# NAGPUR INSTITUTE OF TECHNOLOGY, NAGPUR DEPARTMENT OF COMPUTER SCI. & ENGINEERING ODD SESSION: 2022-2023

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**Semester/ Branch: - III-Sem-CSE Subject Code:- BECSE304T Subject Name: Computer Architecture & Digital System**

**COURSE OUTCOME**

**At the end of course students are able to:**

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| --- | --- |
| **B.TECH\_CSE 504.1T** | **Computer Architecture & Digital System** |
| **CO304T.1** | Understand the basic concept of digital system & apply for problem solving. |
| **CO304T.2** | Describe the computer architecture & addressing modes. |
| **CO304T.3** | Understand various instruction formats. |
| **CO304T.4** | Perform the arithmetic operations. |
| **CO304T.5** | Design & evaluate various memory management systems. |
| **CO304T.6** | Illustrate I/O mapped & memory mapped operations. |

**PROGRAMME OUTCOMES**

At the end of this program graduate should be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate and analyze real world problems to reach substantial conclusions using computer science and engineering concepts.
3. **Design/development of solutions:** Design a system component and process to meet desired needs.
4. **Conduct investigations of complex problems:** use research based knowledge and methods including design, interpretation of data, analysis & synthesis of the information to provide valid conclusion.
5. **Modern tool usage:** apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** communicate effectively both in written & oral formats.
7. **Environment and sustainability:** Understand the impact of professional engineering solutions in societal and environmental contexts.
8. **Ethics:** Demonstrate professional skills and ethics.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Ability to communicate effectively with peer community and society on complex software/system engineering activities through unambiguous spoken language, written reports, presentations.
11. **Project management and finance:** Ability to apply the knowledge of Engineering and Management principles to manage projects as a team member or leader in multidisciplinary teams.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

**CO- PO MAPPING:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 | 3 | 3 | 2 | - | 2 | - | 1 | - | - | - | - | - |
| CO2 | 1 | 2 | 3 | - | - | - | 2 | - | 1 | - | 1 | - |
| CO3 | 3 | 3 | 1 | - | 3 | - | - | - | 2 | - | 1 | - |
| CO4 | 3 | 3 | - | - | 2 | - | - | - | - | - | 1 | - |
| CO5 | 3 | 2 | 3 | - | 1 | - | - | - | - | - | 1 | 2 |
| CO6 | 1 | - | - | 3 | 2 | - | - | - | - | - | - | - |

# NAGPUR INSTITUTE OF TECHNOLOGY, NAGPUR DEPARTMENT OF COMPUTER SCI. & ENGINEERING

**EVEN SESSION: 2022-2023**

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**Semester/ Branch: - III-Sem-CSE Subject Code:- BE\_CSE-303T Subject Name: OPERATING SYSTEM**

**COURSE OUTCOME**

**At the end of course students are able to:**

|  |  |
| --- | --- |
| **BE\_CSE-303T** | **OPERATING SYSTEM** |
| **CO303T.1** | Explain the basic concepts of Operating System. |
| **CO303T.2** | Understand the process management policies and scheduling algorithms. |
| **CO303T.3** | Design the various memory management techniques. |
| **CO303T.4** | Analyze process synchronization techniques. |
| **CO303T.5** | Understand file system concepts. |
| **CO303T.6** | Evaluate deadlock detection & prevention mechanism. |

PROGRAMME OUTCOMES

At the end of this program graduate should be able to:

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2. **Problem analysis:** Identify, formulate and analyze real world problems to reach substantial conclusions using computer science and engineering concepts.
3. **Design/development of solutions:** Design a system component and process to meet desired needs.
4. **Conduct investigations of complex problems:** use research based knowledge and methods including design , interpretation of data ,analysis & synthesis of the information to provide valid conclusion.
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12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

**CO- PO MAPPING:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 | 2 | 3 | 2 | 1 | 2 | 3 |  | 2 | 3 | 3 | 3 | 3 |
| CO2 | 2 | 2 | 2 | 3 | 2 | 2 |  | 2 | 3 | 3 | 3 | 3 |
| CO3 | 2 | 3 | 1 | 2 | 2 | 3 |  | 2 | 3 | 3 | 3 | 3 |
| CO4 | 2 | 3 | 3 | 3 |  | 3 |  | 2 | 3 | 3 | 3 | 3 |
| CO5 | 2 |  | 3 | 3 |  | 3 |  | 3 | 2 | 2 | 2 | 3 |

