GALGOTIAS UNIVERSITY

Greater Noida, GautamBuddh Nagar

Uttar Pradesh

Appendix 4.1

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| Course Handout | | | | | | | |
| 1 | Course details | | | | | | |
| Faculty name | | Swati Sharma | | | | |
| Programme | | BTECH | | | | |
| Semester | | II | | | | |
| Section | | All | | | | |
| Course code | | BCS0IT1006 | | | | |
| Course title | | Object Oriented Programming | | | | |
| 2 | Vision of the Department of Computer Science and Engineering | | | | | | |
| To be known widely as a premier department of Computer Science and Engineering for  value-based education, multidisciplinary research and innovation. | | | | | | |
| 3 | Mission of the Department of Computer Science and Engineering | | | | | | |
| The mission of the Computer Science and Engineering Department is   * Create a strong foundation on fundamentals of SCSE through OB-TLP. * Establish state-of-the-art facilities for Analysis, Design and Implementation to   develop sustainable ethical solutions.   * Conduct multidisciplinary research for developing innovative solutions. * Involve the students in group activity including that of professional bodies to   develop leadership and communication skills. | | | | | | |
| 4 | Programme educational objectives(PEOs) | | | | | | |
| PEO1 | To prepare graduates of the program will utilize modern and advanced technological tools for performing investigation analysis and synthesis by identifying various computer solutions. | | | | | |
| PEO2 | To equip students with analytical, design, development and soft skill to find innovative solutions to the real world problems in collaboration with industry and professional societies. | | | | | |
| PEO3 | To produce graduates of the program will collaborate with multi disciplinary teams and will be able to become leaders in their organization, their profession and in society. | | | | | |
|  | PEO4 | To produce graduates of the program will become technically competent to pursue higher studies. | | | | | |
| 5 | Programme outcomes | | | | | | |
| PO1 | **Engineering Knowledge:** Apply knowledge of mathematics and  Science, with fundamentals of Computer Science & Engineering  to be able to solve complex engineering problems related to CSE | | | | | |
| PO2 | **Problem Analysis:** Identify, Formulate, review research literature and  analyze complex engineering problems related to  CSE and  reaching  substantiated engineering  conclusions using first principles of  mathematics natural sciences and engineering sciences. | | | | | |
| PO3 | **Design/Development of solutions**: Design solutions for complex engineering  problems related to CSE and design system components or  processes that meet the specified needs with appropriate consideration  for the public health and safety and the cultural societal and  environmental considerations. | | | | | |
| PO4 | **Conduct Investigations of Complex problems:** Use research–based  Knowledge and research methods including design of  experiments,  analysis and interpretation of data, and synthesis of the information to provide  valid conclusions. | | | | | |
| PO5 | **Modern Tool Usage**: Create, Select and apply appropriate techniques,  resources and modern engineering and IT tools including prediction and  modeling  to computer science related complex engineering activities with an  understanding  of the limitations. | | | | | |
| PO6 | **The Engineer and Society:** Apply Reasoning informed by the contextual  knowledge to assess societal, health, safety, legal and cultural issues and  the consequent responsibilities relevant to the CSE professional  Engineering practice. | | | | | |
| PO7 | **Environment and Sustainability**: Understand the impact of the CSE  professional engineering solutions in societal and environmental contexts  and demonstrate the knowledge of, and need for sustainable development | | | | | |
| PO8 | **Ethics:** Apply Ethical Principles and commit to professional ethics and  responsibilities and norms of the engineering practice. | | | | | |
| PO9 | **Individual and Team Work:** Function effectively as an individual and as a  member or leader in diverse teams and in multidisciplinary Settings. | | | | | |
| PO10 | **Communication:** Communicate effectively on complex engineering activities  with theengineering community and with society at large such as able to  comprehend and with write effective reports and design documentation, make  effective presentations and give and receive clear instructions. | | | | | |
