, ISBN: 10: 0-7637-7966-0, ISBN: 13: 978-0-7637-7966-5.

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY** | **W.E.F** | **AY:** 2017 - 2018 |
| **SECOND YEAR BACHELOR OF TECHNOLOGY INFORMATION TECHNOLOGY** | **COURSE NAME** | Prototyping |
| | **COURSE CODE** | ET206 |
| | **COURSE CREDITS** | 02 |
| **RELEASED DATE :** 01/06/2017 | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | TUTORIAL/ PRACTICAL | PRESENTATION/ DEMONSTRATION | TOTAL |
| LECTURE | PRACTICAL | MSE | ESE | IA | | | |
| - | 4 | - | - | - | - | 75 | 75 |

**PRE-REQUISITE :**

1. ME101 - Engineering Graphics
2. ME102 - Engineering Tools and Techniques
3. ME103 - Design Thinking
4. EX101 - Electrical and Electronics Engineering
5. CV101 - Applied Mechanics
6. IT101 - Computer Programming

**COURSE OBJECTIVES :**

ET206.CEO.1:Learn about materiality and techniques.
ET206.CEO.2:Justify the product development cycle through prototype project.
ET206.CEO.3:Inculcate implementation of skills by proper budget planning with effective troubleshooting and practices in aesthetics & ergonomics.
ET206.CEO.4:Develop abilities to transmit technical information clearly and test the same by delivery of presentation based on the prototype Project.

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

ET206.CO.1:Consolidate the techniques, skills and modern engineering tools.
ET206.CO.2:Apply acquired skills to the construction of a prototype project.
ET206.CO.3:Develop a prototype project by performing tasks in team.
ET206.CO.4:Demonstrate the work carried out in a team.

**PRACTICAL:**

**Course Introduction:**

This course is aiming at a Project Based Learning methodology. Through a series of projects, students will learn to design, build, and debug engineering prototype systems. They will cover multiple aspects of the prototyping process.

Students will complete four modules in rotational manner,

1.Mechanical Prototyping (MP)

2.Electronic Prototyping (EP)

3.Software Prototyping(SP)

4.Civil Prototyping(CP)

Each module will have on an average six laboratory sessions. The students will complete them in rotational manner. Every module will award for 75 marks.

**Marks of all four course modules will be averaged and if student secures passing marks (passing grade) after averaging; then the required credits of the course will be earned.**

| **MODULE: 1/4** | **Mechanical Prototyping (MP)** | **28 HOURS** |
|---|---|---|

**PRACTICAL:**

| **PRACTICAL NO. 01** | **Introduction to prototyping** | **02 HOURS** |
|---|---|---|

1. Introduction to Prototyping, traditional prototyping vs. advance rapid Prototyping, different types of prototyping techniques (clay modeling, casting, carpentry, metal art etc.) and their working principle.
2. Suitable materials and their properties.
3. Applications and need of prototype in emerging field like Bio - medicals, defense, manufacturing, aerospace etc.
4. Formation of a group of 5 students per project team.

| **PRACTICAL NO. 02** | **Design of models** | **04 HOURS** |
|---|---|---|

1. Introduction of CAD software and its interaction with prototype machine.
2. 3D Modeling using CAD software package.
3. Identify physical constraints of prototyping

| PRACTICAL NO. 03 | Preprocessing of prototype | 06 HOURS |
|---|---|---|

1.Generating STL files from the 3D models & working on STL files.

2.Pre-Processing the 3D Model in KISslicer / Cuba software.

3.Suitable filament selection and its properties.

| PRACTICAL NO. 04 | Orientation and support generation | 04 HOURS |
|---|---|---|

1. Operate Repeater / Cuba software, Selection of Orientation, Supports generation.
2. Slicing pattern, tool path generation, G Code and gives input to prototype machine for actual part/object manufacturing.

| PRACTICAL NO. 05 | Assembly of model | 08 HOURS |
|---|---|---|

1. Complete machine setup.
2. Hands on experience of rapid prototype machine for part/object, assembly manufacturing.
3. Material selection, cost benefit analysis for prototyping, financial aspect.

| PRACTICAL NO. 06 | Project presentation | 04 HOURS |
|---|---|---|

1.Final Presentation and report submission (assessment).

**REFERENCE BOOK**


1. Rapid Prototyping: Principles and Applications in Manufacturing, Chua C K, Leong K F, Chu S L, World Scientific, ISBN-13: 978-9812778987.
2. Additive Manufacturing Technologies: Rapid Prototyping to Direct Digital Manufacturing, Gibson D W Rosen, Brent Stucker, Springer, ISBN: 978-1-4419-1119-3.
3. Rapid Prototyping: Principles and Applications in Manufacturing,Noorani R, John Wiley & Sons, ISBN: 978-0-471-73001-9.
4. Rapid Tooling: Technologies and Industrial Applications, Hilton P, Jacobs P F, CRC press. ISBN:978-0824787882
5. Rapid Prototyping and Engineering applications: A tool box for prototype development, Liou W L, Liou F W, CRC Press, ISBN: 978-0849334092.
6. Rapid Prototyping: Theory & practice, Kamrani A K, Nasr E A, Springer, ISBN: 978-0-387-23291-1.
7. Kenneth Cooper, Rapid Prototyping Technology: Selection and Application, Marcel Dekker, Inc. New York, ISBN: 082470261.

| MODULE: 2/4 | Electronic Prototyping (EP) | 28 HOURS |
|---|---|---|
| **PRACTICAL:** | | |
| **PRACTICAL NO. 01** | **Introduction to design and construction of electronic prototyping** | **02 HOURS** |

1.Gain familiarity with basic stages; Conceptualization, Detailed Design and Implementation.

2.Acquire concepts of basic processes in electronic prototyping.

3.Form a group of students. (03 max)

4.Perform Brainstorming and develop a simple electronic product idea based on given pre-declared theme in given time span.

5.Develop a plan for construction of electronic proto from a concept.

| PRACTICAL NO. 02 | Basic electronic prototyping skills | 02 HOURS |
|---|---|---|

1.Soldering

- Demonstrate structure of solder wire, soldering temperature, soldering station and gun.
- Highlight Industrial safety norms, use of lead free solder, extractor fan etc.
- Use of flux, desoldering gun, desoldering techniques, removing components/wires.
- Fix Solder defects and inspect quality of solder joints.

2.Wiring

- Cleaning, stripping and tinning the wires.
- Connections and protections for wires.
- Using cable ties , heat shrink tubes, sleeves and other wire dressing techniques.

3.Breadboard

- Bending wires and making connections on breadboards.
- Placing components on breadboards.
- Testing circuits using breadboards.

4.Perfboards

- Wire connections and component assembly on perfborads.
- Debugging assembled circuit and increasing stability.

| PRACTICAL NO. 03 | PCB design using basic Electronic Design Automation (EDA)tools | 04 HOURS |
|---|---|---|

1.Gain familiarity with PCB Design software.

2.Draw schematics for PCB design.

3.Make PCB layout as per circuit diagram.

4.Learn PCB design standards.

5.Export PCB files like gerber (.gbr), .pdf etc.

| PRACTICAL NO. 04 | PCB fabrication | 08 HOURS |
|---|---|---|

1.Develop negative imprints of top and bottom sides and expose to PCB.

2.Perform etching process for PCB.

3.Perform cleaning and shearing for required size.

4.Check continuity of tracks.

5.Use drilling machine to make drills.

| PRACTICAL NO. 05 | Assembly and testing of electronic proto | 08 HOURS |
|---|---|---|

1.Make assembly of electronic prototype as per IPC 610 D.

2.Insert components, perform lead cutting with standard clearance.

3.Review mechanical fitment of PCB with component insertion.

4.Solder components and make wiring.

5.Test prototype for electrical functionality, to perform rework if required.

6.Assemble PCB with mechanical fitments and assemblies.

7.Analyze performance and compare with specifications.

| PRACTICAL NO. 06 | Final project presentation | 04 HOURS |
|---|---|---|

1.Demonstrate an electronic prototype in a team.

2.Write a report on implementation of prototype. (10-15 pages max)

3.Present prototype implementation in a team by Power Point presentation.

4.Enumerate proposed specifications of electronic prototype.

5.Highlight financial aspects including proposed cost and bill of material.

**REFERENCE BOOK**


1. Printed Circuit Boards: Design and Technology, Walter C. Bosshart, Tata McGraw-Hill Education, 1983, ISBN: 978-0074515495.
2. Electronic Assembly Fabrication, Charles A. Harper, 1st ed.,McGraw-Hill Education, 2002 ISBN: 978-0071378826.
3. Soldering in Electronics Assembly, Frank Riley, 1st ed., Springer, 2013, ISBN: 978-3-662-13163-3.
4. Electronic Techniques: Shop Practices and Construction, R. S. Villanucci, A. W. Avtgis, W.F. Megow, 6th ed., Practice-Hall, 1999. ISBN: 978-0130195661.
5. Printed Circuit Boards: Design, Fabrication, and Assembly, R. S. Khandpur, 1st ed. McGraw-Hill Education, 2005, ISBN: 978-0071464208.
6. Practical Electronics for Inventors, Paul Scherz , Simon Monk ,3rd Edition, McGraw-Hill Education, 2013, ISBN 978-0071771337 (Available on TAB edition, Kindle)
7. IPC-J-STD-001E-2010, Requirements for Soldered Electrical and Electronic Assemblies, IPC. , ISBN: 9781580986922.
8. IPC-A-610 D-2014, Acceptability of Electronic Assemblies, IPC. ISBN: 9781611931549.


| **MODULE: 3/4** | **Software Prototyping (SP)** | **28 HOURS** |
|---|---|---|
| **PRACTICAL:** | | |
| **PRACTICAL NO. 01** | **Introduction to software engineering** | **04 HOURS** |
| Concepts, Software development life cycle (SDLC). Student need to use AEIOU Framework (Design Thinking) to decide the problem statement. Students will work in group of three on AEIOU framework | | |
| **PRACTICAL NO. 02** | **Design UML Diagrams for given problem statement** | **04 HOURS** |
| Students have to work in group on Project Development canvas and then design following,<br>1.Creation of data Flow diagram<br>2.Creation of block diagram<br>3.Design a Activity Diagram | | |
| **PRACTICAL NO. 03** | **Requirement analysis** | **04 HOURS** |
| 1.Find the requirement specification of given problem statement and formulate the feasible solution.<br>2.Paper (low-fidelity) prototype: choose the interface intend to develop, giving the reasons (pros and cons) and describing it summarily - choose the similar interface, indicating its key characteristics. | | |

| PRACTICAL NO. 04 | Design analysis | 06 HOURS |
|---|---|---|

1. Make an Inspiration board.
2. Start an inspiration board by listing 5-10 words that relate to your design idea or point of view. These words can be anything – from similar designs to feelings that the idea evokes.
3. Once you've listed your words, come up with at least five inspirations, and share them by providing links or images within your assignment submission. For each inspiration, give a brief (1-2 sentences) and insightful explanation of why you chose it (What did you take away from it? What did you learn from it. In other words, why did it inspire you?). Each of these inspirations should offer a different perspective to the design you are working on.

| PRACTICAL NO. 05 | Design analysis | 06 HOURS |
|---|---|---|

1. Create Storyboards
2. A storyboard is a comic-strip-like set of drawings about what interface does and how it is used to accomplish tasks in a real usage scenario. A good storyboard should clearly demonstrate who the user is, the usage situation, and the user's motivations for using the interface. It should show what the user can accomplish with interface, but it needn't (and often shouldn't) show a specific user interface design. For a storyboard including an app screen, the details of the screen are not relevant, but what those screens enable you to accomplish is. Each storyboard should comprise 5-8 panels and will provide all details of end product.

| PRACTICAL NO. 06 | Presentation | 04 HOURS |
|---|---|---|

1. Each group will be given 10 min to present their work.

**REFERENCE BOOK**


1. Software Engineering A practitioner's Approach, Roger S, Pressman, 7th Edition, ISBN:
2. 978–0–07–337597–7
3. Effective prototyping for software Makers, Jonathan Arnowitz, MIchaleArent by, ACM Digital
4. Library,ISBN-13:978-0120885688
5. Rapid prototyping: Principles and applications in manufacturing, Chua, C. K., Leong, K. F.
6. (1997). New York: Wiley, ISBN: 978-9812778987.
7. Fab - The coming revolution on your desktop - from personal computer to personal fabrication,
8. Gershenfeld, N. (2005). New York: Basic Books. ISBN:978-0465027453
9. Rapid prototyping: Principles and applications, Noorani, R. (2006). Hoboken, NJ: Wiley.ISBN:
10. 978-0-471-73001-9.
11. Rapid manufacturing: The technologies and applications of rapid prototyping and rapid tooling,
12. Pham D. T.,Dimov S. S. (2001). New York: Springer. .ISBN: 978-1447111825
13. Digital design and manufacturing: CAD/CAM applications in architecture and design, Schodek
14. D., Bechthold M., Griggs K., Kao K. M., Steinberg M. (2005). Hoboken, NJ: Wiley , ISBN:
15. 978-0471456360

| MODULE: 4/4 | Civil Prototyping (CP)) | 28 HOURS |
|---|---|---|
| **PRACTICAL:** | | |
| **PRACTICAL NO. 01** | **Introduction to civil prototyping** | **04 HOURS** |
| Introduction of bamboo as a construction material, its physical, mechanical properties, selection, seasoning and treatment, testing, joinery, case studies of bamboo buildings. | | |
| **PRACTICAL NO. 02** | **Analysis of determinant trusses.** | **04 HOURS** |
| Study of different types of trusses, analysis of determinant trusses by method of joint and method of section | | |
| **PRACTICAL NO. 03** | **Design bamboo trusses** | **04 HOURS** |
| Design of different bamboo trusses (span more than 3m), Hands on for different types of joinery, axial and angular joints by different methods | | |
| **PRACTICAL NO. 04** | **Making bamboo truss** | **08 HOURS** |
| Making of bamboo truss | | |
| **PRACTICAL NO. 05** | **Testing bamboo truss** | **04 HOURS** |
| Testing of different bamboo truss | | |
| **PRACTICAL NO. 06** | **Final project presentation** | **04 HOURS** |
| Comparative study of analytical and test results of forces in truss members, final project presentation. | | |

**REFERENCE BOOK**


1.Vector mechanics for Engineers: statics and dynamics by Beer Johnston 10th edition, McGraw Hill Education , ISBN: 978-0073398242

2.Bamboo Architecture Design (Architecture Materials), by Chris van Uffelen, , ISBN: 978-3037681824

3.Designing and Building with Bamboo ,Jules J.A. Janssen Technical University of Eindhoven Eindhoven, The Netherlands, ISBN 978-8186247464

4.Codes and standards

IS 1902:1993.Code of Practice for preservation of bamboo and cane for non-structural purposes.

IS 6874:1973 Methods of test for round bamboos

IS 7344:1974 Specification for bamboo tent bamboos.

IS 8242:1976 Methods of tests for split bamboos

IS 8295 (Part 1): 1976 Specification for bamboo chicks

ISO 22157 Standard guidelines for tensile, compressive, shear and bending Strength Parallel to grain and Perpendicular to grain.

**REFERENCE**

1.Paris Agreement(http://unfccc.int/paris agreement/items/9485.php)

2. Kyoto Protocol(http://unfccc.int/kyoto_protocol/items/2830.php)

3. Green Building Objectives Checklist, Auroville Bamboo Centre, Pudducherry, Tamil-nadu.(http://aurovillebamboocentre.org/)

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF HUMANITIES AND ENGINEERING SCIENCES** | **W.E.F** | **AY:** 2017 - 2018 |
| **SECOND YEAR BACHELOR OF TECHNOLOGY All Branches** | **COURSE NAME** | Psychology |
| | **COURSE CODE** | HP201 |
| | **COURSE CREDITS** | 2 |
| **RELEASED DATE :** 01/06/2017 | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | TUTORIAL/ PRACTICAL | PRESENTATION/ DEMONSTRATION | TOTAL |
| LECTURE | PRACTICAL | MSE | ESE | IA | | | |
| 2 | NIL | 20 | 40 | 15 | NIL | NIL | 75 |

**PRE-REQUISITE :** NIL

**COURSE OBJECTIVES :**

HP201.CEO.1:To introduce the basic concept and scope of Organizational Behavior.
HP201.CEO.2:To teach the theory of personality and its implications in the organization.
HP201.CEO.3:To evince types and styles of Leadership and the impact of values on the same.
HP201.CEO.4:To guide learners through a decision making process.
HP201.CEO.5:To enhance participants skills when practicing team work concepts through business games.
HP201.CEO.6:To introduce the concept of Motivation and constructive ways of coping.

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

HP201.CO.1:Explain human behavior in the workplace from an individual, group, and Organizational perspective.
HP201.CO.2:Develop an ability to analyze ones own personality and that of others in Organizations.
HP201.CO.3:Compare different leadership styles with an understanding of how core values affect Leadership.
HP201.CO.4:Demonstrate decision making ability
HP201.CO.5:Identify the problems associated with organizing and managing teams.
HP201.CO.6:Comprehend the correlation amongst stress, motivation and personality.

| THEORY | | |
|---|---|---|
| **UNIT 1** | **Organizational Behaviour** | **6 HOURS** |
| Meaning of Psychology and Organizational Behaviour, Psychology in Organization: History of Organizational Psychology; Scope and Research in Organizational Behaviour, Structure of Organization, Organizational culture, Strong vs Weak culture, Culture vs Formalization. | | |
| **UNIT 2** | **Perception and Decision Making** | **6 HOURS** |
| Meaning, process and determinants of Perception, Process of Decision Making, The link between Perception and Individual Decision Making, Influences on Decision Making: Individual Differences & Organizational constraints, Process and ethics of decision making. | | |
| **UNIT 3** | **Personality, Values and Leadership** | **6 HOURS** |
| What is Personality, The Big Five Personality Model, The importance of values; values and ethical behavior, Leadership, Understanding Personality, values and Leadership, Emotional Intelligence-Personal and Social Competence. | | |
| **UNIT 4** | **Understanding Team Work and Conflict Resolution** | **6 HOURS** |
| Difference between groups and teams, Types of teams, Turning Individuals into Team players, Team building and Team based work, Team dynamics, Types of conflict and conflict resolution. | | |
| **UNIT 5** | **Motivation & Stress** | **4 HOURS** |
| Motivation and its types, Content and Process Theories of Motivation, Concept and reactions to stress, Potential effects of stress, Coping with and managing stress. | | |

**TEXT BOOK**


1.S. P. Robbins, Organizational Behavior Prentice-Hall India, 1995, ISBN-11:81-203-2875-2.

2.F. Luthans, Organizational Behavior. McGraw-Hill, 1995, ISBN-13: 0072873876.

3.U. Sekarn, Organizational Behavior: Text and Cases, Tata McGraw Hill, 1996, ISBN: 0074603663.

4.Furnham, The Psychology of Behavior at Work, Psychology Press, 1997, ISBN: 1841695041 .


**REFERENCE BOOK**


1.M. D. Dunnett, Handbook of Industrial-Organizational Psychology, Jaico Press, 1990, ISBN: 978089106-041-3.

2.M. A. - Ansari, Managing people at work: Leadership styles and influence strategies, Sage, 1990, ISBN: 0803996500.

3.J. B. P. Sinha, Work Culture in Indian Context, Sage, 1990, ISBN: 0019-5286.

4.D.M. Pestonjee, Stress and Coping: The Indian Experience, 2nd ed., Sage Publications, 1999, ISBN: 0761993126.

5.L. N. Jewell & M. Siegall, Contemporary Industrial/Organizational Psychology, West Publishing Company, 1990, ISBN: 0314715991.

6.D. Katz and-R. L. Kahn, The Social Psychology of Organizations, Wiley, 1966, ISBN: 978-0-471-023553.

7.M.L. Blum, and J.C. Naylor, Industrial Psychology, CBS Publishers & Distributors, 1984, ISBN: 8123908601.

8.K. H. Blanchard and P. Hersey, Management of Organizational Behavior: Utilizing Human Resources, Prentice-Hall India, 1993, ISBN: 0-13-5512868-9.

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY** | **W.E.F** | **AY:** 2017 - 2018 |
| **SECOND YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING** | **COURSE NAME** | Engineering Informatics |
| | **COURSE CODE** | IT201 |
| | **COURSE CREDITS** | 4 |
| **RELEASED DATE :** 01/06/2017 | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | PRACTICAL/ | PRESENTATION/ | TOTAL |
| LECTURE | PRACTICAL | MSE | ESE | IA | PRACTICAL | DEMONSTRATION | |
| 3 | 2 | 30 | 50 | 20 | 30 | 20 | 150 |

**PRE-REQUISITE :** IT101 – Computer Programming, ME102 – Engineering Tools and Techniques

**COURSE OBJECTIVES :**

IT201.CEO.1:To introduce facts, concept and theory of an information system.
IT201.CEO.2:To understand evolution of an information system.
IT201.CEO.3:To explain an information life cycle.
IT201.CEO.4:To develop IoT based information system.

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

IT201.CO.1:Interpretation of Data, Information and Knowledge. [Apply]
IT201.CO.2:Make use of data acquisition techniques for an information system. [Apply]
IT201.CO.3:Categories different storage techniques. [Analyze]
IT201.CO.4:Develop dashboard for effective communication of information. [Apply]
IT201.CO.5:Determine components of Human computer interaction. [Evaluate]
IT201.CO.6:Design IoT based information system. [Analyze].

| THEORY COURSE CONTENT | | |
|---|---|---|
| **UNIT 1** | **Evolution Of Information** | **6 HOURS** |
| Data, Types of Data: Primary data, Secondary data, Meta data, Operational data and Derived data Information: Life Cycle, Semantics of information, Knowledge Data forms: Analog and Digital (Telephone and Stenography) ADC, DAC Evolution of Information- Man Machine Interaction Self-Study: Grade Sheet Generation system<br>**Further Reading: Railway reservation, Inventory machine** | | |
| **UNIT 2** | **Information Generation** | **6 HOURS** |
| Data Acquisition, Human interface, Hardware Interface: Input / Output devices Data Transformation: Rearranging, Classifying, Calculating, Summarizing; Self-Study: Weather forecasting System<br>**Further Reading:Data Acquisition Applications** | | |
| **UNIT 3** | **Information Storage And Transmission** | **4 HOURS** |
| Need of data storage, Types of storage: stand alone, centralized, distributed, and cloud. Encryption and decryption (define and need) Transmission Type, Synchronous, Asynchronous, Serial, Parallel, Satellite, radio<br>**Case Study:**Dial up, Broadband<br>**Self-Study:**Stand Alone and Disk storage<br>**Further Reading:**Wireless–(Bluetooth, XBEE) | | |
| **UNIT 4** | **Information Visualization** | **4 HOURS** |
| Representations: Graphs and Charts: Pi Chart, Scatter plot, Histogram, Heat map, Maps, Geo maps Case Study: Dynamic dashboard<br>**Further Reading:** | | |
| **UNIT 5** | **Human Computer Interface** | **4 HOURS** |
| Introduction of HCI, Types – mobile, stand-alone, computer etc, Interactive devices – touch screen, mic, keys, keyboard, scanner, camera etc., HCI design principles- standards, Usability principles –portability, scalability, GUI design and evaluation, Interactive Multimedia document search- image, audio, video, animation Case study: Ticket Generation Kiosk Self-Study: Web based systems interactivity<br>**Further Reading:** Usable GUI Design | | |
| **UNIT 6** | **Internet Of Things** | **4 HOURS** |
| IoT: Overview, Characteristics and Architecture Embedded Devices: Sensors, Actuators, Arduino and RaspberryPI IOT Ecosystem: Basic elements / building blocks of IOT application, Systematic method to design IOT application Applications: Asset management, Industrial automation, Smart cities Self-Study:IoT Essentials.<br>**Further Reading:**IOT and big Data | | |

| PRACTICAL | | |
|---|---|---|
| **PRACTICAL NO.01** | **Data Acquisition , Storage and Retrieval Systems** | **8 HOURS** |

In traditional manual information systems, the storage, retrieval, and update operations on elementary data item, records and files are handled manually. In the context of automation, design an information system that summarizes data while providing storage and retrieval facilities for offline analysis. This automated information system should follow:

Identification of an interdependent elementary data items which have facts and figures

Data collection through sensors

Processing using Arduino

Data Storage using MySQL in an accessible form

Data visualization using graphs

| | | |
|---|---|---|
| **PRACTICAL NO.02** | **Dashboard Design** | **8 HOURS** |

Over the last year, the three locations of fast-food restaurant have produced mixed financial results. You have been asked to analyze the performance data from each location and identifying the causes of these results. For the same, design the dashboard to monitor key performance indicators for given system.

Create a graph showing how revenue evolves throughout the year for each of the sales channels

Create an interactive chart that can be used to switch between different sales channels.

Create three different views of the data: monthly sales revenue, sales revenue by category, and revenue by the top five distributors..

| | | |
|---|---|---|
| **PRACTICAL NO.03** | **IoT Application** | **8 HOURS** |

Deploy an IoT based automation system for controlling home appliances such as fan, lights, water pumps, etc. using Raspberry Pi. Identify the home appliances that require human interaction for its operations and state the need of automation.

Identify system component

Design circuit diagram

Assemble system components

Program the interface

System Testing

System Deployment

**TEXT BOOK**


1. Ralph M Stair, George W Reynolds, ”Fundamentals of Information Systems”, Course Technology Inc; 5th edition, 2008, ISBN 978-1423925811.
2. Benny Raphael, Ian F. C. Smith, ”Engineering Informatics: Fundamentals of Computer-Aided Engineering”, Wiley-Blackwell; 2nd Revised edition, 2013, ISBN-13: 978-1119953418.
3. Paul Mcfedries, “Excel Data Analysis: Your Visual Blueprint for Analyzing Data, Charts and Pivot Tables”, Wiley; Fourth edition 2013, ISBN-13 978-8126544004

**REFERENCE**


1. Gerard Jounghyun Kim, "Human–Computer Interaction: Fundamentals and Practice", CRC Press, Auerbach Publications, 1 edition, 2015 ISBN 9781482233896
2. Adrian McEwen, Hakim Cassimally, "Designing the Internet of Things", Wiley, 2013 ISBN-13: 978-1118430620

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF MECHANICAL AND CIVIL ENGINEERING** | **W.E.F** | **AY:** 2017 - 2018 |
| **SECOND YEAR BACHELOR OF TECHNOLOGY MECHANICAL ENGINEERING** | **COURSE NAME** | Materials Engineering |
| | **COURSE CODE** | ME201 |
| | **COURSE CREDITS** | 4 |
| **RELEASED DATE : 01/06/2017** | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | TUTORIAL/ PRACTICAL | PRESENTATION/ DEMONSTRATION | TOTAL |
| LECTURE | PRACTICAL | MSE | ESE | IA | | | |
| 3 | 2 | 30 | 50 | 20 | Nil | 25 | 125 |

PRE-REQUISITE : AS102/AS103 - Physics, Chemistry

**COURSE OBJECTIVES :**

ME201.CEO.1:To select material for engineering application.
ME201.CEO.2:To classify the available materials.
ME201.CEO.3:To utilize available material for specified purpose.
ME201.CEO.4:To compare desired quality of materials from standard data.
ME201.CEO.5:To measure useful properties of materials.

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

ME201.CO.1:Select material for engineering application.
ME201.CO.2:Classify the available materials.
ME201.CO.3:Utilize available material for specified purpose.
ME201.CO.4:Compare desired quality of materials from standard data.
ME201.CO.5:Measure useful properties of materials.

| THEORY COURSE CONTENT | | |
|---|---|---|
| **UNIT 1** | **Ferrous, Nonferrous metals and alloys** | **8 HOURS** |
| Classifications and specifications of steels and cast iron. Heat treatment of steels, Defects due to heat treatment and remedial measures. Classification of surface hardening treatments. Classification, Composition, Properties & applications of: Copper and Its alloys, Nickel and Its alloys, Aluminum and Its alloys. Specific alloys: soldering & brazing alloy, Precipitation hardening alloys. Bearing materials and their applications. | | |
| **UNIT 2** | **Engineering Polymers, Ceramics and Glass** | **6 HOURS** |
| Classification of polymers, Polymer types-thermoplastics-thermoset-Elastomers, Polymer synthesis and processing-injection moulding-extrusion-blow moulding-calendaring, Degradation of polymers-chemical, thermal, -biological-mechanical. Polymer recycling methods Introduction to Advanced Ceramics-Barium Titanate, Ferrites, Silicon Carbide, Alumina, Ceramics, its classifications and their applications, Introduction to Cermets and its application. HIGH PERFORMANCE POLY-MERS:Acrylo Butadiene Styrene- Polycarbonate-Polyamide, Polymethyl Methacrylate: Characteristic, properties and evaluation | | |
| **UNIT 3** | **Composite Materials** | **6 HOURS** |
| Need of composites. Particle-reinforced composites, large-particle composites, dispersion-strengthened composites. Fiber-reinforced composites, polymer-matrix composites, metal-matrix composites, ceramic-matrix composites, carbon–carbon composites, fiber-reinforced composites, structural composites, laminar composites. | | |
| **UNIT 4** | **Electronic and Photonic materials** | **6 HOURS** |
| Electronic Materials: Intrinsic and extrinsic semiconductors-p-n junction, Bandgap diagrams for conductor, semiconductor and insulator, IR detectors, Hall effect Superconducting Materials: Normal and High temperature superconductivity, Applications. Photonic Materials: LED, LCD, Photo conducting materials, Photo detectors, Photonic crystals and applications. Advancements in electronic materials: Smart materials | | |
| **UNIT 5** | **Testing of Engineering Materials** | **8 HOURS** |
| Need and Comparison of destructive and non-destructive tests, Study of destructive testing: Engineering stress-strain curve, true stress-strain curve, Jominy End Quench Test for hardenability, Izod and Charpy Impact Test. Vickers, Rockwell hardness tests. Non –Destructive Testing Non-Destructive testing: Principles & procedure, advantages, disadvantages and Industrial applications of NDT like Sonic & Ultrasonic testing and Radiography tests. Brief overview of another NDT test- Eddy current test, Magnetic Particle Test | | |
| **UNIT 6** | **Nanomaterials.** | **6 HOURS** |
| Basic concepts of Nano science and Nanotechnology, Carbon nanotubes, Principle of SEM, TEM and AFM, X ray diffraction Fundamentals principles of SEM, SE and BSE imaging modes, Fracture mode analysis and failure analysis using SEM. Potential uses of nonmaterial's' in electronics, robotics, sports equipment, mobile electronic devices, Medical applications of nanomaterials-Cancer, AIDS treatment. | | |

| **PRACTICAL: Perform the following experiments.** | | |
|---|---|---|
| **PRACTICAL NO.01** | **Jominy End Quench Test** | **2 HOURS** |
| Jominy End Quench Test for hardenability. | | |
| **PRACTICAL NO.02** | **Izod / Charpy Impact Test** | **2 HOURS** |
| Izod / Charpy Impact Test. | | |
| **PRACTICAL NO.03** | **Hardness Test** | **4 HOURS** |
| Vickers,/ Rockwell, Brinell/Durometers & Poldi Hardness Test. | | |
| **PRACTICAL NO.04** | **Magnetic Particle & Dye Penetrant Test** | **4 HOURS** |
| Magnetic Particle & Dye Penetrant Test. | | |
| **PRACTICAL NO.05** | **Ultra-sonic Test** | **4 HOURS** |
| Ultra sonic test for detection of flaws in materials. | | |
| **PRACTICAL NO.06** | **Determination of Hall coefficient** | **4 HOURS** |
| Determination of Hall coefficient for a semiconducting material. | | |
| **PRACTICAL NO.07** | **Soldering** | **4 HOURS** |
| Hard and Soft soldering using soldering materials. | | |
| **PRACTICAL NO.08** | **Industrial Visit** | |
| Visit to advanced materials characterization laboratory. | | |

**TEXT BOOK**


1. Material Science & Metallurgy for Engineers, Dr. V.D. Kodgire & S. V. Kodgire, Everest Publications.31st Edition, ISBN No: 8186314008
2. Mechanical Behavior & Testing of Materials, A. K. Bhargava, C.P. Sharma P H I Learning Private Ltd. 2011 edition, ISBN No 13-9788120342507


**REFERENCE BOOK**


1. Engineering Metallurgy, Higgins R. A., Viva books Pvt. Ltd., 2004 ISBN No 13-9788176490276
2. Material Science & Engineering, Raghavan V., Prentice Hall of India, New Delhi. 2003 ISBN No 13-9788120324558
3. Materials Science & Engineering, W. Callister, Wiley Publications,2013, ISBN No 13-9788126521432
4. Physical Metallurgy for Engineers, Clarke D.S. & Varney W.R. Affiliated East-West Press, New Delhi ISBN No 13-978-8176710350

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY** | **W.E.F** | **AY:** 2017 - 2018 |
| **SECOND YEAR BACHELOR OF TECHNOLOGY INFORMATION TECHNOLOGY** | **COURSE NAME** | Data Structures and Application |
| | **COURSE CODE** | IT211 |
| | **COURSE CREDITS** | 4 |
| **RELEASED DATE :** 01/06/2017 | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | | PRESENTATION/ | TOTAL |
| LECTURE | PRACTICAL | ICE | ECE | IA | PRACTICAL | DEMONSTRATION | |
| 3 | 2 | 30 | 50 | 20 | 30 | 20 | 150 |

**PRE-REQUISITE :**

1. ESC4- Computer Programming,
2. IT202 –Object Oriented Technology

**COURSE OBJECTIVES :**

IT211.CEO.1: To Learn and understand linear and nonlinear data structures.
IT211.CEO.2: Explain fundamentals of data structures and their applications essential for Programming /problem solving..
IT211.CEO.3: Assess appropriate data structure during program development/Problem Solving.

