Estd. 1962
NAAC 'A' Grade
MHRD-NIRF- 28th Rank

**SHIVAJI UNIVERISTY, KOLHAPUR-416 004. MAHARASHTRA**
PHONE : EPABX-2609000 **website- www.unishivaji.ac.in**
FAX 0091-0231-2691533 & 0091-0231-2692333 – BOS - 2609094
शिवाजी विद्यापीठ, कोल्हापूर – 416004.
दुरध्वनी (ईपीएबीएक्स) २६०९००० (अभ्यास मंडळे विभाग– २६०९०९४)
फॅक्स : ००९१-०२३१-२६९१५३३ व २६९२३३३.e-mail:bos@unishivaji.ac.in

**SU/BOS/Sci. & Tech/6497** **Date: 26/06/2019**

**To,**

**The Principal/ Director,**
All affiliated Engineering Colleges/ Institute,
Shivaji University, Kolhapur.

**Subject :** Regarding Syllabi and equivalence of CBCS Second Year B.Tech. Part - II (Sem III & IV ) Program under Faculty of Science and Technology.

**Sir/Madam,**

With reference to the subject mentioned above, I am directed to inform you that the University Authorities have accepted and granted approval to structure and Syllabus of CBCS Second Year B.Tech. Part - II (semIII & IV ) syllabi and equivalence under the Faculty of Science & Technology.

**B. Tech. Programme (Branch)**

| | |
|---|---|
| **1.** | Civil Engineering & Technology |
| **2.** | Mechanical Engineering & Technology |
| **3.** | Electrical Engineering & Technology |
| **4.** | Chemcial Engineering & Technology |
| **5.** | Electronics Engineering & Technology |
| **6.** | Electronics and Telecommunication Engineering & Technology |
| **7.** | Computer Science Engineering & Technology |
| **8.** | Information Technology Engineering & Technology |
| **9.** | Mathematics |

This syllabus and equivalence shall be implemented from the academic year 2019-2020 (i.e. from June 2019) onwards.A soft copy containing syllabus is attached herewith and it is available on university website www.unishivaji.ac.in.

The question papers on the pre-revised syllabi of above mentioned course will be set for the examinations to be held in October /November 2019 & March/April 2020. These chances are available for repeater students, if any.

You are, therefore, requested to bring this to the notice of all students and teachers concerned.

Thanking you,

**Yours faithfully,**

**Dy. Registrar**

**Copy to:**

| | | | |
|---|---|---|---|
| 1 | The I/c Dean and Associal Dean, Faculty of Science & Technology | 7 | Computer Centre |
| 2 | The Chairman, Respective Board of Studies | 8 | Affiliation Section (T.1) |
| 3 | Director, Examination and Evaluation | 9 | Affiliation Section (T.2) |
| 4 | Eligibility Section | 10 | P.G.Admission Section |
| 5 | O.E. – 4 | 11 | P.G Seminar Section |

Estd. 1962
NAAC 'A' Grade
MHRD-NIRF- 28th Rank

SHIVAJI UNIVERISTY, KOLHAPUR-416 004. MAHARASHTRA
PHONE : EPABX-2609000 website- www.unishivaji.ac.in
FAX 0091-0231-2691533 & 0091-0231-2692333 – BOS - 2609094
शिवाजी विद्यापीठ, कोल्हापूर – 416004.
दुरध्वनी (ईपीएबीएक्स) २६०९००० (अभ्यास मंडळे विभाग– २६०९०९४)
फॅक्स : ००९१-०२३१-२६९१५३३ व २६९२३३३.e-mail:bos@unishivaji.ac.in

**SU/BOS/Sci. & Tech/**

**Date: 16/07/2020**

16 JUL 2020
No 1831

**To,**

**The Principal/ Director,**
All affiliated Engineering Colleges/ Institute,
Shivaji University, Kolhapur.

**Subject :** Regarding Syllabi and Equivalence of CBCS Third Year B.Tech. Part - III (Sem V & VI ) Dgree Program under Faculty of Science and Technology.

**Sir/Madam,**

With reference to the subject mentioned above, I am directed to inform you that the university authorities have accepted and granted approval to structure and Syllabus of CBCS Third Year B.Tech. Part - III (sem V & VI ) under the Faculty of Science & Technology.

**B. Tech. Programme (Branch)**

| | |
|---|---|
| 1. | Civil Engineering & Technology |
| 2. | Mechanical Engineering & Technology ….. |
| 3. | Electrical Engineering & Technology |
| 4. | Chemcial Engineering & Technology |
| 5. | Electronics Engineering & Technology |
| 6. | Electronics and Telecommunication Engineering & Technology |
| 7. | Computer Science Engineering & Technology |
| 8. | Information Technology Engineering & Technology |
| 9 | Producation |

This syllabus and equivalence shall be implemented from the academic year 2020-2021 onwards. A soft copy containing syllabus is attached herewith and it is available on university website www.unishivaji.ac.in.

The question papers on the pre-revised syllabi of above mentioned course will be set for the examinations to be held in October /November 2020 & March/April 2021. These chances are available for repeater students, if any.

You are, therefore, requested to bring this to the notice of all students and teachers concerned.

Thanking you,

**Yours faithfully,**

**Dy. Registrar**

**Copy to:**

| | | | |
|---|---|---|---|
| 1 | The I/c Dean,<br>Faculty of Science & Technology | 7 | Computer Centre |
| 2 | The Chairman, Respective Board of Studies | 8 | Affiliation Section (T.1) T.2 |
| 3 | Director, Examination and Evaluation | 9 | Dy.Registrar Exam |
| 4 | Eligibility Section | 10 | P.G.Admission Section |
| 5 | O.E. – 4 | 11 | P.G Seminar Section |

SHIVAJI UNIVERISTY, KOLHAPUR-416 004. MAHARASHTRA
PHONE : EPABX-2609000 website- www.unishivaji.ac.in
FAX 0091-0231-2691533 & 0091-0231-2692333 – BOS - 2609094
शिवाजी विद्यापीठ, कोल्हापूर – 416004.
दुरध्वनी (ईपीएबीएक्स) २६०९००० (अभ्यास मंडळे विभाग– २६०९०९४)
फॅक्स : ००९१-०२३१-२६९१५३३ व २६९२३३३.e-mail:bos@unishivaji.ac.in

Estd. 1962
NAAC 'A' Grade
MHRD-NIRF- 28th Rank

SU/BOS/Sci. & Tech/ No 0 0358 Date: 15/09/2021

17 SEP 2021

To,

The Principal/ Director,
All affiliated Engineering Colleges/ Institute,
Shivaji University, Kolhapur.

**Subject :** Regarding revised Syllabus and equivalence of CBCS Final Year B.Tech. Part-IV Sem-VII-VIII Program under Faculty of Science and Technology.

**Sir/Madam,**

With reference to the subject mentioned above, I am directed to inform you that the University Authorities have accepted and granted approval to structure and Syllabus of CBCS Final Year B.Tech. Part-IV Sem-VII-VIII under the Faculty of Science & Technology.

**B. Tech. Programme (Branch)**

| | |
|---|---|
| 1. | Civil Engineering & Technology |
| 2. | Mechanical Engineering & Technology ….. |
| 3. | Electrical Engineering & Technology |
| 4. | Chemcial Engineering & Technology |
| 5. | Electronics Engineering & Technology |
| 6. | Electronics and Telecommunication Engineering & Technology |
| 7. | Computer Science Engineering & Technology |
| 8. | Information Technology Engineering & Technology |
| 9 | Producation |

This revised syllabus and equivalence shall be implemented with effect from the academic year 2021-2022 (i.e. from June 2021) onwards.A soft copy containing syllabus is attached herewith and it is available on university website www.unishivaji.ac.in.