| PO11 | **Project Management and Finance**: Demonstrate knowledge and understanding  of the engineering management principles and apply these to one’s own work, as a member and leader in a team, to manage projects and in multi-disciplinary environments. | | | | | |
| PO12 | **Life- long Learning**: Recognize the need for and have the preparation and  ability to engage in independent and life long learning the broadest  context of technological change. | | | | | |
| 6 | Programme specifics outcome(PSO) (if any) | | | | | | |
| PSO1 | Design, test, develop and maintain desktop, web, mobile and cross platform software applications using modern tools and technologies in software project development using open-ended programming environments to deliver a quality product for business success. | | | | | |
| PSO2 | The ability to understand, analyze and develop computer programs in the areas related to algorithms, system software, multimedia, big data, web design, computer graphics and networking for efficient design of computer-based systems and solve real world computing system problems of various industries by understanding and applying the principles of mathematics, computing techniques and business concepts.. | | | | | |
|  | PSO3 | The ability to employ modern computer languages, environments, and platforms in creating innovative career paths to be an entrepreneur, and a zest for higher studies. | | | | | |
| 7 | Course outcomes (COs) | | | | | | |
| CO1 | Understand the Object Oriented Programming Features. | | | | | |
| CO2 | Analyze and Apply the role of constructors & destructors in program design. | | | | | |
| CO3 | Understand the concept of Exception Handling. | | | | | |
| CO4 | I Apply the concept of inheritances, polymorphism and virtual function for problem solution. | | | | | |
| CO5 | Apply the different input output streams for problem solution. | | | | | |
|  | CO6 | Understanding of latest advances and its applications in Computer Programming and Problem Solving. | | | | | |
| 8 | Evaluation Component | Duration | | **Marks** | Date &Time | Nature of Component | Evaluation Component |
| ETE | 3 hours | | 50 | On a scheduled | Closed Book | ETE |
| Quiz-1/2/3 | 15 mins each | | 5 | date | Closed Book | Quiz |
| CAT 1/2/3 | 90 mins | | 30 | On a scheduled | Closed Book | CAT |
| Assignment  (s) | Within two days | | 5 | Date | Open Book | Assignment(s) |
| Presentation  (Seminar/  mini-project/  poster) | 15 minutes | | 5 | Any time throughout |  | - |
| 9 | List of teaching – Learning pedagogy   1. Lectured Talk 2. Presentation 3. Flipped Class | | | | | | |
| 10 | Open hour for students  Saturday – 12.30 PM to 1.30 PM | | | | | | |
| 11 | Link address for course materials  <http://lms.galgotiasuniversity.edu.in/> | | | | | | |
| 12 | Recommended list of e-books.   1. Object Oriented Programming with C++ - Rajiv Sahay, Oxford Mastering C++ - Venugopal, McGraw-Hill Education (India) 2. Herbert Schildt, C++ - The Complete Reference, Third Edition -Tata McGraw Hill - 1999. 3. Bruce Eckel, Thinking in C++, Second Edition, Volume One, Pearson Education Asia, 2000. | | | | | | |
| 13 | Recommended list of online courses like SWAYYAM/NPTEL/MOOCS etc  https://nptel.ac.in/courses/106/105/106105151/  <https://nptel.ac.in/courses/106/101/106101208/>  <https://www.coursera.org/projects/learn-object-oriented-programming-with-cpp> | | | | | | |
| 14 | Recommended list of mini projects / projects/ technical training etc.   * Login and Registration System | | | | | | |
| 15 | Students’ Presentation – Based on Unit | | | | | | |
| 16 | List of e-books   1. Object Oriented Programming in C++ by Robert LaforeTechmedia Publication. 2. Object Oriented Programming in C++ SauravSahay Oxford University Press. 3. Object Oriented Programming in C++ R Rajaram New Age International Publishers 2nd. 4. OOPS C++ Big C++ Cay Horstmann Wiley Publication. | | | | | | |
| 17 | List of NPTEL/MOOCS/SWAYAM/Courses/Video https://nptel.ac.in/courses/106/105/106105151/  <https://nptel.ac.in/courses/106/101/106101208/>  <https://www.coursera.org/projects/learn-object-oriented-programming-with-cpp> | | | | | | |
| 18 | Content beyond Syllabus   * **Smart Pointers** * **Move Semantics** * **Lambda syntax** | | | | | | |
| 19 | List of mini projects/projects   * Login and Registration System | | | | | | |