# NAGPUR INSTITUTE OF TECHNOLOGY, NAGPUR DEPARTMENT OF COMPUTER SCI. & ENGINEERING ODD SESSION: 2022-2023

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**Semester/ Branch: - VII-Sem-CSE Subject Code:- BECSE-401T Subject Name: Language Processing**

**COURSE OUTCOME**

**At the end of course students are able to:**

|  |  |
| --- | --- |
| **BECSE401T** | **Language Processing** |
| **CO401T.1** | Understand the Phases of compiler and Utilities of Automata. |
| **CO401T.2** | Give the implementation details of Top-Down and Bottom-up Parser and its types. |
| **CO401T.3** | Describe the importance of the Semantic Phase and symbol table in Compiler. |
| **CO401T.4** | Give the descriptions for the Synthesis model of the Compiler w.r.t. Analysis Model. |
| **CO401T.5** | Understand the Architecture of the Computer and few advanced topics for a Compiler. |

**PROGRAMME OUTCOMES**

At the end of this program graduate should be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate and analyze real world problems to reach substantial conclusions using computer science and engineering concepts.
3. **Design/development of solutions:** Design a system component and process to meet desired needs.
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8. **Ethics:** Demonstrate professional skills and ethics.
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11. **Project management and finance:** Ability to apply the knowledge of Engineering and Management principles to manage projects as a team member or leader in multidisciplinary teams.
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| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 | 3 | 3 | 3 | 3 | - |  | - | - | 2 | - | 3 | 2 |
| CO2 | 3 | 3 | 3 | 3 | - | - | - | - | 2 | - | 3 | 2 |
| CO3 | 3 | 3 | 3 | 3 | - | - | - | - | 2 | - | 3 | 2 |
| CO4 | 1 | 3 | 2 | - | - | - | - | - | - | - | - | - |
| CO5 | - | - | 3 | 1 | - | - | - | - | - | - | - | 1 |

# EVEN SESSION: 2022-2023

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**Semester/ Branch: - VI-Sem-CSE Subject Code:- BTECH\_CSE-601T Subject Name: COMPILER DESIGN**

**COURSE OUTCOME**

**At the end of course students are able to:**

|  |  |
| --- | --- |
| **BTECH\_CSE 601T** | **CMPILER DESIGN** |
| **CO601T.1** | Understand the Phases of compiler and Utilities of Automata. |
| **CO601T.2** | Give the implementation details of Top-Down and Bottom-up Parser and its types. |
| **CO601T.3** | Describe the importance of the Semantic Phase and symbol table in Compiler. |
| **CO601T.4** | Give the descriptions for the Synthesis model of the Compiler w.r.t. Analysis Model. |
| **CO601T.5** | Understand the Architecture of the Computer and few advanced topics for a Compiler. |

**PROGRAMME OUTCOMES**

At the end of this program graduate should be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate and analyze real world problems to reach substantial conclusions using computer science and engineering concepts.
3. **Design/development of solutions:** Design a system component and process to meet desired needs.
4. **Conduct investigations of complex problems:** use research based knowledge and methods including design, interpretation of data, analysis & synthesis of the information to provide valid conclusion.
5. **Modern tool usage:** apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** communicate effectively both in written & oral formats.
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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 | 1 |  | 3 | 2 |  | 3 |  | 1 |  | 3 | 1 | 3 |
| CO2 | 1 | 2 | 3 | 3 |  | 2 |  | 2 |  | 3 | 1 | 3 |
| CO3 | 2 | 2 | 3 |  |  |  |  | 1 |  | 1 | 1 | 3 |
| CO4 | 2 | 1 | 3 | 3 | 3 |  |  | 2 |  | 3 | 3 | 3 |
| CO5 | 3 | 2 | 3 | 3 |  |  |  | 3 | 2 | 2 | 1 | 3 |

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**Semester/ Branch: - VII-Sem-CSE Subject Code:- BECSE404T Subject Name: Elective II- MOBILE COMPUTING**

**COURSE OUTCOME**

**At the end of course students are able to:**

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| --- | --- |
| **B.TECH\_CSE 504.1T** | **Elective II- MOBILE COMPUTING** |
| **CO404T.1** | To provide the student with an understanding of the Cellular concept, Frequency reuse,  Hand- off strategies. |
| **CO404T.2** | To provide the student with an understanding of Equalization and diversity reception Techniques. |
| **CO404T.3** | To give the student an understanding of digital cellular systems (GSM, GPRS, WAP, cdma2000, and W-CDMA). |
| **CO404T.4** | To illustrate architecture and protocols in pervasive computing. |
| **CO404T.5** | To design successful mobile and pervasive computing applications and services. |
| **CO404T.6** | To give practical experience in the area through the design and execution of a  modest research project. |