The question papers on the pre-revised syllabi of above mentioned course will be set for the examinations to be held in October /November 2021 & March/April 2022. These chances are available for repeater students, if any.

You are, therefore, requested to bring this to the notice of all students and teachers concerned.

Thanking you,

**Yours faithfully,**

**Dy. Registrar**

**Copy to:**

| | | | |
|---|---|---|---|
| 1 | The I/c Dean, Faculty of Science & Technology | 7 | Computer Centre |
| 2 | The Chairman, Respective Board of Studies | 8 | Affiliation Section (T.1) |
| 3 | Director, Examination and Evaluation | 9 | Affiliation Section (T.2) |
| 4 | Eligibility Section | 10 | P.G.Admission Section |
| 5 | O.E. – 4 | 11 | P.G Seminar Section |

Estd. 1962
NAAC 'A' Grade
MHRD-NIRF- 28th Rank

SHIVAJI UNIVERISTY, KOLHAPUR-416 004. MAHARASHTRA
PHONE : EPABX-2609000 website- www.unishivaji.ac.in
FAX 0091-0231-2691533 & 0091-0231-2692333 – BOS - 2609094
शिवाजी विद्यापीठ, कोल्हापूर – 416004.
दुरध्वनी (ईपीएबीएक्स) २६०९००० (अभ्यास मंडळे विभाग– २६०९०९४)
फॅक्स : ००९१-०२३१-२६९१५३३ व २६९२३३३.e-mail:bos@unishivaji.ac.in

**Ref.No. SU/BOS/Sci & Tech/** No 0881 **Date: 29/10/2020**

29 OCT 2020

**To,**

The Principal,
All affiliated Engineering College,
Shivaji University,
Kolhapur.

**Subject:-**Regarding minor changes in syllabus open Elective papers of Third Year B. Tech. (Sem V & VI) Program under Faculty of Science & Technology.

**Ref.:-** SU/BOS/Sci & Tech/1831 dt. 16/07/2020

**Sir/Madam,**

With reference to subject mentioned above, I am directed to inform you that University Authorities has accepted and granted approval to the minor changes in syllabus open Elective papers of Third Year B. Tech. (Sem V & VI) under Faculty of Science & Technology.

The corrected syllabus will be implemented from the academic year 2020-2021 (i.e. from July 2020) onwards. The corrected syllabus soft copy is enclosed herewith and as well as it is also made available on website www.unishivaji.ac.in (Online syllabus)

You are therefore, requested to bring this to the notice of all students and teachers concerned.

Thanking you,

**Yours faithfully,**

**Deputy Registrar**

Encl:- As above
Copy to:

| | | | |
|---|---|---|---|
| 1 | The Dean, Faculty of Science & Technology | 7 | Computer Centre |
| 2 | The Chairman, Respective Board of Studies | 8 | Affiliation Section (T.1) |
| 3 | Director, Examination and Evaluation | 9 | Affiliation Section (T.2) |
| 4 | Eligibility Section | 10 | P.G.Admission Section |
| 5 | O.E. – 4 | 11 | P.G Seminar Section |
| 6 | Appointment Section | 12 | Meeting Section |

## Semester VII

| Sr. No. | Code No. | Subject | Semester | Credits |
|---|---|---|---|---|
| 1 | PCC-ETC701 | Satellite Communication | 7 | 4 |
| 2 | PCC-ETC702 | Embedded Systems | 7 | 5 |
| 3 | PCC-ETC703 | Computer Networks | 7 | 5 |
| 4 | PCC-ETC704 | Image Processing | 7 | 5 |
| 5 | PCE-ETC701 | Elective-I | 7 | 4 |
| 6 | PW-ETC701 | Project Phase-I | 7 | 2 |
| **Total** | | | | **25** |

## Semester VIII

| Sr. No. | Code No. | Subject | Semester | Credits |
|---|---|---|---|---|
| 1 | PCC-ETC801 | Microwave Engineering | 8 | 5 |
| 2 | PCC-ETC802 | Wireless Communication | 8 | 5 |
| 3 | PCC-ETC803 | Video Engineering | 8 | 5 |
| 4 | PCE-ETC801 | Elective-II | 8 | 4 |
| 5 | PW-ETC801 | Project Phase-II | 8 | 6 |
| **Total** | | | | **25** |

| Elective-I | Elective-II |
|---|---|
| Speech Processing | High Performance Communication Network |
| Radar and Navigation | Advance Network Security |
| Java Script | Electrical Automobile |
| Information Theory And Coding Techniques | Big Data Analytics |

***For Theory CIE 30 Marks,**

Two tests of 30 marks at college should be conducted and best of two marks should be communicated to university.

***Guidelines to paper setter:**

In theory ESE examination of 70 marks following pointes should be considered,

1. First question of 10 marks should be allotted to Objective type questions.
2. In Remaining 60 marks, four questions of 15 marks should be considered.

**Semester V**

| Sr. No | Code No. | Subject | Semester | Credits |
|---|---|---|---|---|
| 1. | PCC-ETC501 | Signal and Systems | 5 | 5 |
| 2. | PCC-ETC502 | Electromagnetic Engineering | 5 | 4 |
| 3. | PCC-ETC503 | Digital and VLSI Design | 5 | 5 |
| 4. | PCC-ETC504 | Optical Communication | 5 | 5 |
| 5. | OEC-ETC501 | Open Elective – I | 5 | 4 |
| 6. | PCC-ETC505 | Simulation and Modeling | 5 | 2 |
| | | Total | | 25 |

**Semester VI**

| Sr. No | Code No. | Subject | Semester | Credits |
|---|---|---|---|---|
| 1. | PCC-ETC601 | Digital Signal Processing | 6 | 5 |
| 2. | PCC-ETC602 | Microprocessor and Microcontrollers | 6 | 5 |
| 3. | PCC-ETC603 | Power Electronics | 6 | 5 |
| 4. | PCC-ETC604 | Antenna and Wave Propagation | 6 | 5 |
| 5. | OEC-ETC601 | Open Elective – II | 6 | 4 |
| 6. | PCC-ETC605 | Mini Project | 6 | 1 |
| | | Total | | 25 |

- **For Theory CIE 30 marks,**
  **Two tests of 30 marks at college should be conducted and best of two marks should be communicated to university.**
- **Guidelines to paper setter:**

  **In theory ESE examination of 70 marks following pointes should be considered,**

  **Q.1 MCQ's based on complete syllabus. (Carries 14 Marks)**

  **Q.2 based on unit no 1, 2, 3 (Carries 14 Marks)**

  **Q.3 based on unit no 1, 2, 3 (Carries 14 Marks)**

  **Q.4 based on unit no 4, 5, 6 (Carries 14 Marks)**

  **Q.5 based on unit no 4, 5, 6 (Carries 14 Marks)**

# Open Elective –I

| Sr. No. | Name of Subject /Elective | Name of the Concern Branch |
|---|---|---|
| 1. | Energy And Environment | Civil Engineering |
| | Waste Management | |
| 2. | Enterprise Resource Planning | Mechanical Engineering |
| | Optimization Techniques | |
| 3. | Electrical Appliances And Luminaries | Electrical Engineering |
| | Domestic /Industrial Electrical Installation, Estimation And Costing | |
| 4. | Industrial Automation | Electronics Engineering |
| | Biomedical Instrumentation | |
| 5. | Computer Graphics & Multimedia | Computer Science & Engineering |
| | Internet of Things | |
| 6. | Additive Manufacturing | Production Engineering |
| | Human Resource Management | |
| 7. | Computational Techniques in Chemical Engineering | Chemical Engineering |
| | Applications of MATLAB in Chemical Engineering | |
| 8. | Human Computer Interaction | Information Technology |
| | Internet of Things | |
| 9. | Industrial Automation | Electronics & Telecommunication Engineering |
| | Biomedical Instrumentation | |