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| --- | --- | --- | --- | --- | --- | --- |
|  | Detail academic calendar of lecture topics | | | | | |
| Lecture No. | Date | Topics to be covered | Learning outcomes of  each topic | Related Unit of syllabus | Total lecture in the Unit | Reference Chap./Sec. (Book) (T1 means test book in serial 1 and so on R1 means reference book in serial no 1 and so on) |
| 1 |  | Object oriented programming concepts – objects – classes – methods and messages | The student would learn the basic concepts of Object Oriented Programming and get introduced to C++. | Unit - I | 4 | Chapter 1 ,2 of T1,  Online Ebook |
| 2 |  | abstraction and encapsulation – inheritance – abstract classes – polymorphism. |
| 3 |  | Introduction to C++ – classes – access specifiers – function and data members – default arguments – function overloading |
| 4 |  | friend functions – const and volatile functions - static members – Objects – pointers and objects – constant objects – nested classes – local classes. |
| 5 |  | Constructors – default constructor – Parameterized constructors – Constructor with dynamic allocation – copy constructor – destructors | Analyze and Apply the role of constructors &destructors in program design. | Unit - II | 2 | Chapter 5 of T1,  Online Ebook |
| 6 |  | operator overloading – overloading through friend functions – overloading the assignment operator – type conversion – explicit constructor. |
| 7 |  | Function and class templates - Exception handling – try-catch-throw paradigm | Understand the concept of Exception Handling | Unit - III | 2 | Chapter 8 of T1,  Online Ebook |
| 8 |  | exception specification – terminate and unexpected functions – Uncaught exception. |
| 9 |  | Inheritance – public, private, and protected derivations – multiple inheritance | Apply the concept of inheritances, polymorphism and virtual function for problem solution | Unit – IV | 3 | Chapter 9 of T1,  Online Ebook |
| 10 |  | virtual base class – abstract class – composite objects Runtime polymorphism |
| 11 |  | virtual functions – pure virtual functions – RTTI – typeid – dynamic casting – RTTI and templates – cross casting – down casting |
| 12 |  | Streams and formatted I/O – I/O manipulators - file handling – random access | Understand and apply basic file handling and string Operations | Unit - V | 2 | Chapter 12 of T1,  Online Ebook |
| 13 |  | object serialization , namespaces - std namespace – ANSI String Objects – standard template library |
| 14 |  | The advances and the latest trends in the course as well as the latest applications of the areas covered in the course. The latest research conducted in the areas covered in the course. | Understanding of latest advances and its applications in Computer Programming and Problem Solving. | Unit - VI | 2 | Chapter 11 of T1,  Online Ebook |
| 15 |  | Discussion of some latest papers published in IEEE transactions and ACM transactions, Web of Science and SCOPUS indexed journals as well as high impact factor conferences as well as symposiums. Discussion on some of the latest products available in the market based on the areas covered in the course and patents filed in the areas covered in the course. |

**Course Description**

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| --- | --- | --- | --- | --- | --- |
| ***Name of The Course*** | **Object Oriented Programming** | | | | |
| ***Course Code*** | BCS01T1006 | | | | |
| ***Prerequisite*** | C Programmimg | | | | |
| ***Corequisite*** |  | | | | |
| ***Antirequisite*** |  | | | | |
|  | | **L** | **T** | **P** | **C** |
|  | | 1 | 0 | 2 | 2 |

***Course Objectives:***

*The purpose of this course is to provide basic concepts of Object oriented programming with C++. The main goal of the course is to teach the students how to Apply the OOPS concepts in various applications that are appropriate for problems that they might encounter. This course is also to teach constructors, destructors, inheritances, polymorphism, virtual function and control structures. This also provides knowledge of input output stream functions.*