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

IT211.CO.1:Select the appropriate data structure for a specified application.
IT211.CO.2:Illustrate linear, Non-linear data structure and various operations on it.
IT211.CO.3:Apply appropriate data structures for solving computing problems.
IT211.CO.4:Analyze the performance of Stack, Queue, Trees and Graphs.
IT211.CO.5:Evaluate the performance of the application based on the data structures.
IT211.CO.6:Design and Implement various data structures in more than one manner.

| THEORY : | | |
|---|---|---|
| **UNIT 1** | **Fundamentals of Data Structures** | **6 HOURS** |
| Introduction: Data Structures, Classifications (Primitive Non Primitive), Data structure Operations, Types of Data Structures - Linear Non Linear Data Structures, searching and sorting techniques. Applications: Searching, sorting algorithm.. | | |
| **UNIT 2** | **Linked Lists** | **6 HOURS** |
| Introduction: Linked List, Types of Linked list: Singly Linked List , Circular Linked List, Doubly Linked List and implementation of Linked List, representation and Implementation of polynomial using Circular Linked List. Applications: Maintaining Access Frequencies.. | | |
| **UNIT 3** | **Stack** | **8 HOURS** |
| Introduction: Definition, Stack Operations, Representation of Stacks, stack as an ADT, array based Stack implementation, Recursion: Factorial, GCD, Fibonacci sequence, Tower of Hanoi, English Ruler, examples. Application: Reversing data, Matching Parentheses and HTML Tags. | | |
| **UNIT 4** | **Queue** | **8 HOURS** |
| Queues: Definition, Array and Linked list Representation, Queue Operations, Circular Queue, Circular queue using array, Double-Ended queue, Priority Queue and implementation. Application: Sorting with Priority Queue. | | |
| **UNIT 5** | **Trees** | **8 HOURS** |
| Introduction to Tree: Tree Terminology, Representation of Trees Binary Tree: Binary Tree ADT, Properties of Binary Tree and Implementing Trees: Linked Structure of Binary Tree, Linked Structure of General Tree,Tree Traversal Algorithm: Preorder and Post order of Traversal of General Tree, Breadth First Tree Traversal, In order Traversal of Tree. Application: Expression Tree.. | | |
| **UNIT 6** | **Graph.** | **8 HOURS** |
| Graph: Definitions, Terminologies, Matrix and Adjacency List Representation of Graphs, Data structures for graphs, Traversal methods: Breadth First Search and Depth First Search, shortest path: weighted graph Dijkastra's Algorithm, Minimum Spanning Tree (MST): Prim's and Kruskal's Algorithm. Applications: Routing tables for the nodes in a computer network. | | |

| **PRACTICAL:Practical's will be performed using Python Programming.** | | |
|---|---|---|
| **PRACTICAL NO.01** | Create a queue which will maintain the list of customer at restaurant/ Bank | **8 HOURS** |
| Functions:<br>1. Add a Customer to list.<br>2.Delete a Customer from list.<br>3. Show all the Customer list of particular day.<br>4. Calculate time complexity of each module.<br>5. Exit. | | |
| **PRACTICAL NO.02** | Create a Word Dictionary using suitable data structure | **8 HOURS** |
| Functions:<br>1. Add a word into dictionary<br>2. Search a word from Dictionary.<br>3. Show the Dictionary.<br>4. Calculate time complexity of search module.<br>5. Exit. | | |
| **PRACTICAL NO.03** | Simulate an air traffic controller using a Priority Queue. | **8 HOURS** |
| Functions:<br>1. Adding information about planes with priority.<br>2. Landing plane with highest priority. | | |
| **PRACTICAL NO.04** | Ticket Checker | **8 HOURS** |
| Functions:<br>1. Insert the data about seat details of particular coach.<br>2. Search the seat in the coach.<br>3. Mark present or absent to seat.<br>4. Allocate new seat to vacant place. | | |

**TEXT BOOK**


1. Michael T. Goodrich, Roberto Tamassia, Michael H. GoldWasser, "Data Structures and Algorithms in Python", 1st Edition December 2016,Wiley, ISBN 978-8126562176.
2. Jean-Paul Tremblay, Paul. G. Soresan, "An introduction to data structures with Applications", Paperback, December 2001, ISBN 007-4624717.


**REFERENCE**


1. Bradley N Miller, David L Ranum," Problem Solving with Algorithms and Data Structures Using Python", 2nd edition August 2011,Franklin, Beedle Associates,ISBN-13: 978-1590282571
2. Horowitz, SartajSahni, SanguthevarRajasekran," Fundamentals of Computer Algorithms",December 2004,Galgotia, ISBN 817-5152575
3. NarasimhaKarumanchi,"Data Structure and Algorithmic Thinking with Python", 1st Edition January 2015,CareerMonk,ISBN 10: 8192107590

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY** | **W.E.F** | **AY:** 2017 - 2018 |
| **SECOND YEAR BACHELOR OF TECHNOLOGY INFORMATION TECHNOLOGY** | **COURSE NAME** | DATABASE SYSTEMS |
| | **COURSE CODE** | IT212 |
| | **COURSE CREDITS** | 4 |
| **RELEASED DATE : 01/06/2017** | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | | PRESENTATION/ | TOTAL |
| LECTURE | PRACTICAL | ICE | ECE | IA | PRACTICAL | DEMONSTRATION | |
| 3 | 2 | 30 | 50 | 20 | 30 | 20 | 150 |

**PRE-REQUISITE :**

IT201 – Object Oriented Technology

**COURSE OBJECTIVES :**

IT212.CEO.1:Understand how the data is stored and processed
IT212.CEO.2:Know the various types of Data models for Database systems.
IT212.CEO.3:Learn the SQL and No SQL for processing all types of data.
IT212.CEO.4:Learn different types of database architectures.
IT212.CEO.5:Understand the concept of Big Data and learn various frameworks for handling it.

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

IT212.CO.1:Experiment the basic concepts of database system using the various data models.
IT212.CO.2:Construct a structured database and execute SQL queries on it.
IT212.CO.3:Identify the data transfer script used in various databases for transferring data over the network.
IT212.CO.4:Examine the need of unstructured database and execute NoSQL queries on it.
IT212.CO.5:Test the selection of database by connecting it to some database application.
IT212.CO.6:Design a database application by considering the requirements of some existing system.

| THEORY : | | |
|---|---|---|
| **UNIT 1** | **Introduction to Database Systems** | **7 HOURS** |
| Application: Case Study on Trivago Hotel Booking System Content: Introduction and purpose of DBMS, DIKW pyramid, Data Abstraction, Data Independence, Data Models, ER Modeling, Integrity Constraints, Keys concept, , Database Architectures. Self-Study: Data, Types of data: Structured, Semi-structured and Unstructured Further Reading: Data Representation Techniques | | |
| **UNIT 2** | **Structured Data** | **8 HOURS** |
| Application: Bank Database System, Student Portal, Social Networketc Content: Introduction to Relational Model, SQL, DDL, DML, DCL, aggregate functions, Set operations, sub-queries, Group by, Having and Order by clauses, join operations. PL/SQL Concepts: Cursors, Stored Procedures, Stored Function, Database Triggers. Self-Study: SQL Functions Further Study: Exception Handling | | |
| **UNIT 3** | **Semi-structured Data** | **7 HOURS** |
| Application: Data transportation, Application configuration, Data storage of Facebook posts. Content: Introduction to XML: Elements, Attributes, XML DTD, XML Schema, XPath Expressions, XQuery, XML Databases, JSON: Syntax, Data Types, Object, Schema. Self-Study: Comparison of XML and JSON Further Study: XML Web Services | | |
| **UNIT 4** | **Unstructured Data** | **7 HOURS** |
| Application: Case Study of Social Networking Site Content: Introduction to Big Data, Introduction to Hadoop, Data Storage: HDFS,HBase, Data Processing: Map Reduce, YARN. Self-Study: Data Access: Hive, Pig, Mahout, Avro, Sqoop Further Study: Data Management: Oozie, Chukwa, Flume, Zoo Keeper | | |
| **UNIT 5** | **No-SQL** | **8 HOURS** |
| Application: Case Study of Aadhar UIDAI No SQL Introduction, ACID vs BASE, SQL vs No-SQL, MongoDB: Data Types, Documents, Collections, Database, CRUD Operations, Aggregation Pipeline and Indexing. Self-Study: Types of No SQL Databases Further Study: Pipeline and Indexing | | |
| **UNIT 6** | **Database Connectivity And Applications** | **5 HOURS** |
| Content: Basics of Database Connectivity: Drivers, Connection Object, Connection URL, Result Set, Database Connectivity through JDBC/ODBC using Python, Real Time Applications of Mongo DB and Hadoop. Self-Study: SQLite Databases Further Study: Multimedia Databases: characteristics, architecture | | |

| **PRACTICAL:** | | |
|---|---|---|
| **PRACTICAL NO. 1** | **Study of various Database systems and their architecture** | **4 HOURS** |
| For a complex system follow the below steps: Students should form a group of minimum 5 members and visit different systems like Social Networking Site, Banking Systems, Management Systems, ERP etc. Each group has to do the following task.<br>1. Study the system architecture and identify the database used at the backend.<br>2. Should justify the need of such database system in that application.<br>3. Identify whether the database used is structured or Un-structured.<br>4. List down the advantages/disadvantages of using that database for that application.<br>5. Using text books and literature study the architecture of database used in your application.<br>6. Group has to present the report in form of poster then present it to the whole class. | | |
| **PRACTICAL NO. 2** | **Explore database design using EER to achieve a better understanding of conceptual schema design, as well as address key issues in conceptual modeling.** | **4 HOURS** |
| A property management company has approached you to build a system that will help it keep track of its properties, tenants, and employees. Consider the following requirements and design a database conceptual schema to support such an application. The property management company owns several buildings, each at a distinct address. Each of the buildings contains several apartments. All apartments in a given building are assigned an apartment number that is unique within that building (but not necessarily across different buildings). The system should keep track of the number of bedrooms and number of bathrooms that each apartment has. The system also needs to handle different kinds of people. A person is identified by a unique Aadhar ID, and has a name consisting their first name and last name. Each person may have several phone numbers. People handled by the application fall into two disjoint categories: tenants and employees. For each tenant, it is necessary to record their bank account number for the purposes of deducting their rent. The application also needs to store the name and phone number of their next-of-kin for contact purposes in case of an emergency. For each employee, the application needs to keep track of their monthly salary. Employees can be managers or technicians (or both). Each manager has an office located in one of the apartments, and is in charge of managing at least one building. All buildings must have a manager. For technicians, the application should keep a record of their skills, which is one or more of the following: "carpentry", "plumbing", "electrical". To rent an apartment from the property management company, tenants must sign a lease agreement. A lease agreement is a formal contract by one or more tenants (as may be the case with roommates) to lease an apartment; it includes the start date and expected duration of occupation of the apartment, as well as the amounts for security deposit and monthly rent. The lease agreement is also countersigned by the manager in charge of the building, on behalf of the company. Students has to perform the following tasks: Design an EER conceptual schema based on the above specification, which accurately captures as much of the semantics of the application as possible. You should use the standard notation shown in the course textbook. Your EER diagram should include all relevant entities, attributes, relationships, cardinalities and specialization and generalization hierarchies. | | |

| PRACTICAL NO. 3 | Database implementation based on a given relational schema within the MySQL database management system. | 6 HOURS |
|---|---|---|

The tasks that you will accomplish in this assignment area as follows:
Create a database using DDL statements in the mysql command line tool
Populate the database row-by-row from provided raw data using JDBC
Write SQL queries to the database to be executed from the mysql command line tool
Query and manipulate the database programmatically using JDBC
Generate reports based on some basic analysis. The project will be divided into different part as follows:
Part 1: Creating the database Identify the keys and constraints for your system and design a database schema containing required tables having columns and its attributes.
Part 2: Populating the database Download the provided dataset from moodle and populate your database using respective commands.
Part 3: SQL queries on the database Write the queries in SQL and run them on your MySQL database via the mysql command line tool. Prepare and submit them as separate files.
Part 4: Querying the database using JDBC You are required to implement a Java program Hw3.java that provides the capability to run queries on the system from the Windows command line or Linux/Mac shell environment.
Part 5: Report Generation Generate the report in the form of either a receipt or bill or an analysis report for general prediction of total sales, profit etc. Interpolation techniques: Lagrange's Interpolation.

| PRACTICAL NO. 4 | Design and implementation of XML Schemas, XML Stylesheets and the use of the XML query language XQuery to query XML data. | 4 HOURS |
|---|---|---|

An independent bookseller would like to stay competitive in the market by using sales information from their competitors for items in their inventory. You would like to represent this data in XML. Given the information shown below about the data, create a valid XML Schema: Each Author has: ID (1 occurrence, required. Format: three alphanumeric characters followed by a number [0-9]) Name (1 occurrence, required. Format: first name [space] last name or first name [space] middle initial [space] last name) Email (1 occurrence, required. A valid email4) Phone (1 occurrence, required. Format: "(xxx) xxx-yyyy" where x and y are numbers and xxx does not start with a "0") Each Book has: ISBN (1 occurrence, required. Format: 10 numbers, where the last number may be replaced with an 'X'. Does not start with a "0") Title (1 occurrence, required) Author (1 or more occurrences, required. Type: Author/ID) Formats (1 or more occurrences, required) an occurrence of this element consists of: Format (1 occurrence, required. The only permitted values are eBook, Paperback, Hardcover) MSRP5 (1 occurrence, required, Format: zero or positive value) WeeksBSL (1 occurrence, optional. Format: positive integer) Each SalesInfo has: Book (1 occurrence, required. Type: Books/ISBN) BookSales (1 or more occurrences, required) an occurrence of this element should have: Format (1 occurrence, required. Type: Books/Formats/Format) Sales (1 or more occurrence, required) an occurrence of this element should have: Retailer (1 occurrence, required) Price (1 occurrence, required. Format: Books/Formats/MSRB) UnitsSold (1 occurrence, required. Format: zero or positive integer) On the above XML File execute the queries using XQuery.

List the ISBN, title and the name(s) of the author(s) for each book. Order the results according to the number of weeks the book was on the bestseller list, with the longest duration first.

Show the author(s) of the eBook with the cheapest MSRP price (amongst all eBooks). Give the author(s)' ID, name, email and phone number.

For each book, list the book title and the total number of units sold. The sum should include all formats sold by all retailers. Sort the answer by the ascending value of the total units sold.

For each format of a book that is not sold by any retailer, list the book's ISBN, title, format and the name(s) of its' author(s).

For each retailer, list each format of a book (ISBN, title, format and retailer's price) that are being sold at half of the MSRB price or less.

| PRACTICAL NO. 5 | Design of Unstructured Database | 6 HOURS |
|---|---|---|
| For the same problem statement as mentioned in project 3 designs and implement an un structured database and perform all the tasks as per project 3. In addition to this write a Map Reduce program for generating the analysis report. | | |
| **MINI PROJECT** | | **8 HOURS** |
| Project Guidelines:<br>Students have to complete a mini project in a group of minimum 3 and maximum 4 students. The problem statement for the project will be given to each group by the instructor in the first week of semester. Students can use either of the database systems (structured or unstructured)for completing their project. | | |

**TEXT BOOK**


1. Abraham Silberschatz, Henry F. Korth S. Sudarshan "Database System Concepts" McGraw Hill. 6th edition, ISBN: 0-07-352332-1.
2. Tom White "Hadoop: The Definitive Guide", O'Reilly Pubications, 4th Edition, ISBN: 978-1- 491-90163-2.
3. Kristina Chodorow "MongoDB: The Definitive Guide", O'Reilly Media,2ndEdition, ISBN: 978-1-4493-4468-9.k


**REFERENCE**


1. 1. Begg C. "Database Systems", Connally T., Pearson Education, 3rd Edition, 2002, ISBN 81-7808-861-4.
2. C.J.Date, A.Kannan, S.Swamynathan "An Introduction to Database Systems", Pearson Education, Eighth Edition, ISBN: 8177585568.
3. Elmasri R., Navathe S. "Fundamentals of Database Systems", 4th Edition, Pearson Education, 2003, ISBN 8129702282.
4. Pramod J. Sadalage, Martin Fowler "NoSQL Distilled", Addison Wesley, ISBN 978-0-321-82662-6.
5. V. S. Subrahmanian, Morgan Kaufmann "Principles of Multimedia Database Systems", Publishers, ISBN-13: 978-1558604667.

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY** | **W.E.F** | **AY:** 2017 – 2018 |
| **SECOND YEAR BACHELOR OF TECHNOLOGY INFORMATION TECHNOLOGY** | **COURSE NAME** | Minor Project |
| | **COURSE CODE** | CS213 |
| | **COURSE CREDITS** | 2 |
| **RELEASED DATE :** 01/06/2017 | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | TUTORIAL/ | PRESENTATION/ | TOTAL |
| LECTUES | PRACTICAL | ICE | ESE | IA | PRACTICAL | DEMONSTRATION | |
| -- | 4 | – | -- | – | – | 75 | 75 |

**PRE-REQUISITE :**

1) ME102 – Engineering Tools and Techniques,
2) ME103 – Design Thinking,
3) ET206 – Prototyping

**COURSE OBJECTIVES :**

CS213.CEO.1:To identify and define a problem to be solved.
CS213.CEO.2:To develop a design for the solution of the problem using engineering tools available.
CS213.CEO.3:To prepare prototype/working model for solving the problem
CS213.CEO.4:To evaluate the model built for its functionality, reliability, sustainability, maintainability and affordability

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

CS213.CO.1:Define the problem to be solved.
CS213.CO.2:Apply knowledge of various engineering tools to develop the solution to the problem.
CS213.CO.3:Critically analyze the options available to solve the problem and select the one identified most effective.
CS213.CO.4:Justify the selection of the method to solve the problem is-a-vis other options considered.
CS213.CO.5::Build the working model of the solution to solve the problem.

**PREAMBLE :** It is a need of the time to pay attention to the societal needs by an engineering graduate to solve some of the real life societal problems by providing affordable technological solutions. The concept of the minor project follows the same theme. The minor project aims to identify the problems from the society and develop the solutions for the same using science and technology for the betterment of society or human life.

**GUIDELINES:**

1. Every student shall undertake the Minor Project in semester IV.
2. Every student shall work on an approved project, a group of 03 students (maximum) shall be allotted for each minor project
3. The group members could be from different departments to support the interdisciplinary functioning
4. The students have to identify the social problem by discussion with various stakeholders, site visits and expert-opinions
5. Collect the sufficient data to establish the criticality of the problem to be solved.
6. Define the actual problem
7. Enumerate various approaches and solutions to solve the problem
8. Select and justify one of the solutions identified based on the feasibility, affordability and ease of use
9. Develop prototype or model for its testing before implementation
10. The three-member committee of jury members will be appointed to monitor the progress and continuous evaluation of each project. One of the members will be the project guide. Assessment of the project for award of grade shall be done jointly by the guide and committee of jury members

**TIMELINES:**

1. Project group formation: 1 Week.
2. Identification of the problem to be solved: 2 Weeks.
3. Data collection to prove the validity of the problem: 2 Weeks
4. Identification of the various approaches to solve the problem: 2 weeks.
5. Justification of the approach selected to solve the problem: 1 week
6. Building the solution to the problem using prototype or implementation: 6 Weeks
7. Report writing: 2Weeks

**ASSESSMENT:**

Presentation 1: Motivation and need for the selected problem to be solved

Presentation 2: To prove the validity of the problem to be solved using data collected

Presentation 3: Identified approaches to solve the problem and justification of approach selected

Presentation 4: Progress towards the prototyping or implementation of the solution to the problem

Presentation 5: Final demonstration

MIT | Academy of Engineering

# MIT ACADEMY OF ENGINEERING, ALANDI

**An Autonomous Institute Affiliated to**

## Savitribai Phule Pune University

# Curriculum

# For

# Third Year

# Bachelor of Technology in Information Technology

**2016-2020**

(With Effect from Academic Year: 2018-2019)

| MIT \| Academy of Engineering (An Autonomous Institute) | CURRICULUM STRUCTURE (2016 - 2020) | | |
|---|---|---|---|
| SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY | W.E.F | : | 2018-19 |
| THIRD YEAR BACHELOR OF TECHNOLOGY INFORMATION TECHNOLOGY | RELEASE DATE | : | 01/12/2017 |
| | REVISION NO. | : | 0.0 |

**SEMESTER: V**

| SL. No. | COURSE TYPE | COURSE CODE | COURSE | TEACHING SCHEME | | |
|---|---|---|---|---|---|---|
| | | | | L | P | CREDIT |
| 1. | DC5 | IT301 | Computability Theory | 3 | 2 | 4 |
| 2. | DC6 | IT302 | Operating System | 3 | 2 | 4 |
| 3. | DC7 | IT303 | Web Technology | 3 | 2 | 4 |
| 4. | OE1 | IT311<br>CS311<br>CS312 | Open Elective - Refer Annexure. | 3 | 2 | 4 |
| 5. | HSS4 | HP301 | Project Management | 1 | 2 | 2 |
| 6 | HSS6 | HP303 | Basics of Entrepreneurship | -- | 2 | 1 |
| 7 | SDP5 | CS305<br>CS306<br>CS307 | Skill Development Lab | -- | 4 | 2 |
| **TOTAL** | | | | **13** | **16** | **21** |

**SEMESTER:VI**

| SL. No. | COURSE TYPE | COURSE CODE | COURSE | TEACHING SCHEME | | |
|---|---|---|---|---|---|---|
| | | | | L | P | CREDIT |
| 1. | DC8 | IT321 | Computational Intelligence | 3 | 2 | 4 |
| 2. | DC9 | IT322 | Cloud Services and Applications | 3 | 2 | 4 |
| 3. | DC10 | IT323 | Mobile Application Development | 3 | 2 | 4 |
| 4. | OE2 | IT331<br>CS331<br>CS332 | Open Elective - Ref er Annexure. | 3 | 2 | 4 |
| 5. | HSS5 | HP302 | Prof essional Skills | 1 | 2 | 2 |
| 6. | SDP6 | IT324 | Mini Project | | 4 | 2 |
| **TOTAL** | | | | **13** | **14** | **20** |

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY** | **W.E.F** | **AY:** 2018 - 19 |
| **THIRD YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING** | **COURSE NAME** | Computability Theory |
| | **COURSE CODE** | IT301 |
| | **COURSE CREDITS** | 4 |
| **RELEASED DATE :** 01/06/2018 | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** | | **EVALUATION SCHEME :** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | PRACTICAL | PRESENTATION/ DEMONSTRATION | TOTAL |
| LECTURE | PRACTICAL | MSE | ESE | IA | | | |
| 3 | 2 | 30 | 40 | 30 | 30 | 20 | 150 |

**PRE-REQUISITE :**

1. AS202 – APPLIED MATHEMATICS

**COURSE OBJECTIVES :**

IT301.CEO.1:To study computing machines by describing, classifying and comparing different types of computational models.

IT301.CEO.2:To study develop fundamentals for 'computational theory'..

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

IT301.CO.1:Construct a finite state machine and inter conversion between them.

IT301.CO.2:Construct the regular expressions and regular language

IT301.CO.3:Develop a language, grammar and inter conversion between them

IT301.CO.4:Design the push down automata and Turing machine.

IT301.CO.5:Classify the automata's, language and grammar.

IT301.CO.6:Distinguish a decidable and un decidable problems, P and NP class problems

| THEORY | | |
|---|---|---|
| **UNIT 1** | **Finite Automata** | **8 HOURS** |
| Definition of Automata, Types of Automata, Languages, Finite Automata, Deterministic Finite Automata, Non Deterministic Finite Automata, Non Deterministic Finite Automata with epsilon transition, Conversion between NFA to DFA, Conversion between epsilon NFA to NFA,<br>**Self-Study:** Finite Automata with output: Mealy and Moore Machine and their Conversion. | | |
| **UNIT 2** | **Regular Expression and Languages** | **6 HOURS** |
| Language classification, Regular Languages, Closure Properties of Regular Language, Regular Expression, Properties of Regular Expression. Conversion between RE and Finite Automata, Relation between Languages.<br>**Self-study:** Pumping Lema for Regular Language. | | |
| **UNIT 3** | **Grammars and Context free Grammar.** | **8 HOURS** |
| Formal Definition of Grammar, Phrase structure grammar, Chomsky hierarchy, context free grammar, Parse Trees, Ambiguity in grammars and their removal, Simplification of Grammar-removal of unit production, useless production, useless symbol,<br>**Self- study:**Normal forms-Chomsky normal form and greibach normal form. | | |
| **UNIT 4** | **Pushdown automata and Context free Language** | **8 HOURS** |
| Definition, deterministic, pushes down automata(DPDA), non-deterministic push down automata(NPDA), the language of PDA. Equivalence of PDA's and CFG's, Concept of post machines. CFL- Properties, normal forms, Pumping lemma of CFL,<br>**Self- study:** Post Machine | | |
| **UNIT 5** | **Turing Machine.** | **7 HOURS** |
| Definition and example of TM, computing a partial function with TM, combining TM's variations of TM: Multi-tape TM's, universal TM, model of computation and church's turing hypothesis, unsolvable problem,<br>**Self- study:** TM's halting problem. | | |
| **UNIT 6** | **Decidability and Un Decidability** | **7 HOURS** |
| Church's Thesis, Decidable Problems Concerning Regular and Context-Free Languages, Un decidability of the Halting Problem, Formal Definition of Reducibility as Many-One Reducibility, Examples of Many-One Reducibility between Problems.<br>**Self-study:**Diagonalization. | | |

| **PRACTICAL:** Perform following experiments using C, C++, and Python. | | |
|---|---|---|
| **PRACTICAL NO.01** | **Vending Machine** | **6 HOURS** |
| Design and Develop the DFA for the vending machine which accepts Rupees, and charges 100Rs per soda. Once the machine receives at least 100Rs, it will allow the user to select a soda. Self-loops represent ignored input: the machine will not dispense a soda until at least 100Rs has been deposited, and it will not accept more money once it has already received greater than or equal to 100Rs.To express the DFA as a 5-tuple, the components are defined as follows:<br>1. Q = 00Rs,25Rs,50Rs,75Rs,100Rs,125Rs,150Rs,175Rs,200Rs are the states<br>2. = 25Rs,100Rs,select is the alphabet<br>3. , the transition function, is described by the state diagram.<br>4. q0 = 00Rs is the start state<br>5. F = is the set of accept states | | |
| **PRACTICAL NO.02** | **Word Recognition** | **6 HOURS** |
| Design and Develop DFA for word recognizer takes a string of characters as input and returns “yes” or “no” according as the word is or is not in a given set. It Solves the membership problem for the below statements. 1. All strings of a’s and b’s in which equal no of a’s followed by b’s. 2. All strings of a’s and b’s in which first and last symbols are same. 3. All strings of a’s and b’s in which no of a’s are divisible by 2. | | |
| **PRACTICAL NO.03** | **Dictionary lookup** | **6 HOURS** |
| Dictionary lookup takes a string of characters as input and returns “yes” or “no” according as the word is or is not in a given set and returns information about the word. Students needs to create the files of words | | |
| **PRACTICAL NO.04** | **Compiler for Calculator** | **4 HOURS** |
| Design and develop (Grammar, Regular expression) for Calculator using Lex and Yacc. | | |
| **PRACTICAL NO.05** | **Compiler for conditional statements** | **6 HOURS** |
| Design and develop (Grammar, Regular expression) for any Conditional statements of C Programming Language usingLex and Yacc. | | |
| **PRACTICAL NO.06** | **2’s Complement** | **4 HOURS** |
| Design and develop Automata to find 2’s complement of binary number.. | | |

**TEXT BOOK**


1. John C. martin, "Introduction to Language and Theory of Computation", TMH, Third Edition. ISBN: 978-0-07- 066048-9.
2. Michel Sipser "Introduction to Theory of Computation" Thomson Course Technology, Second Edition, ISBN: 0- 534-95097-3.


**REFERENCES:**


1.1. Hopcroft, Ullman, "Introduction to automata theory, languages and computations", Pearson education Asia, 3rd edition, 2007,ISBN-9780321455369
2. Erwyn Kreyszig, "Advanced Engineering Mathematics", John Wiley and Sons, 8th edition, 2011, ISBN: 9971- 51-283-1.
3. Daniel I.A. Cohen, "Introduction to Computer Theory" Wiley-India, 2007, ISBN: 978-81-265-1334-5.
4. K.L.P Mishra,N.Chandrasekaran," Theory of computer science(automata, languages and computation)", Prentice hall india, 2nd edition,2006,ISBN-81-203-2968-6.

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY** | **W.E.F** | **AY:** 2018 - 2019 |
| **THIRD YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING** | **COURSE NAME** | Operating System |
| | **COURSE CODE** | IT302 |
| | **COURSE CREDITS** | 4 |
| **RELEASED DATE : 01-06-2018** | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | TUTORIAL/ | PRESENTATION/ | TOTAL |
| LECTURE | PRACTICAL | MSE | ESE | IA | PRACTICAL | DEMONSTRATION | |
| 3 | 2 | 30 | 40 | 30 | 30 | 20 | 150 |

**PRE-REQUISITE :**

1. ME102:Engineering Tools and Technique
2. IT211:Data Structures Application

**COURSE OBJECTIVES :**

IT302.CEO.1:To introduce basic concepts of operating systems.
IT302.CEO.2:To explain goals functions of operating systems.
IT302.CEO.3:To provide solutions to challenges in interacting processes, and use them.

**COURSE OUTCOMES :**

The students after completion of the course will be able to

IT302.CO.1:Describe, contrast and compare different structures and types of operating system.
IT302.CO.2:Analyze theory and implementation of process, resource control in OS.
IT302.CO.3:Realize the concept of I/O and storage management.
IT302.CO.4:Implement various algorithms required for management, scheduling, allocation and Communication used in operating system.
IT302.CO.5:Implement an application using multiple processes.

| THEORY: | | |
|---|---|---|
| **UNIT 1** | **Introduction to Operating System** | **6 HOURS** |
| Introduction to Operating Systems, Hardware support for Operating System, Resource management, operating system architectures. Case Study: History Architecture of operating system | | |
| **UNIT 2** | **Shell Programming** | **6 HOURS** |
| Introduction, Role of Shell, Types of Shells ,File and Directory-related Commands, communication in Unix,Vi Editor, Shell Scripts, Programming Constructs in Shell. | | |
| **UNIT 3** | **Process Management** | **6 HOURS** |
| Fundamentals of Process management, Process Scheduling, Process communication and Synchronization, Deadlock, Multithreading | | |
| **UNIT 4** | **Memory Management** | **8 HOURS** |
| The Buffer Cache: Buffer Headers, Structure of the Buffer Pool, Scenarios for Retrieval of a buffer, Reading Writing Disk Block, Advantages Disadvantages of Buffer Cache. Files: Inodes, Structure of Regular File, Directories, Conversion of a Path Name to an Inode. | | |
| **UNIT 5** | **I/O Management** | **8 HOURS** |
| Driver Interfaces, Disk Drivers, Terminal Drivers, Streams, Computer system operation, I/O structure, storage structure, storage hierarchy, different types of protections, operating system structure (simple, layered, virtual machine), O/S services, Disk Scheduling Management | | |
| **UNIT 6** | **Advanced Operating Systems** | **6 HOURS** |
| Distributed Operating System, Multi-processor Operating System, Real Time Operating System, Mobile operating System, Multimedia Operating System, Virtualization. | | |

| **PRACTICAL: Perform following experiments using Open source software.** | | |
|---|---|---|
| **PRACTICAL NO. 01** | | **4 HOURS** |
| Given the list of processes, their CPU burst times and arrival times, Display /print the Gantt chart for FCFS and SJF. For each of the scheduling policies, compute and print the average waiting time and average turnaround time. | | |
| **PRACTICAL NO. 02** | | **4 HOURS** |
| Develop Application using Inter Process communication (using shared memory, pipes or message queues) | | |
| **PRACTICAL NO.03** | | **4 HOURS** |
| Multi-threaded coin flipping: You have 20 coins on the table lying in a row.P persons flip all coins on the table N times. Write a program that emulates this by using threads, one thread emulating one person. By default, there are P= 100 persons and each person flips each coin N = 10000 times. Provide command line options that allow controlling the number of persons and the number of coin flips per person. | | |
| **PRACTICAL NO. 04** | | **6 HOURS** |
| Develop Application to simulate producer - consumer problem using Semaphores. | | |
| **PRACTICAL NO. 05** | | **6 HOURS** |
| Design and Implementation of a File system. | | |

**TEXT BOOK**


1. Naresh Chauhan, "Principles of Operating Systems", Oxford University Press,2014, ISBN10: 0198082878
2. Maurice Bach, "The Design of Unix Operating System", Prentice Hall, 2015, ISBN: 978-93-325- 4957-9
3. Silberschatz, Galvin and Gagne ,"Operating System Concepts", 8th ed., John Wiley Publishers,ISBN-13: 9780470128725


**REFERENCE BOOK**


1. William Stallings," Operating System: Internals and Design Principles", Prentice Hall, 8th Edition, 2014, ISBN10: 0133805913
2. Tom Adelstein and Bill Lubanovic, Linux System Administration, O'Reilly Media, Inc., 1st Edition, 2007, ISBN: 9780596009526

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY** | **W.E.F** | **AY:** 2018 - 2019 |
| **THIRD YEAR BACHELOR OF TECHNOLOGY INFORMATION TECHNOLOGY** | **COURSE NAME** | Web Technology |
| | **COURSE CODE** | IT303 |
| | **COURSE CREDITS** | 4 |
| **RELEASED DATE :** 01/06/2018 | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | TUTORIAL/ PRACTICAL | PRESENTATION/ DEMONSTRATION | TOTAL |
| LECTURE | PRACTICAL | MSE | ESE | IA | | | |
| 3 | 2 | 30 | 40 | 30 | 30 | 20 | 150 |

**PRE-REQUISITE :**

IT202: Object Oriented Technology

IT212: Database System

**COURSE OBJECTIVES :**

IT303.CEO.1:To understand the concepts principles of Web applications and development.