# Open Elective –II

| Sr. No. | Name of Subject /Elective | Name of the Concern Branch |
|---|---|---|
| 1. | Soil And Water Conservation Techniques | Civil Engineering |
| | Disaster Risk Management | |
| 2. | Computer Aided Design And Manufacturing | Mechanical Engineering |
| | Electric Vehicle | |
| 3. | Electrical Energy Audit And Conservation | Electrical Engineering |
| | PLC & SCADA | |
| 4. | Robotics Engineering | Electronics Engineering |
| | Mobile Technology | |
| 5. | E-Commerce & Digital Marketing | Computer Science & Engineering |
| | Cyber Security | |
| 6. | Entrepreneurship Development | Production Engineering |
| | Supply Chain Management | |
| 8. | Industrial Economics, Management And Entrepreneurship | Chemical Engineering |
| | Project Management And Smart Technology | |
| 10. | Cyber Security | Information Technology |
| | E-Commerce & Digital Marketing | |
| 11. | Robotics Engineering | Electronics & Telecommunication Engineering |
| | Mobile Technology | |

Shivaji University, Kolhapur

**Revised Syllabus Structure of Final Year Engineering (BE) (w. e. f. July 2016)**

**Electronics and Telecommunication Engineering Course**

**Scheme of Teaching and Examination**

**Semester-VII**

| Sr. No. | Subject | Teaching Scheme (Hrs.) | | | | Examination Scheme (Marks) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Total | Theory | TW | POE | OE | Total |
| 1 | Satellite Communication | 3 | 1 | -- | 4 | 100 | 25 | -- | -- | 125 |
| 2 | Embedded System | 4 | -- | 2 | 6 | 100 | 25 | 50 | -- | 175 |
| 3 | Computer Communication Networks | 4 | -- | 2 | 6 | 100 | 25 | -- | 25 | 150 |
| 4 | RF & Microwave Engineering | 4 | - | 2 | 6 | 100 | 25 | -- | -- | 125 |
| 5 | Elective-I | 3 | 1 | -- | 4 | 100 | 25 | -- | -- | 125 |
| 6 | Industrial Training | -- | -- | -- | --- | -- | 25* | -- | -- | 25 |
| 7 | Project Phase-I | -- | -- | 2 | 2 | -- | 25 | -- | 50 | 75 |
| | | **18** | **2** | **08** | **28** | **500** | **175** | **50** | **75** | **800** |

*** Assessment will be carried out with Project Phase – I By Internal Guide.**

**Semester-VIII**

| Sr. No. | Subject | Teaching Scheme(Hrs.) | | | | Examination Scheme(Marks) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Total | Theory | TW | POE | OE | Total |
| 1 | Video Engineering | 4 | -- | 2 | 6 | 100 | 25 | 50 | -- | 175 |
| 2 | Wireless Mobile Communication | 4 | -- | 2 | 6 | 100 | 25 | -- | -- | 125 |
| 3 | Digital Image Processing | 4 | -- | 2 | 6 | 100 | 25 | -- | 50 | 175 |
| 4 | Elective-II | 3 | 1 | -- | 4 | 100 | 25 | -- | -- | 125 |
| 5 | Project Phase – II | -- | -- | 4 | 4 | -- | 100 | -- | 100 | 200 |
| | | **15** | **01** | **10** | **26** | **400** | **200** | **50** | **150** | **800** |

| BE Part-I (Elective-I) | BE Part-II ( Elective-II) |
|---|---|
| 1. Robotics | 1. Mechatronics |
| 2. Speech processing | 2. Artificial Neural Network |
| 3. MEMS | 3. Remote Sensing & GPS |
| 4. Radar & Navigation Aids | 4. Operating System |

## Elective I

| Sr.No. | Name of Subjects |
|---|---|
| 1. | Advanced Traffic Engineering |
| 2. | Open Channel Hydraulics |
| 3. | Remote Sensing and GIS Application in Civil Engineering |
| 4. | Solid Waste Management |
| 5. | Optimization Techniques |
| 6. | Town Planning |

## ELECTIVE-II (STRUCTURE GROUP)

| Sr.No. | Name of Elective |
|---|---|
| 1. | Design of bridges |
| 2. | Maintenance, Retrofitting, Rehabilitation Of Structure |
| 3. | Advance Foundation Engineering |
| 4. | Advanced Pre-stressed Concrete Design |
| 5. | Structural Design of Foundation & Retaining Structures |
| 6. | Advanced Design of Concrete Structures |
| 7. | Dynamics of Structure |
| 8. | Finite Element Method |

| | | |
|---|---|---|
| 6 | 6 | 11 |

## ELECTIVE-III

| Sr.No. | Name of Elective |
|---|---|
| 1. | Hydrology And Watershed Management |
| 2. | Site Investigation Methods And Practices |
| 3. | Industrial Waste Treatment |
| 4. | AdvancedConstructionTechniques |
| 5. | Engineering Geology |
| 6. | Valuation Of Real Properties |
| 7. | Air Pollution And Control |
| 8. | Construction Practices |
| 9. | Water Power Engineering |


# SHIVAJI UNIVERSITY, KOLHAPUR

## REVISED SYLLABUS AND STRUCTURE

THIRD YEAR (C.B.C.S.) BACHELOR OF TECHNOLOGY

IN

# Computer Science and Engineering

To be introduced from the academic year 2020-21

(w. e. f. June 2020) onwards

## THIRD YEAR COMPUTER SCIENCE AND ENGINEERING - CBCS PATTERN

### SEMESTER - V

| Sr. No. | Course Subject / Title | TEACHING SCHEME | | | | | | | EXAMINATION SCHEME | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | THEORY | | | TUTORIAL | | PRACTICAL | | THEORY | | | | ORAL / PRACTICAL | | TERMWORK | |
| | | Credits | No. Of Lectures | Hours | Credits | No. of Hours | Credits | No. of Hours | mode | marks | Total Marks | MIN. | MAX | MIN. | MAX | MIN. |
| 1 | **PCC-CS501** Information Security | 3 | 3 | 3 | | | 1 | 2 | CIE<br>ESE | 30<br>70 | 100 | 40 | | | 50 | 20 |
| 2 | **PCC- CS502** System Programming | 3 | 3 | 3 | | | 1 | 2 | CIE<br>ESE | 30<br>70 | 100 | 40 | 25 | 10 | 50 | 20 |
| 3 | **PCC- CS503** Object-Oriented Modeling & Design | 3 | 3 | 3 | | | | | CIE<br>ESE | 30<br>70 | 100 | 40 | | | | |
| 4 | **PCC- CS504** Computer Algorithms | 4 | 4 | 4 | 1 | 1 | | | CIE<br>ESE | 30<br>70 | 100 | 40 | | | 25 | 10 |
| 5 | **OEC- CS505** Computer Graphics & Multimedia<br>**OEC-CS506** Internet of Things | 3 | 3 | 3 | | | | | CIE<br>ESE | 30<br>70 | 100 | 40 | | | | |
| 6 | **PCC- CS507** Java Programming | 3 | 3 | 3 | | | 2 | 4 | | | | | 50 | 20 | 50 | 20 |
| 7 | **HM- CS508** Business English | | | | 1 | 2 | | | | | | | 25 | 10 | 25 | 10 |
| | ***Total (SEM –V)*** | ***19*** | ***19*** | ***19*** | ***2*** | ***3*** | ***4*** | ***8*** | | | ***500*** | | ***100*** | | ***200*** | |

# T. Y. B. Tech (Computer Science and Engineering) Sem – V

## 5. Open Elective Course - I (OEC - CS506)

## Internet of Things (OEC - CS506)

| TEACHING SCHEME | EXAMINATION SCHEME |
|---|---|
| Theory : 3 Hrs./Week | Theory : ESE 70 Marks<br>CIE 30 Marks |
| Tutorial : ----- | Term work : ----- |
| Practical : ----- | Practical : ----- |

***Pre-requisites:*** Fundamentals of Computer Network and Internet, basics of C / C++ programming language.

### Course Objectives

1. To learn Internet of Things Technology
2. To know the basics of RFID, Sensor technologies.
3. To know the basics of IoT systems like Raspberry Pi, Arduino, and Banana Pi.
4. To aware students about wireless communication technologies and IoT applications.
5.

### Course Outcome

1. Students will understand basic concepts of IoT
2. students will be able to learn and implement RFID technology in various applications.
3. Students will be able to write programs for basic applications
4. Student will understand and implement different communication technologies in IoT systems.

| UNIT NO. | UNIT NAME & DETAILS | NO. OF LECTURES |
|---|---|---|
| 1. | **Introduction:** IoT, Objects / Things, IoT definitions, IoT frame work, Identification technologies, Internet in IoTs. | 4 |
| 2. | **Fundamental of IoT mechanisms:** Identification of IoT objects and services, Traffic characteristics, scalability and inter-operability, security and privacy, Communication capabilities, Mobility support and device power, Sensor technology, RFID technology and satellite technology. | 6 |
| 3. | **Radio Frequency Identification Technology:** RFID, IoT objects and services, principles of RFID, Components of an RFID system, RFID reader, Tags, middleware, Sensor nodes, connecting nodes, networking nodes. | 6 |
| 4. | **IoT systems:** Hardware and Software: Introduction to Raspberry Pi, Familiar with Raspberry Pi hardware, study of I/O ports, Programming with Raspberry Pi: Study of operating system, simple programs in C / C++, Introduction with Python programming. | 8 |

| | | |
|---|---|---|
| 5. | **Communication Technologies:** WPAN Technologies: Introduction to IEEE 802.15.4 standard, Bluetooth, Zigbee, IEEE 802.15.6; WBANS, NFC, IEEE 802.11 WLAN, Cellular and mobile technologies. | 6 |
| 6. | **IoT Application Examples:** Smart Metering, advanced metering infrastructure, e-health / Body Area Network, City Automation (Smart City), Automotive Application, Environmental Applications, Home Automation, Control Applications. | 6 |

***Text Books***

| Sr. No. | Title | Author(s) Name | Publication & Edition |
|---|---|---|---|
| 1 | The Internet of Things - Connecting objects to the web | Hakima Chaouchi | Wiley Publications |
| 2 | Building the Internet of Things | Daniel Minoli | Wiley Publications |
| 3 | Raspberi Pi Beginner's Guide | Gareth Halfacree | Raspberi Press |
| 4 | Introduction to Wireless Telecommunications systems and Networks | Gary J. Mulett. | Cengage Learning (India Edition). |

***Reference Books***

| Sr. No. | Title | Author(s) Name | Publication & Edition |
|---|---|---|---|
| 1 | Raspberry Pi for Dummies | Sean McManus, Mike Cook | A Wiley Brand |
| 2 | Architecting the Internet of Things | Bernd Scholz, Reiter | Springer |

# T. Y. B. Tech (Computer Science and Engineering) Sem – V

## 5. Open Elective Course - I (OEC - CS505)

## Computer Graphics and Multimedia (OEC - CS505)

| TEACHING SCHEME | EXAMINATION SCHEME |
|---|---|
| **Theory** : 3 Hrs./Week | **Theory** : ESE 70 Marks<br>CIE 30 Marks |
| **Tutorial** : ----- | **Term work** : ----- |
| **Practical** : ----- | **Practical** : ----- |

### Course Objectives

1. To provide knowledge to the students about basics of computer graphics and different display devices.
2. To expose students to the various 2D & 3D transformation & projection techniques.
3. To provide knowledge to the students about basics of Illumination models, surface rendering methods.
4. To make the students aware of multimedia system &Multimedia Authoring, Compression techniques.

### Course Outcomes

Upon successful completion of this course, the student will be able to -

1. Express basic ideas of computer graphics and different display devices.
2. Understand & apply various transformation, projection and rendering techniques on graphical objects.
3. Identify & apply the intensity of light on graphical objects using different illumination models.
4. Understand multimedia system & use of Multimedia Authoring & Compression techniques on graphical objects.

| Unit No. | Unit Name and Contents | No. of Lectures |
|---|---|---|
| 1 | **Basic of Computer Graphics**<br>Basic of Computer Graphics, Applications of computer graphics, Display devices: Random and Raster scan systems, Input devices, Scan Conversion techniques: RLE, Frame Buffer, Graphics software and standards. | 5 |
| 2 | **Transformations –**<br>Basic 2D & 3D transformations - Translation, Scaling, Rotation, Reflection, Shearing, Multiple Transformations, Rotation about an axis parallel to a coordinate axis, Rotation about an arbitrary axis in space, Affine and Perspective Geometry, Orthographic projections and Axonometric projections. | 8 |
| 3 | **Illumination models and surface rendering methods**<br>Light sources, Basic illumination models, Displaying light intensities, Polygon Rendering methods, Ray tracing methods, Radiosity lighting. | 5 |

| | | |
|---|---|---|
| 4 | **Introduction to Multimedia**<br>Multimedia: Historical perspective, multimedia data and multimedia systems, a multimedia system today, Analog and Digital Signals, Analog-to-Digital Conversion, Media Representation and Media Formats - Digital Images, Digital Video, Digital Audio. | 6 |
| 5 | **Multimedia Authoring & Compression**<br>Examples of Multimedia, Requirements for Multimedia Authoring Tools, Intramedia Processing, Intermedia Processing, Media Compression - The Need for Graphics Compression, Graphics compression in relation to other media compression, Mesh compression using connectivity encoding. | 7 |
| 6 | **Computer Animation**<br>Introduction: Types, Key frame animation, Procedural animation, Construction of an animation sequence, Motion control methods, VFX, SFX, Introduction to Morphing, Wrapping techniques, Defining virtual & Augmented reality. | 5 |

***Text Books:***


1. Procedural elements for Computer Graphics - David F. Rogers (MGH International) (For Units 1)
2. Mathematical elements for Computer Graphics - David F. Rogers, J. Alan Adams (MGH Int.) (Unit 2)
3. Computer Graphics C Version second edition –Donald D. Hearn, M. Pauline Baker (Pearson) (Unit 3)
4. Multimedia systems: Algorithms, Standards & Industry Practice-Parag Havaldar & Gerard Medioni, Cengage Learning (Unit 4, 5)
5. Computer Graphics- Rajesh Maurya (WILEY India) (Unit 6)
6. Virtual & Augmented reality - Paul Mealy ( Kindle Edition ) (Unit 6)


Some assignments on following topics can be given and its evaluation should be considered for CIE

1. Introduction to computer graphics, OPEN GL, GLUT, GLU
2. Design 2D & 3D objects by using graphics primitives
3. Apply the different transformation techniques on 2D & 3D graphical objects
4. Create graphics design using any software(Picasa, Autodesk Maya, Sketch Up, Solid works)
5. Perform rendering using Blender or Lux Core Render Software
6. Create 2D & 3D animated object using Synfig or Blender Software.

Date: 11/8/23

To,

The HOD,

CSE Department,

AGTI's DACOE,

Karad.

**Subject: Regarding application for selection of OEC-I subject.**

Respected Sir,

With due respect and humble submission to say that we are the students of class T.Y B. TECH CSE of your college. We choose Internet of Thing as our OEC-I subject. We request you to provide the faculty incharge for the same.

Therefore, we hope that you will be kind enough to permit us to select this subject and oblige thereby.

Yours Faithfully,

| Roll no | Name of Students | Sign |
|---|---|---|
| 15 | Shraddha Anandrao Gurav | Sgurav |
| 16 | Sakshi Shivaji Ingavale | S.S Ingavale. |
| 18 | Jadhav manali Ramesh | Jadhav. |
| 4 | Chavan Nilam Bhaskar | Chavan |
| 12 | Gaikwad Namrata Babu | Ngaikwad. |
| 10 | Dhebe Rutuja Bajrang | Dhebe |
| 30 | Lade vidya DIPak | Vedad |
| 51 | Pawar Aarati Uttam | APawar |
| 53 | Pawar Nisha Baluram | N.B.Pawar |
| 40 | Nalgure Shrutika Dhananjay | Nalgure |
| 35 | Mane Vaibhavi Umesh | V.V.Mane |
| 44 | Patil Gayatri Prakash | Gpatil |
| 71 | Babar Amruta Sadanand | ABabar. |
| 54 | Pawar Saksha Bajirao | Apawar |
| 64 | Sonawale Bhavana Bhimrao | Bsonwale |
| 50 | Pawar Aarati Chandrakant | Apawar |
| 01 | Abdar Divya Laxman | Dabdar |
| 32 | Mahadik shreya Rahulkumar | Mahadik |
| 03 | Bhosale Sanika Dattatray | SBhosale |
| 29 | Tegswini Vijay Kalekar | |
| 31 | Lokare Prajakta Prakash | Plokare |
| 23 | Kachare Rohini Sakharam | Rkachare |
| 24 | Kodom Nandini prashant | Nkodom |
| 49 | Patil Vishakha Sanjay | Vpatil |
| 39 | Mohite sakshi Ashok | Smohite |
| 60 27 | Satpute sakshi Ramchandra | SRsatpute |
| 62 | Shinde Ashlesha Deepak | Ashinde |
| 35 | Pawar Shivani Pralhad | Spawar |
| 41 | Patel Aarju Samir. | A.S.Patel. |
| 75 | Shinde Vaishnavi Shashikant | Vshinde |
| 70 | Kashid Shraddha Shekhar | S.S.Kashid |
| 77 | Patil Vaishnavi Vishnu | Vpatil. |
| 72 | Patil Vaishnavi Pravin | Vpatil |

| Roll No | Name of Student | Sign |
|---|---|---|
| 47 | | |
| 38 | Patil Sakshi Satish | SPatil |
| 22 | More Sayali Tukaram | Smore |
| 06 | Junjwadkar Yogita Narayan | Yogita |
| 13 | Dange Jyoti Shrikant | Jdange |
| 07 | Ghorge Harsh Vijay | Ghorge |
| 02 | Dange Tejas Amar | Tange |
| ~~33~~ | Bagwan Maaaj Sajid | MS |
| 68 | Mali Abhishek Bharat | ABM |
| 56 | Yelave Omkar Dattatray | O.Yelave |
| 09 | Pise Prathamesh Anil | KAP |
| 19 | Deshmukh Jagadish Sunil | JSunil |
| 79 | Jadhav Rohit Raju | RJadhav |
| | Ghutukade Swapnil Dada | Swapnil |

| | |
|---|---|
| | G.K. Gujar Memorial Charitable Trust's<br>**Dr. Ashok Gujar Technical Institute's,**<br>**Dr. Daulatrao Aher College of Engineering, Karad.**<br>Vidyanagar Ext. Banawadi, Tal. Karad 415124, Dist. Satara, Maharashtra INDIA |
| **Year: 2023-24** **Date: 11/08/2023** | *DACOE/ACAD/EL/FRM- 01* |
| **Department: COMPUTER SCIENCE & ENGINEERING** | *EL-FRM-01- Rev. No: 0* |

**Date: 11/08/2023**

**Elective Choice Form (For T.Y. B.Tech)**

**Academic Year: 2023-24** **Semester-V** **Class: T.Y. B.Tech**

**Terms and Conditions:**

1) **Once selected, the elective will be Final**
2) **Under any circumstances this elective will not be changed.**

Open Elective Choice I (Subjects)

1) Computer Graphics & Multimedia
2) Internet of Things

| Roll No | Name of Student | Open Elective Choice | | Sign |
|---|---|---|---|---|
| | | Choice 1 CG & M | Choice 2 IOT | |
| 23010 | Dhebe Rutuja Bajrang. | | ✓ | Dhebe |
| 23012 | Gaikwad Namrata Babu | | ✓ | Namrata Gaikwad |
| 23006 | Dange Jyoti Shrikant | | ✓ | JDange |
| 23027 | Kolekar Tejaswini Vijay | | ✓ | TK |
| 23049 | Pawar Aarti Uttam | | ✓ | A.Pawar |
| 23028 | Lade Vidya Dipak | | ✓ | VidyaL |
| 23067 | Babar Amruta Sadanand | | ✓ | ASBabar. |
| 23052 | Pawar Sakshi Bajirao | | ✓ | SPawar |

| Roll No | Name of Student | Open Elective Choice | | Sign |
|---|---|---|---|---|
| | | Choice 1 CG | Choice 2 IOT | |
| 23048 | Pawar Aarati Chandrakant | | ✓ | Apawar |
| 23033 | Mane Vaibhavi Umesh | | ✓ | V.U.Mane |
| 23042 | Patil Gayatri Prakash | | ✓ | GPatil |
| 23071 | Shinde Vaishnavi Shashikant | | ✓ | VShinde |
| 23066 | Kashid Shraddha Shekhar | | ✓ | S.Skashid |
| 23057 | Satpute Sakshi Ramchandra | | ✓ | SRSatpute |
| 23059 | Shinde Ashlesha Deepak | | ✓ | AShinde |
| 23051 | Powar Nisha Baluram | | ✓ | N.BPawar |
| 23053 | Pawar Shivani Pralhad | | ✓ | SPawar |
| 23025 | Kale Vishwajeet Vijay | | ✓ | VVKale |
| 23020 | Jadhav Shivaji Rajendra | | ✓ | SRJ |
| 23064 | Yelave Omkar Dattatray | | ✓ | OD Yelave |
| 23075 | Ghatukade Swapnil. D. | | ✓ | SDGhatukade |
| 23018 | Jadhav Manali Ramesh | | ✓ | MRJadhav |
| 23004 | Chavan Nilam Bhaskar | | ✓ | NBChavan |
| 23060 | Sonawale Bhavana Bhimrao | | ✓ | BBSonawale |
| 23074 | Lochande Swastika Thulsiramkumar | | ✓ | SLochande |
| 23070 | Girigosavi prasanna sunil | | ✓ | PSGirigosavi |
| 23078 | Shinde Neha Dilip | | ✓ | NDShinde |
| 23073 | Patil Vaishnavi Vishnu | | ✓ | VVPatil |

Sign of Class Teacher:

HOD

| Roll No | Name of Student | Open Elective Choice | | Sign |
|---|---|---|---|---|
| | | Choice 1 CG | Choice 2 IOT | |
| 23015 | Gurav Shraddha Anandrao | | ✓ | Sgurav |
| 23016 | Ingavale Sakshi Shivaji | | ✓ | S.S.Ingavale |
| 23022 | Junjwadkar Yogita Narayan | | ✓ | Yogita. |
| 23024 | Jangam varadraj somnath | | ✓ | |
| 23019 | Jadhav Rohit Raju | | ✓ | Rjadhav |
| 23026 | Khedkar Utkarsh Sudhir | | ✓ | Ukhedkar. |
| 23062 | velhal Chinmay Jagdish | | ✓ | CJV. |
| 23037 | Mulla Rihan Jakir | | ✓ | RMulla. |
| 23009 | Deshmukh Jagadish S. | | ✓ | JSmukh |
| 23032 | Mane Shubham Ravindra | | ✓ | Smane. |
| 23044 | Patil Rohan Digambar | | ✓ | Rohi |
| 23043 | Patil omkar krushnat | | ✓ | Opatil |
| 23008 | Desai Rohan Ramkrishna. | | ✓ | |
| 23005 | Chavan Prathmesh Rajendra. | | ✓ | Pchavan |
| 23096 | Kotaktalware Ritesh Arvind | | ✓ | R |
| 23050 | Pawar Nikhil Rajesh | | ✓ | NRPawar |
| 23039 | Patil Ajinkya Jaywant | | ✓ | AJPatil |
| 23040 | Patil Aditya Jaydeep | | ✓ | Apatil |
| 23059 | Pise Prathamesh Anil | | ✓ | PAP. |
| 23046 | Patil Sumit Sudhir | | ✓ | Patil. |
| 23069 | Molone digvijay Somnath | | ✓ | Digvijay |

Sign of Class Teacher:-

HOD

| Roll No | Name | OEC | | Sign |
|---|---|---|---|---|
| | | CG | IOT | |
| 230381 | Mali Abhishek Bharat | | ✓ | |
| 23002 | Bagwan Miraaj Sajid | | ✓ | |
| 23013 | Ghaige Harsh Vijay | | ✓ | |
| 23056 | sathe Atharv sunil | | ✓ | |


# SHIVAJI UNIVERSITY KOLHAPUR

## REVISED SYLLABUS AND STRUCTURE

FINAL YEAR (FINAL YEAR B. Tech) BACHELOR OF TECHNOLOGY

IN

# Computer Science and Engineering

To be introduced from the academic year 2021-22

(w.e.f. June 2021) onwards

## FINAL YEAR COMPUTER SCIENCE AND ENGINEERING - CBCS PATTERN

### SEMESTER - VII

| Sr. No. | Course Subject / Title | TEACHING SCHEME | | | | | | | EXAMINATION SCHEME | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | THEORY | | | TUTORIAL | | PRACTICAL | | THEORY | | | | ORAL / PRACTICAL | | TERMWORK | |
| | | Credits | No Of Lectures | Hours | Credits | No of Hours | Credits | No. of Hours | mode | marks | Total Marks | MIN | MAX | MIN | MAX | MIN |
| 1 | PCC-CS701 Advanced Computer Architecture | 4 | 4 | 4 | 1 | 1 | | | CIE | 30 | 100 | 40 | | | 25 | 10 |
| | | | | | | | | | ESE | 70 | | | | | | |
| 2 | PCC- CS702 Cloud Computing | 3 | 3 | 3 | | | 1 | 2 | CIE | 30 | 100 | 40 | | | 25 | 10 |
| | | | | | | | | | ESE | 70 | | | | | | |
| 3 | PCC- CS703 Advanced Database Systems | 3 | 3 | 3 | | | 1 | 2 | CIE | 30 | 100 | 40 | 50 | 20 | 25 | 10 |
| | | | | | | | | | ESE | 70 | | | | | | |
| 4 | PCE- CS704 Elective-I | 3 | 3 | 3 | 1 | 1 | | | CIE | 30 | 100 | 40 | | | 25 | 10 |
| | | | | | | | | | ESE | 70 | | | | | | |
| 5 | PCC- CS705 Web Technologies | 3 | 3 | 3 | | | 2 | 4 | | | | | 50 | 20 | 50 | 20 |
| 6 | PW- CS706 Project – I | | | | | | 2 | 4 | | | | | 50 | 20 | 50 | 20 |
| 7 | SI-CS707 Internship | | | | | | 1 | | | | | | | | 50 | 20 |
| | *Total (SEM –VII)* | *16* | *16* | *16* | *2* | *2* | *7* | *12* | | | *400* | | *150* | | *250* | |

| | |
|---|---|
| • Candidate contact hours per week : 30 Hours (Minimum) | • Total Marks for Final Yr. Sem VII & VIII : **800 + 800 =1600** |
| • Theory and Practical Lectures : 60 Minutes Each | • Total Credits for Final Yr. Sem VII & VIII: **50 (SEM-VII: 25 + SEM -VIII: 25)** |
| • In theory examination there will be a passing based on separate head of passing for examination of CIE and ESE. | |
| • There shall be separate passing for theory and practical (term work) courses. | |

**Note:**

1. **PCC-CS:** Professional Core Course – Computer Science and Engineering are compulsory.
2. **PCE-CS:**ProfessionalCoreElective–ComputerScienceandEngineeringarecompulsory
3. **HM-CS:** Humanities and Management- Computer Science and Engineering are compulsory.
4. **PW-CS:** Domain Specific Mini Project — Computer Science and Engineering are compulsory.
5. **SI-CS:** Internship-Computer Science and Engineering are compulsory.

**Professional Core Elective – I**

1. Artificial Intelligence
2. Software Testing & Quality Assurance
3. Image Processing

**Professional Core Elective – II**

1. Project Management
2. Natural Language Processing
3. Ad-Hoc Wireless Sensor Networks

**Professional Core Elective – III**

1. High Performance Computing
2. Blockchain Technologies
3. Human computer Interaction

# Final Year B. Tech (Computer Science and Engineering) Sem- VII

## 4. Artificial Intelligence (PCE– CS704) Elective-I

| TEACHING SCHEME | EXAMINATION SCHEME |
|---|---|
| **Theory** : 3 Hrs./Week (3 Credits) | **Theory** : ESE 70 Marks<br>CIE 30 Marks |
| **Tutorial** :1 Hr. /Week (1 Credit) | **Term work: 25 Marks** |
| **Practical :** | **Practical** : – |

**Pre-requisites:** Basic Programming in Python.

### Course Objectives

1. To impart artificial intelligence principles, techniques, and its history.
2. To assess the applicability, strengths, and weaknesses of the basic knowledge representation, problem solving, and learning methods in solving engineering problems.
3. To develop intelligent systems by assembling solutions to concrete computational problems.

### Course Outcomes

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

1. Evaluate Artificial Intelligence (AI) methods and describe their foundations.
2. Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation and learning.
3. Demonstrate knowledge of reasoning and knowledge representation for solving real world problems.
4. Analyze and illustrate how search algorithms play vital role in problem solving.
5. Illustrate the construction of learning and expert system.
6. Discuss current scope and limitations of AI and societal implications.

| UNIT NO. | UNIT NAME & DETAILS | NO. OF LECTURES |
|---|---|---|
| 1. | **Artificial Intelligence and Its Issues:** Definitions - Importance of AI, Evolution of AI - Applications of AI, Classification of AI systems with respect to environment, Knowledge Inferring systems and Planning, Uncertainty and towards Learning Systems. | 5 |
| 2. | **Overview to Problem Solving&Heuristic Search:** Problem solving by Search, Problem space - State space, Blind Search - Types, Performance measurement. Types, Game playing mini-max algorithm, Alpha-Beta Pruning | 6 |
| 3. | **Probabilistic Reasoning & Markov Decision process:** Probability, conditional probability, Bayes Rule, Bayesian Networks- representation, construction and inference, temporal model, hidden Markov model. MDP formulation, utility theory, utility functions, value iteration, policy iteration and partially observable MDPs. | 7 |
| 4. | **Learning Systems & Expert Systems:** Forms of Learning Types - Supervised, Unsupervised, Reinforcement Learning, LearningDecision Trees. Expert Systems - Stages in the development of an Expert System - Probability based ExpertSystems - Expert System Tools - Difficulties in Developing Expert Systems - Applications ofExpert Systems. | 7 |
| 5. | **Reinforcement Learning:** Passive reinforcement learning, direct utility estimation, adaptive dynamic programming, temporal difference learning, active reinforcement learning- Q learning. | 5 |
| 6. | **AI with Python:** Study of important inbuilt libraries of Python like NumPy, SciPy, matplotlib, nltk, SimpleAI. Installing Python. Setting up PATH. Running Python. Study of real time applications of AI with Python, Case Studies: AI Platforms-Azure ML, Google AI, Swift AI, Tensorflow. | 6 |

## Term Work

- Minimum 8 tutorials to be performed from the list given below.
- Practical should include the implementation and use of the above mechanisms/Algorithms/Tools /Techniques.
- Implementation can be in Python Programming Language.

## Tutorial List

1. Write a program to conduct uninformed and informed search.
2. Write a program to conduct game search.
3. Write a program to construct a Bayesian network from given data.
4. Write a program to infer from the Bayesian network.
5. Write a program to run value and policy iteration in a grid world.
6. Write a program to do reinforcement learning in a grid world.
7. Develop small AI based Mini Project like:
    i) Predicting user's next location
    ii) Detecting YouTube comment spam
    iii) Identifying the genre of a song
    iv) Shock front classification
8. Case Study on any one real time AI application.

# Final Year B. Tech (Computer Science and Engineering) Sem–VII

## 5. Software Testing and Quality Assurance (PCE- CS704) Elective-I

| TEACHING SCHEME | EXAMINATION SCHEME |
|---|---|
| **Theory** :3 Hrs./Week | **Theory** : ESE 70 Marks<br>CIE 30 Marks |
| **Tutorial : 1 Hrs/Week** | **Term work: 25 Marks** |
| **Practical : --** | **Practical** : – |

**Pre-requisites:** Software Engineering, SDLC and STLC.

### Course Objectives

1. To understand software testing and quality assurance as a fundamental component of software life cycle
2. To understand the fundamentals of software verification
3. To efficiently perform Testing & QA activities using modern software tools
4. To understand and compare testing web applications and desktop applications

### Course Outcomes

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

1. Understand fundamental component of software life cycle
2. Apply and use the modern software testing tools
3. Compare and analyze the web and desktop application testing
4. Explore newer software project assessment methods

| UNIT NO. | UNIT NAME & DETAILS | NO. OF LECTURES |
|---|---|---|
| 1. | **Introduction :**<br>Some Software Failures, Testing Process, Some Terminologies, Limitations of Testing, The V Shaped software life cycle model | 4 |
| 2. | **Software Verification:**<br>Verification Methods, SRS document verification, SDD document verification, Source code reviews, User documentation verification, Software project audit<br>**Creating test cases from SRS and Use cases:** Use Case Diagram and Use Cases, Generation of<br>test cases from use cases, Guidelines for generating validity checks, | 8 |

| | | |
|---|---|---|
| | strategies for data validity,<br>Database testing | |
| **3.** | **Regression Testing:**<br>What is regression testing?, Regression Test cases selection, Reducing the number of test cases, Risk analysis, Code coverage prioritization techniques<br>Object oriented testing: What is Object orientation?, What is object oriented testing?, Path<br>testing, State based testing, Class testing | 7 |
| **4.** | **Software Testing Tools:**<br>Selecting and Installing Software Testing tools, Automation and Testing Tools, Load Runner, Win runner and Rational Testing Tools, Silk test, Java Testing Tools, | 6 |
| **5.** | **Testing Process :**<br>Seven Step Testing Process – I: Overview of the Software Testing Process, Organizing of Testing, Developing the Test Plan, Verification Testing, Validation Testing. | 5 |
| **6.** | **Testing Web applications**<br>What is web testing? functional testing, UI testing, Usability testing, configurations and compatibility testing, security testing, performance testing, database testing, post deployment testing, web metrics.<br>**Automated Test data generation:** Automated Test Data generation, Approaches to test data generation, Test data generation tools | 6 |

## Term Work

- Minimum of 10 Tutorials to be done from the list given below.
- It should include the demonstration and use of the Tools /Techniques

## Guidelines for tutorials:

It should consist of 8-10 assignments based on the following topics:

1. Software Testing Process, its need and limitations
2. Verification at different phases of SDLC for particular case study (SRS document verification, SDD document verification, Source code reviews, User documentation verification, Software project audit etc.)
3. Creating test cases from SRS and Use cases for particular case study
4. Generation of validity checks for particular case study
5. Regression testing with Test cases selection / Regression testing with reducing the number of test cases / Regression testing with code coverage prioritization techniques
6. Generation of test cases using Path testing/ State based testing/Class testing for particular case Study
7. Measurement in Software Engineering
8. Software Metrics: Object oriented Metrics used in testing
9. Calculation of Software Quality attributes using different prediction models
10. Measurement of Internal / External Product Attributes

11. Generation of test cases in different key areas of Web application testing

12. Automated test data generation

**Text Books**

| Sr. No. | Title | Author(s) Name | Publication & Edition | Units Covered |
|---|---|---|---|---|
| 1 | Software testing: | Yogesh Singh, | Cambridge University Press, First Edition | Unit-I,II,III,VI |
| 2 | Effective Methods for Software Testing (Chapter 4, 6, 7, 8, 9, 10) | William E. Perry, | Third edition, Wiley India, 2009 | Unit –IV,V |
| 3 | Software Testing – Principles and Practices (Chapter 12) | Naresh Chauhan, | Oxford University Press, 2010 | Unit –IV |

**Reference Books**

| Sr. No. | Title | Author(s) Name | Publication & Edition |
|---|---|---|---|
| 1 | Foundations of Software testing: | Aditya P. Mathur, | Pearson, Second Edition |
| 2 | Software Testing: | Ron Patton, | Pearson (SAMS), Second Edition |
| 3 | Software Quality, Mordechai | Ben Menachem, Garry S. Marliss, | BS Publications |

# Final Year B. Tech (Computer Science and Engineering) Sem- VII

## 6. Image Processing (PCE – CS704) Elective-I

| TEACHING SCHEME | EXAMINATION SCHEME |
|---|---|
| Theory :3 Hrs./Week | Theory : ESE 70 Marks<br>CIE 30 Marks |
| Tutorial : 1 Hrs./Week | Term work: 25 Marks |
| Practical : | Practical : – |

**Pre-requisites:**

### Course Objectives

1. To learn the fundamental concepts of Digital Image Processing
2. To study basic image processing operations.
3. To cover the basic analytical methods which are widely used in image processing.

### Course Outcomes

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

1. Describe the basic issues and the scope of image processing, and the roles of image processing and systems in a variety of applications.
2. Explore different techniques in image acquisition and color transformation
3. Understand how digital images are represented
4. Evaluate the mathematical principles of digital image enhancement
5. Explore and apply the concepts of Edge detection, segmentation and object recognition

| UNIT NO. | UNIT NAME & DETAILS | NO. OF LECTURES |
|---|---|---|
| 1. | **Introduction**<br>Concept of Digital Image Processing, Steps in Image Processing, Components of Image Processing System, Applications areas, Image representation, Grey scale and color images. | 6 |
| 2. | **Image Enhancement and Processing :**<br>Basic Grey level transformation, Histogram Processing techniques, Color Fundaments, color models, Pseudo color image processing. | 7 |
| 3. | **Image Restoring and Reconstruction:**<br>Noise models, Noise Reduction, Inverse filtering, MMSE filtering. | 5 |
| 4. | **Image Compression :**<br>Fundamental of Redundancies, Basic Compression Methods, Huffman coding, Arithmetic coding, LZW coding, JPEG | 5 |

| | | |
|---|---|---|
| | compression, Standard. | |
| 5. | **Image Segmentation:** Detection of Discontinuities, Point, Line and Edge detection, Thresholding, Region based Segmentation. | 6 |
| 6. | **Image Processing Applications:** Biometric Pattern Recognition, Face Recognition, Preprocessing of Signature Patterns, Lung Disease Identification. | 7 |

## Term Work

- It should consist of minimum 8 – 10 assignments based on the above topics.

### *Text Books*

| Sr. No. | Title | Author(s) Name | Publication & Edition | Units Covered |
|---|---|---|---|---|
| 1 | Digital Image Processing | R.C.Gonzalez and R.E.Woods | Pearson Edition | 1 to 6 |

### *Reference Books*

| Sr. No. | Title | Author(s) Name | Publication & Edition |
|---|---|---|---|
| 1 | Digital Image Processing | A.K.Jain | PHL |
| 2 | Image processing, Analysis and Machine vision | M.Sonka, V.Hlavac, and R.Boyle | Thomson Asia pvt. Ltd |

| | | |
|---|---|---|
| | G.K. Gujar Memorial Charitable Trust's<br>**Dr. Ashok Gujar Technical Institute's,**<br>**Dr. Daulatrao Aher College of Engineering, Karad.**<br>Vidyanagar Ext. Banawadi, Tal. Karad 415124, Dist. Satara, Maharashtra INDIA | |
| **Year: 2023-24** | **Date: 17/08/23** | *DACOE/ACAD/EL/FRM- 01* |
| **Department: COMPUTER SCIENCE & ENGINEERING** | | *EL-FRM-01- Rev. No: 0* |

**Date: 17/08/23**

**Elective Choice Form (For B.Tech)**

**Academic Year: 2023-24** **Semester-VII** **Class: B.Tech**

**Terms and Conditions:**

1) **Once selected, the elective will be Final**
2) **Under any circumstances this elective will not be changed.**

Elective I (Subjects)

1) Artificial Intelligence
2) Software Testing & Quality Assurance
3) Image Processing

| Roll Number | Name of Student | Elective Choice-I | | | Sign |
|---|---|---|---|---|---|
| | | Choice 1 AI | Choice 2 STQA | Choice 3 IP | |
| 24055 | Pawar Kajal Krishnat | ✓ | | | Pawar |
| 24042 | Patil Saylee Sanjay | ✓ | | | Patil |
| 24002 | Bansode Vidya Pravin | ✓ | | | Bansode |
| 24064 | Shinde Sanika Sanjay | ✓ | | | Shinde |
| 24036 | mulla suhan Jameer | ✓ | | | Mulla |
| 24049 | Patole shravani Mahesh | ✓ | | | Patole |
| 24024 | khot shruti sharad | ✓ | | | Khot |

| Roll Number | Name of Student | Elective Choice-I | | | Sign |
|---|---|---|---|---|---|
| | | Choice 1 AI | Choice 2 STQA | Choice 3 IP | |
| 24059 | Shedage Gauri Dhanaji | ✓ | | | |
| 24069 | Tandale Pradnya Mahesh | ✓ | | | |
| 24057 | Salunkhe Rucha Sandesh | ✓ | | | |
| 24052 | Pawar Harshali Madan | ✓ | | | |
| 24016 | Kadam Sakshi Milind | ✓ | | | |
| 24038 | Nalawade Sanika Anil | ✓ | | | |
| 24030 | Mahajan Mukti Premchand | ✓ | | | |
| 24021 | Kale Asmita Yuvaraj | ✓ | | | |
| 24015 | Jadhav Snehal Sanjay | ✓ | | | |
| 24013 | Inamdar Diya Ramjan | ✓ | | | |
| 24060 | Shejwal Archana Raju | ✓ | | | |
| 24051 | Pawar Dhanashri Nitin | ✓ | | | |
| 24010 | Gadale Snehal Krishna | ✓ | | | |
| 24066 | Shirsat Saloni Pravin | ✓ | | | |
| 24043 | Patil Vaishnavi Ashok | ✓ | | | |
| 24031 | Mane Sanket Sinabhau | ✓ | | | |
| 24050 | Pawar Mayur Pratap | ✓ | | | |
| 24026 | Kumbhar Prathmesh Popat | ✓ | | | |
| 24048 | Patil Suyash Jivan | ✓ | | | |
| 24001 | Bagwan Kamil M. Rafique | ✓ | | | |
| 24006 | Chorage Pratik Arjun | ✓ | | | |
| 24025 | Kodulkar Omkar Arun | ✓ | | | |

Sign of Class Teacher:

HOD

| Roll Number | Name of Student | Elective Choice-I | | | Sign |
|---|---|---|---|---|---|
| | | Choice 1 AI | Choice 2 STQA | Choice 3 IP | |
| 24039 | Pakhale Omkar Santosh | ✓ | | | |
| 24020 | Karande Neha Ganesh | ✓ | | | |
| 24011 | Gawade Komal Kiran | ✓ | | | |
| 24012 | Gurav Aishwarya Rajendra | ✓ | | | |
| 24008 | Chavan Tejaswini Dilip | ✓ | | | |
| 24005 | Chorage Ankita Chandrakant | ✓ | | | |
| 24004 | Chavan Shubham Sanjay | ✓ | | | |
| 24017 | Kalaskar Abhishek pandit | ✓ | | | |
| 24063 | Sanika Sandeep Shinde | ✓ | | | |
| 24045 | Patil Pranjali Pradip | ✓ | | | |
| 24009 | Desai Rohan Ramesh | ✓ | | | |
| 24050 | Patil Sakshi Mohan | ✓ | | | |
| 24065 | Shinde Tanmay Balkrishna | ✓ | | | |
| 24053 | Pawar Pratik Shankar | ✓ | | | |
| 24062 | Shikalgar Junaid Kamruddin | ✓ | | | |
| 24072 | Christian Shine Jayan | ✓ | | | |
| 24067 | Sonawale Sakshi Baburao | ✓ | | | |
| 24054 | Poojary Varsha Vasantha | ✓ | | | |
| 24071 | Yadav Pratiksha Balasaheb | ✓ | | | |
| 24029 | Mahadik Viraj Nitin | ✓ | | | |
| 24034 | Mujawar Rizwan Abid | ✓ | | | |
| 24036 | Mujawar Sayama Dilawar | ✓ | | | |
| 24028 | Lohar Prajakta Prakash | ✓ | | | |