***Course Outcomes:***

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

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| --- | --- |
| **CO1** | Understand the Object Oriented Programming Features. |
| **CO2** | Analyze and Apply the role of constructors &destructors in program design. |
| **CO3** | Understand the concept of Exception Handling. |
| **CO4** | Apply the concept of inheritances, polymorphism and virtual function for problem solution |
| **CO5** | Apply the different input output streams for problem solution. |
| **CO6** | Understanding of latest advances and its applications in Computer Programming and Problem Solving. |

***Text Book (s)***

* + - 1. Object Oriented Programming with C++ - Rajiv Sahay, Oxford Mastering C++ - Venugopal, McGraw-Hill Education (India)
      2. Herbert Schildt, C++ - The Complete Reference, Third Edition -Tata McGraw Hill - 1999.
      3. Bruce Eckel, Thinking in C++, Second Edition, Volume One, Pearson Education Asia, 2000.

***Reference Book (s):***

1. Object Oriented Programming in C++ by Robert LaforeTechmedia Publication.

2. Object Oriented Programming in C++ SauravSahay Oxford University Press.

3. Object Oriented Programming in C++ R Rajaram New Age International Publishers 2nd.

4. OOPS C++ Big C++ Cay Horstmann Wiley Publication.

5. C++ and Object Oriented Programming – Jana, PHI Learning.

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| **Unit I: Introduction: Basic Terminology 4 lecture hours** |
| Object oriented programming concepts – objects – classes – methods and messages – abstraction and encapsulation – inheritance – abstract classes – polymorphism. Introduction to C++ – classes – access specifiers – function and data members – default arguments – function overloading – friend functions – const and volatile functions - static members – Objects – pointers and objects – constant objects – nested classes – local classes. |
| **Unit II: Constructor & Destructor 2 lecture hours** |
| Constructors – default constructor – Parameterized constructors – Constructor with dynamic allocation – copy constructor – destructors – operator overloading – overloading through friend functions – overloading the assignment operator – type conversion – explicit constructor. |
| **Unit III: Exception Handling 2 lecture hours** |
| Function and class templates - Exception handling – try-catch-throw paradigm – exception specification – terminate and unexpected functions – Uncaught exception. |
| **Unit IV: Inheritance 3 lecture hours** |
| Inheritance – public, private, and protected derivations – multiple inheritance - virtual base class – abstract class – composite objects Runtime polymorphism – virtual functions – pure virtual functions – RTTI – typeid – dynamic casting – RTTI and templates – cross casting – down casting |
| **Unit V: I/O STREAMS 2 lecture hours** |
| Streams and formatted I/O – I/O manipulators - file handling – random access – object serialization – namespaces - std namespace – ANSI String Objects – standard template library |
| **Unit-6Advances in C++ Programming 2 lecture hours** |
| The advances and the latest trends in the course as well as the latest applications of the areas covered in the course. The latest research conducted in the areas covered in the course. Discussion of some latest papers published in IEEE transactions and ACM transactions, Web of Science and SCOPUS indexed journals as well as high impact factor conferences as well as symposiums. Discussion on some of the latest products available in the market based on the areas covered in the course and patents filed in the areas covered in the course. |

**Appendix 4.3: Compliance report**

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| **School of SCSE** | | | | | | | |
| **Programme** | | | B.Tech II Sem | | | | |
| **Programme Chair** | | |  | | | | |
| **Compliance report of course handout** | | | | | | | |
| **S. No.** | **Course code** | **Course title** | **Section** | **Taught by faculty** | **Course**  **coordinator** | **Course handout Submission date** | **Remarks by PC**  **if any** |
| 1 | BCS01T1006 | **Object Oriented Programming** |  | Monu Singh | Monu Singh | **10-03-2022** |  |

Signature of PC;

Signature of Dean:

Review by IQAC: