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| Department | International College of Liberal Arts | | |
| Semester | Spring 2025 | Year Offered (Odd/Even/Every Year) | Every Year |
| Course Number | DATA100 | | |
| Course Title | Introduction to Computer Science | | |
| Prerequisites | None | | |
| Course Instructor | PARIDA Abhishek | Year Available (Grade Level) | 1 |
| Subject Area | Data Science | Number of Credits | 3 |
| Class Style | Lecture | Language of instruction | English |

(NOTE 1) Depending on the class size and the capacity of the facility, we may not be able to accommodate all students who wish to register for the course

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| Course Description | Computer Science is a vast field, encompassing various topics ranging from organization and architectures designs, operating systems, programming languages, data structures, software engineering techniques, communication and networking, and many others. The field is growing faster than any other profession and offers many opportunities provided one thoroughly adopts the current developments. Moreover, knowledge about various technical concepts develops critical thinking and helps understand technology profoundly. The course is intended for all students and articulates various essential topics in Computer Science and Information Technology. It is specially crafted for students in Liberal Arts and describes all the vital topics required to understand the newly emerging field of Data Science and more. After covering the essentials, the course orients students towards data used in society and several areas of Artificial Intelligence in the present scenario. |
| Class plan based on course evaluation from previous academic year | N/A |
| Course related to the instructor's practical experience (Summary of experience) | N/A |
| Learning Goals | The course is prepared for beginners to Computer Science and intended mainly for students from a non-technical background like the Liberal Arts and related. After completing the course, students would have a moderate level of computer basics. The subject's scope is vast and builds a pavement for the Data Science curriculum by covering all essential materials. |

| iCLA Diploma Policy | DP1／DP2 |
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iCLA Diploma Policy

(DP1) To Value Knowledge - Having high oral and written communication skills to be able to both comprehend and transfer knowledge

(DP2) To Be Able to Adapt to a Changing World - Having critical, creative, problem-solving, intercultural skills, global and independent mindset to adopt to a changing world

(DP3) To Believe in Collaboration - Having a disposition to work effectively and inclusively in teams

(DP4) To Act from a Sense of Personal and Social Responsibility - Having good ethical and moral values to make positive impacts in the world

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| Active Learning Methods | Problem-Based Learning／Discussion, Debate | | | | |
| More details/supplemental information on Active Learning Methods | N/A | | | | |
| Use of ICT | N/A. The course will be taught on pen and paper/ whiteboard. | | | | |
| Contents of class preparation and review | Students are advised to take handwritten notes; this will drastically increase their ability to retain the information. Further, they are expected to practice regularly. One to two hours of study is required before the class preparation, and an equal amount of practice is needed after each lecture. | Hours expected to be spent preparing for class (hours per week) | 3 hours | Hours expected to be spent on class review (hours per week) | 3 hours |
| Feedback Methods | The best way to correspond during the course is the UNIPA system or direct emails. Please check the UNIPA account regularly for updates related to classes. To have a better grade, be regular in the study, active and attentive in the class, do a revision of classwork regularly, and participate in-class quizzes. | | | | |

| Grading Criteria | | |
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| Grading Methods | Grading Weights | Grading Content |
| Understanding of Concepts | 40% | In-class participation, Homework Assignments, Class Quizes and Final Exam |
| Correctness | 30% | In-class participation, Homework Assignments, Class Quizes and Final Exam |
| Timeliness | 30% | Homework Assignments |

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| Required Textbook(s) | Handouts/ Notes will be provided to students. These notes would be indicative, and students may refer to materials online to suffice their understanding. However, they are encouraged to take proper class notes to refer them later.<br><br>William Stallings - Computer Organization and Architecture<br>William Stallings - Operating Systems: Internals and Design Principles<br>Thomas L. Floyd - Digital Fundamentals<br>Kenneth H. Rosen - Discrete Mathematics and Its Applications |
| Other Reading Materials/URL | N/A |
| Plagiarism Policy | Plagiarism is the dishonest presentation of others' work as if it were one's own. Duplicate submission is also treated as plagiarism. Depending on the nature of plagiarism, one may fail the assignment or the course. The repeated act of plagiarism will be reported to the University, which may apply additional penalties. |

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| Other Additional Notes (Outline crucial policies and info not mentioned above) | N/A |

(NOTE 2) Class schedule is subject to change

| Class Schedule | |
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| Class Number | Content |
| Class 1 | Module 1: An Overview of a Computer System<br>Lecture 1 - Opening remarks and relevance of studying Computers fundamentals; Overview of a Computer system; History/ Evolution of Computers; How do Computers Work?; Types of Computer System |
| Class 2 | Lecture 2 - Fundamentals of Computer Organization- (John) von Neumann Architecture; Classification of Computer Language |
| Class 3 | Lecture 3 - Classification of softwares; Operating system basics: Introduction and objectives; Types of Operating System |
| Class 4 | Lecture 4 - Process state diagram; Process and Threads; Scheduling Algorithms |
| Class 5 | Lecture 5 - Process Scheduling Algorithms (exercises) |
| Class 6 | Lecture 6 - Process Scheduling Algorithms (exercises) |
| Class 7 | Lecture 7 - Number Systems: Positional versus non-positional numbering systems; Binary, Octal, Decimal, Hexadecimal |
| Class 8 | Lecture 8 - Quiz 1 |
| Class 9 | Lecture 9 - The language of 0s and 1s: Representation of data in Computer memory; Binary arithmetic; |
| Class 10 | Lecture 10 - Representing floating point numbers |
| Class 11 | Lecture 11 - Exercises - Scheduling Algorithms and Number System |

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| Class 12 | Lecture 12 - Quiz 2 |
| Class 13 | Module 2: Propositional Logic<br>Lecture 13 - Propositions and Compound Statements; Logical Operations and truth tables; Logical Equivalence; Tautology and Contradictions; Mathematical Arguments; Exercises |
| Class 14 | Lecture 14 - Quiz 3 |
| Class 15 | Module 3: Theory of Computation<br>Lecture 15 - Theory of Computation: Introduction, Preliminaries - language and grammar |
| Class 16 | Lecture 16 - Finite State Machines; Difference between DFA and NFA; Exercises |
| Class 17 | Lecture 17 - Practice Exercises |
| Class 18 | Lecture 18 - Minimizing the DFA; Regular Expressions |
| Class 19 | Lecture 19 - Pushdown automata, Turing Machine |
| Class 20 | Lecture 20 - Exercises |
| Class 21 | Lecture 21 - Quiz 4 - Module 3 |
| Class 22 | Module 4: Data Structures and Algorithms<br>Lecture 22 - Fundamental (linear) Data Structure: array, linked list, stack, queue |
| Class 23 | Lecture 23 - Sorting and Searching algorithm |
| Class 24 | Lecture 24 - Non-linear Data Structures - Tree |
| Class 25 | Lecture 25 - Exercises |

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| Class 26 | Lecture 26 - Non-linear Data Structures - Graphs |
| Class 27 | Lecture 27 - Exercises |
| Class 28 | Lecture 28 - Non-linear Data Structures - Heaps |
| Class 29 | Module 5: New Technologies (Data used in Society/ Artificial Intelligence)<br>Lecture 29 - Blockchain; chat GPT |
| Class 30 | Lecture 30 - Internet of Things; Generative AI |