**PROGRAMME OUTCOMES**

At the end of this program graduate should be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate and analyze real world problems to reach substantial conclusions using computer science and engineering concepts.
3. **Design/development of solutions:** Design a system component and process to meet desired needs.
4. **Conduct investigations of complex problems:** use research based knowledge and methods including design, interpretation of data, analysis & synthesis of the information to provide valid conclusion.
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10. **Communication:** Ability to communicate effectively with peer community and society on complex software/system engineering activities through unambiguous spoken language, written reports, presentations.
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**CO- PO MAPPING:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 | 3 | 2 | 1 | 3 | - | 1 | - | - | - | 3 | - | 2 |
| CO2 | 3 | 2 | 3 | 3 | - | 2 | 2 | - | 2 | 2 | 3 | 2 |
| CO3 | 3 | 2 | 3 | 3 | - | - | - | - | 2 | 3 | - | 2 |
| CO4 | 3 | - | 2 | 3 | - | - | - | - | - | 1 | 3 | 2 |
| CO5 | 3 | 2 | 1 | 3 | - | - | - | - | 2 | - | - | 2 |
| CO6 | 3 | 2 | 1 | 3 | - | 3 | - | - | 3 | 2 | 3 | - |

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**Semester/ Branch: - V-Sem-CSE Subject Code:- B.TECH\_CSE504.1T**

**Subject Name: Elective 1-TCP/IP**

**COURSE OUTCOME**

**At the end of course students are able to:**

|  |  |
| --- | --- |
| **B.TECH\_CSE 504.1T** | **Elective 1-TCP/IP** |
| **CO504.1T.1** | Enumerate the layers of the TCP/IP model. |
| **CO504.1T.2** | Analyze the services of TCP/IP protocol and be able to deal with its layers. Also the concepts of IP addressing. |
| **CO504.1T.3** | Acquire the knowledge of routing protocols. |
| **CO504.1T.4** | Familiarize students with the basic computer network protocols, and how they can be used to help develop and execute networks. |
| **CO504.1T.5** | Generate the solution for basic issues of Internet Mechanism and its security. |

**PROGRAMME OUTCOMES**

At the end of this program graduate should be able to:

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**CO- PO MAPPING:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 | - | - | 3 | - | 2 | - | - | 1 | - | - | - | 1 |
| CO2 | - | 1 | - | - | 3 | - | - | 2 | - | - | - | - |
| CO3 | 2 | - | - | 3 | - | - | - | - | - | - | 1 | 1 |
| CO4 | 1 | - | 2 | - | 3 | - | - | 1 | - | - | - |  |
| CO5 | - | - | - | - | - | - | - | - | - | - |  |  |
| CO6 | 2 | 1 | 3 | - | - | - | - | - | - | - | 2 | 1 |

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**Semester/ Branch: - VI-Sem-CSE Subject Code:- BTECH\_CSE-601T Subject Name: COMPILER DESIGN**

**COURSE OUTCOME**

**At the end of course students are able to:**

|  |  |
| --- | --- |
| **BTECH\_CSE 601T** | **CMPILER DESIGN** |
| **CO601T.1** | Understand the Phases of compiler and Utilities of Automata. |
| **CO601T.2** | Give the implementation details of Top-Down and Bottom-up Parser and its types. |
| **CO601T.3** | Describe the importance of the Semantic Phase and symbol table in Compiler. |
| **CO601T.4** | Give the descriptions for the Synthesis model of the Compiler w.r.t. Analysis Model. |
| **CO601T.5** | Understand the Architecture of the Computer and few advanced topics for a Compiler. |

**PROGRAMME OUTCOMES**

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| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 | 3 | 3 | 3 | 3 | - |  | - | - | 2 | - | 3 | 2 |
| CO2 | 3 | 3 | 3 | 3 | - | - | - | - | 2 | - | 3 | 2 |
| CO3 | 3 | 3 | 3 | 3 | - | - | - | - | 2 | - | 3 | 2 |
| CO4 | 1 | 3 | 2 | - | - | - | - | - | - | - | - | - |
| CO5 | - | - | 3 | 1 | - | - | - | - | - | - | - | 1 |

