|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SN** | **Course Code**  **21CSP-314** | **Competitive Coding-I** | **L** | **T** | **P** | **S** | **C** | **CH** | **Course Type\*** |
|  |  | 0 | 0 | 2 | 0 | 1 | 2 | EE |
|  | |  | | | | Course Code(s)  **20CSP-314** | | | |
| **PRE-REQUISITE** | | 21CSP-259 | | | |  | | | |
| **CO-REQUISITE** | | 21CST-313 ,21CST-315,21CST-316,21CST-319,21CSP-321 | | | |  | | | |
| **ANTI-REQUISITE** | | 21CSP-356 | | | |  | | | |

**a. Course Description**

During the course the student will learn everything needed to participate in real competitions. Along the way the students also also gain useful skills for which competitive programmers are so highly valued by employers: ability to write efficient, reliable, and compact code, manage your time well when it’s limited, apply basic algorithmic ideas to real problems, etc.

**b. Course Objectives**

* To give students the ability to write reliable codes.
* To provide skills to the students to write compact and efficient code in a quick manner
* To provide logic building capability to the student.

**c. Course Outcomes**

|  |  |
| --- | --- |
| CO1 | Understand the problem and find out better approach to solve particular problem |
| CO2 | Build the logic to find out the solution of problem and achieve all test cases |
| CO3 | Apply appropriate approaches to solve specific problem. |
| CO4 | To gain critical understanding of problem solving on hackerrank platform |
| CO5 | To acquire proficiency in developing and implementing efficient solutions of given problems by using different approaches and achieve desirable results. |