IT303.CEO.2:To apply current Web technologies and Web business models.

IT303.CEO.3:To understand and apply Web development processes.

IT303.CEO.4:To understand the engineering aspect of web technology.

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

IT303.CO.1:Apply the principles and protocols of web engineering.

IT303.CO.2:Construct responsive web pages using HTML CSS.

IT303.CO.3:Apply the basic of scripting language to provide interactivity and validation.

IT303.CO.4:Build the single page web application using AngularJS.

IT303.CO.5:Create dynamic web pages using any client server side programming.

| THEORY COURSE CONTENT | | |
|---|---|---|
| **UNIT 1** | **Web Basics** | **7 HOURS** |
| **Content:** Introduction to World Wide Web: Introduction to WAP, DNS, Email, HTTP and FTP. Concepts of effective web design, Good bad web design and website Design issues. Client-Server architecture.<br>History of WWW<br>**Further Study:** Semantic Web. | | |
| **UNIT 2** | **HTML & CSS** | **7 HOURS** |
| **Application:** Internet web pages of any web application<br>**Content:** Basics of HTML, List of Tags in html, hyperlink, forms, Meta tags, character entities, frames, introduction to HTML5.Cascading style sheet, internal, external and inline style sheet, basic syntax and structure.<br>**Self-Study:** Layout Design<br>**Further Study:** HTML5,CSS Preprocessor Less and Sass. | | |
| **UNIT 3** | **Client Side Scripting** | **9 HOURS** |
| **Application:** Data validation and Dynamic interactive web pages.<br>**Content:** JavaScript: variables, functions, conditions, loops, array, JavaScript object, properties, methods, the DOM and web browsers, forms validations, DHTML: Combining HTML, CSS and JavaScript, Events and buttons.<br>**Self-Study:** Ajax J Query.<br>**Further Study:** Node JS. | | |
| **UNIT 4** | **SPA with AngularJS** | **9 HOURS** |
| **Application:** Hybrid mobile applications<br>**Content:** Introduction to Single Page Applications (SPA), Introduction to AngularJS, Core concepts: Module, Controller, Scope and view, Services, Filters, Form validation, Directive, Routing.<br>**Self-Study:** SPA frameworks.<br>**Further Study:** React JS. | | |
| **UNIT 5** | **Server Side Scripting: PHP** | **10 HOURS** |
| **Application:** Facebook<br>**Content:** Introduction and basic syntax of scripting language, Arrays, Functions, String, Form processing, Files, Cookies and Sessions, MVC Framework, Database Connectivity, Introduction to NodeJS.<br>**Self-Study:** Introduction to server side scripting various scripting languages.<br>**Further Study:** Java Servlet JSP: Java Server Pages, API's. | | |

| **PRACTICAL: Perform following experiments using Open source software.** | | |
|---|---|---|
| **PRACTICAL NO.01** | | **2 HOURS** |
| **HTML:**<br>Create a static website for any organization or portfolio of yourself using HTML, you can include images, also provide navigation for other pages and make use of all possible formatting. | | |
| **PRACTICAL NO.02** | | **4 HOURS** |
| **Cascading Style Sheet**<br>Apply the CSS on the pages created in practical no. 1, include margin, border, padding etc. properties to design the pages. | | |
| **PRACTICAL NO.03** | | **4 HOURS** |
| **JavaScript**<br>Create event registration website having home, about and registration page, use CSS to design the website and JavaScript for validating the registration form. | | |
| **PRACTICAL NO.04** | | **4 HOURS** |
| **Ajax using J Query**<br>For the registration form in practical no. 3, write a J Query code to fetch the information from server for drop own fields. | | |
| **PRACTICAL NO.05** | | **4 HOURS** |
| **Create a single page application using Angular JS**<br>Write a single page application of practical no 4 using Angular JS. | | |
| **PRACTICAL NO.06** | | **6 HOURS** |
| **Dynamic website using server side script**<br>Add database connectivity for the practical no 4 for storing the registration information in database and fetching the information from database using j Query. | | |
| **Mini projects** | | **8 HOURS** |
| Student will work in a group of 3 or 4, build a web application using any third party API. Use MVC framework in your project. | | |

**TEXT BOOK**

1.Ralph Moseley, M.T. Savaliya, "Developing Web Applications ", Willy India, Second Edition, 2013,ISBN:9788126538676

**REFERENCE BOOK**

1.Kogent Learning Solutions Inc , "Web Technology Black Book", Wiley, 2009, ISBN: 9788177229974

2.B. M. Harwani, "Developing Web Applications in PHP and AJAX", Tata McGraw-Hill, 2010,ISBN: 9780070707108

| MIT Academy of Engineering (An Autonomous Institute) (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY** | **W.E.F** | **AY:** 2018 - 2019 |
| **THIRD YEAR BACHELOR OF TECHNOLOGY INFORMATION TECHNOLOGY** | **COURSE NAME** | Cryptography and System Security |
| | **COURSE CODE** | IT311 |
| | **COURSE CREDITS** | 4 |
| **RELEASED DATE : 01/06/2018** | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | PRACTICAL | PRESENTATION/ DEMONSTRATION | TOTAL |
| LECTURE | PRACTICAL | ICE | ECE | IA | | | |
| 3 | 2 | 30 | 40 | 30 | 25 | – | 125 |

**PRE-REQUISITE :** IT203: Computer Network

**COURSE OBJECTIVES :**

IT311.CEO 1:To understand fundamentals of cryptography, authentication and emerging security standards.

IT311.CEO 2:Determine basics of network security protocols.

IT311.CEO 3:Identify the possible threats to each mechanism and ways to protect against these threats.

IT311.CEO 4:Understand cryptographic techniques that provide information and network security

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

IT311.CO.1:Explain symmetric cryptography, asymmetric cryptography, and digital signatures.

IT311.CO.2:Implement security algorithms in computer network.

IT311.CO.3:Identify the different security technology and devices.

IT311.CO.4:Outline the requirements and mechanisms for identification and authentication.

IT311.CO.5:List the security threats, and the security services and mechanisms to counter them.

IT311.CO.6:Comprehend security services and mechanisms in the network protocol stack.

| THEORY: | | |
|---|---|---|
| **UNIT 1** | **Basics of Security** | **8 HOURS** |
| Attacks on Computer and Computer Security: Introduction, The Need for Security, Security Approaches, Principles of Security, Types of Attacks Cryptography Techniques: Introduction, Plaintext and Cipher Text, Substitution Techniques, Transposition Techniques, Encryption and Decryption, Symmetric and Asymmetric Key Cryptography.<br>Self-Study: Key Range and Key Size<br>Further Studies : Possible Type of Attacks | | |
| **UNIT 2** | **Symmetric Key Algorithms** | **8 HOURS** |
| Introduction, Algorithms types and modes, Overview of Symmetric key cryptography, Data Encryption Standard (DES), International Data Encryption Algorithm (IDEA),RC5, Blowfish, Advanced Encryption Standard (AES).<br>Further Studies : RC4 | | |
| **UNIT 3** | **Asymmetric Key Algorithms** | **8 HOURS** |
| Brief history of Asymmetric Key Cryptography, Overview of Asymmetric Key Cryptography, RSA algorithm, Symmetric and Asymmetric key cryptography together, Digital Signatures.<br>Further Studies: Knapsack Algorithm | | |
| **UNIT 4** | **Digital Signature and Key Management** | **6 HOURS** |
| Introduction, Digital Signature, Digital certificates, Digital Envelop, classification of security measures with digital signature, digital certificate and digital envelop, private key management, the PKIX model, Public key cryptographic standards (PKCS).<br>Self-Study: Key Management<br>Further Studies: XML, PKI and Security | | |
| **UNIT 5** | **Security Protocols and Tools** | **6 HOURS** |
| Introduction to security protocols, concept behind secure socket layer, Transport layer security, Secure Hypertext Transfer Protocol, Time stamping protocol, secure electronic transaction (SET).<br>Self-Study: SSL vs SET<br>Further Studies: E-mail Security | | |
| **UNIT 6** | **User Authentication and Kerberos** | **6 HOURS** |
| The Kerberos Authentication Service, provides a trusted third-party authentication to verify users' identity Authentication basics, Passwords, Authentication Tokens, Certificate-based Authentication, Biometric Authentication, Kerberos, Key Distribution Center (KDC) , Security Handshake Pitfalls.<br>Self-Study: Single Sign On (SSO) Approaches<br>Further Studies: IP Security | | |

| | | |
|---|---|---|
| **PRACTICAL:**Perform following experiments using open source software. | | |
| **PRACTICAL NO.01** | | **4 HOURS** |
| Write a program to encrypt and decrypt the message using encryption decryption techniques. | | |
| **PRACTICAL NO.02** | | **4 HOURS** |
| Develop a program in C++/Java/Python on Extended Euclidean Algorithm . | | |
| **PRACTICAL NO.03** | | **6 HOURS** |
| Develop a program in C/C++/Java to implement RSA algorithm for key generation and cipher verification | | |
| **PRACTICAL NO.04** | | **4 HOURS** |
| Implement Diffie -Hellman key exchange algorithm using an open source language. | | |
| **PRACTICAL NO.05** | | **6 HOURS** |
| Cryptography Library ( API ): Write a program in C++/Java/Python to implement RSA algorithm using Libraries (API). | | |
| **PRACTICAL NO.06** | | **8 HOURS** |
| Security Tools :<br>1:Configure and demonstrate use of IDS tool such as snort standards.<br>2:Configure and demonstrate use of traffic monitoring tool such as wire shark with security perspective.<br>3:Configure and demonstrate use of vulnerability assessment tool such as NESSUS. | | |

**TEXT BOOK**


1. Atul Kahate, "Cryptography and Network Security", The McGraw Hill Publication Second Edition, ISBN – 13: 978-0-07-064823-4.
2. Eric Maiwald , "Network Security: A Beginners' Guide" , ISBN: 978-0-07-179571-5


**REFERENCES:**


1. William Stallings , "Cryptography and Network Security", Prentice Hall, Fourth Edition ISBN-13: 978-0-13- 187316-2
2. Bernard Menezes ," Network Security and Cryptography: Bernard Menezes ", CENGAGE Learning.
3. Charlie Kaufman, Radia Perlman and Mike Speciner, "Network Security - Private Communication in a Public World", Pearson/PHI..
4. Stallings , "Cryptography and network Security", Third edition, PHI/Pearson.

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY** | **W.E.F** | 2018 - 2019 |
| **THIRD YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING** | **COURSE NAME** | Descriptive Analytics |
| | **COURSE CODE** | CS311 |
| | **COURSE CREDITS** | 4 |
| **RELEASED DATE : 01/06/2018** | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | | PRESENTATION/ | TOTAL |
| LECTURE | PRACTICAL | ICE | ESE | IA | PRACTICAL | DEMONSTRATION | |
| 3 | 2 | 30 | 40 | 30 | 50 | - | 150 |

**PRE-REQUISITE :**

1. IT101: Computer Programming
2. CS212: Database Management System

**COURSE OBJECTIVES :**

CS311.CEO.1:To understand the data warehouse architecture.
CS311.CEO.2:To outline the various preprocessing operations on data warehouse.
CS311.CEO.3:To apply the various operations on OLAP cubes and schema modeling.
CS311.CEO.4:To elaborate the need of Data Science.
CS311.CEO.5:To apply regression methods for a given dataset.
CS311.CEO.6:To summarize the basic concepts frequent item sets.

**COURSE OUTCOMES :**

The students after completion of the course will be able to

CS311.CO.1:Outline the data warehouse architecture.
CS311.CO.2:Apply the various data preprocessing techniques for making data marts for a given application.
CS311.CO.3:Apply the various operations of OLAP cube.
CS311.CO.4:Apply regression and Correlation on real datasets
CS311.CO.5:Generate frequent item sets for given datasheet

| THEORY COURSE CONTENT | | |
|---|---|---|
| **UNIT 1** | **Introduction to Data Warehouse** | **6 HOURS** |

**App/System/Case study**:
Retail-Industry Case Study

**Content:**
Overview, need of its components, architecture, characteristics, goals, models, knowledge discovery, challenges, importance of meta data repositories. Introduction to Business Intelligence (BI), Significance of BI

**Self-Study:** Data Warehouse Security Measures : User access, Data load, Data movement, Query generation

**Further Reading:** Advancement Data Collection Security.

| UNIT 2 | Operations of Data Warehouse | 6 HOURS |
|---|---|---|

**App/System/Case study:**
Retail-Industry Case Study

**Content:**
Data preprocessing: data cleansing, data integration, data reduction, data transformation and discretization, concept hierarchy, data quality, data warehouse design process, distributed data warehouse, real time data warehouse architecture.

**Self-Study:** Outlier Analysis

**Further Reading:** Real Time ETL

| UNIT 3 | Data Warehouse Modeling | 8 HOURS |
|---|---|---|

**App/System/Case study:**
Retail-Industry Case Study

**Content:**
Data modeling, OLAP vs OLTP, MOLAP, ROLAP, HOLAP, Dimensions and facts and types, granularity of facts, measures and categorization of measures, Data mart, OLAP cubes , Cube operations, scheme modeling (star, snowflake, star constellation schema)

**Self-Study:** Analyze OLAP cube with Microsoft Excel, Cross Table Cube

**Further Reading:** Cubing Service Security, Multidimensional Data Analysis

| UNIT 4 | Introduction to Data Science and Statistical techniques. | 6 HOURS |
|---|---|---|

**App/System/Case study:**
Retail-Industry Case Study

**Content:**
Introduction to Data Science and Data Mining, Descriptive, Predictive and Prescriptive data analysis techniques, Descriptive Statistics, Probability Distributions, Inferential Statistics through hypothesis tests.

**Self -Study:** Permutation Randomization Test

| UNIT 5 | Regression and Correlation | 8 HOURS |
|---|---|---|

**App/System/Case study:**
Real Estate Case Study

**Content:**
Simple, Multiple regression, Linear-Logistic Regression, Poisson Regression, Non linear regression. Correlation coefficient, ANOVA, Measuring performance of a model, Accuracy, ROC curves, precision-recall curves.

Self-Study: Regression Models using Excel 2013

**Further Reading**:Correlation Mining for Massive data

| UNIT 6 | Frequent Item-set Mining | 6 HOURS |
|---|---|---|

**App/System/Case study:**
Retail-Industry Case Study

**Content:**
Market Basket Analysis, Support and Confidence, Frequent Item-sets, Closed Item-sets, and Association Rules Frequent Pattern Mining

**Self-Study:** Applications of Frequent Item-sets Mining.

**Further Reading:** Multilevel Association Rules Generation

| PRACTICAL : Perform following experiments using prescribed tools | | |
|---|---|---|
| **PRACTICAL NO.01** | | **10 HOURS** |

**Data Preprocessing exercise using R**

Suppose that the data for analysis includes the attribute age. The age values for the data tuples are (in increasing order) 13, 15, 16, 16, 19, 20, 20, 21, 22, 22, 25, 25, 25, 25, 30, 33, 33, 35, 35, 35, 35, 36, 40, 45, 46, 52, 70.

(a) What is the mean of the data? What is the median?

(b) What is the mode of the data? Comment on the data's modality (i.e., bimodal, trimodal, etc.).

(c) What is the midrange of the data?

(d) Can you find (roughly) the first quartile (Q1) and the third quartile (Q3) of the data?

(e) Give the five-number summary of the data.

(f) Show a boxplot of the data.

(g) How is a quantile- quantile plot different from a quantile plot?

(a) Use smoothing by bin means to smooth the data, using a bin depth of 3.Illustrate your steps. Comment on the effect of this technique for the given data.

(b) How might you determine outliers in the data?

(c) What other methods are there for data smoothing? Plot an equal-width histogram of width 10.

(d) Sketch examples of each of the following sampling techniques: SRSWOR, SRSWR, cluster sampling, stratified sampling. Use samples of size 5 and the strata "youth,""middle-aged," and "senior." Suppose a group of 12 sales price records has been sorted as follows: 5, 10, 11, 13, 15, 35, 50, 55, 72, 92, 204, 215 Partition them into three bins by each of the following methods:

(a) equal-frequency (equidepth) partitioning

(b) equal-width partitioning

(c) clustering

**OR**

Demonstration of preprocessing operations on given dataset (Retail Big Bazar, Health System, Banking System, Sales, Fast Food Industry System).Using ETL tool like Talend /Pentaho/or any proprietary tool.

Note: The above assignment is for the reference, Similar level assignment can be taken lab.

| PRACTICAL NO.02 | | 12 HOURS |
|---|---|---|

**Dimensional Modeling, Data Mart, Cube Analysis**

The Leisure Hotel chain is a small chain with properties throughout Pennsylvania, Arizona, Florida, and New York. They have a central database to store and track guest reservations. In 2008, they put cafes in many of their hotels, called "Café in the Hotel." They have an order-tracking system that relays customer orders from the wait staff to the kitchen.

Leisure Hotels would like to use the data they have collected to better understand the performance of their hotels and cafes. They also have access to a database from the online review site "Hotel Complainer.com." Your task is to design two dimensional data marts using data from those three databases. You will plan the star schema for each data mart by choosing the dimensions, facts, and attributes from the data contained in those databases. The relational schemas of those databases are on the following page.

The questions to be addressed by each data mart are listed in the table below. You should include only the data fields you need in each data mart, but the data marts can contain some of the same data (i.e., the same fields can appear in both data marts). To complete the exercise, you'll need to perform the following steps:

1) Identify the main business event for each data mart. This will be the fact.Ask yourself, "What is the basic business event that generates the performance metric (revenue)?"

2) Identify the attributes associated with the fact. Ask yourself, "How is the business event quantified (measured)?"

3) Identify the dimensions and their attributes. Ask yourself, "What data characterizes the various aspects of that business event?"

4) Either sketch the star schema or make a list of the dimensions and the fact and their attributes. You can use the examples in the slides as a guide.

**Following Descriptive Analysis –Cube Analysis is expected from data mart**

. During which month are the most rooms rented?

- Identify the "off season" (if any) for our hotels in Arizona, Florida,Pennsylvania, and New York.

. Which hotel generates the most (non-restaurant) revenue?

. What is the average length of stay in hotels with 4.5 or more stars?

. Do smokers stay longer than non-smokers?

. For a given hotel, how many customers come from out of state?

. Which hotel restaurant generates the most revenue?

. Do the best rated hotels generate more restaurant revenue?

. What is the most frequently ordered item in the Philadelphia metropolitan area?

Note: Above case study is just for reference any other Case study with similar level can be taken in lab.

| PRACTICAL NO.03 | | 8 HOURS |
|---|---|---|

Project on Descriptive analytics (Data –preprocessing, Dimensional modeling, Cube Analysis) using R/ Cognos /Pentaho /Talend /Power BI.

**TEXT BOOK**


1. Jiawei Han, MichelineKamber, Jian Pei Professor, "Data Mining: Concepts and Techniques", The Morgan Kaufmann Series in Data Management Systems, ISBN 978-9380931913
2. Rick Sherman, Business Intelligence Guidebook: From Data Integration to Analytics,The Morgan Kaufmann Series in Data Management Systems, ISBN 012411461X


**REFERENCE BOOK**


1. Paulraj Ponniah,Data Warehousing: Fundamentals for IT Professionals, 2nd Edition, Paperback, McGraw Hill Publishers, 2006, ISBN 978-0-07-352332-3
2. Ralph Kimball, "Data Warehouse Lifecycle Toolkit", Willey, ISBN 0471200247
3. Maria Sueli Almeida, Missao Ishikawa, Joerg Reinschmidt, Torsten Roeber, Getting Started with Data Warehouse and Business Intelligence, IBM
4. Ramesh Sharda, Dursun Delen, Efraim Turban, "Business Intelligence, Analytics and Data Science: A Managerial Perspective", Pearson Publication, 4th Edition ISBN 0134633288
5. Grolemund, Garrett "R for Data Science", O'Reilly
6. Murrey R Spiegal, Larry Stifens, Statistics, 4th edition, Schaum's Series, McGraw Higher Ed ISBN: 9780070151536, 0070151539

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY** | **W.E.F** | **AY:** 2018 – 2019 |
| **THIRD YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING** | **COURSE NAME** | Artificial Intelligence and Neural Networks |
| | **COURSE CODE** | CS312 |
| | **COURSE CREDITS** | 4 |
| **RELEASED DATE : 01/06/2018** | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | PRACTICAL | PRESENTATION/ DEMONSTRATION | TOTAL |
| LECTURE | PRACTICAL | ICE | ECE | IA | | | |
| 3 | 2 | 30 | 40 | 30 | 50 | – | 150 |

**PRE-REQUISITE:**

1.CS201 – Data and File Structures

**COURSE OBJECTIVES :**

CS312.CEO.1:Gain a historical perspective of AI and its foundations.

CS312.CEO.2:Become familiar with basic principles of AI toward problem solving, inference, perception, knowledge representation and learning.

CS312.CEO.3:Investigate applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.

CS312.CEO.4:Explore the current scope, potential, limitations and implications of intelligent system.

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

CS312.CO.1:Analyze the variations in agents and environments behavior and major functions implemented in a general agent.

CS312.CO.2:Evaluate agents using search algorithms such as uninformed search, informed search or local search.

CS312.CO.3:Illustrate adversarial search mechanism and game-playing agents.

CS312.CO.4:Identify capabilities of specific knowledge representation formalisms for specific tasks.

CS312.CO.5:Apply the methodology to transfer human knowledge into an expert system.

CS312.CO.6:Explain the learning and adaptation capability of neural systems.

| **THEORY :** | | |
|---|---|---|
| **UNIT 1** | **Introduction** | **7 HOURS** |
| **App/System/Case study:** Virtual Personal Assistants, Autonomous cruise control system.<br>**Contents:**<br>Introduction to Artificial Intelligence, The Foundations of Artificial Intelligence, Emergence of Intelligent Agents, PEAS Representation of Agents, Rationality, Environment, Problem Formulation.<br>**Self Study:** Agent Oriented Design<br>**Further reading:** A taxonomy of autonomous agents | | |
| **UNIT 2** | **Search Strategies** | **7 HOURS** |
| **App/System/Case study:** GPS Navigation systems, Tile games.<br>**Contents:**<br>State space search, heuristic search, Uninformed Search Techniques- DFS, BFS, Iterative Deepening, Informed search Techniques- Greedy best first search, A* search.<br>**Self Study:** Genetic Algorithms<br>**Further reading:** Hill Climbing Search | | |
| **UNIT 3** | **Constraint Satisfaction Problem** | **7 HOURS** |
| **App/System/Case study:** SICStus Prolog<br>**Contents:**<br>Constraint Satisfaction Problem, Backtracking search for CSPs, Adversarial search - Games, Optimal decisions in games, Mini Max Algorithm, Alpha-Beta pruning.<br>**Self Study:** Deterministic games in practice<br>**Further reading:** Map coloring problem | | |
| **UNIT 4** | **Reasoning and Knowledge Representation** | **7 HOURS** |
| **App/System/Case study:** WebQR , Inquire an iPad app<br>**Contents:**<br>Introduction to Reasoning and Knowledge Representation, Knowledge-based reasoning-First- order Logic and theorem proving, Rules and rule-based reasoning, Knowledge representation –Production based system, Frame based system.<br>**Self Study:** Propositional Logic<br>**Further reading:** Uncertainty representation and management | | |
| **UNIT 5** | **Expert Systems and Learning** | **7 HOURS** |
| **App/System/Case study:** MYCIN<br>**Contents:**<br>Expert systems - Architecture of expert systems, Roles of expert systems - Knowledge Acquisition –Meta knowledge, Heuristics, Expert systems shells. Learning from Observations, General Model of Learning Agents, Inductive learning.<br>**Self Study:** Natural Language Processing<br>**Further reading:** Statistical Learning | | |

| UNIT 6 | Neural Networks | 7 HOURS |
|---|---|---|

**App/System/Case study:** Architecture of Complex Pattern Recognition: ART/ART-1

**Contents:**

Introduction to neural networks, Perceptrons, Single layered feed forward network, Applications of ANN, Neural Networks viewed as directed graphs, Feedback from neurons to ANN.

**Self Study:** Multi-layered Feed- forward Networks.

**Further reading:** Hebb's rule

| PRACTICAL:Perform 6 experiments (a or b) using python/specifted tools. | | |
|---|---|---|
| **PRACTICAL NO.01** | | **6 HOURS** |
| a) Elaborate uninformed search algorithm for any suitable real time application.<br>b) Develop Vacuum Cleaner Agent Application. | | |
| **PRACTICAL NO.02** | | **6 HOURS** |
| a) Find the shortest path (by number of towns passed and by distance) for any particular source and destination using A* search.<br>b) Elaborate hill climbing algorithm. | | |
| **PRACTICAL NO.03** | | **6 HOURS** |
| a) Develop 8-puzzle problem using appropriate search method.<br>b) Develop 4 Queens or 8 Queens Problem using backtracking. | | |
| **PRACTICAL NO.04** | | **6 HOURS** |
| a) Design map coloring problem using backtracking.<br>b) Make use of Natural Language Toolkit to count word frequency. | | |
| **PRACTICAL NO.05** | | **6 HOURS** |
| a) Develop game of tic-tac-toe using minimax algorithm.<br>b) Build Fact, Rule, goal for family relationships and arithmetic operations using Prolog. | | |
| **PRACTICAL NO.06** | | **6 HOURS** |
| a) Design map coloring problem using backtracking.<br>b) Make use of Natural Language Toolkit to count word frequency. | | |

**TEXT BOOK**


1. Stuart Russel and Peter Norvig, "Artificial Intelligence: A Modern Approach", Third Edition, Pearson, ISBN-13: 978-0-13-604259-4.
2. Elaine Rich, Kevin Knight, Shivashankar B. Nair, "Artificial Intelligence", Third Edition, Tata McGraw Hill, ISBN-13: 978-0-07-008770-5.
3. Simon Haykin, "Neural Networks and Learning Machines", Third Edition, Pearson, ISBN: 9789332570313.


**REFERENCES**


1. Nils Nilsson, "Artificial Intelligence: A New Synthesis ", Second Edition, Morgan Kaufmann Series, ISBN: 9780080948348.
2. Deepak Khemani, "A First course in Artificial Intelligence", First Edition, McGraw Hill Education, ISBN: 9781259029981.
3. Peter Jackson, "Introduction to Expert Systems", 3rd Edition, Pearson Education, ISBN:0201876868.
4. Yegna Narayanan, "Artificial Neural Networks", 8th Printing, PHI, ISBN: 9788120312531.

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF HUMANITIES AND ENGINEERING SCIENCES** | **W.E.F** | **AY:** 2018 - 2019 |
| **THIRD YEAR BACHELOR OF TECHNOLOGY** | **COURSE NAME** | Project Management |
| | **COURSE CODE** | HP 301 |
| | **COURSE CREDITS** | 2 |
| **RELEASED DATE :** 01/06/2018 | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | TUTORIAL/ PRACTICAL | PRESENTATION/ DEMONSTRATION | TOTAL |
| LECTURE | PRACTICAL | MSE | ESE | IA | | | |
| 1 | 2 | 15 | 25 | 10 | NIL | 25 | 75 |

**PRE-REQUISITE :** NIL

**COURSE OBJECTIVES :**

HP301.CEO.1:To introduce the basic concept and scope of Project Management.
HP301.CEO.2:To teach the theory of project Initiation and its analysis with project vision.
HP301.CEO.3:To introduce the concept of risk analysis and different types of tools used in project planning.
HP301.CEO.4:To guide learners monitoring and controlling project progress.
HP301.CEO.5:To introduce the concept of System dynamics, project audit and reviews.

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

HP301.CO.1:Explain the concept of project management.
HP301.CO.2:Develop an ability to analyze scope, objective and vision of project initiation.
HP301.CO.3:Able to analyze risk and different tools of project planning.
HP301.CO.4:Develop an ability to measure progress of project by monitoring and controlling
HP301.CO.5:Identify the problems associated with project and reviewing the same.

| THEORY | | |
|---|---|---|
| **UNIT 1** | **Introduction Project Management** | **5 HOURS** |
| Meaning of Project Management, Classifications of projects, The Triple Constraint, The PMBOK project management process framework, Standard project team roles and project organisation (Functional, matrix, projectised), System approach, Systems development, System analysis, Project feasibility, Product life cycle, Project appraisal, Project contracting, The phases of SDLC. | | |
| **UNIT 2** | **Project Initiation** | **5 HOURS** |
| Determining the project business reason, creating a project charter (market and technical analysis), financial analysis evaluation of project proposals, risk analysis, sensitivity analysis and social cost benefits analysis, defining scope and objectives, define a project vision. | | |
| **UNIT 3** | **Project Planning** | **6 HOURS** |
| Planning fundamentals, identifying the project team responsibilities, project master plan, work breakdown structure, and other tools of project planning, estimating the efforts and duration of tasks, Identifying and analyzing risks, PERT,CPM,GERT,SLAM,DPM and resource allocation. | | |
| **UNIT 4** | **Project monitoring and controlling** | **4 HOURS** |
| Executingthe project on time, Measuring project progress, Identifying corrective actions, Internal & external project control, control process, variance limit, issues in project control. | | |
| **UNIT 5** | **Project Learning** | **4 HOURS** |
| System dynamics, Project audit, Change management, Project reviews and reporting. | | |

| **PRACTICALS** | | |
|---|---|---|
| **PRACTICAL NO.01** | **SDLC** | **2 HOURS** |
| Preparing for managing and developing a perfect model of SDLC for a particular given problem. | | |
| **PRACTICAL NO.02** | **PERT and CPM** | **2 HOURS** |
| Planning a project under PERT and CPM charts | | |
| **PRACTICAL NO.03** | **GERT and SLAM** | **2 HOURS** |
| Planning a project under GERT and SLAM charts | | |
| **PRACTICAL NO.04** | **DPM** | **2 HOURS** |
| Solving practical problems under DPM | | |
| **PRACTICAL NO.05** | **Variance Limit** | **2 HOURS** |
| Project monitoring under variance and controlling according to the given situations. | | |
| **PRACTICAL NO.06** | **System Dynamics** | **2 HOURS** |
| Understanding System dynamics by solving case studies | | |
| **PRACTICAL NO.07** | **Change Management** | **2 HOURS** |
| Solving case studies for learning how change management works. | | |
| **PRACTICAL NO.08** | **Project Reviewing** | **2 HOURS** |
| Solving many practical problems by reviewing projects as well as some case studies. | | |

**TEXT BOOK**


1. James P. Clements and Gido, Effective Project Management Cengage India 5th Edition , ISBN: 9781111824051
2. John Nicholas, Project Management for Business and Technology: Principles and Practice, PHI-Eastern economy 3rd Edition, ISBN: 0-7506-7824-0
3. Juana Clark Craig, Project Management Lite, 2nd Edition, ISBN-13: 9781478129226
4. Harold R. Kerzner, Project Management, 11th Edition, ISBN: 978-1-118-48322-0


**REFERENCE BOOK**


1. Erik Larson and Clifford Gray, Project Management: The Managerial Process, McGraw Hill ISBN-10: 0-07-340334-2
2. Enzo Frigneti, The Practice of Project Management, KOGAN PAGE INDIA PRIVATE LIMITED,ISBN: 9788175545397
3. Geogary M. Horine, Project Management, QUE 4th Edition, ISBN: 9780134653914
4. Cynthia Stackpole Snyder, A User manual to The PMBOK Guide, ISBN: 9781118546604
5. Brown, James T., The Handbook of Program Management: How to Facilitate Project Success with Optimal Program Management, Second Edition. The McGraw-Hill Companies, 2014, ISBN 978-0071837859
6. Frame, J. Davidson, Managing Projects in Organizations: How to Make the Best Use of Time, Techniques, and People, 3rd edition, Jossey-Bass, 2003, ISBN 0-787-96831-5
7. Kerzner, Harold, ProjectManagement: Project Management: A Systems Approach to Planning, Scheduling, and Controlling, 10th edition, Wiley, 2009, ISBN 0-470-27870-6
8. Meredith, R. Jack and Mantel, Jr., Samuel J., Project Management: A Managerial Approach, 7th edition, Wiley, 2008, ISBN 0-470-22621-8
9. Stackpole, Cynthia Snyder, A Project Manager's Book of Forms: A Companion to the PMBOK Guide, Wiley, 2009, ISBN 978-0470389843
10. Weiss, Joseph and Wysocki, Robert, Five-phase Project Management: A Practical Planning And Implementation Guide, Basic Books, 1992, ISBN 0-201-56316-9

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF HUMANITIES AND ENGINEERING SCIENCES** | **W.E.F** | **AY:** 2018 - 2019 |
| **THIRD YEAR BACHELOR OF TECHNOLOGY** | **COURSE NAME** | Basic Entrepreneurship |
| | **COURSE CODE** | HP 303 |
| | **COURSE CREDITS** | 1 |
| **RELEASED DATE :** 01/06/2018 | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | TUTORIAL/ PRACTICAL | PRESENTATION/ DEMONSTRATION | TOTAL |
| LECTURE | PRACTICAL | MSE | ESE | CA | | | |
| NIL | 2 | NIL | NIL | 25 | NIL | 25 | 50 |

**PRE-REQUISITE :** WF Orientation Course

**COURSE OBJECTIVES :**

HP303.CEO.1:To understand the fit between you and your entrepreneurialambitions
HP303.CEO.2:To find a problem worthsolving
HP303.CEO.3:To identify yourcustomers
HP303.CEO.4:To develop a solution for your customers' problems and problemsolution
HP303.CEO.5:To build and demonstrate anMVP
HP303.CEO.6:To structure a business model around the problem, customer, and solution and present your Business ModelCanvas.

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

HP303.CO.1:Why entrepreneurship requires
HP303.CO.2:Outline the Problems Worth Solving by using various techniques like DT, JTBD
HP303.CO.3:Identify the Customer Segments and Early Adopters
HP303.CO.4:Develop the solution demo for identify problem.
HP303.CO.5:Create Business Model Canvas and Minimum Viable Product

| PRACTICALS: | | |
|---|---|---|
| **PRACTICAL NO.01** | **GET STARTED - Discover Yourself** | **2 HOURS** |
| Find your flow, Effectuation, Case Study: Tristan Walker: The extroverted introvert, Identify your entrepreneurial style. | | |
| **PRACTICAL NO.02** | **IDEA/PROBLEM - Identify Problems Worth Solving** | **4 HOURS** |
| What is a business opportunity and how to identify it. Find problems around you that are worth solving. Methods for finding and understanding problems - (Observation, Questioning, DT, Jobs to be done (JTBD) How to run problem interviews to understand the customer's worldview Introduction to Design Thinking - Process and Examples Generate ideas that are potential solutions to the problem identified - DISRUPT GOOTB: Run problem interviews with prospects Class Presentation: Present the problem you "love" Form teams | | |
| **PRACTICAL NO.03** | **CUSTOMER** | **6 HOURS** |
| Identify Your Customer Segments and Early Adopters The difference between a consumer and a customer (decision maker); Market Types, Segmentation and Targeting, Defining the personas; Understanding Early Adopters and Customer Adoption Patterns. Identify the innovators and early adopters for your startup.Craft Your Value Proposition Come up with creative solutions for the identified problems Deep dive into Gains, Pains and Jobs-To-Be-Done (using Value Proposition Canvas, or VPC) Identify the UVP of your solution using the Value Proposition section of the VPC Outcome-Driven InnovationClass Presentation: Communicating the Value Proposition- 1 min Customer Pitch | | |
| **PRACTICAL NO.04** | **BUSINESS MODEL** | **4 HOURS** |
| Get Started with Lean Canvas Basics of Lean Approach and Canvas; Types of Business Models (b2b; b2c) | | |
| **PRACTICAL NO.05** | **VALIDATION** | **9 HOURS** |
| Develop the Solution Demo Build solution (mockups) demo, How to run solution interviews, GOOTB: Run Solution interviews. Does your solution solve the problem for your customers: The problem-solution test. Sizing the Opportunity Differences between a Startup venture and a small business; Industry Analysis Understanding what is Competition and it's role, Analyze competition Case study: Blue Ocean Strategy Building an MVP Identify an MVP and build it - I; Document and validate your assumptions Build-Measure-Learn feedback loop and the MVP/Javelin Board How to do MVP Interviews GOOTB: Run MVP interviews Is there a market for your product –The product-market fit test Class Presentation: Present your MVP | | |
| **PRACTICAL NO.06** | **MONEY** | **5 HOURS** |
| Revenue Streams Basics of how companies make money. Understand income, costs, gross and net margins. Identify primary and secondary revenue streams. Pricing and Costs Value, price, and costs; Different pricing strategies. Understand product costs and operations costs; Basics of unit costing Financing Your New Venture How to finance business ideas, Various sources of funds available to an entrepreneur and pros and cons of each, What investors expect from you, Practice Pitching to Investors and Corporates. | | |

| PRACTICAL NO.07 | TEAM | 2 HOURS |
|---|---|---|
| Team Building Shared Leadership Role of a good team in a venture's success; What to look for in a team; How do you ensure there is a good fit? Defining clear roles and responsibilities. How to pitch to candidates to join your startup Explore collaboration tools and techniques - Brainstorming, Mind mapping, Kanban Board, #Slack. | | |
| **PRACTICAL NO.08** | **MARKETING & SALES** | **2 HOURS** |
| Positioning Understand the difference between product and brand and the link between them. Define the positioning statement for your product/service and how it should translate into what your customers should see about that brand in the marketplace. Channels & Strategy Building Digital Presence and leveraging Social media, Creating your company profile page, Measuring the effectiveness of selected channels, Budgeting and planning. Sales Planning Understanding why customers buy and how buying decisions are made; Listening. Sales planning, setting targets. Unique Sales Proposition (USP); Art of the sales pitch (focus on customers needs, not on product features) Follow-up and closing a sale; Asking for the sale. | | |
| **PRACTICAL NO.09** | **SUPPORT** | **2 HOURS** |
| Planning & Tracking Importance of project management to launch and track progress Understanding time management, workflow, and delegation of tasks Business Regulation Basics of business regulations of starting and operating a business; Importance of being compliant and keeping proper documentation How to find help to get started | | |
| **PRACTICAL NO.10** | **Capstone Project: Present Your BMC (Optional - and MVP)** | **2 HOURS** |
| BMC: Business Model Canvas. / MVP: Minimum Viable Product. | | |

## REFERENCES


1. Read Forbes article and do Group Discussionhttps://www.forbes.com/sites/chrismyers/2015/12/16/find-your-flow-and-success-will-follow/
2. https://necrophone.com/2014/01/20/effectuation-the-best-theory-of-entrepreneurship-you-actually-follow-whether-youve-heard-of-it-or-not/
3. Use your self awareness to find out what motivates and drives Entrepreneurial activity - Ted Talk "What is your Entrepreneurial style - EntrepreneurKnow
4. Prof. ClayChristensen"IdentifyingCustomerNeeds"https://www.youtube.com/watch?v=yVCZ-7xSsCw
5. Understand the customer problem by GOOTB":byGOOTB":https://www.youtube.com/watch?v=sEENIZgscDw
6. https://www.forbes.com/sites/danschawbel/2013/12/17/geoffrey-moore-why-crossing-the-chasm-is-still-relevant
7. Value Proposition: https://www.youtube.com/watch?v=jZN6CUieuOQ&list=PLw540Wq5kay866m6A6xI7KOwEAh7is4m
8. Value Proposition & Customer Need:https://www.youtube.com/watch?v=6FnG8pJL8yM&index=3&list=PLw540Wq5kay866m6A6xI7KOwEAh7is4m
9. https://strategyn.com/turn-customer-input-into-innovation/ CASE STUDIES in ODI: https://jobs-to- be-done.com/tagged/case-study
10. TheLeanBMC https://www.youtube.com/watch?v=FjBe7UO1hc
11. Ash Maurya -Capture your BMC in 20
12. minuteshttps://www.youtube.com/watch?v=7o8uYdUaFR4&t=462s
13. Ash Maurya - How to Prioritize Risks on Your BusinessModel https://www.youtube.com/watch?v=01z7EPXS42k
14. https://pt.slideshare.net/bmorelean/dan-lemberg-lean-pitch
15. https://startups.fb.com/en-in/categories/development/
16. Designing Experiments: https://www.youtube.com/watch?v=WiMZWCg1Hu8&t=111s
17. Customer Development Process:https://www.youtube.com/watch?v=lLEebbiYIkI
18. Beating the Competition: https://www.youtube.com/watch?v=46uP6vOj5G0
19. Q&A with Garr :https://www.youtube.com/watch?v=SmJjjOrusyI
20. Basic Accounting Lingo for Entrepreneurs:https://www.youtube.com/watch?v=Y7Pm1jEEKE
21. Vinod Khosla : How Leaders can BUILDhttps://www.youtube.com/watch?v=bRCoBgCn1Q
22. Vinod Khosla: https://www.youtube.com/watch?v=VIrNLzTs9cw
23. How to Pitch the way VC's think, so you can convince co-founders : https://www.youtube.com/watch?v=fTgU7THoKCw
24. Tony Buzan:http://www.tonybuzan.com/about/mind-mapping/
25. Google : Think branding:https://www.youtube.com/watch?v=1l2CUjkg0ug
26. The Battle for your mind using Positioning:https://www.youtube.com/watch?v=jQrY8xRx-0 Design rules-https://www.igorinternational.com/, Web design course:https://www.coursera.org/specializations/web-designStrikingly Free : https://www.strikingly.com/online-resume/linkedin
27. https://certification.hubspot.com/inbound-sales-certification-course
28. https://www.udemy.com/courses/business/sales/
29. https://www.accountingtools.com/articles/2017/5/17/sales-budget-sales-budget-example

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY** | **W.E.F** | 2018 - 2019 |
| **THIRD YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING** | **COURSE NAME** | Software Skill Development Lab |
| | **COURSE CODE** | CS305 |
| | **COURSE CREDITS** | 2 |
| **RELEASED DATE : 01/06/2018** | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | | PRESENTATION/ | TOTAL |
| LECTURE | PRACTICAL | ICE | ECE | IA | PRACTICAL | DEMONSTRATION | |
| – | 4 | – | – | – | – | 75 | 75 |

**AIM:**

To provide technical skills, for sharpening the students to enable them to meet the techno-socio-economic challenges.

**COURSE OBJECTIVES :**

CS305.CEO.1:To recognize the importance of and possess the skills necessary for life-long learning

CS305.CEO.2:To enhance the capacity to express programming concepts and choose among alternative ways to express things.

CS305.CEO.3:To improve the background for choosing appropriate programming languages for certain classes of programming problems.

CS305.CEO.4:To construct software solutions by evaluating alternate architectural patterns.

CS305.CEO.5:To apply integrated tool and techniques for building enterprise applications.

CS305.CEO.6:To implement application using IDLE tools.

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

CS305.CO1:Acquire practical knowledge within the chosen area of technology for project development.

CS305.CO2:Identify, analyze, formulate and handle programming projects with a comprehensive and systematic approach.

CS305.CO3:Contribute as an individual or in a team in development of technical projects.

CS305.CO4:Incorporate best practices for building applications.

CS305.CO5:Test and validate developed prototype against the original requirements of the problem.

CS305.CO6:Express technical ideas, strategies and methodologies in written form.

**Guidelines for Laboratory Conduction :**

The assignments to be framed by understanding the prerequisites, technological as- pects, utility and recent trends related to the topic. All problem statements or the assignments are based on real world problems/applications. In addition to these, in- structor can assign one real life application in the form of a mini project based on the concepts learned. Instructor may also set one assignment or mini-project that is suitable to respective branch beyond the scope of syllabus. Team of 3 to 4 students may work on mini-project. During the assessment, the expert evaluator should give the maximum weightage to the satisfactory implementation and software engineering approach followed .The supplementary and relevant questions may be asked at the time of evaluation to test the student's for advanced learning, understanding, effective and efficient implementation and demonstration skills.

**Module :**

| **Module** | **Python with Kali Linux** | **36 HOURS** |
|---|---|---|

**Prerequisite:** Python Programming

**Industry Expert:** Mr. QaidJohar Jawadwala

**Course Instructor:** Mr. Santosh Warpe

**Course Content**

Kali linux, Installation, python programming, socket concept, variables, list, dictionaries, packet sniffer, IP spoofing, passive and active attacks, network attacks

**Beneftts:**

1. Mini Project implementation
2. Placement Opportunities

| PRACTICAL | | |
|---|---|---|
| **Practical No.01** | | **4 HOURS** |
| Write a socket program to scan host vulnerabilities. | | |
| **Practical No.02** | | **4 HOURS** |
| Write a program to scan network for host active status. | | |
| **Practical No.03** | | **4 HOURS** |
| Creating a UNIX Password Cracker with Python. | | |
| **Practical No.04** | | **4 HOURS** |
| Writing a Zip File Password Cracker with Python. | | |
| **Practical No.05** | | **4 HOURS** |
| Writing a Packet Sniffer for monitoring network traffic. | | |
| **Practical No.06** | | **4 HOURS** |
| Writing a Python code for full host TCP Port Scanner | | |
| **Practical No.07** | | **4 HOURS** |
| Writing a Python code for Jamming a Wireless Network. | | |
| **Practical No.08** | | **4 HOURS** |
| Writing a Python program for sending packets with unknown Source IP (IP Spoofing). | | |
| **Practical No.09** | | **4 HOURS** |
| Writing a Python program for performing Man-in-the-Middle attack on Network for credential Harvesting. | | |
| **MINI PROJECT** | | |

**REFERENCE**


1. TJ O'Connor," Violent Python: A Cookbook for Hackers, Forensic Analysts, Penetration Testers and Security Engineers", Syngress, 2012, ISBN 978-15974995761
2. Himanshu Sharma," Kali Linux - An Ethical Hacker's Cookbook", Packt Publishing Limited, 2017, ISBN 978-1787121829
3. Raphael Hertzog, Mati Aharoni," Kali Linux Revealed: Mastering the Penetration Testing Distribution", Offsec Press, 2017, ISBN 978-0997615609

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY** | **W.E.F** | **AY:** 2018-19 |
| **THIRD YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING** | **COURSE NAME** | Software Skill Development Lab |
| | **COURSE CODE** | CS306 |
| | **COURSE CREDITS** | 2 |
| **RELEASED DATE :** 01/06/2018 | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** | | **EVALUATION SCHEME :** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | | PRESENTATION/ | TOTAL |
| LECTURE | PRACTICAL | ICE | ECE | IA | PRACTICAL | DEMONSTRATION | |
| – | 4 | – | – | – | – | 75 | 75 |

**AIM:**

To provide technical skills, for sharpening the students to enable them to meet the techno-socio-economic challenges.

**COURSE OBJECTIVES :**

CS306.CEO.1:To play role of Business Intelligent Analyst and Data Scientist in Data Analytics Life Cycle.
CS306.CEO.2:To acquire the skills of Analytics in R Programming.
CS306.CEO.3:To perform graphical analysis using Data Visualization tools and techniques.
CS306.CEO.4:To perform analytics for improvement of Business Process.
CS306.CEO.5:To implement application using IDLE tools..

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

CS306.CO1:Perform the analytics in R on real time data sets.
CS306.CO2:Analyze the real time data with graphical visualization.
CS306.CO3:Generate the different types of analytics reports.
CS306.CO4:Develop the models using analytics for BI Process.
CS306.CO5:Test and validate developed prototype against the original requirements of the problem.
CS306.CO6:Use Tableau Visualization effectively for Data Analytics..

**Guidelines for Laboratory Conduction**

The assignments to be framed by understanding the prerequisites, technological aspects, utility and recent trends related to the topic. All problem statements or the assignments are based on real world problems/applications. In addition to these, instructor can assign one real life application in the form of a mini-project based on the concepts learned. Instructor may also set one assignment or mini-project that is suitable to respective branch beyond the scope of syllabus. Team of 3 to 4 students may work on mini-project. During the assessment, the expert evaluator should give the maximum weightage to the satisfactory implementation and software engineering approach followed. The supplementary and relevant questions may be asked at the time of evaluation to test the student's for advanced learning, understanding, effective and efficient implementation and demonstration skills.

**Module: R Programming**

**Prerequisite:** Database Management System

**Industry Expert:** Ms. Shobha Mourya

**Course Instructor:** Ms. Shobha Mourya Mr.Jayvant Devare

**Course Content**

Basics of R Programming: Installation, Reading and Getting Data into R, Constructing Data Objects, Data:Descriptive Statistics and Tabulation, Data: Distribution, Simple Hypothesis Testing, Introduction to Graphical Analysis, Formula Notation and Complex Statistics, Manipulating Data and Extracting Components, Regression model, Advanced Graphs, Writing your scripts in R, Introduction of data science, Visualization, Introduction to Tableau, Navigating Tableau, Advanced Data Mining With Tableau, Creating bins Visualizing distributions, Modeling.

**Beneftts:**

1. Dell EMC Certification (optional)
2. Placement Opportunities.

| **PRACTICAL** | | |
|---|---|---|
| **Practical No.01** | | **4 HOURS** |
| Installing and loading R packages, set/get working directory. | | |
| **Practical No.02** | | **4 HOURS** |
| Import datasets using readr package and explore datasets using dplyr functions. | | |
| **Practical No.03** | | **4 HOURS** |
| Creating subsets from datasets using filter conditions. | | |
| **Practical No.04** | | **4 HOURS** |
| Creating new variables using mutate. | | |
| **Practical No.05** | | **4 HOURS** |
| Analyzing factor variables using frequency and contingency table. | | |
| **Practical No.06** | | **4 HOURS** |
| Analyzing numeric variables using summary command. | | |
| **Practical No.07** | | **4 HOURS** |
| Visualization using ggplot2 package for Bivariate, Univariate and Multi-variate plots.. | | |
| **Practical No.08** | | **4 HOURS** |
| Understanding ggplot layers for plotting graphs. | | |
| **Practical No.09** | | **4 HOURS** |
| Scatter plot, Histogram, Bar chart, Density Plot, Faceting and Scaling. | | |
| **Practical No.10** | | **4 HOURS** |
| Importing and exploring Titanic dataset. | | |
| **Practical No.11** | | **4 HOURS** |
| Data wrangling for Titanic case study. | | |
| **Practical No.12** | | **4 HOURS** |
| Feature engineering for Titanic case study. | | |
| **Mini Project :** | | **8 HOURS** |
| **Note:** Data sets should be real time data sets like heart disease, Airline, etc. | | |

## REFERENCES


1. Mark Gardener, "Beginning R: The Statistical Programming Language", Wiley paperback edition 2013, ISBN: 978-1-118-16430-3.
2. Ohri, "R for Business Analytics", Springer, 2012, ISBN: 978-1-4614-4342-1.
3. Ashutosh Nandeshwar, "Tableau Data Visualization Codebook", Packt publishers, ISBN : 978-1-849-68-978-6.

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY** | **W.E.F** | 2018 - 2019 |
| **THIRD YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING** | **COURSE NAME** | Software Skill Development Lab |
| | **COURSE CODE** | CS307 |
| | **COURSE CREDITS** | 2 |
| **RELEASED DATE : 01/06/2018** | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | | PRESENTATION/ | TOTAL |
| LECTURE | PRACTICAL | ICE | ECE | IA | PRACTICAL | DEMONSTRATION | |
| —- | 4 | —- | —- | —- | — - | 75 | 75 |

**AIM:**

To provide technical skills, for sharpening the students to enable them to meet the techno-socio-economic challenges.

**COURSE OBJECTIVES :**

CS307.CEO.1:Plan Extraction, transformation, scraping, joining and cleaning of large data sets

CS307.CEO.2:Analyse large data sets to bring out insights to solve business problems.

CS307.CEO.3:Make use of machine learning libraries and apply established machine learning algorithms classes of programming problems.

CS307.CEO.4:Utilize Machine learning concepts in Python using problem solving approach by working on real time cases and in class programming assignments.

CS307.CEO.5:Develop code in support of Machine learning solutions in Python.

CS307.CEO.6:Evaluate and debug various learning algorithms.

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

CS307.CO1:Apply python to build various machine learning application.

CS307.CO2:Interpret the fundamental issues and challenges of machine learning: data, model selection, model complexity.

CS307.CO3:Identify the strengths and weaknesses of many popular machine learning approaches.

CS307.CO4:Analyze the underlying mathematical relationships within and across Machine Learning algorithms and the paradigms of supervised and un-supervised learning.

CS307.CO5:Design and implement various machine learning algorithms in a range of real-world applications.

**Guidelines for Laboratory Conduction :**

The assignments to be framed by understanding the prerequisites, technological as- pects, utility and recent trends related to the topic. All problem statements or the assignments are based on real world problems/applications. In addition to these, in- structor can assign one real life application in the form of a mini-project based on the concepts learned. Instructor may also set one assignment or mini-project that is suitable to respective branch beyond the scope of syllabus. Team of 3 to 4 students may work on mini-project. During the assessment, the expert evaluator should give the maximum weightage to the satisfactory implementation and software engineering approach followed .The supplementary and relevant questions may be asked at the time of evaluation to test the student's for advanced learning, understanding, effective and efficient implementation and demonstration skills.

| Module | Python and Machine Learning | 36 HOURS |
|---|---|---|
| Prerequisite: Python<br>Course Content<br>Understanding Data Analytics, Importance of data in business, Data analytics ecosystem, Basis of Python programming, Basics of Python, Variables and Operators, Data types, Lists, Dictio- nary and Functions, Programming in Python, Introduction to Machine learning, python Libraries, Numpy, Scikit, Pandas, Matplotlib, Data Visualization, Supervised learning, Linear Regression, Logistic Regression, Decision Tree, Naive Bayes, K Nearest Neighbor, Random Forest, Dimension- ality Reduction, Gradient Boosting algorithms, Support Vector Machine, Unsupervised learning, Clustering techniques – K means clustering , Association Rule Learning, Natural Language Pro- cessing<br>**Beneftts:** 1.Placement Opportunities | | |

| PRACTICAL List | | |
|---|---|---|
| **Practical No.01** | | **4 HOURS** |
| Perform data processing and cleaning of dataset using Python. | | |
| **Practical No.02** | | **4 HOURS** |
| Create a machine learning model using Linear Regression (Example : Salary Prediction). | | |
| **Practical No.03** | | **4 HOURS** |
| Create a machine learning model using multiple linear regression (Example : Flight elay Data For July 2014. | | |
| **Practical No.04** | | **4 HOURS** |
| Create a machine learning model using Decision Tree (Example : Position of an Employee as per salary). | | |
| **Practical No.05** | | **4 HOURS** |
| Create a machine learning model using K Means Clustering Algorithm. | | |
| **Practical No.06** | | **4 HOURS** |
| Create a machine learning model using Market Basket analysis. | | |
| **Practical No.07** | | **4 HOURS** |
| Create a natural language processing model (Example : Customer purchasing).<br>m | | |

| Mini Project | | 8 HOURS |
|---|---|---|
| **Note:** Data sets should be real time data sets like heart disease, Airline, etc. | | |

**REFERENCE**


1. Daniel Nedal, "Python Machine Learning from Scratch", AI Sciences paperback edition 2016, ISBN-13: 9781720649496
2. Chris Albon, "Machine Learning with Python Codebook", O'REILLY Paperback, 2018, ISBN-13: 1491989388

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY** | **W.E.F** | **AY:** 2018 - 2019 |
| **THIRD YEAR BACHELOR OF TECHNOLOGY INFORMATION TECHNOLOGY** | **COURSE NAME** | Computational Intelligence |
| | **COURSE CODE** | IT321 |
| | **COURSE CREDITS** | 4 |
| **RELEASED DATE :** 01/06/2018 | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | TUTORIAL/ PRACTICAL | PRESENTATION/ DEMONSTRATION | TOTAL |
| LECTURE | PRACTICAL | ICE | ECE | IA | | | |
| 3 | 2 | 30 | 40 | 30 | NIL | 50 | 150 |

**PRE-REQUISITE :** 1.AS101:Mathematics I 2. IT301:Computability Theory

**COURSE OBJECTIVES :**

IT321.CEO.1:To introduce soft computing techniques that are different from conventional AI techniques.

IT321.CEO.2:To understand soft computing Techniques such as neural networks, fuzzy systems, and genetic algorithms.

IT321.CEO.3:To introduces case studies where soft computing techniques can be implemented.

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

IT321.CO.1:Explain about the basics of soft computing techniques and also their use in some real life Situations.

IT321.CO.2:Solve the problems using neural networks techniques.

IT321.CO.3:Find the solution using different fuzzy logic techniques.

IT321.CO.4:Make use of genetic algorithms for different modeling.

IT321.CO.5:Test for various soft computing techniques.

| THEORY COURSE CONTENT | | |
|---|---|---|
| **UNIT 1** | **Introduction** | **5 HOURS** |
| Introduction to Computational Intelligence.<br>Self-Study: Application of Computational Intelligence | | |
| **UNIT 2** | **Fuzzy Systems** | **7 HOURS** |
| Fuzzy Set Theory: Fuzzy set: Membership, Operations, Properties; Fuzzy Relations. Fuzzy Logic, Fuzzification, Fuzzy Inference, Fuzzy Rule Based System, Defuzzification, Application.<br>Self-study: Study different Example of a Fuzzy Logic System. | | |
| **UNIT 3** | **Artiftcial Neural Networks** | **7 HOURS** |
| Model of Artificial Neuron, Architectures, Learning Methods, Taxonomy of NN Systems, Single-Layer NN System, Applications. Case study: Retail case study /Retail segmentation using artificial neural networks | | |
| **UNIT 4** | **Back Propagation Network** | **7 HOURS** |
| Background, Back-Propagation Learning, Back-Propagation Algorithm, Applications. case study of the back propagation algorithm Application of design reuse to artificial neural networks | | |
| **UNIT 5** | **Genetic Algorithms** | **7 HOURS** |
| Encoding, Operators of Genetic Algorithm, Basic Genetic Algorithm, Applications. A case study on the application of a genetic algorithm for optimization of engine parameters | | |
| **UNIT 6** | **Hybrid Systems.** | **7 HOURS** |
| Integration of Neural Networks, Fuzzy Logic and Genetic Algorithms, GA Based Back Propagation Networks, Fuzzy Back Propagation Networks, Fuzzy Associative Memories, Simplified Fuzzy ARTMAP. PV-wind hybrid system: A review with case study | | |

| PRACTICAL | | |
|---|---|---|
| **Practical NO.01** | | **2 HOURS** |
| Write a program in MATLAB/PYTHON to implement Fuzzy Operations. | | |
| **Practical NO.02** | | **4 HOURS** |
| Write a MATLAB/PYTHON program to generate ANDNOT function using McCulloch-Pitts neural net. | | |
| **Practical NO.03** | | **4 HOURS** |
| Write a MATLAB/PYTHON program to generate XOR function using McCulloch-Pitts neural net. | | |
| **Practical NO.04** | | **4 HOURS** |
| Implementation Genetic Application – Match Word Finding. | | |
| **Practical NO.05** | | **4 HOURS** |
| Write a MATLAB/PYTHON program for Back Propagation Algorithm. | | |
| **Practical NO.06** | | **4 HOURS** |
| Write a MATLAB program for washing machine controller using Fuzzy Logic | | |
| **Practical NO.07** | | **4 HOURS** |
| Write a MATLAB program to plot various membership functions. | | |
| **Practical NO.08** | | **8 HOURS** |
| Mini Project | | |

## TEXT BOOK


1. Rajasekaran S. and G.A.VijayalakshmiPai, 2003, "Neural Networks, Fuzzy Logic and Genetic Algorithms", PHI, New Delhi,ISBN 10: 8120321863.
2. David E. Goldberg "Genetic Algorithms in Search, Optimization, and Machine Learning, (1989), Addison- Wesley, Chapter 1-8, page 1- 432.


## REFERENCE BOOK


1. Hakin, Simon 2003, "Neural Networks: A Comprehensive Foundation", PHI, New Delhi,ISBN: 9788120340008.
2. Kosko B.1997, "Neural Networks and Fuzzy Systems", PHI, New Delhi ,ISBN 0-13- 6 11 435-0 1.
3. Andries P. Engelbrecht, "Computational Intelligence An Introduction", Second Edition, University of Pretoria, South Africa, ISBN 978-0-470-03561-0.
4. N.P. Padhy, "Artificial Intelligence and Intelligent Systems", Oxford, ISBN-13: 978-0195671544.

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY** | **W.E.F** | **AY:** 2018 - 2019 |
| **THIRD YEAR BACHELOR OF TECHNOLOGY INFROMATION TECHNOLOGY** | **COURSE NAME** | Cloud Services and Applications |
| | **COURSE CODE** | IT322 |
| | **COURSE CREDITS** | 4 |
| **RELEASED DATE : 01/06/2018** | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | TUTORIAL/ PRACTICAL | PRESENTATION/ DEMONSTRATION | TOTAL |
| LECTURE | PRACTICAL | ICE | ECE | IA | | | |
| 3 | 2 | 30 | 40 | 30 | 30 | 20 | 150 |

**PRE-REQUISITE :**

1:IT203 – COMPUTER NETWORK

**COURSE OBJECTIVES :**

IT322.CEO.1:To understand the current trend and basics of cloud computing.
IT322.CEO.2:To learn cloud services.
IT322.CEO.3:To understand the collaboration of cloud services.
IT322.CEO.4:To expose various ways to collaborate the cloud service online.

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

IT322.CO.1:Virtualize Physical Machine[Apply]
IT322.CO.2:Apply basics of cloud computing for Creating Cloud services[Apply]
IT322.CO.3:Contrast the cloud services[Analyze]
IT322.CO.4:Measure and Monitor the Applications in Cloud environment[Analyze].
IT322.CO.5:Deploy the Applications in AWS Cloud[Apply].
IT322.CO.6:Outline the basics of Enterprise cloud computing[Understand].

| **THEORY:** | | |
|---|---|---|
| **UNIT 1** | **Introduction to Cloud Computing** | **8 HOURS** |
| Roots of Cloud Computing, Layers and types of cloud, Desired features of Cloud, Cloud Infrastructure Management, Infrastructure as service provider, Platform as Service provider, Challenges and risks. Broad Approaches to Migrating into the cloud.<br>**Self-study: seven-step model of migration into a cloud.** | | |
| **UNIT 2** | **Introduction to virtualization and Cloud Deployment Models** | **8 HOURS** |
| virtualization– Virtual Machine Monitor/Hypervisor. Different Cloud services and deployment models, the economics of Cloud, Cloud infrastructure components, and Cloud service creation processes.<br>**Self-study: Cloud service management processes** | | |
| **UNIT 3** | **The Enterprise Cloud Computing** | **6 HOURS** |
| Introduction, Background, issues for enterprise applications on the cloud, Transition challenges, Enterprise cloud technology and market evaluation, Business drivers for enterprise cloud computing.<br>**Self-study: cloud supply chain** | | |
| **UNIT 4** | **Cloud services** | **8 HOURS** |
| Infrastructure as a service: Introduction, Virtual Machines Provisioning and manageability, Virtual Machine Migration services, Cloud Storage: From LANs to WANs. Platform as a Service (Aneka): Introduction, Technologies and tools for cloud computing, Aneka Cloud platform, Aneka Resource provisioning service<br>**Self-study: Hybrid Cloud Implementation** | | |
| **UNIT 5** | **Monitoring and Management** | **6 HOURS** |
| Federated Cloud Computing: Model for federated cloud computing. SLA Management in cloud computing : Inspiration, Traditional approaches to SLA Management, Types of SLA, Life Cycles of SLA, SLA Management in cloud.<br>**Self-study:** Automated Policy- Based Management | | |
| **UNIT 6** | **Best Practices in architecting cloud Applications in the AWS Cloud** | **6 HOURS** |
| Introduction, Business and technical benefits of cloud computing, understanding the Amazon web service cloud, Cloud Concepts, Cloud best Practices<br>**Self-study:** GREPTHEWEB case study. | | |

| | | |
|---|---|---|
| **PRACTICAL:** Perform following experiments | | |
| **PRACTICAL NO.01** | **Virtual Machine** | **4 HOURS** |
| Creating a Virtual Machine (VM) on a Guest Operating System. | | |
| **PRACTICAL NO.02** | **Bare metal Hypervisor** | **4 HOURS** |
| Running Multiple Concurrent operating system using a bare Metal Hypervisor | | |
| **PRACTICAL NO.03** | **Virtual Network** | **2 HOURS** |
| Creating a Virtual Network to allow VM to VM communication | | |
| **PRACTICAL NO.04** | **Infrastructure as a service** | **4 HOURS** |
| Creating of cloud Services to be hosted as either, Infrastructure as a service | | |
| **PRACTICAL NO.05** | **Platform as a service** | **6 HOURS** |
| Using Platform as a Service to upload any application | | |
| **PRACTICAL NO.06** | **VMware V Center Server** | **6 HOURS** |
| Install and Configure VMware V center Server. | | |
| **PRACTICAL NO.07** | **OpenStack** | **6 HOURS** |
| Installation and configuration of OpenStack. | | |

**TEXT BOOK**


1. RajkumarBuyya, James Broberg, AndrzejGoscinski, "Cloud Computing: Principles and paradigms" WILEY, 2016, ISBN: 978-81-265-4125-6.
2. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008. ISBN-978-0-7897-3803-5


**REFERENCE BOOK**


1. David Marshall, Wade A. Reynolds, - Advanced Server Virtualization: VMware and Microsoft Platform in the Virtual Data Center, Auerbach Publications, 2006, ISBN-978-0978-0-8493-3931-8
2. Kumar Reddy, Victor Moreno, - Network virtualization, Cisco Press, July, 2006. ISBN-9781587052484
3. Chris Wolf, Erick M. Halter, - Virtualization: From the Desktop to the Enterprise, APress 2005. ISBN-1-59059-495-9
4. Danielle Ruest, Nelson Ruest - Virtualization: A Beginner's Guide, TMH, 2009, ISBN-978-0-07-014719-5
5. Dr. Kumar Saurabh, "Cloud Computing – Insights into New Era Infrastructure", Wiley Indian Edition, 2011, ISBN-9788126528837
6. Haley Beard, Cloud Computing Best Practices for Managing and Measuring Processes for Ondemand Computing, Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008, ISBN-9781921523199.

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY** | **W.E.F** | **AY:** 2018 - 2019 |
| **THIRD YEAR BACHELOR OF TECHNOLOGY INFROMATION TECHNOLOGY** | **COURSE NAME** | Mobile Application Development |
| | **COURSE CODE** | IT323 |
| | **COURSE CREDITS** | 4 |
| **RELEASED DATE :** 01/06/2018 | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | TUTORIAL/ PRACTICAL | PRESENTATION/ DEMONSTRATION | TOTAL |
| LECTURE | PRACTICAL | ICE | ECE | IA | | | |
| 3 | 2 | 30 | 40 | 30 | | 50 | 150 |

**PRE-REQUISITE :**

1:IT303: Web Technology
2:IT212: Database System

**COURSE OBJECTIVES :**

IT323.CEO.1:To know about the mobile application development
IT323.CEO.2:To increase the productivity of mobile application
IT323.CEO.3:To strengthen the knowledge of student about mobile app development
IT323.CEO.4:To understand android web access of data.

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

IT323.CO.1:Utilize the major components of Android API for developing the apps.
IT323.CO.2:Analyze the life cycles of Activities, Applications and Fragments.
IT323.CO.3:Build application logic using the Java programming language.
IT323.CO.4:Design UI-rich applications using all the major UI components.
IT323.CO.5:Identify the internal or external data storage of an application.
IT323.CO.6:Build cross platform (hybrid) mobile application.

| THEORY COURSE CONTENT | | |
|---|---|---|
| **UNIT 1** | **Introduction to Java** | **7 HOURS** |
| Native Android Application Basics of java programming, string processing, multi-threading, and input-output, object oriented concept: inheritance, encapsulation polymorphism. Interfaces, collections and Exception handling.<br>**Further Reading:** JDK and JRE | | |
| **UNIT 2** | **The Android Platform** | **7 HOURS** |
| Development Platform Introduction to the Android platform, Application framework, Basic Building blocks, Broadcast Receivers Content providers, UI Components, Intents Intent Filters, Android API levels, AVD and the Android Studio IDE.<br>**Self-Study:** Android Student IDE<br>**Further Reading:** API and SDK for Android | | |
| **UNIT 3** | **User Interface design** | **7 HOURS** |
| UI UX Design of various type of application UI Design: Activities, Views, layouts and Common UI components, UI through code and XML, Activity life-cycle, Intents, communication among activities, Menus, Custom and compound Views, Notifications, UI Events, Event Listeners.<br>**Self-Study:** Recourse file | | |
| **UNIT 4** | **Intent, Broadcast Receivers and Sensors** | **7 HOURS** |
| Explicit Intents, Implicit intents, Role of filters, Intent-matching rules, Filters in manifest and in dynamic Broadcast Receivers, Creating Broadcast receiver, Receiving System Broadcast, Understanding Broadcast action, category and data, Sending Broadcast. Sensors: Finding sensors, Accelerometers, Gyroscopes, Other type.<br>**Self-Study:** Introduction to intent | | |
| **UNIT 5** | **Android Data Storage** | **6 HOURS** |
| Android File System, Internal storage, External storage, SQLite, Introducing SQLite, SQLite Open Helper and CRUD operations, Content Providers: Accessing built in content providers, and Content provider MIME types, searching, Adding, changing, and removing contents.<br>**Self-Study:** Data Storage<br>**Further Reading:** Google Firebase Database | | |
| **UNIT 6** | **Hybrid App Development** | **6 HOURS** |
| Introduction to Hybrid Applications, Benefits, Challenges, Power of Hybrid over Mobile Web, Architectural approaches, Mobile Hybrid Application development framework.<br>**Self-Study:** Web app using SPA | | |

| PRACTICAL | | |
|---|---|---|
| **PRACTICAL NO.01** | **Tic-Tac-Toe game** | **4 HOURS** |
| Create an android app for TIC-TAC-TOE Game and provide UI using android and run it in android virtual device. | | |
| **PRACTICAL NO.02** | **Calculator APP** | **4 HOURS** |
| Create a simple calculator application in android and run it in real device. | | |
| **PRACTICAL NO.03** | **Design Tab Layout** | **4 HOURS** |
| Design a tab layout for android device and show course infromation in each tab. (Exam Scheme, Content, Practical List) | | |
| **PRACTICAL NO.04** | **Design List Layout** | **4 HOURS** |
| Extend the practical no. 3 and add list layout for different courses after clicking on course display the course information in tab layout. | | |
| **PRACTICAL NO.05** | **Create database storage** | **4 HOURS** |
| For practical no. 4 provide the backend support for data storage and store all the course information in database, also provide a functionality to edit the course content in application. | | |
| **PRACTICAL NO.06** | **Create a Hybrid app which can be run on any platform** | **6 HOURS** |
| Create a hybrid app for the practical no.5 using any hybrid app framework | | |

**TEXT BOOK**


1. Rajiv Ramnath, Roger Crawfis, and Paolo Sivilotti, "Android SDK 3 for Dummies", Wiley, 2011, ISBN: 9781118008256
2. Zigurd Mednieks, Laird Dornin, G. Blake Meike, Masumi Nakamura, "Programming Android", O'Reilly Media Inc, 2012, ISBN: 9781449316648


**REFERENCE BOOK**


1. Meier Reto , "Professional Android 2 Application Development", Wiley India Pvt. Ltd. 2012, ISBN: 9788126525898.
2. Marko Gargenta, Masumi Nakamur, "Learning Android: Develop Mobile Apps Using Java and Eclipse", O'Reilly Media, Inc., 2014, ISBN: 9781449336257.
3. Lombardo John ; Rogers Rick ; Mednieks Zigurd, "Android Application Development", Shroff Publishers Distributors PvtLtd, 2010 ISBN: 9788184047332

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF HUMANITIES AND ENGINEERING SCIENCES** | **W.E.F** | **AY:** 2018 - 2019 |
| **THIRD YEAR BACHELOR OF TECHNOLOGY** | **COURSE NAME** | Professional Skills |
| | **COURSE CODE** | HP 302 |
| | **COURSE CREDITS** | 2 |
| **RELEASED DATE :** 01/06/2018 | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | TUTORIAL/ | PRESENTATION/ | TOTAL |
| LECTURE | PRACTICAL | MSE | ESE | IA | PRACTICAL | DEMONSTRATION | |
| 1 | 2 | NIL | NIL | NIL | 50 | 25 | 75 |

**PRE-REQUISITE :** Basic Communication Skills

**COURSE OBJECTIVES :**

HP302.CEO.1:To define the importance of professional skills in students life
HP302.CEO.2:To explain them necessary, specific professional skills
HP302.CEO.3:To appraise students for placements through acquisition of professional skills
HP302.CEO.4:To support them detect their present level in respect of each professional skill and show direction for improvement

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

HP302.CO.1:Relate the importance of professional skills(L2)
HP302.CO.2:Build necessary, specific professional skills (L3)
HP302.CO.3:Analyze the environment of employ-ability (L4)
HP302.CO.4:Develop various techniques of effective team building in their professional life(L6)

| | | |
|---|---|---|
| **PRACTICALS: (SECTION A)** | | |
| **PRACTICAL NO.01** | **Self Awareness** | **2 HOURS** |
| Concept of Johari Window, Advantages and disadvantages of every quadrant, Identifying the proportion of each quadrant in respect of self, Using the tools of Feedback & Exposure for self-development | | |
| **PRACTICAL NO.02** | **Personal Interviews** | **6 HOURS** |
| Preparing for Interviews, Typical expected questions & suggested responses, Posture, Body language, Greetings and pleasantries, , Handling unforeseen questions | | |
| **PRACTICAL NO.03** | **Group Discussion** | **4 HOURS** |
| Parameters of assessment, Initiating the discussion, Effective listening, Own contribution, Paraphrasing, Arguing and counter-arguing, Giving direction to the discussion | | |
| **PRACTICAL NO.04** | **Team building and Motivation** | **2 HOURS** |
| Hallmark of effective teams, Barriers to team work, Subjugation of Individual interests for achievement of teams goal, Leading & motivating team members | | |
| **PRACTICAL NO.05** | **Innovative Thinking** | **2 HOURS** |
| Relevance and importance of innovative thinking, Introduction to Brain Storming technique, Collective and individual Brain Storming, | | |
| **PRACTICAL NO.06** | **Decision Making** | **2 HOURS** |
| Levels of decisions, Process of decision-making, Types of criteria, Individual and collective decision-making, Barriers in decision making, Keys to sound decision-making | | |
| **SECTION B:** | **Aptitude Training.** | |
| . | | |

**REFERENCE BOOK**


1. Stephen Covey: The Seven Habits of Highly Effective People, Simon and Schuster Ltd, ISBN: 0-671-71117-2
2. Krishna Mohan, Meera Banerji, Developing Communication Skills, Birla Institute of Technology and Science, ISBN: 033392-919-5
3. Charles Kepner and Benjamin Tregoe, The Rational Manager: A systematic Approach to Problem Solving and Decision Making , Tata McGraw-Hill Publishing Company Ltd., ISBN:13:978-0070341753
4. Priyadarshini Patnaik, Group Discussion and Interview Skills , Foundation Books, 1st Ed.- 2011, ISBN No.: 9788175967847, 8175967846.

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY** | **W.E.F** | 2018 - 2019 |
| **THIRD YEAR BACHELOR OF TECHNOLOGY INFORMATION TECHNOLOGY** | **COURSE NAME** | Mini Project |
| | **COURSE CODE** | IT324 |
| | **COURSE CREDITS** | 2 |
| **RELEASED DATE : 01/06/2018** | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | PRACTICAL | PRESENTATION/ DEMONSTRATION | TOTAL |
| LECTURE | PRACTICAL | ICE | ESE | IA | | | |
| – | 4 | – | – | – | – | 75 | 75 |

**PRE-REQUISITE :**

1. ET206 Prototyping,
2. CS213 Minor project.

**COURSE OBJECTIVES :**

IT324.CEO.1:To understand the Product Development Cycle through Mini project.
IT324.CEO.2:To undertake execute a mini Project through a group of students
IT324.CEO.3:To inculcate skills in engineering product design and development process, budgeting, Planning, testing, effective trouble-shooting practices, aesthetics and ergonomics.
IT324.CEO.4:To understand the role of professional and ethical practices, management principles,Technical documentation and communication skills in engineering.

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

IT324.CO.1:Execute an idea in a team as well as within constraints.
IT324.CO.2:Acquire knowledge of the techniques, skills and modern engineering tools necessary for engineering practices.
IT324.CO.3:Use standard engineering tools and processes for design, simulation, testing,analysis in implementation and deployment of theoretical idea into practice.
IT324.CO.4:Use standard documentation and presentation tools for a professional report and presentation of the work.

**PREAMBLE :** The main objective of this course is to understand the Product Development Cycle through mini Project, Where students will undertake execute a project through a group of students. They will plan for various activities of the project and distribute the work amongst team members. The students will learn budgeting, planning for the project, engineering skills and processes, testing and effective trouble-shooting practices, safety norms and standards, significance of aesthetics ergonomics while designing a product. This course will develop students.abilities to transmit technical information clearly and delivery of presentation based on the Mini Project. They will understand the importance of document design standards by compiling technical report on the mini Project work carried out in a team.

| **PRACTICAL** | | |
|---|---|---|
| **Stage- 1** | **Formation of group and Allocation of project adviser** | **Week 1** |
| . Project group formation and project advisor allocation by the department<br>. Project group shall consist of Minimum 02 and maximum 03 students per group (For detailed process please check Annexure-1 Mini project guidelines)<br>. Selection of finalized topic from approved project topics by the department.<br>. The project design idea shall be based on refereed papers, white papers, product, patent, application notes,industry problem, academic, institute or societal requirement, funded research, innovative thought,modification/ development in existing idea etc.<br>. Each student will maintain a logbook/project diary. This diary will be utilized to monitor project progress throughout | | |
| **Stage- 2** | **Project Review -1 Internal review by project adviser** | **Week-2,3** |
| . The project group will work on ,<br>1. Conceptualization of an Idea 2. Literature review 3. Market survey 4. Finalizing the Specifications<br>. Presentation of work progress to project adviser and proceed to project approval. | | |
| **Stage- 3** | **Project Review -2 Project Approval** | **Week-4** |
| . Presentation of concept to Department Review Committee (DRC) or Committee appointed by department.<br>. Review of concept and feasibility of project and necessary suggestions for implementation by the committee<br>. The project group will make corrections and continue their work. | | |
| **Stage- 4** | **Project Review -3 Internal review by project adviser** | **Week-5,6,7,8,9** |
| . The project group will work on ,<br>1. System Architecture and Design 2. Simulation /software development (As applicable) 3. Manufacturing of project 4. Assembly 5. Testing6. Troubleshooting.<br>. Presentation of work progress to project adviser and proceed to final project progress review. | | |

| Stage- 5 | Project Review -4 Final Project progress review | Week-10,11 |
|---|---|---|

.The project group will work on ,

1. Result analysis against specifications 2. Enclosure/Aesthetic design (As applicable) 3. Technical report generation (Draft copy) 4. User's manual (As applicable) 5. Bill of material etc.

. The technical report may incorporate following points,

1) Title
2) Introduction and Concept
3) Literature Market survey
4) Theory and relevance
5) Block diagram
6) Drawings (As applicable)
7) Specifications
8) Project plan
9) Bill of material
10) Enclosure/aesthetic design (As applicable)
11) Results
12) Results analysis
13) Conclusion
14) References

. Presentation of project work, draft copy of technical report , Final presentation etc. to DRC or Committee appointed by department.

. Review of project progress and necessary suggestions by DRC or Committee appointed by department for final presentation.

. The project group will make corrections. After clearing all comments from DRC; project can be presented to final l examination.

. Project must be approved by department to appear for final examination.

Mm

| Practical- 6 | Examination: Final Demonstration and presentation | Week-12 |
|---|---|---|

. Final examination will be divided in three parts a) Demonstration b) Presentation c) Project documentation

. For final examination project must be demonstrated in front of examiner panel. For Industry sponsored projects or other installations examiner panel can visit the project venue.

. All students must be physically present in front of examiner panel at the time of examination.

. Only demonstrated projects can be evaluated for presentation and documentation.

. Mini Project demonstration: Demo of project works and validation of project results to examiners panel.

. Mini Project presentation: Presentation of overall project work form project idea to implementation and deployment of project to examiners panel.

. Mini Project documentation: Presentation of technical documentary report to examiners panel

**Assessment :**

::

1. Internal Assessment:
   a. Project Review -2 Project Approval -05 Marks
   b. Project Review -3 Internal review by project adviser- -05 Marks
   c. Project Review -4 Final Project progress review- 10 Marks
2. Examination: Final Demonstration and presentation
   a. Mini Project demonstration: 20 Marks
   b. Mini Project presentation: 20 Marks
   c. Mini Project documentation: 15 Marks

MIT | Academy of Engineering

# MIT ACADEMY OF ENGINEERING, ALANDI

**An Autonomous Institute Affiliated to**

## Savitribai Phule Pune University

# Curriculum

# For

# Final Year

# Bachelor of Technology in Information Technology

**2016-2020**

(With Effect from Academic Year: 2019-2020)

| MIT \| Academy of Engineering (An Autonomous Institute) | CURRICULUM STRUCTURE (2016 - 2020) | | |
|---|---|---|---|
| SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY | W.E.F | : | 2019-20 |
| FINAL YEAR BACHELOR OF TECHNOLOGY INFORMATION TECHNOLOGY | RELEASE DATE | : | 01/12/2017 |
| | REVISION NO. | : | 0.0 |

**SEMESTER: VII**

| SL. No. | COURSE TYPE | COURSE CODE | COURSE | TEACHING SCHEME | | |
|---|---|---|---|---|---|---|
| | | | | L | P/T* | CREDIT |
| 1. | DC – 11 | CS401 | Software Engineering, Testing and Quality Assurance | 3 | 2 | 4 |
| 2. | DE – 1 | IT41# | Department (Program) elective - Ref er Annexure | 3 | -- | 3 |
| 3. | OE – 3 | IT421<br>CS421<br>CS422 | Open elective - Ref er Annexure | 3 | 2 | 4 |
| 4. | HSS – 7 | HP401 | Engineering Economics | 2 | -- | 2 |
| 5. | HSS – 8 /SDP–7 | HP403/CS40# | Business Strategies / Advance skill development lab (Adv. Java/ R programming/Python with kali Linux) | -- | 2 | 1 |
| 6. | SDP – 8 | IT402 | Project - I | -- | 8 | 4 |
| 7. | SDP-9 | CS406 | Summer Internship | -- | -- | 4 |
| TOTAL | | | | 11 | 14 | 22 |

**SEMESTER: VIII**

| SL. No. | COURSE TYPE | COURSE CODE | COURSE | TEACHING SCHEME | | |
|---|---|---|---|---|---|---|
| | | | | L | P/T* | CREDIT |
| 1. | DC – 12 | CS431 | Human Computer Interactions | 3 | 2 | 4 |
| 2. | DE – 2 | IT44# | Department (Program) elective - Ref er Annexure | 3 | -- | 3 |
| 3. | OE – 4 | IT451<br>CS451<br>CS452 | Open elective - Ref er Annexure | 3 | 2 | 4 |
| 4. | HSS – 9 | HP402 | Sociology | 2 | -- | 2 |
| 5. | SDP –10 | IT432 | Project - II | -- | 8 | 4 |
| TOTAL | | | | 11 | 12 | 17 |

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY** | **W.E.F** | **AY:** 2019 - 2020 |
| **FINAL YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING** | **COURSE NAME** | Software Engineering, Testing and Quality Assurance |
| | **COURSE CODE** | CS401 |
| | **COURSE CREDITS** | 4 |
| **RELEASED DATE :** 01/01/2019 | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | TUTORIAL/ PRACTICAL | PRESENTATION/ DEMONSTRATION | TOTAL |
| LECTURE | PRACTICAL | MSE | ESE | IA | | | |
| 3 | 2 | 30 | 40 | 30 | 30 | 20 | 150 |

**PRE-REQUISITE :** ET206: Prototyping, ET201: System Engineering

**COURSE OBJECTIVES :**

CS401.CEO.1:To understand the basics of testing, test planning and design and test team organization
CS401.CEO.2:To study the various types of test in the life cycle of the software product.
CS401.CEO.3:To build design concepts for system testing and execution.
CS401.CEO.4:To learn the software quality assurance ,metrics, defect prevention techniques.
CS401.CEO.5:To learn the techniques for quality assurance and applying for applications.

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

CS401.CO.1:To understand the basics of testing, test planning and design and test team organization.
CS401.CO.2:To study the various types of test in the life cycle of the software product.
CS401.CO.3:To build design concepts for system testing and execution.
CS401.CO.4:To learn the software quality assurance, metrics, defect prevention techniques.
CS401.CO.5:To learn the techniques for quality assurance and applying for applications.

| THEORY COURSE CONTENT | | |
|---|---|---|
| **UNIT 1** | **Basics Of Software Engineering** | **6 HOURS** |

**App/System/Case study**:Learning Game Design and Software Engineering through a Game Prototyping Experience.

**Content:** Process Models - Waterfall Model, Prototyping, Incremental, Spiral, RAD. Software Requirement Specification: Requirement Process, SRS Components, Requirement Specifications with Use Cases Diagram, Requirements Validation. Software Project Planning: Project Planning objectives. Software Metrics: Size, Function Point, Staffing, Project Estimation Methods – Decomposition Techniques; Empirical Estimation Models – COCOMO Model.

**Self-Study:** The evolving role of software –characteristics, components and applications.

**Further Reading:** Software estimation techniques.

| **UNIT 2** | **System Testing** | **6 HOURS** |
|---|---|---|

**App/System/Case study:**

Manual Testing (Online Marketing Software Platform)

**Content:**

System Testing - System Integration, Techniques-Incremental, Top Down Bottom Up Sandwich and Big Bang, Software and Hardware Integration, Hardware Design Verification Tests, Hardware and Software Compatibility Matrix Test Plan for System Integration. Built-in Testing. Functional testing - Testing a Function in Context. Boundary Value Analysis, Decision Tables. acceptance testing - Selection of Acceptance Criteria, Acceptance Test Plan, Test Execution Test. software reliability - Fault and Failure, Factors Influencing Software, Reliability Models

**Self-Study:** Manual Testing Process Life Cycle.

**Further Reading:**Test Case Design and Execution

| **UNIT 3** | **Automatic Testing** | **7 HOURS** |
|---|---|---|

**App/System/Case study:**

Journey Boosts Revenue and Reduces Costs by Implementing TEST Co Software Test Automation Solutions

**Content:**

Introduction to Automation, Training of Application, Test Automation Process. Introduction to Selenium: Selenium IDE Interface, Replay Scripts, Locate the elements on a Web page, Shared UI Map, Functions in Web Driver, Configuration File, Synchronizing Web Driver scripts, Dynamic UI Objects, Reporting in Selenium.

**Self-Study:** Sample Naming Conventions, Coding Conventions.

**Further Reading:** Continuous Integration with Jenkins.

| UNIT 4 | Software Reliability Modeling | 7 HOURS |
|---|---|---|

**App/System/Case study:**

Software Reliability In Safety Critical Supervision And Control Of Nuclear Reactors

**Content:**

Historical Perspective and Implementation Exponential Failure Time Class of Model, Schneidewind's Model, Hyper exponential Model, Weibull and Gamma Failure Time Class of Models, Infinite Failure Category Models, Bayesian Model, Model Relationships.

**Self-Study:** Software Reliability Prediction in Early Phases of the Life Cycle.

**Further Reading:**Techniques for Prediction Analysis and Recalibration

| UNIT 5 | Software Quality Assurance | 8 HOURS |
|---|---|---|

**App/System/Case study:**

Successful Application of Software Reliability By Norman F. Chneidewind

**Content:**

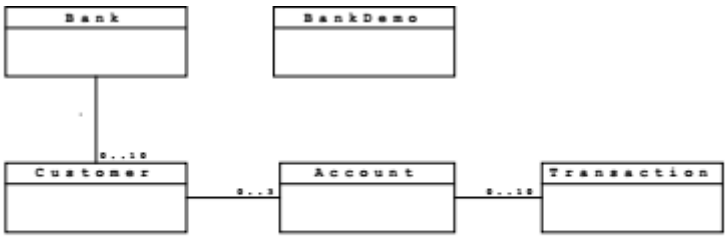
Quality concepts, Software quality assurance , SQA activities; Software reviews: cost impact of software defects, defect amplification and removal; formal technical reviews: The review meeting, review reporting and record keeping, review guidelines; Formal approaches to SQA; Statistical software quality assurance; software reliability: Measures of reliability and availability ,The ISO 9000 Quality standards: The ISO approach to quality assurance systems, The ISO 9001 standard, Software Configuration Management.

**Self-Study:** Software Quality ISO Standards

**Further Reading:** ISO/IEC 9126 Software engineering

| PRACTICAL | | |
|---|---|---|
| **PRACTICAL NO.01** | | **8 HOURS** |

Perform following experiments using Open source tools. Note: Following are the reference case studies, can be changed with other appropriate examples with same level.




BankDemo

The BankDemo is the main class of the program. It has a main () method that will be used to test the functionality of the classes in the program.

Bank

A Bank has an array of Customers (maximum 10) and an addCustomer() method that adds a new Customer to the array.

Customer

A Customer has a name and an array of Accounts (maximum 3). Customer has an addAccount() method that adds a new Account to the array. Customer also has a printAccountsSummary() method that prints details of all of their Accounts.

Account

An Account has an accountNumber and a balance. It is possible to withdraw money from the Account using the withdraw() method and to deposit money using the deposit() method. An Account also has an array of Transactions (maximum 10). Each time a deposit or withdrawal is made, a new Transaction is created and added to the array. Note: For simplicity, only whole amounts of currency can be deposited or withdrawn.

Transaction

A Transaction has a numerical amount (negative or positive) and a description.

Exercise Steps

1. Start up a new project in Together and create the class diagram shown above. Add the specified attributes and methods to each class via the diagram.

Note 1: All attributes should be private. This means that you should supply public get. . . () methods for them.

Note 2: You will probably need to make the following Together configuration change to see the get. . . () methods you add. Go to Tools — Options — Project Level and a dialog box will appear. Expand the View Management item in the explorer view on the left and select the JavaBeans / C++ Properties item. In the panel on the right, make sure Recognize Java Beans is unchecked. Click OK to return to the project.

2. In the source code for Customer add a constructor that takes a name as a parameter. The constructor should set the Customer's name attribute and also create a new array of Accounts (with the maximum size as specified above). To create arrays of objects, use code like the following: Thing[] things = new Thing[200]; where Thing is the class name, things is the name you want to give the array and 200 is the size of the array.

3. In the source code for Account add a constructor that takes an account Number as a parameter. The constructor should set the Customer's account Number attribute, set the balance to zero and create a new array of Transactions (with the maximum size as specified above)

| **PRACTICAL NO.02** | | **8 HOURS** |
|---|---|---|

Measure software cost and effort for a realistic project using COCOMO II tool.(Build small project and identify the cost of it)

| **PRACTICAL NO.03** | | **6 HOURS** |
|---|---|---|

Test a program using manual testing :

1. Login a specific web page.
2. Update 10 student records into table into Excel file.
3. Total number of objects present / available on the page
4. Select the number of students who have scored more than 60 in any one subject (or all subjects).
5. To get the number of list items in a list /combo box and count number of check boxes on the page checked and unchecked count.

| **PRACTICAL NO.04** | | **8 HOURS** |
|---|---|---|

Automate some Open Source CRM Software — Vtiger CRM and install locally and try automating few tests and Identify software quality by considering following test cases.

1. Data Quality and Conversion in CRM
2. Functionality of CRM
3. Reporting and Integration
4. Regression and User Acceptance Testing

**TEXT BOOK**


1. Roger Pressman, "Software Engineering: A Practitioner's Approach", McGraw-Hill Education; 8 edition ISBN 13: 9789339212087.
2. Srinivasan Desikan, "Software Testing Principals and practices", Pearson Publication ISBN-13 978-8-17-758295-6.


**REFERENCE BOOK**


1. Software Testing And Quality Assurance-Theory and Practice, Kshirasagar Nak, Priyadarshi Tripathy, John Wiley & Sons Inc,2008
2. Software Quality Engineering: Testing, Quality Assurance, and Quantifiable Improvement, Jeff Tian, John Wiley & Sons, Inc., Hoboken, New Jersey. 2005.
3. Software Quality Assurance - From Theory to Implementation, Daniel Galin, Pearson Education Ltd UK, 2004
4. Software Quality Assurance, Milind Limaye, TMH, New Delhi, 2011.
5. The Art of Software Testing, by Glenford J. Myers , Corey Sandler, Tom Badgett, 3rd Edition, Wiley; 3rd edition, ISBN-13: 978-1118031964.
6. Selenium Testing Tools Cookbook - Second Edition, Unmesh Gundecha , Publisher: Packt Publishing, ISBN:13 -9781784392512

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY** | **W.E.F** | **AY:** 2019 - 2020 |
| **FINAL YEAR BACHELOR OF TECHNOLOGY INFORMATION TECHNOLOGY** | **COURSE NAME** | Operating System Administration |
| | **COURSE CODE** | IT411 |
| | **COURSE CREDITS** | 3 |
| **RELEASED DATE : 01-01-2019** | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | TUTORIAL/ PRACTICAL | PRESENTATION/ DEMONSTRATION | TOTAL |
| LECTURE | PRACTICAL | MSE | ESE | IA | | | |
| 3 | – | 30 | 40 | 30 | – | – | 100 |

**PRE-REQUISITE :**

1. IT302-Operating System
2. IT211- Data Structures and Applications
3. IT101-Computer Programming

**COURSE OBJECTIVES :**

IT411.CEO.1:To summarize various types of users and files on a computer system
IT411.CEO.2:To outline the administrative capabilities of linux and windows based systems.
IT411.CEO.3:To identify and show the security aspects while communicating over networks.

**COURSE OUTCOMES :**

Students successfully completing the course will be able to,

IT411.CO.1:Administer (Demonstrate) the operating system using the internal commands.
IT411.CO.2:Organize the various users, files and applications on the computer system
IT411.CO.3:Utilize various command-line functions and utilities to control the access and support operating systems.
IT411.CO.4:Examine procedures for identifying and resolving common problems using operating system utilities and tools.

| THEORY: | | |
|---|---|---|
| **UNIT 1** | **Linux Operating System Kernel Concepts** | **8 HOURS** |
| App/System/Case study:<br>Ubuntu operating system<br>Content:<br>Tasks of Kernel, Architecture of Kernel, Elements of Kernel: Processes, Threads, Address Space, Privileges Levels, Filesystems, Device Drivers, Character Devices, Block Devices, Kernel Modules.<br>Self Study: Device Drivers in Linux: Loadable modules<br>Further reading: Classes of Devices and Modules | | |
| **UNIT 2** | **Process & File Management** | **8 HOURS** |
| App/System/Case study:<br>Ext3 file system<br>Contents:<br>Overview, Internal Representation of Files, Systems calls for the files systems, Organization of file tree, File types, File Attributes, process management with top,ps, pstree,kill.<br>Self Study: Filesystem mounting and Unmounting<br>Further reading: File systems in embedded operating system | | |
| **UNIT 3** | **Access Control & Powers to Users** | **6 HOURS** |
| App/System/Case study:<br>Fedora linux operating system's Access Control<br>Contents:<br>File System Access Control, Role based Access Control, Real world Access Control , Root user Access Control, Pseudo user other than root.<br>Self Study: Access Control Lists<br>Further reading: Access Control Lists in Linux | | |
| **UNIT 4** | **Windows Administration** | **4 HOURS** |
| App/System/Case study:<br>Windows 10<br>Contents:<br>Roles and Features, Storage, Active Directory, Remote Access, Tools.<br>Self Study:<br>Further reading: Remote Server Administration Tools | | |
| **UNIT 5** | **User to user communication** | **6 HOURS** |
| App/System/Case study: Connecting to Apple Network. Contents:<br>On-line Communication: write ,who , Instant Messaging Applications ,Off-line Communication, Apache<br>Server Settings, Network Server Settings, Domain Name Server, Debugging , Logs and Backup.<br>Self Study: Types of Network File Servers<br>Further reading: Network File Server administration | | |

| UNIT 6 | System Services and Security | 4 HOURS |
|---|---|---|

App/System/Case study:
Security in Linux Mint
Contents:
Start and Stop services, Disable unwanted services, SSH, Protect SSH logins, Password Protection for Grub, Security auditing tools
Self Study: Firewall
Further reading: Internet Security with Firewalls

**TEXT BOOK**


1.The Design of the Unix Operating System, Maurice J. Bach, Pearson Education, ISBN: 81-7758-770-6
2.Evi Nemeth, Garth Snyder, Trent R. Hein - UNIX and Linux System Administration Handbook, 4th Edition - 2010, Prentice Hall, ISBN-13: 978-0-13-148005-6
3.John Muller, Windows administration at the command line: for Windows Vista, Windows 2003, Windows XP and Windows 2000, Indianapolis, Ind. : Sybex/Wiley Pub., §c 2007.
4.Wolfgang Mauerer, Professional Linux §R Kernel Architecture, Somerset : Wiley, 2010, ISBN 9780470343432


**REFERENCE BOOK**


1.Daniel J. Barrett, Richard E. Silverman, Robert G. Byrnes, SSH, The Secure Shell: The Definitive Guide, O'Reilly Media, Inc.
2.Terry Collings, Kurt Wall, Red Hat Linux Networking and System Administration, Indianapolis : Wiley, §c 2005, ISBN 0764599496
3.Sumitabha Das,"Unix Concepts Applications", Fourth Edition ,Tata McGraw Hill, ISBN:0-07-063546-3
4.Stephen Prata,"Advanced Unix –A Programmer's Guide", BPB, ISBN: 81-7029-107-0

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY** | **W.E.F** | **AY:** 2019 - 2020 |
| **FINAL YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING** | **COURSE NAME** | Wireless and Mobile Networks |
| | **COURSE CODE** | CS412 |
| | **COURSE CREDITS** | 3 |
| **RELEASED DATE : 01/01/2019** | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | TUTORIAL/ PRACTICAL | PRESENTATION/ DEMONSTRATION | TOTAL |
| LECTURE | PRACTICAL | MSE | ESE | IA | | | |
| 3 | - | 30 | 40 | 30 | - | - | 100 |

**PRE-REQUISITE :** CS323 : Computer Networks

**COURSE OBJECTIVES :**

CS412.CEO.1:To build an understanding of wireless network.
CS412.CEO.2:To understand architecture and types of Wireless Networks.
CS412.CEO.3:To identify design issues of Wireless Network.
CS412.CEO.4:To know the challenges of Wireless Network.

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

CS412.CO.1:Determine issues and challenges in Wireless Network.
CS412.CO.2:Categories different types of wireless networks.
CS412.CO.3:Determine issues and challenges of Mobile Ad-Hoc Networks
CS412.CO.4:Assessing the features of Mobile Ad-Hoc Networks.
CS412.CO.5:Design and implement Wireless Sensor Network.
CS412.CO.6:Apply different security algorithms in wireless sensor network.

| THEORY COURSE CONTENT | | |
|---|---|---|
| **UNIT 1** | **Basics Of Wireless Networks** | **7 HOURS** |

**App/System/Case study:** Smart phones, Wi-Fi, Hotspot, MANET, VANET, Wireless Mouse and Keyboard etc.

**Content:**

Wireless Network Architecture, Classification, Wireless Switching Technology, Wireless Communication Problems with examples, Wireless Network Reference Model, Wireless Networking Issues, Wireless Networking Standards.

**Self Study:** Evolution of Wireless Networking.

**Further Reading:** Trends in Wireless Networking.

| UNIT 2 | Types Of Wireless Networks | 7 HOURS |
|---|---|---|

**App/System/Case study:** Bluetooth, SHARE it, Internet Service Providers, WLAN in Inventory control, Publicly Shared Data Networks Provided by ISP, Privately Owned Networks.

**Content:**

Introduction, Properties, Network Architecture, Network Components, Protocols, Technologies and Applications of following wireless networks

1) Wireless Body Area Network (WBAN)
2) Wireless Personal Area Network (WPAN)
3) Wireless Local Area Network (WLAN / Wi-Fi)
4) Wireless Metropolitan Area Network (WMAN / Wi-Max)
5) Wireless Wide Area Network (WWAN)

**Self Study:** IEEE Standards for WBAN, WPAN, WLAN, WMAN and WWAN.

**Further Reading:** 1) A review on Wireless Body Area Network for Medical Applications. 2) Wireless Personal Area Networks Architecture and protocols for Multimedia Applications

| UNIT 3 | Basics Of Mobile Ad-Hoc Networks | 7 HOURS |
|---|---|---|

**App/System/Case study:** Military Communication, Virtual Classrooms, Multi user Games etc.

**Content:** Wireless ad-hoc Network: Introduction, Features, Advantages, Applications, Ad-Hoc Mobility Models ( Indoor and outdoor) MANET: Historical Development, Basics, Features, Challenges, Deployment Issues, Technologies, Applications, Protocols and their classification. MAC Protocols: Design issues, goals and classification, Contention based protocols- with reservation, scheduling algorithms, IEEE standards: 802.11a, 802.11b, 802.11g, 802.15. HIPERLAN.

**Self Study:** DUCHA – Dual Channel MAC Protocol.

**Further Reading:** Attacks and Challenges in MANET.

| UNIT 4 | Routing Protocols And Transport Layer Protocol In MANET | 7 HOURS |
|---|---|---|

**App/System/Case study:** Use of MANET in Military.

**Content:**

Routing Protocols: Design issues, goals and classification, Proactive, reactive and hybrid routing, Uni cast routing algorithms, Multi-cast routing algorithms, hybrid routing algorithm, Energy aware routing algorithm, Hierarchical Routing, Transport layer: Issues in designing, Transport layer classification, Ad-Hoc transport protocols.

**Self Study:** QoS aware routing.

**Further Reading:** ZRP – Zonal Routing Protocol, DYMO – Dynamic MANET on Demand.

| UNIT 5 | Wireless Sensor Network | 7 HOURS |
|---|---|---|

**App/System/Case study:** Military, Health Care, Disaster Management, Home Control, Industrial Automation etc.

**Content:**

Introduction, Network Architecture, Sensing and Communication Ranges, Design Issues, Challenges, Energy Consumption, Clustering of Sensors, Protocols and their Classification, Applications.

**Self Study:** Routing in Wireless Sensor.

**Further Reading:** Operating Systems for Wireless Sensor Network.

| UNIT 6 | Security In Wireless Network | 7 HOURS |
|---|---|---|

**App/System/Case study:** Attack in Wireless Networks.

**Content:**

Wireless LAN Security, Wireless Application Protocol (WAP) Overview, Wireless Transport Layer Security, WAP End-to-End Security.

**Self Study:** Wireless Datagram Protocol (WDM), Wireless Transaction Protocol (WTP)

**Further Reading:** Extensible Authentication Protocol (EAP)

**TEXT BOOK**


1. Dr. Sunil kumar S. Manvi, Mahabaleshwar S. Kakkasageri, "Wireless and Mobile Networks Concepts and Protocols", Wiley India Pvt. Ltd., 2010, ISBN: 978-81-265-2069-5.
2. C.Siva Ram Murthy and B.S.Manoj, Ad hoc Wireless Networks Architectures and protocols, 2nd edition, Pearson Education. 2007.
3. Charles E. Perkins, Ad hoc Networking, Addison – Wesley, 2000
4. KazemSohraby, Daniel Minoli, TaiebZanati, "Wireless Sensor Network Technology, Protocols and Applications", John & Wiley Sons INC., 2007, ISBN 978-0-471-74300-2. [Freely available on internet]
5. William Stallings, "Cryptography and Network Security – Principles and Practice", Fifth Edition, PEARSON Publication.


**REFERENCE BOOK**


1. Carlos de Morais Cordeiro, Dharma Prakash Agrawal, "AD HOC SENSOR NETWORKS", World Scientific Publishing Co. Pte. Ltd., 2006, ISBN : 13: 978-81-7596-792-2.
2. Stefano Basagni, Marco Conti, Silvia Giordano and Ivan stojmenovic, Mobile ad hoc networking, Wiley-IEEE press, 2004.
3. Mohammad Ilyas, " The handbook of adhoc wireless networks", CRC press, 2002
4. Stefano Basagni, Marco Conti, Silvia Giordano and Ivan stojmenovic, Mobilead hoc networking, Wiley-IEEE press, 2004.
5. Mohammad Ilyas, The handbook of adhoc wireless networks, CRC press, 2002.

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY** | **W.E.F** | **AY:** 2019 - 2020 |
| **FINAL YEAR BACHELOR OF TECHNOLOGY INFORMATION TECHNOLOGY** | **COURSE NAME** | Information Retrieval |
| | **COURSE CODE** | IT413 |
| | **COURSE CREDITS** | 3 |
| **RELEASED DATE :** 01/01/2019 | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | TUTORIAL/ PRACTICAL | PRESENTATION/ DEMONSTRATION | TOTAL |
| LECTURE | PRACTICAL | MSE | ESE | IA | | | |
| 3 | - | 30 | 40 | 30 | - | - | 100 |

**PRE-REQUISITE :**

1. CS201 Data and File Structure
2. CS321 Design and Analysis of Algorithms

**COURSE OBJECTIVES :**

IT413.CEO.1:Learn the information retrieval methods and models.
IT413.CEO.2:Be familiar with web search engine.
IT413.CEO.3:To Understand theoretical base behind standard IR models
IT413.CEO.4:Be exposed to evaluation analysis of IR models.
IT413.CEO.5:Introduce to modern IR methods.

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

IT413.CO.1:Understand the process of representing, retrieving and analyzing IR models and advanced IR models.
IT413.CO.2:Understand structure of web and working of crawlers
IT413.CO.3:Develop IR models form standard IR models.
IT413.CO.4:Develop the standard methods for web indexing and evaluation
IT413.CO.5:To analyze optimization techniques various algorithms used in web search.

| THEORY | | |
|---|---|---|
| **UNIT 1** | **Introduction to Information Retrieval** | **6 HOURS** |
| **App/System/Case study:** logistic issues<br>**Content:**<br>Introduction: Information Retrieval, History of IR, Issues. Architecture of a Search Engine: Architecture, Basic Building Blocks, Components of building blocks: Text Acquisition, Text Transformation, Index Creation, User Interaction, Ranking, Evaluation<br>**Self Study:** An example information retrieval problem<br>**Further Reading:** The role of artificial intelligence (AI) in IR | | |
| **UNIT 2** | **Web Crawlers** | **6 HOURS** |
| **App/System/Case study:** Web Crawlers<br>**Content:**<br>Deciding What to Search, Web structure , Crawling the Web, Web Search Architectures , Crawling Documents and Email, Document Feeds, The Conversion Problem, Storing the Documents, Meta Crawlers, Focused Crawling, Detecting Duplicates, Removing Noise<br>**Self Study:** Google Bot, Bing Bot<br>**Further Reading:** Open Source Web Crawlers | | |
| **UNIT 3** | **Retrieval Models** | **8 HOURS** |
| **App/System/Case study:** Similarity Based IR Models<br>**Content:**<br>Processing Text: From Words to Terms, Text Statistics, Document Parsing, Document Structure and Markup, Boolean Model, Vector Space Model, Probabilistic Model.<br>**Self Study:** Alternative Models<br>**Further Reading:** learning-to-rank. | | |

| UNIT 4 | Indexing & Retrieval Evaluation | 6 HOURS |
|---|---|---|

**App/System/Case study:** Basic Indexing- Map Reduce

**Content:**

Indexing: Inverted Indexes, Compression, Index Construction, Retrieval Evaluation: Why Evaluate?, The Evaluation Corpus, Logging, Effectiveness Metrics, Efficiency Metrics, Training, Testing, and Statistics

**Self Study:** Query Processing

**Further Reading:** Query Interfaces

| UNIT 5 | Web-Search Optimization | 6 HOURS |
|---|---|---|

**App/System/Case study:** Google Search Engines

**Content:**

Web Search: History of Web, Indexing, Link Analysis (HITS, PageRank), Relevance Scoring and ranking for Web, Search Engine Optimization, On page Optimization, Off page optimization

**Self Study:** Personalized search, Handling "invisible" Web

**Further Reading:** Summarization, Question Answering, Reporting.

| UNIT 6 | Advanced Information Retrieval | 8 HOURS |
|---|---|---|

**App/System/Case study:** Information Retrieval of Images

**Content:**

Multimedia Information Retrieval, Parallel and Distributed IR, Meta-Ranking, Searching with Communities, Filtering and Recommending, Web data mining, Structure Revisited

**Self Study:** Economic, ethical, legal and political issues

**Further Reading:** Categorization algorithms

**TEXT BOOK**


1. W. Bruce Croft, Donald Metzler, Trevor Strohman, "Search Engines Information Retrieval in Practice" ©W.B. Croft, D. Metzler, T. Strohman, 2015, Electronic Copy Freely Available
2. C. Manning, P. Raghavan, and H. Schütze, "Introduction to Information Retrieval" Cambridge University Press, 2008 ISBN – 978-1107666399.


**REFERENCE BOOK**


1. Ricardo Baeza -Yates and Berthier Ribeiro – Neto, "Modern Information Retrieval: The Concepts and Technology behind Search" 2nd Edition, ACM Press Books 2011 ISBN - 978-0136072249.
2. Stefan Buettcher, Charles L. A. Clarke, Gordon V. Cormack, "Information Retrieval: Implementing and Evaluating Search Engines", The MIT Press, 2010 ISBN - 978-0262528870.
3. Ophir Frieder "Information Retrieval: Algorithms and Heuristics: The Information Retrieval Series", 2nd Edition, Springer, 2004 ISBN - 978-1402030031.

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY** | **W.E.F** | **AY:** 2019 - 2020 |
| **FINAL YEAR BACHELOR OF TECHNOLOGY INFORMATION TECHNOLOGY** | **COURSE NAME** | Ethical Hacking and Cyber Laws |
| | **COURSE CODE** | IT421 |
| | **COURSE CREDITS** | 4 |
| **RELEASED DATE : 01/01/2019** | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| (HOURS/WEEK) | | THEORY | | | TUTORIAL/ | PRESENTATION/ | TOTAL |
| LECTURE | PRACTICAL | ICE | ECE | IA | PRACTICAL | DEMONSTRATION | |
| 3 | 2 | 30 | 40 | 30 | 30 | 20 | 150 |

**PRE-REQUISITE :**

IT321: Cyber Security

**COURSE OBJECTIVES :**

IT421.CEO.1:Understand Various types of footprinting, footprinting tools, and countermeasures

IT421.CEO.2:AnalyzeNetwork scanning techniques and scanning countermeasures.

IT421.CEO.3:Enumeration techniques and enumeration countermeasures.

IT421.CEO.4:Working of viruses, virus analysis, computer worms, malwareanalysis procedure, and countermeasures.

**COURSE OUTCOMES: :**

The students after completion of the course will be able to

IT421.CO.1: Identify and analyse the stages an ethical hacker requires to take in order to compromise a target system.

IT421.CO.2: Identify tools and techniques to carry out a penetration testing.

IT421.CO.3: Critically evaluate security techniques used to protect system and user data.

IT421.CO.4: Demonstrate systematic understanding of the concepts of security at the level of policy and strategy in a computer system.

IT421.CO.5: Classify different types of webserver attacks, attack methodology, and countermeasures.

IT421.CO.6: Understand Wireless Encryption, wireless hacking methodology, wirelesshacking tools, and wi-fi security tools

| THEORY | | |
|---|---|---|
| **UNIT 1** | **Introduction to Ethical Hacking** | **6 HOURS** |
| Introduction, Legal and Illegal part in Hacking, Network Hacking, Network Vulnerability, Route Protocol Hacking,Firewall Scanning, Application Proxy Vulnerabilities | | |
| **UNIT 2** | **Foot printing and Social Engineering** | **6 HOURS** |
| Footprinting Concepts, Internet Footprinting,Different types of scanning, Using DNS Zone transfers, Introduction to Social Engineering | | |
| **UNIT 3** | **Web and Password Hacking** | **9 HOURS** |
| Web Server Hacking, Web Application Hacking, Hacking a web platform, Cracking a password, E-mail Hacking,SSL Fraud, Internet relay chat Hacking | | |
| **UNIT 4** | **Software Hacking** | **9 HOURS** |
| Remote Control Insecurities, Virtual Network computing, Terminal Server and Citrix, Session Hijacking, Trojans,Secure Shell (SSH) Attacks, Subverting the system environment | | |
| **UNIT 5** | **Attacking the Web** | **6 HOURS** |
| Web Authentication threats, Bypassing Authentication, Attacking the Web Authorization, Attacking ACLs, Attacking Tokens, Case Studies | | |
| **UNIT 6** | **Cyber Crimes and Cyber Laws** | **6 HOURS** |
| Introduction to IT laws Cyber Crimes – Internet, Hacking, Cracking, Viruses, Virus Attacks, Pornography,Software Piracy, Intellectual property, Legal System of Information Technology, Social Engineering, Mail Bombs, Bug Exploits, and Cyber Security | | |

| PRACTICAL:Perform following experiments using Open source software. | | |
|---|---|---|
| **PRACTICAL NO.01** | | **6 HOURS** |
| Setting up The Lab, Installing Kali 2018 As a Virtual Machine Installing Metasploitable As a Virtual Machine | | |

| **PRACTICAL NO.02** | | **6 HOURS** |
|---|---|---|
| Network Penetration Testing Connecting a Wireless Adapter To Kali | | |

| **PRACTICAL NO.03** | | **6 HOURS** |
|---|---|---|
| Network Penetration Testing - Pre Connection Attacks: Packet Sniffing Basics Using Airodump-ng, Creating a Fake Access Point (Honeypot) - Practical | | |

| **PRACTICAL NO.04** | | **4 HOURS** |
|---|---|---|
| Kali linux Information gathering practical: Server Location Finder- Recon-ng | | |

| **PRACTICAL NO.05** | | **4 HOURS** |
|---|---|---|
| Kali linux vulnerability analysis practical: Golimero Practicalm lynis practical, nikto practical | | |

**TEXT BOOK:**


1. An Unofficial guide to ethical Hacking, 2nd edition, by Ankit Fadia, Macmillan publishers, ISBN 1403-92964-5
2. Hacking Web Applications Exposed, Second Edition by Joel Scambray, Mike Shema, Caleb Sima, TATA McGraw hill edition, ISBN 0-07-061980-8
3. Hacking Exposed, 4th Edition by Stuart McClure, Joel Scambray, George Kurtz, TATA McGraw hill edition,ISBN 0-07-059696-4


**REFERENCE**


1. CEH Certified Ethical Hacker All-in-One Exam Guide 1st Edition, byMatt WalkerISBN-13: 978-0071772297
2. "Gray Hat Hacking: The Ethical Hackers Handbook, 3rd Edition" by Allen Harper and Shon Harris
3. "The Unrevealed Secrets of Hacking and Cracking – Hack Before You Get Cracked" by Prateek-Shukla and NavneetMehra
4. "How to Unblock Everything on the Internet" by AnkitFadia
5. Ethical Hacking and Network Defence by Michale Simpson, Cengage Learning, ISBN 978-81-315-0748-3

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY** | **W.E.F** | **AY:** 2019 - 2020 |
| **FINAL YEAR BACHELOR OF TECHNOLOGY INFORMATION TECHNOLOGY** | **COURSE NAME** | Big Data Analytics Framework |
| | **COURSE CODE** | CS421 |
| | **COURSE CREDITS** | 4 |
| **RELEASED DATE :** 01/01/2019 | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | TUTORIAL/ PRACTICAL | PRESENTATION/ DEMONSTRATION | TOTAL |
| LECTURE | PRACTICAL | MSE | ESE | IA | | | |
| 3 | 2 | 30 | 40 | 30 | - | 25 | 125 |

**PRE-REQUISITE :** 1. CS331. Predictive Analytics

**COURSE OBJECTIVES :**

CS421.CEO.1:To optimize business decisions and create competitive advantage with Big Data analytics

CS421.CEO.2:To introduce Java concepts required for developing map reduce programs

CS421.CEO.3:To derive business benefit from unstructured data

CS421.CEO.4:To impart the architectural concepts of Hadoop and introducing map reduce paradigm

CS421.CEO.5:To introduce programming tools PIG HIVE in Hadoop echo system

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

CS421.CO.1:Prepare for data summarization, query, and analysis.

CS421.CO.2:Apply data modeling techniques to large data sets.

CS421.CO.3:Create applications for Big Data analytics.

CS421.CO.4:Build a complete business data analytic solution

| THEORY COURSE CONTENT | | |
|---|---|---|
| **UNIT 1** | **Introduction To Big Data And Hadoop** | **6 HOURS** |

**App/System/Case Study:**
Library Management Case Study

**Contents:**
Types of Digital Data, Introduction to Big Data, Big Data Analytics, , Apache Hadoop Features , Hadoop Echo System, Hadoop 2.x core components , Analysing Data with Hadoop, Hadoop Streaming

**Self-study:** Security of Hadoop

**Further Reading:** Hadoop Security Architecture

| | | |
|---|---|---|
| **UNIT 2** | **HDFS(Hadoop Distributed File System)** | **8 HOURS** |

**App/System/Case Study:**
Library Case Study

**Contents:**
The Design of HDFS, HDFS Concepts, Command Line Interface, Hadoop file system interfaces, Data flow, Data Ingest with Flume and Scoop and Hadoop archives, Hadoop I/O: Compression, Serialization, Avro and File-Based Data structures.

**Self-study:** Performance Evaluation in HDFS

**Further reading:** HDFS architecture in cloud computing

| | | |
|---|---|---|
| **UNIT 3** | **Map Reduce Framework** | **6 HOURS** |

**App/System/Case Study:**
Library Case Study

**Contents:**
Anatomy of a Map Reduce Job Run, Failures, Job Scheduling, Shuffle and Sort, Task Execution, Map Reduce Types and Formats, Map Reduce Features. MapReduce Use Cases. Input Splits, Relation between Input Splits and HDFS Blocks Combiner Partitioner

**Self-study:** Map reduce for desktop Grid Computing

**Further reading:** Map reduce in Cloud Computing

| UNIT 4 | Hadoop Eco System - Pig | 8 HOURS |
|---|---|---|

**App/System/Case Study:**

Library Case Study

**Contents:**

Introduction to PIG, Execution Modes of Pig, Comparison of Pig with Databases, Grunt, User Defined Functions, Data Processing operators, Pig Data Types , Shell and Utility Commands Pig Latin : Relational Operators, File Loaders, Group Operator, COGROUP Operator, Joins and COGROUP Union, Diagnostic Operators, Specialized joins in Pig , Built In Functions ( Eval Function, Load and Store Functions, Math function, String Function, Date Function, Pig UDF, Piggybank, Parameter Substitution ( PIG macros and Pig Parameter substitution ) Aviation use case in PIG, Pig Demo on Healthcare Data set

**Self-study:** Data Analysis using Pig

**Further reading:** Crime Data Analysis using Pig

| UNIT 5 | Hive and HBase | 6 HOURS |
|---|---|---|

**App/System/Case Study:**

Library Case Study

**Contents:**

Hive : Hive Shell, Hive Services, Hive Metastore, Comparison with Traditional Databases, HiveQL, Tables, Querying Data and User Defined Functions. Hbase : Introduction to NoSQL Databases and HBase ,HBasics, Concepts, Clients, Example, Hbase Versus RDBMS, HBase Data Model, HBase Shell, HBase Client API

**Self-study:** Difference in Pig and Hive

**Further reading:** MapR Hadoop Hive

| UNIT 6 | Spark Framework and Scala | 6 HOURS |
|---|---|---|

**App/System/Case Study:**

Library Case Study

**Contents:**

Introduction, components of spark, Resilient distributed databases(RDD), Spark core programming concepts, compilation and execution of spark program. Introduction to Scala ,bAsic Programming Constructs of Scala , Running the Average Friends by Age Example, Filtering RDD's, and the Minimum Temperature by Location Example, Running the Minimum Temperature Example, and Modifying it for Maximum , Counting Word Occurrences using Flatmap() , Improving the Word Count Script with Regular Expressions, Sorting the Word Count Results

**Self-study:** Hadoop Mapreduce Vs Apache Spark

**Further reading:** Mobile big data analysis using Apache Spark

| PRACTICAL | | |
|---|---|---|
| **PRACTICAL NO.01** | | **8 HOURS** |

Install the Hadoop Distribution of Cloudera (http://www.cloudera.com/hadoop/) in Pseudo-Distributed Mode or use the VMWare Image provided by Cloudera to familiarize yourself with Hadoop, especially with the distributed file system HDFS and the implementation of MapReduce programs in Java. For the following tasks use the file 'twain.txt' as input which contains a collection of the works of Mark Twain. You will find the file on the course website.

*a)* Implement a MapReduce program that outputs all words of the input in a sorted order. Your program should not distinguish between upper and lower case and duplicates should be preserved. Example: From *{*To be or not to be*}* into *{*be be not or to to*}*

b) Extend your program from part (a) such that every word occurs only once in the output together with the corresponding frequency of the word. Your program should not distinguish between upper and lower case. Example: From To be or not to be to (be,2) (not,1) (or,1) (to,2)

c) Extend your word count implementation from part (b) with an additional Combiner. Therefore you should familiarize yourself with the function of a Combiner and think about how to usefully integrate a Combiner into your implementation. Characterize advantages and disadvantages of a Combiner.

d) Implement a MapReduce program that computes the inverted index for the given input, i.e. for every word in the input it should output a list of (byte) offsets. The offset should be the byte offset of the row that contains the word. However, typical stop words should not be part of the index. Stop words are frequently occuring words like 'and' that do not have a substantial relevance. You can find a list of typical english stop words in the file 'english.stop.txt' from the course website.

| **PRACTICAL NO.02** | | **8 HOURS** |
|---|---|---|

Pig Exercise: Using the census data (path), compute the number of records for each state.

| **PRACTICAL NO.03** | | **6 HOURS** |
|---|---|---|

HIVE DDL AND DML

Description

We will be creating several hive tables using different file formats, delimiters and partitioning strategy. Also we will be loading data into these hive tables

Data Location

HDFS – /public/retail_db

Local – /data/retail_db

To get data types visit mysql database retail_db using user retail_dba

Problem Statement- Make sure you have 2 databases with your OS User name and then stage and final as suffix

Example: ujjwal_stage, ujjwal_final

ujjwal_stage – Create external tables in ujjwal_stage pointing to HDFS location /public/retail_db

ujjwal_stage – Make sure at least one table point to different location and use load command to load data from local file system into the hive table

ujjwal_final – Create all 6 tables in hive as managed tables, delimiter is vertical line. Also use gzip compression while storing the data.

Also create 2 additional tables for orders and order_items where both tables are bucketed by order_id. Create another table for orders where data is partitioned by order_month.

| PRACTICAL NO.04 | | 6 HOURS |
|---|---|---|

Apache Spark Programming Exercise :Twitter Analysis using Spark

- Find all the tweets by user
- Find how many tweets each user has
- Find all the persons mentioned on tweets
- Count how many times each person is mentioned
- Find the 10 most mentioned persons
- Find all the hashtags mentioned on a tweet
- Count how many times each hashtag is mentioned
- Find the 10 most popular Hashtags

**TEXT BOOK**

1.Big Data, Black Book(covers Hadoop 2, Mapreduce, Hive, Yarn, Pig, R And Data Visualization, Black Book, Dreamtech

**REFERENCE BOOK**

1. Tom White, "Hadoop: The Definitive Guide", O'reilly
2. Alan Gates, "Programming Pig: Dataflow Scripting with Hadoop", O'reilly
3. Stefano Baghino, Andrea Bessi, Bertrand Bossy, "Scala and Spark for Big Data Analytics", Packt
4. Bill Chambers, "Spark: The Definitive Guide: Big Data Processing Made Simple", O'reilly

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2019 – 2023)** | |
|---|---|---|
| **SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY** | **W.E.F** | **AY:** 2019 - 2020 |
| **FINAL YEAR BACHELOR OF TECHNOLOGY INFORMATION TECHNOLOGY** | **COURSE NAME** | Deep Learning |
| | **COURSE CODE** | CS422 |
| | **COURSE CREDITS** | 4 |
| **RELEASED DATE :** 01/01/2019 | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | TUTORIAL/ PRACTICAL | PRESENTATION/ DEMONSTRATION | TOTAL |
| LECTURE | PRACTICAL | MSE | ESE | IA | | | |
| 3 | 2 | 30 | 40 | 30 | - | 50 | 150 |

**PRE-REQUISITE :** CS 312 Artificial Intelligence and Neural Network, CS 332 Machine Learning .

**COURSE OBJECTIVES :**

CS422.CEO.1:To present the mathematical, statistical and computational challenges of building stable representations for high-dimensional data, such as images, text and data.

CS422.CEO.2:To learn the fundamentals of deep learning, and the main research activities in this field.

CS422.CEO.3:To learn implementation, training, and validation of neural network.

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

CS422.CO.1:Illustrate the fundamentals of deep learning neural network.

CS422.CO.2:Identify various strategies for deep neural network model.

CS422.CO.3:Classify different data set using convolutional neural network.

CS422.CO.4:Examine the sequence modelling using different algorithms.

CS422.CO.5:Interpret deep learning concepts in real time applications.

CS422.CO.6:Explain the working of deep reinforcement learning model

| THEORY COURSE CONTENT | | |
|---|---|---|
| **UNIT 1** | **Introduction** | **8 HOURS** |
| **App/System/Case study:** Classification of Dogs.<br>**Content:**<br>Linear Algebra, Probability and Information Theory, Numerical Computation, Machine Learning Basics, Basics of Deep learning, Trends in deep learning, Deep learning vs Machine learning. | | |
| **UNIT 2** | **Designing & Optimizing Deep Neural Network Model** | **6 HOURS** |
| **App/System/Case study:** House Prediction<br>**Content:**<br>Distribution of data set, Error Analysis, Bias and Variance, Data Augmentation Modern Deep Networks, Regularization for Deep Learning, Optimization for Training Deep Models, Deep Feed forward Networks | | |
| **UNIT 3** | **Convolutional Neural Network** | **8 HOURS** |
| **App/System/Case study:** Cancer Detection.<br>**Content:**<br>Introduction to CNNs, CNN architecture Variability models, Properties of CNN representation, Covariance / invariance, Kernel filter, Principles behind CNNs, Multiple Filters, CNN applications. | | |
| **UNIT 4** | **Sequence Modelling** | **8 HOURS** |
| **App/System/Case study:** Speech Recognition<br>**Content:**<br>Introduction to Dynamical systems: RNNs, Unfolded RNNs, Recurrent Neural network, Bidirectional RNNs, Encoder Decoder Sequence to sequence architecture, Basics of Recursive neural network and Long Short-Term Memory Network(LSTM), RNN applications. | | |
| **UNIT 5** | **Deep Learning applications** | **6 HOURS** |
| **App/System/Case study:** Generate Faces, Text summarization, classification of images and Activity detection.<br>**Contents:**<br>Image Processing, Natural Language Processing, Speech Recognition, Video Analytics Self Study: Healthcare Application | | |
| **UNIT 6** | **Deep Reinforcement Learning** | **6 HOURS** |
| **App/System/Case study:** Quad copter to Fly, Game and Robotics<br>**Content:**<br>Introduction to Deep Reinforcement Learning, Domain Selection for Reinforcement Learning, State-Action Pairs Complex Probability Distributions of Reward, Neural Networks and Deep Reinforcement Learning, Hierarchical RL, Multi-agent RL, Relational RL. | | |

| | | |
|---|---|---|
| **PRACTICAL:Perform following experiments using Open source tools** | | |
| **PRACTICAL NO.1** | | **4 HOURS** |
| Implement back propagation algorithm to train a neural network in Python.(Gradient Descent) | | |
| **PRACTICAL NO.2** | | **6 HOURS** |
| Implement and train a deep convolutional neural network in Tensorflow. | | |
| **PRACTICAL NO.3** | | **6 HOURS** |
| Implement simple audio recognition using RNN(tensorflow) | | |
| **PRACTICAL NO.4** | | **6 HOURS** |
| Keras and Tensorflow–Implement Applications of deep Learning to NLP | | |
| **PRACTICAL NO.5** | | **6 HOURS** |
| Keras and Tensorflow - Implement Applications of Deep Learning with Computer Vision | | |
| **MINI PROJECT** | | **10 HOURS** |
| The Course Mini Project work will be started in Semester VII. The work of the mini projects will be starting at beginning of term in alignment with laboratory assignments. It may be done by a groups of 3 students. However if project is done in groups, each student will be given a responsibility for a distinct module and the progress of individual modules is independent of others and performance of individual modules will be tracked periodically. The final evaluation will be done at the end of term through presentation, project demonstration and report. | | |

**TEXT BOOK**


1. Bengio, Yoshua, Ian J. Goodfellow, and Aaron Courville. "Deep learning." An MIT Press book in preparation. (2015).
2. Bengio, Yoshua. "Learning deep architectures for AI." Foundations and trends in Machine Learning 2.1 (2009): 1127.


**REFERENCE BOOK**


1. Sutskever, Ilya, OriolVinyals, and Quoc V. Le. "Sequence to sequence learning with neural networks." Advances in neural information processing systems. 2014.
2. Kalchbrenner, Nal, EdwardGrefenstette, and Phil Blunsom. "A convolutional neural network for modelling sentences." ACL(2014).

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF HUMANITIES AND ENGINEERING SCIENCES** | **W.E.F** | **AY:** 2019 - 2020 |
| **FOURTH YEAR BACHELOR OF TECHNOLOGY All Branches** | **COURSE NAME** | Engineering Economics |
| | **COURSE CODE** | HP401 |
| | **COURSE CREDITS** | 2 |
| **RELEASED DATE :** 01/06/2019 | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | TUTORIAL/ | PRESENTATION/ | TOTAL |
| LECTURE | PRACTICAL | MSE | ESE | IA | PRACTICAL | DEMONSTRATION | |
| 1 | NIL | NIL | 50 | 20 | NIL | NIL | 70 |

**PRE-REQUISITE :** NIL

**COURSE OBJECTIVES :**

HP401.CEO.1:To enable the students to understand the basic concepts of Economics

HP401.CEO.2:To impart knowledge, with respect to practical applications of Economics .

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

HP401.CO.1:The students would have understood the basic concepts of Economics.

HP401.CO.2:The students would have acquired knowledge, with respect to concepts, principles and practical applications of Economics, which govern the functioning of a firm/organization under different market conditions

HP401.CO.3:The course is designed to improve critical thinking, problem solving skills by using economic models and theories and predict economic relationships

HP401.CO.4:Students entering any profession in the workforce today must be able to utilize these basic economic principles. The course expected to develop critical understanding of current topics in economics and able to formulate their own opinions on economic issues

| THEORY | | |
|---|---|---|
| **UNIT 1** | **Introduction to Economics** | **6 HOURS** |
| Economic Issues and Concepts; How Economist Work ; Theory of Demand & Supply; Meaning, Determinants, Law of Demand and Supply, Equilibrium between Demand & Supply; Elasticity of demand, price elasticity, income elasticity, cross elasticity. | | |
| **UNIT 2** | **Micro Economics** | **6 HOURS** |
| Revenue Concepts; Cost Concepts, Short run & Long run cost Concepts and curves, opportunity cost. Break even analysis; meaning, explanation, numerical. Markets; meaning, types of markets & their characteristics<br>( Perfect Competition, Monopoly, Monopolistic Competition , Oligopoly).<br>**Further Reading:** | | |
| **UNIT 3** | **Macro Economy** | **5 HOURS** |
| National Income; meaning, stock and flow concept, NI at current price, NI at constant price, GNP, GDP, NNP,NDP, Personal income, disposal income. Inflation; meaning, types, causes, measures to control.<br>**Further Reading:** | | |
| **UNIT 4** | **Indian Economy** | **5 HOURS** |
| Characteristics of an Indian Economy; Human Development Index(HDI); Concepts of Foreign Trade, Goods and Services Tax(GST); Micro Small and Medium Enterprise(MSME) ; Foreign Direct Investment(FDI);Unemployment: meaning, types, causes, remedies.<br>**Further Reading:** | | |
| **UNIT 5** | **Introduction to Banking & Money Market** | **6 HOURS** |
| Banking; meaning, types, functions, Commercial Banks- Instruments in Operation of an Account, Central Bank- RBI; its functions, Concepts- CRR, Bank Rate, Repo Rate, Reverse Repo rate, SLR; Introduction to Money and Capital Market , Introduction to Fiscal policy- meaning and tools.<br>**Further Reading:** | | |

**REFERENCE BOOKS**


1. R.Paneerselvam :Engineering Economics, , PHI publication ISBN : 978-81-203-5172-1
2. Robbins S.P. and Decenzo David A :Fundamentals of Management: Essential Concepts and Applications, Pearson Education, ISBN-13: 9780133499919
3. N Gregory Mankiw : Economics: Principles of Economics, Cengage Learning ISBN-10: 1305585127
4. L.M. Prasad: Principles and Practices of Management ISBN-10: 9351610500; ISBN-13: 978-9351610502
5. Tripathy and Reddy :Principles of Management ISBN, 1259050572, 9781259050572
6. Dr. K. K. Dewett & M. H. Navalur, S. Chand :Modern Economic Theory ISBN, : 9788121924634 .

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF HUMANITIES AND ENGINEERING SCIENCES** | **W.E.F** | **AY:** 2019 - 2020 |
| **FOURTH YEAR BACHELOR OF TECHNOLOGY All Branches** | **COURSE NAME** | Business Strategies |
| | **COURSE CODE** | HP403 |
| | **COURSE CREDITS** | 1 |
| **RELEASED DATE :** 01/06/2019 | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | TUTORIAL/ | PRESENTATION/ | TOTAL |
| LECTURE | PRACTICAL | MSE | ESE | CA | PRACTICAL | DEMONSTRATION | |
| NIL | 2 | NIL | NIL | 25 | NIL | 25 | 50 |

**PRE-REQUISITE :** HP303 : Basics of Entrepreneurship

**COURSE OBJECTIVES :**

HP403.CEO.1:To understand the importance of growth and to be able to chart a path towards growth.
HP403.CEO.2:To revisit your business model
HP403.CEO.3:To give a growth orientation your customer acquisition, operations, revenue and sales strategy
HP403.CEO.4:To list and comply with the requirements relating to regulatory compliance
HP403.CEO.5:To be able to effectively pitch your venture to potential stakeholders .

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

HP403.CO.1:Rephrase business model and Identify additional customer segments
HP403.CO.2:Identify channels and strategy for budgeting and planning.
HP403.CO.3:Make use of Legal aspect, Mentors, Advisors, and Experts in startups
HP403.CO.4:Analyze the growing revenues, sales planning, strengthening sales, improving margins
HP403.CO.5:Estimate customer lifetime value, competitor and peer's financial models for venture growth
HP403.CO.6:Formulate the all procedure for new venture ; Product market fit and A Pitch Deck

| PRACTICALS: | | |
|---|---|---|
| **PRACTICAL NO.01** | **Orientation to Growth** | **3 HOURS** |
| **Getting Ready for Growth**<br>Why growth stage is different compared to startup phase, Why Product-Market fit is not enough, Case study, To assess readiness for growth, To chart a growth path . | | |
| **PRACTICAL NO.02** | **Customers** | **3 HOURS** |
| **Expanding Customer Base**<br>Revisit your business model and develop few variants (more business model types). Identify additional customer segments that your solution can address. Evaluate business models for the new customer segments. Relook at the Problem Statement (can you expand the scope and scalability of your business by repositioning your problem statement?) Explore additional ways to monetize. | | |
| **PRACTICAL NO.03** | **Traction** | **12 HOURS** |
| **Scaling**<br>How to gain traction beyond early customers. Defining traction (in quantifiable terms) and identifying the most important metrics to measure traction. Calculate cost of new customer acquisition. Estimate your customer lifetime value (LTV). Identifying waste in your operations and focusing your team on what is important for traction.<br>**Channels and Strategies**<br>The Bulls eye framework, Identify Channels using Bulls Eye Framework, Measuring the effectiveness of selected channels, Budgeting and planning. | | |
| **PRACTICAL NO.04** | **Money** | **20 HOURS** |
| Growing Revenues. Stabilizing key revenue streams. Developing additional revenue streams (licensing, franchising). Exploring new channels and partnerships. Sales Planning. Understanding why customers buy and how buying decisions are made; Listening skills. Sales planning, setting targets. Unique Sales Proposition (USP); Art of the sales pitch (focus on customers needs, not on product features) Follow-up and closing a sale; Asking for the sale. Strengthening Sales. Building a professional sales team. Sales compensation and incentives. Sales planning, setting targets Improving Margins. Testing price elasticity.<br>Optimizing costs and operational expenses. Advanced concepts of unit costing. Financial Modeling. Financial modeling of your venture's growth. Analyzing competitor and peer's financial models. | | |
| **PRACTICAL NO.05** | **Support** | **5 HOURS** |
| Legal Overview of legal issues and their impact on entrepreneurs. Importance of getting professional help (legal and accounting). Importance of being compliant and keeping proper documentation. Patents and Intellectual property. Trademarks. Mentors, Advisors, and Experts. The importance of a Mentor and how to find one. Role of business advisors and experts for specific targets in your growth plan. | | |
| **PRACTICAL NO.06** | **Capstone Project: Pitch Your Venture** | **2 HOURS** |

**REFERENCE BOOKS**


1. Zero to One: Note on Start Ups, or How to Build the Future, Peter Thiel and Blake Masters, Virgin Books,ISBN: 9780753555194
2. Tools of Titans: The Tactics, Routines, and Habits of Billionaires, Icons, and World-Class Performers, Timothy Ferriss, Random House,ISBN: 9781785041273.
3. Disrupted: My Misadventure in the Start-Up Bubble, Dan Lyons, Penguin Publishers, ISBN: 9781786491022
4. Unshakeable: Your Financial Freedom Playbook, Tony Robbins, Simon & Schuster Publishers,ISBN: 9781471164934
5. Grit: The Power of Passion and Perseverance, Angela Duckworth, Vermilion Publishing,ISBN: 9781785040207
6. Big Magic: Creative Living 4BEyond Fear, Elizabeth Gillbert, Penguin Publishers,ISBN: 9781408886182
7. Pivot: The Only Move That Matters Is Your Next One, Jernny Blake, Random House,ISBN: 9780241975466
8. Financial Management; Text and Problems, 7th Ed., A Khan and P. K. Jain, TataMacGraw Hill, ISBN: 9789353162184
9. Financial Management; Theory and Practice, 4th Ed., Prasanna Chandra, TataMacGraw Hill,
10. Essentials of Management : An International and Leadership Perspective, 10th Ed., Harold Koontz and Heinz Weihrich, MGH, ISBN: 9789339222864
11. Kites in a Hurricane: Startups from Cradle to Fame, Rishi Kapal, SAGE Publishing, ISBN: 9789352807895
12. Wadhwani Foundation Advanced Course in Entrepreneurship

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | COURSE SYLLABI (2016 – 2020) | |
|---|---|---|
| SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY | W.E.F | 2019 – 2020 |
| FINAL YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING | COURSE NAME | Software Skill Development Lab |
| | COURSE CODE | CS402 |
| | COURSE CREDITS | 2 |
| RELEASED DATE : 01/01/2019 | REVISION NO | 0.0 |

| TEACHING SCHEME (HOURS/WEEK) | | EXAMINATION SCHEME AND MARKS | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | | PRESENTATION/ | TOTAL |
| LECTURE | PRACTICAL | ICE | ECE | IA | PRACTICAL | DEMONSTRATION | |
| - | 4 | - | - | - | - | 75 | 75 |

**AIM:**

To provide technical skills, for sharpening the students to enable them to meet the techno-socio-economic challenges.

**COURSE OBJECTIVES :**

CS402.CEO.1: Plan Extraction, transformation, scraping, joining and cleaning of large data sets

CS402.CEO.2: Analyse large data sets to bring out insights to solve business problems.

CS402.CEO.3: Make use of machine learning libraries and apply established machine learning algorithms classes of programming problems.

CS402.CEO.4: Utilize Machine learning concepts in Python using problem solving approach by working on real time cases and in class programming assignments.

CS402.CEO.5: Develop code in support of Machine learning solutions in Python.

CS402.CEO.6: Evaluate and debug various learning algorithms

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

CS402.CO.1: Apply python to build various machine learning application.

CS402.CO.2: Interpret the fundamental issues and challenges of machine learning: data, model selection, model complexity.

CS402.CO.3: Identify the strengths and weaknesses of many popular machine learning approaches.

CS402.CO.4: Analyze the underlying mathematical relationships within and across Machine Learning algorithms and the paradigms of supervised and un-supervised learning.

CS402.CO.5: Design and implement various machine learning algorithms in a range of real-world applications.

**Guidelines for Laboratory Conduction :**

The assignments to be framed by understanding the prerequisites, technological as- pects, utility and recent trends related to the topic. All problem statements or the assignments are based on real world problems/applications. In addition to these, in- structor can assign one real life application in the form of a mini-project based on the concepts learned. Instructor may also set one assignment or mini-project that is suitable to respective branch beyond the scope of syllabus. Team of 3 to 4 students may work on mini-project. During the assessment, the expert evaluator should give the maximum weightage to the satisfactory implementation and software engineering approach followed .The supplementary and relevant questions may be asked at the time of evaluation to test the student's for advanced learning, understanding, effective and efficient implementation and demonstration skills.

| **Module** | **Python and Machine Learning** | **36 HOURS** |
|---|---|---|
| Prerequisite: Python Course<br>Content<br>Understanding Data Analytics, Importance of data in business, Data analytics ecosystem, Basis of Python programming, Basics of Python, Variables and Operators, Data types, Lists, Dictio- nary and Functions, Programming in Python, Introduction to Machine learning, python Libraries, Numpy, Scikit, Pandas, Matplotlib, Data Visualization, Supervised learning, Linear Regression, Logistic Regression, Decision Tree, Naive Bayes, K Nearest Neighbor, Random Forest, Dimension- ality Reduction, Gradient Boosting algorithms, Support Vector Machine, Unsupervised learning, Clustering techniques – K means clustering , Association Rule Learning, Natural Language Pro- cessing<br>**Beneftts:** 1.Placement Opportunities | | |

| **PRACTICAL List** | | |
|---|---|---|
| **Practical No.01** | | **4 HOURS** |
| Perform data processing and cleaning of dataset using Python. | | |
| **Practical No.02** | | **4 HOURS** |
| Create a machine learning model using Linear Regression (Example : Salary Prediction). | | |
| **Practical No.03** | | **4 HOURS** |
| Create a machine learning model using multiple linear regression (Example : Flight elay Data For July 2014. | | |
| **Practical No.04** | | **4 HOURS** |
| Create a machine learning model using Decision Tree (Example : Position of an Employee as per salary). | | |
| **Practical No.05** | | **4 HOURS** |
| Create a machine learning model using K Means Clustering Algorithm. | | |

| **Practical No.06** | | **4 HOURS** |
|---|---|---|
| Create a machine learning model using Market Basket analysis. | | |
| **Practical No.07** | | **4 HOURS** |
| Create a natural language processing model (Example : Customer purchasing).<br>m | | |

| **Mini Project** | | **8 HOURS** |
|---|---|---|
| **Note:** Data sets should be real time data sets like heart disease, Airline, etc. | | |

**REFERENCE**


1. Daniel Nedal, "Python Machine Learning from Scratch", AI Sciences paperback edition 2016, ISBN-13: 9781720649496
2. Chris Albon, "Machine Learning with Python Codebook", O'REILLY Paperback, 2018, ISBN-13: 1491989388

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY** | **W.E.F** | **AY:** 2019-20 |
| **FINAL YEAR BACHELOR OF TECHNOLOGY INFORMATION TECHNOLOGY** | **COURSE NAME** | Advanced Software Skill Development Lab |
| | **COURSE CODE** | CS403 |
| | **COURSE CREDITS** | 2 |
| **RELEASED DATE :** 01/01/2019 | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** | | **EVALUATION SCHEME :** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | | PRESENTATION/ | TOTAL |
| LECTURE | PRACTICAL | ICE | ECE | IA | PRACTICAL | DEMONSTRATION | |
| – | 4 | – | – | – | – | 75 | 75 |

**AIM:**

To provide technical skills, for sharpening the students to enable them to meet the techno-socio-economic challenges.

**COURSE OBJECTIVES :**

CS403.CEO.1:To play role of Business Intelligent Analyst and Data Scientist in Data Analytics Life Cycle.
CS403.CEO.2:To acquire the skills of Analytics in R Programming.
CS403.CEO.3:To perform graphical analysis using Data Visualization tools and techniques.
CS403.CEO.4:To perform analytics for improvement of Business Process.
CS403.CEO.5:To implement application using IDLE tools..

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

CS403.CO1:Perform the analytics in R on real time data sets.
CS403.CO2:Analyze the real time data with graphical visualization.
CS403.CO3:Generate the different types of analytics reports.
CS403.CO4:Develop the models using analytics for BI Process.
CS403.CO5:Test and validate developed prototype against the original requirements of the problem.
CS403.CO6:Use Tableau Visualization effectively for Data Analytics..

**Guidelines for Laboratory Conduction**

The assignments to be framed by understanding the prerequisites, technological aspects, utility and recent trends related to the topic. All problem statements or the assignments are based on real world problems/applications. In addition to these, instructor can assign one real life application in the form of a mini-project based on the concepts learned. Instructor may also set one assignment or mini-project that is suitable to respective branch beyond the scope of syllabus. Team of 3 to 4 students may work on mini-project. During the assessment, the expert evaluator should give the maximum weightage to the satisfactory implementation and software engineering approach followed. The supplementary and relevant questions may be asked at the time of evaluation to test the student's for advanced learning, understanding, effective and efficient implementation and demonstration skills.

**Module: R Programming**

**Prerequisite:** Database Management System

**Industry Expert:** Ms. Shobha Mourya

**Course Instructor:** Ms. Shobha Mourya Mr.Jayvant Devare

**Course Content**

Basics of R Programming: Installation, Reading and Getting Data into R, Constructing Data Objects, Data: Descriptive Statistics and Tabulation, Data: Distribution, Simple Hypothesis Testing, Introduction to Graphical Analysis, Formula Notation and Complex Statistics, Manipulating Data and Extracting Components, Regression model, Advanced Graphs, Writing your scripts in R, Introduction of data science, Visualization, Introduction to Tableau, Navigating Tableau, Advanced Data Mining With Tableau, Creating bins Visualizing distributions, Modeling.

**Beneftts:**

1. Dell EMC Certification (optional)
2. Placement Opportunities.

| **PRACTICAL List** | | |
|---|---|---|
| **Practical No.01** | | **4 HOURS** |
| Installing and loading R packages, set/get working directory. | | |
| **Practical No.02** | | **4 HOURS** |
| Import datasets using readr package and explore datasets using dplyr functions. | | |
| **Practical No.03** | | **4 HOURS** |
| Creating subsets from datasets using filter conditions. | | |
| **Practical No.04** | | **4 HOURS** |
| Creating new variables using mutate. | | |
| **Practical No.05** | | **4 HOURS** |
| Analyzing factor variables using frequency and contingency table. | | |
| **Practical No.06** | | **4 HOURS** |
| Analyzing numeric variables using summary command. | | |
| **Practical No.07** | | **4 HOURS** |
| Visualization using ggplot2 package for Bivariate, Univariate and Multi-variate plots.. | | |
| **Practical No.08** | | **4 HOURS** |
| Understanding ggplot layers for plotting graphs. | | |
| **Practical No.09** | | **4 HOURS** |
| Scatter plot, Histogram, Bar chart, Density Plot, Faceting and Scaling. | | |
| **Practical No.10** | | **4 HOURS** |
| Importing and exploring Titanic dataset. | | |
| **Practical No.11** | | **4 HOURS** |
| Data wrangling for Titanic case study. | | |
| **Practical No.12** | | **4 HOURS** |
| Feature engineering for Titanic case study. | | |
| **Mini Project :** | | **8 HOURS** |
| **Note:** Data sets should be real time data sets like heart disease, Airline, etc. | | |

## REFERENCES


1. Mark Gardener, "Beginning R: The Statistical Programming Language", Wiley paperback edition 2013, ISBN: 978-1-118-16430-3.
2. Ohri, "R for Business Analytics", Springer, 2012, ISBN: 978-1-4614-4342-1.
3. Ashutosh Nandeshwar, "Tableau Data Visualization Codebook", Packt publishers, ISBN : 978-1-849-68-978-6.

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY** | **W.E.F** | AY: 2019-20 |
| **FINAL YEAR BACHELOR OF TECHNOLOGY INFORMATION TECHNOLOGY** | **COURSE NAME** | Advanced Software Skill Development Lab |
| | **COURSE CODE** | CS404 |
| | **COURSE CREDITS** | 2 |
| **RELEASED DATE : 01/01/2019** | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** | | **EVALUATION SCHEME :** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | | PRESENTATION/ | TOTAL |
| LECTURE | PRACTICAL | ICE | ECE | IA | PRACTICAL | DEMONSTRATION | |
| – | 4 | – | – | – | – | 75 | 75 |

**AIM:**

To provide technical skills, for sharpening the students to enable them to meet the techno-socio-economic challenges.

**COURSE OBJECTIVES :**

CS404.CEO.1:To play role of Web developer.
CS404.CEO.2:To acquire the skills of Advanced Java.
CS404.CEO.3:To implement application using IDLE tools.

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

CS404.CO1:Identify advance concepts of java programming Servlet and JSP.
CS404.CO2:Design and develop platform independent applications using a variety of component based frameworks
CS404.CO3:Able to implement the concepts of Hibernate EJB for building enterprise applications.

**Guidelines for Laboratory Conduction**

The assignments to be framed by understanding the prerequisites, technological aspects, utility and recent trends related to the topic. All problem statements or the assignments are based on real world problems/applications. In addition to these, instructor can assign one real life application in the form of a mini-project based on the concepts learned. Instructor may also set one assignment or mini-project that is suitable to respective branch beyond the scope of syllabus. Team of 3 to 4 students may work on mini-project. During the assessment, the expert evaluator should give the maximum weightage to the satisfactory implementation and software engineering approach followed. The supplementary and relevant questions may be asked at the time of evaluation to test the student's for advanced learning, understanding, effective and efficient implementation and demonstration skills.

| **Module** | **Advanced JAVA** | **36 HOURS** |
|---|---|---|

**Prerequisite:** CPP

**Industry Expert:** Mr. TusharKute

**Course Instructor:** Mr. TusharKute

**Course Content**

**Basics of Servlets:** ServletRequest, Servlet Collaboration, ServletConfig, ServletContext, Attribute, Session Tracking, Event and Listener, Filter, ServletInputStream and ServletOutputStream, Annotation Servlet

**Basics of JSP:** Scripting elements, Implicit Objects, Directive Elements, Exception Handling, Action Elements, Expression Language, MVC in JSP, JSTL, Custom tags, JavaMail API,

**Java Server Faces2.0** Introduction to JSF, JSF request processing Life cycle, JSF Expression Language, JSF Standard Component, JSF Facelets Tag, JSF Convertor Tag, JSF Validation Tag, JSF Event Handling and Database Access, JSF Libraries: PrimeFaces

**Basics of Struts2:** Core Components, Struts 2 Architecture, Struts2 Action, Struts2 Configuration, Interceptors, Struts 2 Validation, Hibernate with Struts2, Spring with Struts2

**Introduction to JavaEE :** Introduction to EJB3, Developing Session Beans, Using Dependency Injection, JMS, Message Driven Beans, Persistence Introduction to JPA

**Beneftts:**

1. Placement Opportunities.
2. Project

| PRACTICAL List | | |
|---|---|---|
| **Practical No.01** | | **4 HOURS** |
| Write a program using Servlet to display Visitor Count. | | |
| **Practical No.02** | | **4 HOURS** |
| Write a program for authentication, which validate the login-id and password by the servlet code. | | |
| **Practical No.03** | | **4 HOURS** |
| Write a program to read data send by the client (HTML page) using servlet. | | |
| **Practical No.04** | | **4 HOURS** |
| Write a program to read data send by a client (HTML page) using JSP | | |
| **Practical No.05** | | **4 HOURS** |
| Create an Enterprise application using Session Bean (Stateless) which convert the amount from Dollar to Rupees. | | |
| **Practical No.06** | | **4 HOURS** |
| Write a Entity bean to find a student record in student data base using primary key property. | | |
| **Practical No.07** | | **4 HOURS** |
| Write program to demonstrate Java Server Faces | | |
| **Practical No.08** | | **4 HOURS** |
| Write program to demonstrate Java Server Faces – event handling | | |
| **Practical No.09** | | **4 HOURS** |
| Write program to demonstrate EJB2 | | |
| **Practical No.10** | | **4 HOURS** |
| Write program to demonstrate Struts2 and Spring | | |
| **Practical No.11** | | **4 HOURS** |
| Write a program to query record based on primary key using Hibernate. | | |
| **Practical No.12** | | **4 HOURS** |
| Write a program using Hibernate to develop classes and Hibernate configuration to persist an EventManager application. The classes in EventManager are | | |
| **Mini Project :** | | **8 HOURS** |
| **Note:** Mini Project Group of 2-3 students | | |

**REFERENCES**


1. Kogent Learning Solutions,"JAVA Server Programming JAVA EE7",DreamTech paperback edition 2014, ISBN: 978-1-118-16430-3.
2. Hans Bergsten, "Java Server Pages", Oreilly, 2012, ISBN: 978-1565927469.
3. Kahy Sierra, Bert Bates, "Head First EJB", Oreilly, Paperback 2017, ISBN : 978-8173665264

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY** | **W.E.F** | **AY:** 2019 - 2020 |
| **FINAL YEAR BACHELOR OF TECHNOLOGY INFORMATION TECHNOLOGY** | **COURSE NAME** | Major Project - I |
| | **COURSE CODE** | IT402 |
| | **COURSE CREDITS** | 4 |
| **RELEASED DATE :** 01/01/2019 | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | TERMWORK | PRESENTATION/ DEMONSTRATION | TOTAL |
| LECTURE | PRACTICAL | ICE | ECE | IA | | | |
| - | 8 | – | – | – | 100 | 50 | 150 |

**PRE-REQUISITE :**

1. IT213 : Minor Project
2. IT324 : Mini Project

**COURSE OBJECTIVES :**

IT402.CEO.1:To implement the idea/ real time industrial problem/ current application from engineering domain

IT402.CEO.2:To evaluate an alternative approaches and justify the use of selected tools and methods

IT402.CEO.3:To inculcate skills in engineering product design and development process, budgeting, Planning, testing, effective trouble-shooting practices.

IT402.CEO.4:To understand the roles and responsibility, accountability and learn team work ethics

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

IT402.CO1:Solve real life problems by applying the knowledge and problem solving ability.

IT402.CO2:Analyze alternative approaches, find feasible solution and apply most appropriate one.

IT402.CO3:Use standard engineering tools and processes for analysis, design, simulation, testing, Implementation and deployment of idea into practice.

IT402.CO4:Participate effectively in multidisciplinary and heterogeneous teams exhibiting team work, inter-personal Relationship, conflict management and leadership quality.

PREAMBLE:

objective of this Major Project-I course is to understand the Product Development through team work. The students will able to shoulder the roles and responsibility and activity distribution amongst them. The students will learn designing, budgeting, planning, engineering skills and processes, testing and effective trouble-shooting practices, safety norms and standards while developing the application/ product. The students will deliver a presentation on the advancement in Technology pertaining to the selected project topic and able to understand importance of document design and professional ethics.

GUIDELINES:

Project work stage –I is an integral part of Project work. In this, the student shall complete the partial work of project, consist of problem statement, literature survey, Project specification and planning. The students expected to complete the project at least up to the design phase. As a part of project phase-I, candidate shall appear for two reviews and delivered the presentation on the advancement of selected project topic. The student shall submit the duly certified project report in standard format for satisfactory completion of work by the concern Advisor and Dean of the School.

The examinee will be assessed by panel of examiner of which one is necessarily as a external examiner. The assessment will be broadly based on work undergone, content delivery, presentation skills, documentation, question answer and report.

**Preparation of the Literature survey paper and communicating and publishing in relevant publishing agency agency is recommended. Bonus 10 marks will be awarded.**

**Follow the guideline and formats as mentioned in guideline document Annexure-I.)**

TIMELINE

1. Formation of Project Group: 2 Weeks (1st ,2nd week)
2. Presentation of Project Review -1- Finalizing title with feasibility study and approval: 2 Weeks (3rd, 4th week)
3. Presentation of Project Review -2 Analysis and Design of Project: 2 weeks (7th, 8th week)
4. Preparation of Project Progress Report – I (week 9th and 10th)
5. Project Phase-I Evaluation by external examiner ( End Semester by 12th, 13th week)

**ASSESSMENT**

**1. Internal Assessment (TW)**

a. Project Review -1 Project Approval -30 Marks

b. Project Review -2 Analysis and Design- -30 Marks

c. Project Review -3 Project progress Report-I and Presentation - 40 Marks

d. Paper publication/IPR -10 marks (Bonus)

**2. Examination: Final Demonstration and presentation**

a. Project presentation: 15 Marks

b. Project design / execution / demonstration : 20 Marks

c. Project Report preparation and documentation: 15 Marks

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY** | **W.E.F** | **AY:** 2019 - 2020 |
| **FINAL YEAR BACHELOR OF TECHNOLOGY INFORMATION TECHNOLOGY** | **COURSE NAME** | Human Computer Interactions |
| | **COURSE CODE** | CS431 |
| | **COURSE CREDITS** | 4 |
| **RELEASED DATE : 0**1/01/2019 | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | TUTORIAL/ PRACTICAL | PRESENTATION/ DEMONSTRATION | TOTAL |
| LECTURE | PRACTICAL | ICE | ESE | IA | | | |
| 3 | 2 | 30 | 40 | 30 | – | 50 | 100 |

**PRE-REQUISITE :**

1.IT201 Engineering Informatics

2.CS301 Operating System

**COURSE OBJECTIVES :**

CS431.CEO.1:To apply the foundations of Human Computer Interaction.

CS431.CEO.2:To Understand the design technologies for individuals and persons with disabilities.

CS431.CEO.3:To apply the guidelines for user interface.

**COURSE OUTCOMES :**

The students after completion of the course will be able to

CS431.CO.1:Design effective dialog for HCI.

CS431.CO.2:Design effective HCI for individuals and persons with disabilities.

CS431.CO.3:Understand the HCI implications for designing multimedia/ ecommerce/ e-learning Web sites.

CS431.CO.4:Develop meaningful user interface.

| THEORY COURSE CONTENT | | |
|---|---|---|
| **UNIT 1** | **Foundation of HCI** | **8 HOURS** |
| **App/System/Case study**:<br>Automatic syringe: setting the dose to 1372. The effect of one key slip before and after user involvement<br>**Content:** Why Human Computer Interaction, What is HCI,Design focus:Human input output channels, Skill acquisition, Design Focus: Machine I/O Channels and Skill acquisition, limitations of interactive performance, models of interactions<br>**Self-Study:** Psychology and the design of Interactive systems | | |
| **UNIT 2** | **Framework and HCI** | **8 HOURS** |
| **App/System/Case study:**<br>ATM machine<br>**Content:**<br>Ergonomics, Interaction Styles, Interactivity, Context of Interaction, HCI Paradigm: Time sharing, video display unit, programming tool kits, Personal computing, The metaphor, sensor based and context aware interfaces<br>**Self-Study:** Ubiquitous Computing<br>**Further Reading:** Agent based Interfaces | | |
| **UNIT 3** | **Design Process** | **8 HOURS** |
| **App/System/Case study:**<br>Product prototype development<br>**Content:**<br>What is Design, Process of Design, User focus, Scenarios, Navigation Design, Screen design and layout, HCI in software process: interactive systems and SDLC, Design rules: golden rules and Heuristics, HCI pattern<br>**Self-Study:** Interactive design and Prototyping<br>**Further Reading:** Design rationale | | |

| UNIT 4 | Evaluation and Support | 8 HOURS |
|---|---|---|

**App/System/Case study:**
application development for users with disabilities

**Content:**
Implementation Support, UI management system, Evaluation Techniques: Goals, evaluation through experts, model based evaluation, user participation in evaluation, universal design: design principles, multimodal interactions: sound, touch, handwriting, gesture,

**Self-Study:** Heuristic evaluation

**Further Reading:** User support

| UNIT 5 | Models and Theories | 8 HOURS |
|---|---|---|

**App/System/Case study:**
Mobile User Interfaces

**Content:**
Cognitive model: model theory, linguistic models, Physical and device models, Communication and Collaborative models: face to face model, Text based model

**Self-Study:** Computer Mediated Communication

**Further Reading:** Modeling Rich Interactions

**PRACTICAL:**: Perform following experiments using Open source tools

Note: Following are the reference case studies, can be changed with other appropriate examples with same level.

| PRACTICAL NO.1 | Mini Project | 22 Hrs |
|---|---|---|
| | 1. Students need to work on user requirements, UI requirements | 04 |
| | 2. Work on ergonomics and context interaction | 04 |
| | 3. Development of prototype | 10 |
| | 4. Evaluation of all sort of interfaces used in the project | 04 |

## TEXT BOOK

1. Alan Dix, Janet Finlay" Human Computer Interaction" 3rd Edition, Pearson publication, ISBN 0130461091

## REFERENCE BOOK

1. Kent Norman, JurekKirakowski "Handbook of Human Computer Interaction" Wiley Publication, ISBN 9781118976135
2. Helen Sharp, Jenifer Preece" Interaction Design beyond Human Computer Interaction" 5th Edition, ISBN 978-1119547259

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY** | **W.E.F** | **AY:** 2019 - 2020 |
| **FINAL YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING** | **COURSE NAME** | Distributed System |
| | **COURSE CODE** | CS 441 |
| | **COURSE CREDITS** | 3 |
| **RELEASED DATE : 01/01/2019** | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EVALUATION SCHEME** | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | THEORY | | | PRACTICAL | PRESENTATION/ DEMONSTRATION | | TOTAL |
| LECTURE | PRACTICAL | ICE | ECE | IA | | | | |
| 3 | | 30 | 40 | 30 | | | - | 100 |

**PRE-REQUISITE: :**

1. CS301- Operating System
2. CS323-Computer Network

**COURSE OBJECTIVES :**

CS441.CEO.1:To Understand design issues of distributed system.

CS441.CEO.2:To Analyze algorithm for communication, security and synchronization in distributed system.

CS441.CEO.3:To Provide an exposure to commercial distributed applications / tools / technologies.

**COURSE OUTCOMES :**

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

CS441.CO1:Classify distributed system models and architectures.

CS441.CO2:Explain design issues of distributed system.

CS441.CO3:Design distributed applications using distributed communication models.

CS441.CO4:Analyze different algorithms for concurrency and synchronization of distributed system.

CS441.CO5:Analyze the performance of distributed system based on fault tolerance, security, scalability.

| THEORY | | |
|---|---|---|
| **UNIT 1** | **Introduction of Distributed System** | **5 HOURS** |
| **Application/ Case Study/ System:** Distributed Reddening in Gaming, Online Gaming<br>**Contents:**<br>Distributed System Definition, Goals, Types, System Architecture, Trends in Distributed Systems<br>**Self-Study:** Amoeba<br>**Further Reading:** CODA | | |
| **UNIT 2** | **Communication** | **6 HOURS** |
| **Application/ Case Study/ System:** SunRPC<br>**Contents:**<br>MPI, Message Oriented Communication, Stream Oriented Communication, Multicast Communication<br>**Self-Study:** JavaRMI<br>**Further Reading:** IBM's Web sphere Message Passing | | |
| **UNIT 3** | **Synchronization** | **8 HOURS** |
| **Application/ Case Study/ System:** Distributed Camera System<br>**Contents:**<br>Clock Synchronization-Physical Clock, Clock Synchronization Logical Clock- lamport, Vector, Mutual Exclusion, Election Algorithm, Consensus and Agreement Algorithm<br>**Self-Study:** Trace Synchronization<br>**Further Reading:** Paxos | | |
| **UNIT 4** | **Consistency Replication** | **8 HOURS** |
| **Application/ Case Study/ System:** Amazon's Dynamo<br>**Contents:**<br>Need of Replication, Replication as scaling techniques, Data centre consistency model, Client centre consistency model, Consistency Protocol<br>**Self-Study:** Replica Management<br>**Further Reading:** View Stamped Replication. | | |
| **UNIT 5** | Fault Tolerance | **7 HOURS** |
| **Application/ Case Study/ System:** Fault tolerance in RAFT, Zookeeper<br>**Contents:**<br>Faulty System, Failure Models, Failure Techniques, Reliable Client Server Communication, Reliable Group Communication, Distributed Communication, Recovery.<br>**Self-Study:**Fault Tolerance in Spark<br>**Further Reading:** Handling Byzantine Failure | | |

| UNIT 6 | Distributed System Security | 6 HOURS |
|---|---|---|

**Application/ Case Study/ System:** Kerberos

**Contents:**

Design issue of Distributed System, Secure Channels, Access Control, Firewall, Secure Mobile Code, DOS

**Self-Study:** Secure Management , JINI

**Further Reading:** Security in Block Chain

**TEXT BOOK**


1. Andrew.S.Tanenbaum, Maarten Van Steen, Distributed Systems –Principles and Paradigms, Third Edition, Prentice Hall -2016. ISBN-9788120322158.
2. Coulouris, J. Dollimore, and T. Kindberg, Distributed Systems: Concepts and Designs, Fifth Edition, Addison Wesley, 2012.ISBN- 9780132143011.


**REFERENCES:**


1. Mukesh Singal, Advanced Concepts in operating System, Mcgraw Hill, ISBN-9780070472686.
2. Pradeep K. Sinha," Distributed Operating Systems: Concepts and Design", Prentice Hall India Learning Private Limited , ISBN-978-8120313804.

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY** | **W.E.F** | **AY:** 2019 - 2020 |
| **FINAL YEAR BACHELOR OF TECHNOLOGY INFORMATION TECHNOLOGY** | **COURSE NAME** | IoT and Wireless Sensor Network |
| | **COURSE CODE** | IT442 |
| | **COURSE CREDITS** | 3 |
| **RELEASED DATE : 01/01/2019** | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | TUTORIAL/ PRACTICAL | PRESENTATION/ DEMONSTRATION | TOTAL |
| LECTURE | PRACTICAL | ICE | ECE | IA | | | |
| 3 | - | 30 | 60 | 10 | - | - | 100 |

**PRE-REQUISITE :** 1. ME103 : Design Thinking 2. IT203 : Computer Network Technology

**COURSE OBJECTIVES :**

IT442.CEO.1:Understand the Architectural overview of IoT and WSN.
IT442.CEO.2:Make use of suitable communication protocols
IT442.CEO.3:Analyze various design principles
IT442.CEO.4:Apply the IoT concepts in Real World problems.

**COURSE OUTCOMES :**

The Students after completing the course will be able to,

IT442.CO.1:Understand the concept of Internet of Things and Wireless Sensor Network
IT442.CO.2:Analyze basic protocols in Wireless Sensor Network
IT442.CO.3:Design IoT applications in different domain and able to analyze their performance.
IT442.CO.4:Implement IoT applications.

| THEORY COURSE CONTENT | | |
|---|---|---|
| **UNIT 1** | **Introduction to Internet of Things** | **6 HOURS** |

**Application/System/Case Study:**

Introduction :- Internet of Things, characteristics of IoT, IoT conceptual framework, IoT architectural view, functional blocks of IoT, technology and sources of IoT M2M – difference between machine to machine (M2M) and IoT, M2M communication, modified OSI model of IoT/M2M systems, M2M and IoT analytics

**Self-Study:** Devices and gateways, LAN and WAN

**Further Reading:** Standard considerations IoT

| UNIT 2 | Overview of Wireless Sensor Network | 7 HOURS |
|---|---|---|

**App/System/Case Study:**

Wireless Sensor Network application in Agriculture use of various sensors

Introduction – Wireless Sensor Network, enabling technologies for Wireless sensor network, challenges for WSN Architecture – Single node architecture, Hardware Components, Energy Consumption of Sensor Nodes, Operating Systems and Execution Environments, Network Architecture-Sensor Network Scenarios, Optimization Goals and Figures of Merit, Design principles for WSNs, Service interfaces of WSNs Gateway Concepts.

**Self-Study:** Difference between WSN and IoT

**Further Reading:**Wireless Sensor Network application in Healthcare.

| UNIT 3 | Architecture and Design Principles for IoT. | 7 HOURS |
|---|---|---|

**App/System/Case Study:**

Designing IoT based Home monitoring system for assisting diabetes patients.

**Contents:**

IoT System Architectures – Elements of IoT architecture, Device management, User management, Security monitoring Data Collection, Data Aggregation, Analyzing Data, Acting on Data, Storage and Computing using a Cloud Platform: Introduction, Cloud computing paradigm for data collection, storage and computing, Cloud service models, IoT Cloud- based data collection, storage and computing services using Nimbits

**Self-Study:** Various ways to collect data for IoT

**Further Reading:**Security issues in IoT

| UNIT 4 | Internet of Things Protocols and Standards. | 8 HOURS |
|---|---|---|

**App/System/Case Study:**

Architecture and Protocols in IoT (IEEE)

**Contents:**

Data Link Layer - IEEE 802.11, IEEE 802.15, IEEE 802.15-4, A-Wave, Bluetooth, Zegbee, Z-Wave, LoRaWAN, Wireless HART Network Layer Routing Protocols – IPv4, IPv6, 6LoWPAN Transport Layer Protocols, Transport Layer protocols – TCp, UDP, SCTP Session Layer Protocol – CoAP, XMPP, DDS, MQTT IoT management protocols, Security in IoT protocols – MAC 802.15.4, 6LoWPAN. **Self-Study:** Wi-Fi

**Further Reading:**Near Field Communication(NFC), Sigfox protocols

| UNIT 5 | Prototyping and Designing Software for IoT Applications | 8 HOURS |
|---|---|---|

**App/System/Case Study:**Case study - Home Automation using Arduino / Raspberry Pi

**Contents:** Introduction, Prototyping Embedded device software, Programming Embedded Device Arduino Platform using IDE, Raspberry pi, Reading data from sensors and devices, Devices, Gateways, Internet and Web services software development. Programming MQTT clients and MQTT server. Introduction to IoT privacy and security. Vulnerabilities, security requirements and threat analysis, IoT Security Tomography and layered attacker model.

**Self-Study:**Application for development of connected cars

**Further Reading:**IoT Symmetric and non symmetric encryption standards+

| UNIT 6 | Recent Trends and Internet of Everything (IoE). | 6 HOURS |
|---|---|---|

**App/System/Case Study:**

Internet of Everything case study – Goldcorp by CISCO

**Contents:**Recent Trends – IoT and Blockchain, IoT- Healthcare, IoT - Bigdata, IoT-Artificial Intelligence Introduction to IoE, Pillars of IoE, Difference between IoT and IoE, Impact of IoE on Business

**Self-Study:** IoT in Various sectors

**Further Reading:**Recent trends in IoT and IoE

**TEXT BOOK:**


1. Arshdeep Bahga, Vijay Madisetti, "Internet of Things - Hands-on Approach", Orient Blackswan, 2015, ISBN 978-8173719547.
2. Olivier Hersent, David Boswarthik "The Internet of Things – Applications and Protocols", Wiley Publications, 2015, ISBN – 9788126557653.
3. Rajkumar Buyya, Amir Dustjerdi, "Internet of Things – Principles and Paradigms" , Morgan Kaufmann, 2016, ISBN - 978-8173739564


**REFERENCES:**


1. DieterUckelmann, MarkHarrison "Architecting the Internet of Things", Springer
2. Peter Cocovic, Reinhold Behringer, "Emerging Trends and Application in Internet of Things", IGI Global, 2017, ISBN- 978-1522524373.
3. Hanes Divid, Salgueiro Gonzalo, "IoT Fundamentals – Networking Technologies, Protocols and use cases of IoT", Pearson, 2017, ISBN - 978-9386873743..

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY** | **W.E.F** | **AY:** 2019 - 2020 |
| **FINAL YEAR BACHELOR OF TECHNOLOGY INFORMATION TECHNOLOGY** | **COURSE NAME** | Computer Graphics and Multimedia Technique |
| | **COURSE CODE** | IT 443 |
| | **COURSE CREDITS** | 3 |
| **RELEASED DATE :** 01/01/2019 | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EVALUATION SCHEME** | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | THEORY | | | PRACTICAL | PRESENTATION/ DEMONSTRATION | | TOTAL |
| LECTURE | PRACTICAL | ICE | ECE | IA | | | | |
| 3 | | 30 | 40 | 30 | | | - | 100 |

**PRE-REQUISITE: :**

1. CS201- Data File Structures
2. CP-Computer Programming

**COURSE OBJECTIVES :**

IT443.CEO.1: To acquaint the learners with the basic concepts of Computer Graphics.
IT443.CEO.2: To learn the various algorithms for generating and rendering graphical figures
IT443.CEO.3: To get familiar with mathematics behind graphical transformations
IT443.CEO.4: To understand various methods of clipping and fractals.
IT443.CEO.5: To understand various methods of clipping and animation.
IT443.CEO.6: To understand multimedia system.

**COURSE OUTCOMES :**

Students successfully completing the course will be able to,

1.IT443.CO.1:To apply mathematics to develop Computer graphics programs for elementary graphic operations. (Apply)

1.IT443.CO.2:To develop scientific and strategic approach to solve complex problems in the domain of Computer Graphics. (Apply)

1.IT443.CO.3:To develop programs on 2D and 3D transformation(Apply).

1.IT443.CO.4:To apply various methods and techniques for projection (Apply).

1.IT443.CO.5:To Apply the logic to develop programs on clipping,and animation(understand).

1.IT443.CO.6:To understand Multimedia Techniques

| THEORY | | |
|---|---|---|
| **UNIT 1** | **Graphics primitives and Scan conversion** | **6 HOURS** |

**Application/ Case Study/ System:** Display devices –Radar displays, LCD, LED, HDTV

**Contents:**

Introduction to Computer Graphics, Definition: Pixel, Frame buffer, Aspect ratio, Resolution Primitives: Lines, Line segments, vectors Display file: Display file structure, Display file interpreter Line drawing algorithms: Digital Differential Analyzer (DDA), Bresenham Circle drawing algorithm: Bresenham, Midpoint algorithm Character generating method: Stroke and bitmap method

**Self-Study:** Line styles: Thick, dotted and dashed, DDA circle drawing algorithm

**Further Reading:** Raster refresh Displays, CRT basics, Video basics, Flat panel Displays

| **UNIT 2** | **Polygon, Windowing and Clipping** | **6 HOURS** |
|---|---|---|

**Application/ Case Study/ System:** Application of clipping algorithm in video games

**Contents:**

Definition, Types of polygon, Convex and Concave, Representation of polygon, inside test of polygon, Polygon filling algorithms: Flood fill, Seed fill and scan fill algorithm Windowing: Definition of window, viewport, viewing transformation Clipping: Cohen Sutherland outcode algorithm, Sutherland Hodgeman algorithm

**Self-Study:** Self intersecting polygon

**Further Reading:** Cyrus-Beck Clipping

| **UNIT 3** | **Graphics Programming using OPENGL** | **6 HOURS** |
|---|---|---|

**Application/ Case Study/System:**Texture Filtering.

Contents:

Introduction to OpenGL, Features in OpenGL, OpenGL operations, Abstractions in OpenGL – GL, GLU GLUT, 3D viewing pipeline, viewing matrix specifications, a few examples and demos of OpenGL programs.

**Self-Study:** OpenGL Polygon Rasterization.

Further Reading:Illumination using OpenGL

| **UNIT 4** | **Geometric Transformation** | **6 HOURS** |
|---|---|---|

**Application/ Case Study/ System:** Animation

**Contents:**

2D transformation: Introduction, matrices of Translation, scaling and rotation, Homogeneous coordinates, Rotation about an arbitrary point, Shear transformation, Reflection about X axis, Reflection about Y axis and Reflection about X=Y axis 3D Transformation: Introduction, Translation, Rotation about X axis, Y axis and Z axis Projection: Parallel and Perspective projection

**Self-Study:** Classification of projection

**Further Reading:** 3D viewing, 3D clipping

| UNIT 5 | Segment and Animation | 6 HOURS |
|---|---|---|

**App/System/Case study:** Animation in medical, Architecture

**Contents:**

Segment table, Segment creation, closing a segment, deleting a segment, visibility Introduction to animation, Design of Animation sequences, Animation languages, Animation guidelines, Key frame, Computer based animation

**Self Study:** Morphing

**Further Reading:** Colour models RGB,CMY HSV

| UNIT 6 | **Multimedia Systems Design** | 6 HOURS |
|---|---|---|

**App/System/Case study:** Multimedia and web

**Contents:**

An Introduction, Multimedia applications , Multimedia System Architecture, Evolving technologies for Multimedia, Defining objects for Multimedia systems, Multimedia Data interface standards, Multimedia Databases.

**Self Study:**Multimedia I/O technologies

**Further Reading:** Distributed Multimedia Systems.

**TEXT BOOK**


1.D. Hearn and M. Baker “Compute Graphics”,2nd Edition,Pearson Education,2002,ISBN-7808-794-4

2.D.Hearn, Computer Graphics with OpenGL”,4th Edition,ISBN-139780136053583


**REFERENCES:**


1.S. Harrington, Computer Graphics”, 2nd Edition, McGraw-Hill Publications,1987,ISBN 0-07-100472-6

2.D. Rogers, ”Procedural Elements for Computer Graphics”,2nd Edition, Tata McGraw-Hill publication,2001,ISBN 0-07-047371-4.

3.D.Rogers, J.Adams, Mathematical Elements for Computer Graphics”, 2nd Edition, Tata McGraw-Hill publication,2002,ISBN 0-07-048677-8.

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF HUMANITIES AND ENGINEERING SCIENCES** | **W.E.F** | **AY:** 2019 – 2020 |
| **FOURTH YEAR BACHELOR OF TECHNOLOGY All Branches** | **COURSE NAME** | Sociology |
| | **COURSE CODE** | HP402 |
| | **COURSE CREDITS** | 2 |
| **RELEASED DATE :** 01/06/2019 | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | TUTORIAL/ PRACTICAL | PRESENTATION/ DEMONSTRATION | TOTAL |
| LECTURE | PRACTICAL | MSE | ESE | IA | | | |
| 1 | NIL | NIL | 50 | 20 | NIL | NIL | 70 |

**PRE-REQUISITE :** NIL

**COURSE OBJECTIVES :**

HP402.CEO.1:The course focuses on the society in India with an attempt to acquaint students with sociology as a social science and the distinctiveness as a social science.

HP402.CEO.2:It displays the relevance and significance of sociology in understanding the society and in attempting to solve its problems.

HP402.CEO.3:Many of the Sociological Changes are an answer to the age-old social norms and practices giving rise to a solution which is critical to social issues and problems.

HP402.CEO.4:The course sensitizes students to the emerging social issues and enables them to acquire sociological understanding of these issues with an ability to answer the problems.

HP402.CEO.5:Projects in Sociology are tools that facilitate the construction of knowledge in imparting the right attitude towards social issues .

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

HP402.CO.1:Get acquainted to sociology as a social science.

HP402.CO.2:Explain the significance of sociology in solving problems.

HP402.CO.3:Derive solutions to critical social issues.

HP402.CO.4:Change their attitude towards social issues.

| THEORY | | |
|---|---|---|
| **UNIT 1** | **Introduction to Sociology** | **6 HOURS** |
| The nature of Sociology, meaning of Sociology: Origin, Definition, Scope, Culture, meaning, components, beliefs, values, norms, technology, diversity, towards a global culture. | | |
| **UNIT 2** | **Sociolization** | **5 HOURS** |
| Socialization, Agents of Socialization, Heredity and Environment, Group, Social structure, Status and role, family, school, peer group, media, adult socialization, resocialization, Role of Social moments, Illustrations: Women, Tribal & Dalit Movements .<br>**Further Reading:** | | |
| **UNIT 3** | **Nature and factors of Social Change** | **5 HOURS** |
| Change: Meaning. Nature and factors of Social Change: Biological Factors. Demographic Factors, Technological Factors, Economic Factors Cultural Factors, Info-tech factors, Meaning of Gender sensitization, Discrimination, violence and Abuse.<br>**Further Reading:** | | |
| **UNIT 4** | **Visions of Social Change in India** | **4 HOURS** |
| Idea of development planning and mixed economy, Constitution, law and social change, Education and social change.<br>**Further Reading:** | | |
| **UNIT 5** | **Works and Economic Life** | **4 HOURS** |
| Social organization of work in different types of society- slave society, feudal society, industrial /capitalist society. Formal and informal organization of work. Labour and society.<br>**Further Reading:** | | |
| **UNIT 6** | **Introduction to Applied sociology** | **4 HOURS** |
| The use of Sociology: Introduction to applied Sociology-Sociology and social problems, Ecology and Environment: Pollution, Global warming and Greenhouse effect. Impact of Industrialization and Urbanization on Environment. | | |

**REFERENCE BOOKS**


1. T.B. Bottomore, Sociology: A Guide to Problems and Literature, Blackie and Sons Publishers, 1978, ISBN:978-0043000267
2. Sociology: A guide to problems and literature. Bombay: George Allen and Unwin (India): Harlambos, M.1998. ISBN: 978-0043000267
3. Sociology: Themes and perspectives. New Delhi Oxford University Press.: Inkeles, Alex, 1987
4. What is Sociology, Madras: Macmillan, India: Johnson, Harry M. 1995.
5. Sociology: A Systematic Introduction. New Delhi, Allied Publishers. ISBN: 978-8170231370 .

| MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU) | **COURSE SYLLABI (2016 – 2020)** | |
|---|---|---|
| **SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY** | **W.E.F** | **AY:** 2019 – 2020 |
| **FINAL YEAR BACHELOR OF TECHNOLOGY INFORMATION TECHNOLOGY** | **COURSE NAME** | Major Project – II |
| | **COURSE CODE** | IT432 |
| | **COURSE CREDITS** | 4 |
| **RELEASED DATE :** 01/01/2019 | **REVISION NO** | 0.0 |

| **TEACHING SCHEME** (HOURS/WEEK) | | **EXAMINATION SCHEME AND MARKS** | | | | | |
|---|---|---|---|---|---|---|---|
| | | THEORY | | | PRACTICAL/ | PRESENTATION/ | TOTAL |
| LECTURE | | MSE | ESE | IA | TERMWORK | DEMONSTRATION | |
| - | 8 | – | – | – | 100 | 50 | 150 |

**PRE-REQUISITE :** IT402 Major Project– I

**COURSE OBJECTIVES :**

IT432.CEO.1:To follow the standard guideline to meet the objective for development of Project.
IT432.CEO.2:To test rigorously before deployment of Systems
IT432.CEO.3:To Verify and Validate the work Undertaken
IT432.CEO.4:To Consolidate the work and preparation of final report

**COURSE OUTCOMES :**

The students after completion of the course will be able to,

IT432.CO1:Show the evidence of independent evaluation.
IT432.CO2:Critically analyzed the result and their implementation methodology.
IT432.CO3:Validate the results with standard tools and techniques.
IT432.CO4:Understand the importance of documentation and report writing.

PREAMBLE:

objective of this Major Project-II to implement the full and final project and the report. After The remaining project work which consist of selection of approach / methodology / tools and techniques, Designing, installation, results and performance evaluation. Also includes the comparative analysis and validation of result. Should prepare the Project report as per format for satisfactory completion of work certified by concern project advisor and dean. .

**It is desirable to prepare and publish the conference or journal paper or IPR and publish with peer reviewed publishing agency. 10 marks will be awarded.:**

**Follow the guideline and formats as mentioned in guideline document.(Annexure-II):**

GUIDELINES:

In Project Work Stage-II, the student shall complete the remaining project work which consists of Selection of Methodology, Tools and Technology, Installations, Design, Implementations, testing, Results, performance analysis if applicable (discussions using data tables per parameter considered for the improvement with existing/known algorithms/systems) and comparative analysis and validation of results and conclusions. The student shall prepare and submit the report of Project work in standard format for satisfactory completion of the work that is the duly certified by the concerned advisor and Dean of the school.

**It is desirable to prepare and publish the conference or journal paper or IPR and publish with peer reviewed publishing agency. 10 marks will be awarded.**

**Follow the guideline and formats as mentioned in guideline document.(Annexure-II)**

TIMELINE

1. Presentation of Project Review- 3 Project Progress Monitoring DRC review – (Week 5th )
2. Presentation of Project Review – 4 Project Progress Monitoring and Report Preparation –( Week-8th)
3. Internal Examination/ Project Expo: Project-2 Demonstration and presentation- (Week 10th )
4. External Examination: Project-2 Demonstration and Presentation- (End semester-Week 12th or 13th )

**ASSESSMENT**

1. Internal Assessment

a. Project Review -3 Progress Monitoring - 30 Marks

b. Project Review -4 Progress Monitoring and Report Preparation -30 Marks

c. Project Expo/ Examination- Evaluation Presentation and Demonstration- 30 Marks

d. Paper publication/presentation/IPR -10 Marks

2. Examination: Final Demonstration and presentation a. Project presentation: 15 Marks

b. Project design / execution / demonstration : 20 Marks

c. Project Report preparation and documentation: 15 Marks

MIT | Academy of Engineering

# MIT ACADEMY OF ENGINEERING, ALANDI

**An Autonomous Institute Affiliated to**

## Savitribai Phule Pune University

# Curriculum for

# Final Year

# Bachelor of Technology in

# Information Technology

**(Amendments for Semester Long Internship)**

**2016-2020**

(With Effect from Academic Year: 2019-2020)

| MIT \| Academy of Engineering<br>**(An Autonomous Institute Affiliated to SPPU)** | **SEMESTER LONG INTERNSHIP**<br>**Rules and Regulations**<br>**(2016 - 2020)** |
|---|---|

## 1. ELIGIBILITY:

I. No live backlogs
II. CGPA of 8.50 and above
III. If Recruiter/s (MNCs) have asked for semester long internship to the selected student/s (before joining the organization after his / her graduation), then in special case recruited students can apply for the same. (Only criteria-I should be satisfied by the student)

Only students satisfying the above criteria can be permitted for semester-long internship in any MNCs / R&D laboratories such as DRDO, NCL, NEERI, CDAC and Institutions like IITs/ NITs / International institutes of repute.

## 2. DEADLINES:

For the current batch, the applications must be submitted by 30, November 2019 by all students desired to go for the semester long internship.

## 3. APPLICATION PROCEDURE:

The student must submit a proposal of the semester-long internship including details of the organization along with the details of the project in brief, copy of their CV and copies of mark sheet to the respective school Corporate Relations (CR) coordinator. The application must be as per the format given below.

### Application for Internship Program

| Sr. No. | Particulars | |
|---|---|---|
| 1 | Name of the applicant (in bold letters) | |
| 2 | Gender | |
| 3 | School | |
| 4 | Date of Birth & Age (as on date) | |
| 5 | Roll Number & PRN | |
| 6 | Address for correspondence with mobile / telephone number and email-id | |
| 7 | Name & address of the Institute / Industry | |
| 8 | Core Domain of Institute / Industry | |

| | | |
|---|---|---|
| 9 | Contact details Supervisor / HR Mobile / Telephone number and email-id | |
| 10 | Period of internship | 24-26 weeks |
| 11 | Details of the Project proposed | |

*Signatures*

| | |
|---|---|
| | |
| Student | School Internship Coordinator |
| **Approved by:** | |
| No. of credits proposed | 6 / 10 |
| Dean – School of _____ Engineering | MIT AOE Seal |
| Date: | |

## 4. RULES & CONDITIONS:

I. Sponsored project should be along the same track of the minor (Open Elective) chosen by the student. (desirable)

II. Semester long internship is applicable only in the 8th semester.

The distribution of credits for the VIII semester is as follows

| | | |
|---|---|---|
| DC | Department Core | 4 Credits |
| DE | Department Elective | 3 Credits |
| OE | Open Elective | 4 Credits |
| HSS | Humanities & Social science | 2 Credits |
| SDP | Skill development and Project | 4 Credits |

III. For a student who is going for a semester long internship, 10 credits (OE, HSS and SDP) will be awarded if OE is part of the internship otherwise 6 credits will be awarded.

IV. The equivalence courses for the DC, DE and OE must be floated by the Schools.

V. The credits of DC, DE and OE should be earned through MOOC courses.

VI. If a student is not able to successfully earn the credits of the DC / DE / OE within the stipulated time, they will not be eligible for the graduation in the same academic year.

## 5.1 ASSESSMENT METHOD FOR SEMESTER LONG INTERNSHIP:

Credits for the semester-long internship need to be earned by the students by the following assessment in front of the panel.

**i)** The Panel for the evaluation should be 3 members (if 3 credits) or 4 members (if 5 credits). The composition of the team would be as follows.

i. Dean, Respective School ii. CR Coordinator / Project Coordinator / Project Guide iii. Project Guide (Industry)

iv. The domain expert (In case of 5 credits, as per the minor specialization)

**ii)** Presentation I at the end of 45th day and presentation II at the end of 90th day from the start of the project combined to a total weightage of 5 credits ***(3 credits if OE is exempted).*** Itcan be possible to do through Skype, if acceptable to the panel. **In Grade card it will be mentioned as SLIP – Project Design.**

**iii)** Presentation at the end of the Internship Work and Final Internship Report after the completion of the Internship Work combined for a total weightage of 5 credits ***(3 credits if OE is exempted)*** and should be as per the template).**In Grade card it will be mentioned as SLIP – Project Implementation.**

## 5.2 ASSESSMENT METHOD FOR OTHER COURSES RUN THROUGH INSTITUTE LMS:

Credits for the courses run through Go-Webinar will be assessed using the following methods.

I. There will be SIX assignments ( one per unit) to be submitted through the moodle. This will have a weightage of 30% of the total score. This contributes to the IA for the course.

II. There will be SIX quizzes ( one per unit) to be conducted through moodle. This will have a weightage of 30% of the total score. This contributes to the ISE for the course.

III. One FINAL presentation to be done at the end and evaluated by a team of THREE members including the Course Champion, Instructor and any other nominated member by the respective School Dean. This will have a weightage of 40% of the total score. This contributed for the ESE of the course.

| MIT \| Academy of Engineering (An Autonomous Institute) | **CURRICULUM STRUCTURE (2016 - 2020)** | | |
|---|---|---|---|
| **SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY** | **W.E.F** | **:** | 2019-20 |
| **FINAL YEAR BACHELOR OF TECHNOLOGY INFORMATION TECHNOLOGY** | **RELEASE DATE** | **:** | 01/06/2019 |
| | **REVISION NO.** | **:** | 0.0 |

**SEMESTER: VII**

| SL. No. | COURSE TYPE | COURSE CODE | COURSE | TEACHING SCHEME | | |
|---|---|---|---|---|---|---|
| | | | | L | P | CREDIT |
| 1. | DC 12 | CS401 | Software Engineering, Testing and Quality Assurance. | 3 | 2 | 4 |
| 2. | DE 1 | IT41# | Department (Program) elective - Ref er Annexure | 3 | 0 | 3 |
| 3. | OE 3 | IT42# | Open Elective – Refer Annexure | 3 | 2 | 4 |
| 4. | HSS 6 | HP402 | Sociology | 2 | -- | 2 |
| 5. | HSS7/S DP7 | HP403/CS 40# | Business Strategies/ Advance skill development lab(Adv. Java/R Programming/Python with kali Linux) | --- | 2 | 1 |
| 6. | SDP 8 | IT402 | Project – I | -- | 8 | 4 |
| 7. | SDP9 | IT403 | Summer Internship | -- | -- | 4 |
| | | | TOTAL | 11 | 14 | 22 |

**SEMESTER: VIII (SLIP not inline with the Open elective)**

| SL. No. | COURSE TYPE | COURSE CODE | COURSE | TEACHING SCHEME | | |
|---|---|---|---|---|---|---|
| | | | | L | P | CREDIT |
| 1. | DC 13 | CS431 | Human Computer Interaction @ | 4 | - | 4 |
| 2. | DE2 | CS44# | Department Elective | 3 | - | 3 |
| 3. | OE4 | CS45# | Open Elective @ | 4 | - | 4 |
| 4. | SEMESTER LONG INTERNSHIP – Project Design | | | - | 6 | 3 |
| 5. | SEMESTER LONG INTERNSHIP – Project Implementation | | | - | 6 | 3 |
| **TOTAL** | | | | **11** | **12** | **17** |

| MIT \| Academy of Engineering (An Autonomous Institute) | **CURRICULUM STRUCTURE (2016 - 2020)** | | |
|---|---|---|---|
| **SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY** | **W.E.F** | **:** | 2019-20 |
| **FINAL YEAR BACHELOR OF TECHNOLOGY INFORMATION TECHNOLOGY** | **RELEASE DATE** | **:** | 01/06/2019 |
| | **REVISION NO.** | **:** | 0.0 |

**SEMESTER: VII**

| SL. No. | COURSE TYPE | COURSE CODE | COURSE | TEACHING SCHEME | | |
|---|---|---|---|---|---|---|
| | | | | L | P | CREDIT |
| 1. | DC 12 | CS401 | Software Engineering, Testing and Quality Assurance. | 3 | 2 | 4 |
| 2. | DE 1 | IT41# | Department (Program) elective - Ref er Annexure | 3 | 0 | 3 |
| 3. | OE 3 | IT42# | Open Elective – Refer Annexure | 3 | 2 | 4 |
| 4. | HSS 6 | HP402 | Sociology | 2 | -- | 2 |
| 5. | HSS7/SDP7 | HP403/CS40# | Business Strategies/ Advance skill development lab(Adv. Java/R Programming/Python with kali Linux) | --- | 2 | 1 |
| 6. | SDP 8 | IT402 | Project – I | -- | 8 | 4 |
| 7. | SDP9 | IT403 | Summer Internship | -- | -- | 4 |
| | | | TOTAL | 11 | 14 | 22 |

**SEMESTER: VIII (SLIP inline with the Open elective)**

| SL. No. | COURSE TYPE | COURSE CODE | COURSE | TEACHING SCHEME | | |
|---|---|---|---|---|---|---|
| | | | | L | P | CREDIT |
| 1. | DC13 | CS431 | Human Computer Interactions @ | 4 | - | 4 |
| 2. | DE2 | CS44# | Department Elective | 3 | - | 3 |
| 4. | SEMESTER LONG INTERNSHIP – Project Design | | | - | 10 | 5 |
| 5. | SEMESTER LONG INTERNSHIP – Project Implementation | | | - | 10 | 5 |
| **TOTAL** | | | | **7** | **20** | **17** |

@ - Courses run through institute LMS.

| DEPARTMENT ELECTIVE ON MOOCS PLATFORM | | | |
|---|---|---|---|
| **SR. NO.** | **COURSE DETAILS** | **MOOC DETAILS** | **NO. OF WEEKS** |
| 1. | Distributed system (IIT) | NPTEL | 8 |
| 2. | Introduction to industry 4.0 and industrial IOT (IIT ) | NPTEL | 12 |
| 3. | Virtual Reality Engineering (IIT) | NPTEL | 12 |