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**Semester/ Branch: - VI-Sem-CSE Subject Code:- BTECH\_CSE-601T Subject Name: COMPILER DESIGN**

**COURSE OUTCOME**

**At the end of course students are able to:**

|  |  |
| --- | --- |
| **BTECH\_CSE 601T** | **CMPILER DESIGN** |
| **CO601T.1** | Understand the Phases of compiler and Utilities of Automata. |
| **CO601T.2** | Give the implementation details of Top-Down and Bottom-up Parser and its types. |
| **CO601T.3** | Describe the importance of the Semantic Phase and symbol table in Compiler. |
| **CO601T.4** | Give the descriptions for the Synthesis model of the Compiler w.r.t. Analysis Model. |
| **CO601T.5** | Understand the Architecture of the Computer and few advanced topics for a Compiler. |

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| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 | 1 |  | 3 | 2 |  | 3 |  | 1 |  | 3 | 1 | 3 |
| CO2 | 1 | 2 | 3 | 3 |  | 2 |  | 2 |  | 3 | 1 | 3 |
| CO3 | 2 | 2 | 3 |  |  |  |  | 1 |  | 1 | 1 | 3 |
| CO4 | 2 | 1 | 3 | 3 | 3 |  |  | 2 |  | 3 | 3 | 3 |
| CO5 | 3 | 2 | 3 | 3 |  |  |  | 3 | 2 | 2 | 1 | 3 |

**Shree Sai Shikshan Sanstha’s**

**NAGPUR INSTITUTE OF TECHONOLOGY, NAGPUR**

**DEPARTMENT OF COMPUTER SCIENCE ENGINEERING**

**Academic Session: 2022-23 ( Even Sem.)**

**CO & PO MAPPING**

**Course Name: Discrete Mathematics & Graph Theory Course Code : BTCHCSE401T**

CO1 –Illustrate basic mathematical objects such as sets, functions, relations and natural numbers and their properties.

CO2 – Learn the concepts of fuzzy logic , Fuzzy sets and Fuzzy relation.

CO3 –Understanding group , Normal group , Subgroup and also learn the concepts of ring theory. CO4 –Use graphs and trees, as tools to visualize and simplify the problems.

CO5 – Understanding Pigenhole principal with simple application. Learn reccurence relation and solve using generationg function.

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|  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO 1 | **3** | **2** | **1** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **1** |
| CO 2 | **3** | **2** | **1** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **1** |
| CO 3 | **3** | **2** | **1** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **1** |
| CO 4 | **3** | **2** | **2** | **1** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **1** |
| CO 5 | **3** | **2** | **1** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **1** |

**Subject Name: THEORY OF COMPUTATION**

**COURSEOUTCOME**

**At the end of course students are able to:**

|  |  |
| --- | --- |
| **BECSE405T** | **Theory of Computation** |
| **CO405T.1** | Design finite automata and its minimization along with Moore and Mealy Machine. |
| **CO405T.2** | Apply regular expression and create grammar for the same. |
| **CO405T.3** | With context free grammar and various normal forms of CFGs. |
| **CO405T.4** | Create Push Down Automata for the given CFG and inter-conversion of the same. |
| **CO405T.5** | Create Turning Machine for the grammar and Deal with recursive and Recursively Enumerable Languages |

PROGRAMME OUTCOMES

At the end of this program graduate should be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:**Identify, formulate and analyze real world problems to reach substantial conclusions using computer science and engineering concepts.
3. **Design/development of solutions:** Design a system component and process to meet desired needs.
4. **Conduct investigations of complex problems:** use research based knowledge and methods including design , interpretation of data ,analysis & synthesis of the information to provide valid conclusion.
5. **Modern tool usage:** apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** communicate effectively both in written & oral formats
7. **Environment and sustainability:**Understand the impact of professional engineering solutions in societal and environmental contexts.
8. **Ethics:**Demonstrate professional skills and ethics.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Ability to communicate effectively with peer community and society on complex software/system engineering activities through unambiguous spoken language, written reports, presentations.
11. **Project management and finance:** Ability to apply the knowledge of Engineering and Management principles to manage projects as a team member or leader in multidisciplinary teams.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

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| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 |  | 3 | 2 | 1 |  | 3 |  | 2 | 3 | 2 | 3 | 3 |
| CO2 | 3 | 2 |  | 3 |  | 2 |  | 2 | 3 | 3 | 3 | 2 |
| CO3 | 2 | 3 | 1 |  | 1 | 3 |  | - | 3 | 3 | 3 | 3 |
| CO4 | 2 | 3 |  | 3 |  | 3 |  | 2 | 3 | 3 |  | 3 |
| CO5 | 2 |  | 3 | 3 |  | 3 |  | 3 | 2 | 2 | 2 | 3 |