**d. Syllabus**

|  |  |  |
| --- | --- | --- |
| **Unit-1 Contact Hours:15** | | |
| **Experiment 1**  **Arrays** | <https://www.hackerrank.com/challenges/30-arrays/problem>  <https://www.hackerrank.com/challenges/simple-array-sum/problem?isFullScreen=true>  <https://www.hackerrank.com/challenges/compare-the-triplets/problem?isFullScreen=true>  <https://www.hackerrank.com/challenges/diagonal-difference/problem?isFullScreen=true> | |
| **Experiment 2**  **Stacks & Queues** | <https://www.hackerrank.com/challenges/equal-stacks/problem?isFullScreen=true>  <https://www.hackerrank.com/challenges/game-of-two-stacks/problem?isFullScreen=true>  <https://www.hackerrank.com/challenges/balanced-brackets/problem?isFullScreen=true>  <https://www.hackerrank.com/challenges/down-to-zero-ii/problem?isFullScreen=true>  <https://www.hackerrank.com/challenges/truck-tour/problem?isFullScreen=true> | |
| **Experiment 3**  **Linked List** | https://www.hackerrank.com/challenges/compare-two-linked-lists/problem?isFullScreen=true  <https://www.hackerrank.com/challenges/insert-a-node-into-a-sorted-doubly-linked-list/problem?isFullScreen=true>  <https://www.hackerrank.com/challenges/reverse-a-doubly-linked-list/problem?isFullScreen=true>  <https://www.hackerrank.com/challenges/find-the-merge-point-of-two-joined-linked-lists/problem?isFullScreen=true>  <https://www.hackerrank.com/challenges/detect-whether-a-linked-list-contains-a-cycle/problem?isFullScreen=true> | |
| **Experiment 4**  **Searching and Sorting** | <https://www.hackerrank.com/challenges/fraudulent-activity-notifications/problem?isFullScreen=true>  <https://www.hackerrank.com/challenges/missing-numbers/problem?isFullScreen=true>  https://www.hackerrank.com/challenges/minimum-loss/problem?isFullScreen=true  <https://www.hackerrank.com/challenges/pairs/problem?isFullScreen=true>  https://www.hackerrank.com/challenges/closest-numbers/problem?isFullScreen=true  https://www.hackerrank.com/challenges/quicksort1/problem?isFullScreen=true  <https://www.hackerrank.com/challenges/insertion-sort/problem?isFullScreen=true>  https://www.hackerrank.com/challenges/countingsort4/problem?isFullScreen=true | |
| **Unit-2 Contact Hours:15** | | |
| **Experiment 5**  **Graph** | | <https://www.hackerrank.com/challenges/bfsshortreach/problem?isFullScreen=true>  <https://www.hackerrank.com/challenges/the-quickest-way-up/problem?isFullScreen=true>  <https://www.hackerrank.com/challenges/even-tree/problem?isFullScreen=true>  https://www.hackerrank.com/challenges/journey-to-the-moon/problem?isFullScreen=true  <https://www.hackerrank.com/challenges/frog-in-maze/problem?isFullScreen=true> |
| **Experiment 6**  **Trees** | | <https://www.hackerrank.com/challenges/tree-top-view/problem?isFullScreen=true>  https://www.hackerrank.com/challenges/binary-search-tree-insertion/problem?isFullScreen=true  <https://www.hackerrank.com/challenges/swap-nodes-algo/problem?isFullScreen=true>  https://www.hackerrank.com/challenges/tree-huffman-decoding/problem?isFullScreen=true  https://www.hackerrank.com/challenges/balanced-forest/problem?isFullScreen=true |
| **Experiment 7**  **String** | | <https://www.hackerrank.com/challenges/separate-the-numbers/problem?isFullScreen=true>  <https://www.hackerrank.com/challenges/pangrams/problem?isFullScreen=true>  <https://www.hackerrank.com/challenges/camelcase/problem?isFullScreen=true>  <https://www.hackerrank.com/challenges/strong-password/problem?isFullScreen=true>  https://www.hackerrank.com/challenges/camelcase/problem?isFullScreen=true |
| **Unit-3 Contact Hours:15** | | |
| **Experiment 8**  **Dynamic Programming** | | <https://www.hackerrank.com/challenges/construct-the-array/problem?isFullScreen=true>  <https://www.hackerrank.com/challenges/equal/problem?isFullScreen=true>  <https://www.hackerrank.com/challenges/sam-and-substrings/problem?isFullScreen=true>  https://www.hackerrank.com/challenges/red-john-is-back/problem?isFullScreen=true  <https://www.hackerrank.com/challenges/kingdom-division/problem?isFullScreen=true> |
| **Experiment 9**  **Backtracking** | | <https://www.hackerearth.com/practice/basic-programming/recursion/recursion-and-backtracking/practice-problems/algorithm/n-queensrecursion-tutorial/>  <https://www.hackerrank.com/challenges/subset-sum/problem>  <https://www.hackerrank.com/challenges/queens-on-board/problem>  <https://www.hackerearth.com/practice/basic-programming/recursion/recursion-and-backtracking/practice-problems/algorithm/biggest-forest-700592dd/>  <https://www.hackerearth.com/practice/basic-programming/recursion/recursion-and-backtracking/practice-problems/algorithm/simran-and-stairs/>  <https://www.hackerearth.com/practice/basic-programming/recursion/recursion-and-backtracking/practice-problems/algorithm/a-tryst-with-chess/>  <https://www.hackerearth.com/practice/basic-programming/recursion/recursion-and-backtracking/practice-problems/algorithm/hack-the-money/> |
| **Experiment 10**  **Greedy and Branch and Bound** | | <https://www.hackerrank.com/challenges/marcs-cakewalk/problem?isFullScreen=true>  <https://www.hackerrank.com/challenges/grid-challenge/problem?isFullScreen=true>  <https://www.hackerrank.com/challenges/grid-challenge/problem?isFullScreen=true>  <https://www.hackerrank.com/challenges/beautiful-pairs/problem?isFullScreen=true>  https://www.hackerrank.com/challenges/candies/problem?isFullScreen=true |

**e. Assessment Pattern - Internal and External**

The performance of students is evaluated as follows:

|  |  |  |
| --- | --- | --- |
|  | **Theory** | |
| **Components** | **Continuous Internal Assessment (CAE)** | **Semester End Examination (SEE)** |
| **Marks** | 60 | 40 |
| **Total Marks** | 100 | |

**f. Internal Evaluation Component**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Sr. No. | Type of Assessment | Weightage of actual conduct | Frequency of Task | Final Weightage in Internal  Assessment | Remarks |
| 1 | Conduct | 10 Marks per Practical | 1 per practical | 60 Marks per course |  |
| 2 | Report | 10 Marks per Practical | 1 per practical |  |
| 3 | Viva- Voce | 20 Marks per Course | 1 per Course |  |

**g. CO-PO Mapping**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course Outcome** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** |
| CO1 | 3 |  | 3 | 2 | 3 |  |  | 1 | 1 |  |  |  |  |  |
| CO2 | 3 |  |  | 3 | 2 | 3 |  |  |  |  |  |  |  |  |
| CO3 | 3 | 2 |  | 3 | 2 |  |  |  |  |  |  | 3 | 3 |  |
| CO4 | 3 | 3 |  |  | 3 | 2 |  |  | 2 |  |  | 3 |  |  |
| CO5 | 3 |  |  |  |  |  |  | 1 | 2 | 3 | 2 | 3 |  | 2 |