**Subject Name: DATA STRUCTURE AND PROGRAM DESIGN**

**COURSEOUTCOME**

**At the end of course students are able to:**

|  |  |
| --- | --- |
| **BECSE402T** | **Data Structure and Program Design** |
| **CO402T.1** | Analyze the complexity of algorithm and sorting techniques. |
| **CO402T.2** | Apply the concept of stack and queues to solve real world problem. |
| **CO402T.3** | Describe and implement linked list operation. |
| **CO402T.4** | Demonstrate different methods for traversing trees. |
| **CO402T.5** | Utilized the concept of graphs to build solution. Design and implement searching techniques and hashing function. |

PROGRAMME OUTCOMES

At the end of this program graduate should be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:**Identify, formulate and analyze real world problems to reach substantial conclusions using computer science and engineering concepts.
3. **Design/development of solutions:** Design a system component and process to meet desired needs.
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| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 | 2 | 3 | 2 | 1 |  | 3 |  | 2 | 3 | 3 | 3 | 3 |
| CO2 | 3 | 2 |  | 3 |  | 2 |  | 2 | 3 | 3 | 3 | 3 |
| CO3 | 2 | 3 | 1 |  |  | 3 |  | 2 | 3 | 3 | 3 | 3 |
| CO4 | 2 | 3 |  | 3 |  | 3 |  | 2 | 3 | 3 | 3 | 3 |
| CO5 | 2 |  | 3 | 3 |  | 3 |  | 3 | 2 | 2 | 2 | 3 |

# NAGPUR INSTITUTE OF TECHNOLOGY, NAGPUR

**DEPARTMENT OF COMPUTER SCI. & ENGINEERING EVEN SESSION: 2022-2023**

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**Semester/ Branch: - IV-Sem-CSE Subject Code:- BECSE404T Subject Name: COMPUTER NETWORK**

**COURSE OUTCOME**

**At the end of course students are able to:**

|  |  |
| --- | --- |
| **BECSE404T** | **COMPUTER NETWORK** |
| **CO404T.1** | Develop a fundamental understanding of network design principles and performance metrics. |
| **CO404T.2** | Understand the data link-layer concepts, protocols, and services and basic concepts of wired and wireless networks. |
| **CO404T.3** | Distinguish packet switching and circuit switching techniques.  Develop mechanisms for effective network management, congestion control and congestion avoidance in the internetwork. |
| **CO404T.4** | Understand different network interfaces and routing techniques for IP based networking infrastructure. |
| **CO404T.5** | Apply the knowledge earned into various application level services like email, www etc. |

PROGRAMME OUTCOMES

At the end of this program graduate should be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate and analyze real world problems to reach substantial conclusions using computer science and engineering concepts.
3. **Design/development of solutions:** Design a system component and process to meet desired needs.
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12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

**CO- PO MAPPING:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 | 2 | 3 | 2 | 1 |  |  |  |  |  |  | 3 | 3 |
| CO2 | 3 | 2 |  | 3 |  |  |  |  |  |  | 3 | 3 |
| CO3 | 2 | 3 | 1 |  |  |  |  |  |  |  | 3 | 3 |
| CO4 | 2 | 3 |  | 3 |  |  |  |  |  |  | 3 | 3 |
| CO5 | 2 |  | 3 | 3 |  |  |  |  |  |  | 2 | 3 |



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**Semester/ Branch: - IV-Sem-CSE Subject Code:-BECSE403T Subject Name: DATABASE MANAGEMENT SYSTEM**

**COURSEOUTCOME**

**At the end of course students are able to:**

|  |  |
| --- | --- |
| **BECSE403T** | **Database Management System** |
| **CO403T.1** | Understand basic database concepts and data modeling techniques used indatabase design. |
| **CO403T.2** | udy the concept of functional dependency and Perform the calculus with design database by using different normalization technique. |
| **CO403T.3** | Study query processing and Perform optimization on query processing. |
| **CO403T.4** | Understand the concept of transaction processing and different recovery technique used in RDBMS. |
| **CO403T.5** | Study and Implement advanced databases which are used real time system. |

**PROGRAMME OUTCOMES**

At the end of this program graduate should be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:**Identify, formulate and analyze real world problems to reach substantial conclusions using computer science and engineering concepts.
3. **Design/development of solutions:** Design a system component and process to meet desired needs.
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**CO- PO MAPPING:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 | 3 | - | 3 | 1 | 2 | - | 1 | - | - | - | 3 | 2 |
| CO2 | 3 | 3 | 3 | - | 3 | - | - | - | 2 | - | - | 2 |
| CO3 | - | 3 | 3 | 2 | - | - | - | - | 2 | - | 2 | 2 |
| CO4 | 3 | - | 3 | 1 | - | - | - | - | - | - | 1 | 3 |
| CO5 | 3 | 3 | - | 3 | - | - | - | - | 2 | - | 3 | 2 |

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**Semester/ Branch: - VI-Sem-CSE Subject Code:-BTECH-CSE-608T Subject Name: ECONOMICS OF IT INDUSTRY**

**COURSEOUTCOME**

**At the end of course students are able to:**

|  |  |
| --- | --- |
| **BECSE403T** | **ECONOMICS OF IT INDUSTRY** |
| **CO608T.1** | The learners will be able to distinguish between Micro and Macro economics. |
| **CO608T.2** | The learners will be able to relate economics concept with IT industry. |
| **CO608T.3** | The learners will be able to identify key trends in IT industry. |
| **CO608T.4** | The learners will be able to understand the key economic drivers of IT industry. |

**PROGRAMME OUTCOMES**

At the end of this program graduate should be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:**Identify, formulate and analyze real world problems to reach substantial conclusions using computer science and engineering concepts.
3. **Design/development of solutions:** Design a system component and process to meet desired needs.
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**CO- PO MAPPING:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 | - | - | - | 3 | 3 | - | - | 2 | 1 | 2 | - | 3 |
| CO2 | - | - | - | - | 3 | - | - | 2 | 1 | 1 | 3 | 2 |
| CO3 | - | 3 | 2 | 1 | - | - | - | - | - | - | 3 | 2 |
| CO4 | 2 | - | - | - | 3 | - | 1 | - | - | - | - | 3 |

# NAGPUR INSTITUTE OF TECHNOLOGY, NAGPUR DEPARTMENT OF COMPUTER SCI. & ENGINEERING EVEN SESSION: 2022-2023

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**Semester/ Branch: - VI-Sem-CSE Subject Code:-BTECH-CSE-604.1T Subject Name: Open Elective 1: Linux Fundamentals**

**COURSEOUTCOME**

**At the end of course students are able to:**

|  |  |
| --- | --- |
| **BTECHCSE604.1T** | **Distributing Operating System (Elective 3)** |
| **CO604.1T.1** | Understand linux architecture, different linux installation and linux. |
| **CO604.1T.2** | Effective use linux environment using shell, file system, scripts, filters and program development tools. |
| **CO604.1T.3** | Perform user, group management package management through commands. |
| **CO604.1T.4** | Perform storage management and failure recovery through commands. |
| **CO604.1T.5** | Automate tasks and write simple programs using shell scripts. |

**PROGRAMME OUTCOMES**

**At the end of this program graduate should be able to:**

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:**Identify, formulate and analyze real world problems to reach substantial conclusions using computer science and engineering concepts.
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| **CO/PO** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** |
| **CO1** | **3** | **-** | - | - | **2** | - | - | **1** | - | - | - | **3** |
| **CO2** | **3** | **1** | **3** | **2** | **2** | - | - | **-** | - | - | - | **3** |
| **CO3** | **2** | **2** | **-** | **-** | **3** | **-** | **1** | **-** | **-** | **1** | **-** | **3** |
| **CO4** | **1** | **3** | **1** | **-** | **2** | **-** | **-** | **2** | **-** | **1** | **-** | **2** |
| **CO5** | **3** | **2** | **1** | **3** | **2** | **-** | **-** | **-** | **-** | **-** | **2** | **2** |

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**Semester/ Branch: - VIII-Sem.-CSE Subject Code:- BECSE406T Subject Name: DISTRIBUTED OPERATING SYSTEM**

**COURSEOUTCOME**

**At the end of course students are able to:**

|  |  |
| --- | --- |
| **BTECHCSE406T** | **Distributing Operating System (Elective 3)** |
| **CO406T.1** | Learn the principles, architectures, Algorithms and programming models used in distributed system |
| **CO406T.2** | Understand the core concept of distributed system |
| **CO406T.3** | Design and implements sample distributed system, using different algorithm |
| **CO406T.4** | Understand the distributed file system, Architecture And mechanism |
| **CO406T.5** | Analyze the distributed scheduling, Issue in load distributing, Components of load distributing algorithm, load distributing algorithm |
| **CO406T.6** | Study the failure recovery, Synchronous and Asynchronous check pointing on distributed system |

**PROGRAMME OUTCOMES**

**At the end of this program graduate should be able to:**

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:**Identify, formulate and analyze real world problems to reach substantial conclusions using computer science and engineering concepts.
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**CO- PO MAPPING:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
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| **CO/PO** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** |
| **CO1** | **3** | **-** | **2** | **-** | **2** | **2** | **-** | **1** | **-** | **1** | **2** | **2** |
| **CO2** | **2** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **2** |
| **CO3** | **2** | **-** | **3** | **1** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **1** |
| **CO4** | **2** | **-** | **2** | **-** | **3** | **-** | **-** | **-** | **-** | **-** | **-** | **2** |
| **CO5** | **-** | **-** | **3** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **1** |
| **CO6** | **1** | **2** | **3** | **2** | **1** | **-** | **-** | **-** | **-** | **-** | **-** | **2** |

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**Semester/ Branch: - VIII-Sem-CSE Subject Code:-BECSE409T Subject Name: Elective IV- ADVANCED WIRELESS SENSOR NETWORKS**

**COURSEOUTCOME**

**At the end of course students are able to:**

|  |  |
| --- | --- |
| **BECSE402T** | **Elective IV- ADVANCED WIRELESS SENSOR NETWORKS** |
| **CO409T.1** | Understand and introducebasic concepts of Wireless sensor network. |
| **CO409T.2** | udy the concept of execution environment withenergy power management technique. |
| **CO409T.3** | Study concept and architecture of network. |
| **CO409T.4** | Study and Implementthe concept of fundament address and naming. |
| **CO409T.5** | Understandcontent based routing protocol. |
| **CO409T.6** | Study and Implement advanced databases which are used real time system. |

**PROGRAMME OUTCOMES**

At the end of this program graduate should be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:**Identify, formulate and analyze real world problems to reach substantial conclusions using computer science and engineering concepts.
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| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 | - | - | 1 | 1 | 2 | - | 3 | - | - | - | - | - |
| CO2 | - | - | - | - | 3 | - | - | 2 | 1 | - | - | - |
| CO3 | - | - | 2 | - | 3 | - | - | 2 | 1 | - | - | 2 |
| CO4 | 2 | - | - | - | 3 | - | - | - | - | - | 1 | 2 |
| CO5 | - | - | - | 2 | 3 | - | 2 | - | - | - | 1 | - |
| CO6 | 2 | - | 3 | - | 3 | - | - | 2 | - | - | - | 1 |

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**Semester/ Branch: - VI/VIII-Sem.-CSE Subject Code:- BECSE406T Subject Name: DISTRIBUTED OPERATING SYSTEM**

**COURSEOUTCOME**

**At the end of course students are able to:**

|  |  |
| --- | --- |
| **BTECHCSE406T** | **Distributing Operating System (Elective 3)** |
| **CO406T.1** | Learn the principles, architectures, Algorithms and programming models used in distributed system |
| **CO406T.2** | Understand the core concept of distributed system |
| **CO406T.3** | Design and implements sample distributed system, using different algorithm |
| **CO406T.4** | Understand the distributed file system, Architecture And mechanism |
| **CO406T.5** | Analyze the distributed scheduling, Issue in load distributing, Components of load distributing algorithm, load distributing algorithm |
| **CO406T.6** | Study the failure recovery, Synchronous and Asynchronous check pointing on distributed system |

**PROGRAMME OUTCOMES**

**At the end of this program graduate should be able to:**

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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| **CO/PO** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** |
| **CO1** | **3** | **-** | **2** | **-** | **2** | **2** | **-** | **1** | **-** | **1** | **2** | **2** |
| **CO2** | **2** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **2** |
| **CO3** | **2** | **-** | **3** | **1** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **1** |
| **CO4** | **2** | **-** | **2** | **-** | **3** | **-** | **-** | **-** | **-** | **-** | **-** | **2** |
| **CO5** | **-** | **-** | **3** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **1** |
| **CO6** | **1** | **2** | **3** | **2** | **1** | **-** | **-** | **-** | **-** | **-** | **-** | **2** |

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**Semester/ Branch: - VI-Sem-CSE Subject Code:-BTECH\_CSE-602.1T Subject Name: Elective 2 : MACHINE LEARNING**

**COURSEOUTCOME**

**At the end of course students are able to:**

|  |  |
| --- | --- |
| **CO** | **MACHINE LEARNING** |
| **CO602.1T.1** | Understand basics of Machine Learning Techniques. |
| **CO602.1T.2** | Understand different types of Regression Techniques |
| **CO602.1T.3** | Be capable of applying classification techniques. |
| **CO602.1T.4** | Apply unsupervised machine learning techniques |
| **CO602.1T.5** | Apply & evaluate the machine learning techniques to real world problems. |

PROGRAMME OUTCOMES

At the end of this program graduate should be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:**Identify, formulate and analyze real world problems to reach substantial conclusions using computer science and engineering concepts.
3. **Design/development of solutions:** Design a system component and process to meet desired needs.
4. **Conduct investigations of complex problems:** use research based knowledge and methods including design , interpretation of data ,analysis & synthesis of the information to provide valid conclusion.
5. **Modern tool usage:** apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** communicate effectively both in written & oral formats
7. **Environment and sustainability:**Understand the impact of professional engineering solutions in societal and environmental contexts.
8. **Ethics:**Demonstrate professional skills and ethics.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Ability to communicate effectively with peer community and society on complex software/system engineering activities through unambiguous spoken language, written reports, presentations.
11. **Project management and finance:** Ability to apply the knowledge of Engineering and Management principles to manage projects as a team member or leader in multidisciplinary teams.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

**CO- PO MAPPING:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 | 3 | 2 | 2 | 1 | 3 | - | - | - | - | - | - | 1 |
| CO2 | 2 | 1 | 2 | 1 | 1 | - | - | - | - | - | - | - |
| CO3 | 1 | 1 | 3 | 2 | 3 | - | - | - | - | - | - | - |
| CO4 | 2 | 2 | 1 | 1 | 3 | - | - | - | - | - | - | 2 |
| CO5 | 1 | 2 | 3 | 2 | 3 | - | - | - | 2 | - | 3 | 2 |

# NAGPUR INSTITUTE OF TECHNOLOGY, NAGPUR DEPARTMENT OF COMPUTER SCI. & ENGINEERING EVEN SESSION: 2022-2023

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**Semester/ Branch: -VIII-Sem-CSE Subject Code:- BECSE409T Subject Name: DIGITAL FORENCIS**

**COURSE OUTCOME**

**At the end of course students are able to:**

|  |  |
| --- | --- |
| **BECSE409T** | **DIGITAL FORENCIS** |
| **CO409T.1** | Understand organizational Setup and functioning of Crime detection agencies |
| **CO409T.2** | Execute various duties of first responding officer and investigating officers at the crime |
| **CO409T.3** | Apply documentation techniques at crime scene of various nature |
| **CO409T.4** | Execute management of crime scene of diverse nature. |
| **CO409T.5** | Investigating various crime scene |
| **CO409T.6** | Basics of digital and Cyber Forencics |

PROGRAMME OUTCOMES

At the end of this program graduate should be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate and analyze real world problems to reach substantial conclusions using computer science and engineering concepts.
3. **Design/development of solutions:** Design a system component and process to meet desired needs.
4. **Conduct investigations of complex problems:** use research based knowledge and methods including design , interpretation of data ,analysis & synthesis of the information to provide valid conclusion.
5. **Modern tool usage:** apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** communicate effectively both in written & oral formats
7. **Environment and sustainability:** Understand the impact of professional engineering solutions in societal and environmental contexts.
8. **Ethics:** Demonstrate professional skills and ethics.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Ability to communicate effectively with peer community and society on complex software/system engineering activities through unambiguous spoken language, written reports, presentations.
11. **Project management and finance:** Ability to apply the knowledge of Engineering and Management principles to manage projects as a team member or leader in multidisciplinary teams.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

**CO- PO MAPPING:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 | 2 | 1 |  | 3 | 2 | 2 |  |  |  |  |  | 2 |
| CO2 | 2 | 2 |  | 3 | 3 | 2 |  |  | 1 |  |  | 2 |
| CO3 | 2 | 2 |  |  | 3 |  |  | 3 |  |  |  | 2 |
| CO4 | 1 | 3 | 3 |  | 3 |  |  |  |  |  |  | 2 |
| CO5 | 1 | 2 | 2 |  | 3 |  |  |  |  |  |  | 2 |