**Bhartiya Vidya Bhavan’s** 

**Sardar Patel Institute of Technology**

**(An Autonomous Institute Affiliated to University of Mumbai)**

**Munshi Nagar, Andheri (W), Mumbai-400058**

**Computer Science and Engineering**

**AY 2024-25**

**Course CS203: Computer Architecture & Organization**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course (Category)**  **Code** | **Course Name** | **Teaching Scheme (Hrs/week)** | | | | | | | **Credits Assigned** | | | | | |
| **L** | **T** | **P** | **O** | | **E** | | **L** | **T** | | **P** | | **Total** |
| **(PC)** | **Computer Architecture & Organization** | **3** | **0** | **2** | **4** | | **9** | | **3** | **0** | | **1** | | **4** |
| **Examination Scheme** | | | | | | | | | | | | |
| **Component** | | | | **ISE** | | **MSE** | | | **ESE** | | **Total** | |
| **CS203** | **Theory** | | | | **20** | | **20** | | | **60** | | **100** | |
| **Laboratory** | | | | **80** | | **--** | | | **20** | | **100** | |

**Course Outcomes:**

|  |  |  |  |
| --- | --- | --- | --- |
| After successful completion of the course, student will be able to | | PO/PSO | CO Target |
| CS203.1 | Conceptualize basic computer structure with its models and compute performance metrics. | PO1, PO5, PO8, PO10 | 70% |
| CS203.2 | Design algorithms to solve ALU operations | PO1, PO2, PO3, PO5, PO8, PO10 | 70% |
| CS203.3 | Comprehend processor organization with various design methods of CPU with comparative analysis | PO1,PO2, PO3, PO5,PO8, PO10 | 70% |
| CS203.4 | Design memory systems with analysis of mapping techniques for cache and virtual memory | PO1, PO3, PO8, PO10 | 70% |
| CS203.5 | Comprehend different types of I/O buses, compare and contrast different types of data transfer methods and arbitration techniques | PO2, PO5, PO8, PO10 | 70% |
| CS203.6 | Analyze different parallel organizations that includes pipelined and parallel processors | PO1, PO3, PO4, PO5, PO8, PO10, **PSO1 (Open Source tools), PSO2 (Communication)** | 80% |

When a CO target set is attained in a specific academic year, the faculty has to assign a higher target (of +5%) for the next academic year

**Table1: Mapping of CO with PO: (correlation/ strength matrix)**

**Correlation Levels: 1(Weak) 2(Medium) 3(Strong)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | PO  1 | PO  2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| CS203.1 | 3 |  |  |  | 2 |  |  | 3 |  | 3 |  |  |  |  |
| CS203.2 | 3 | 3 | 3 |  | 2 |  |  | 3 |  | 3 |  |  |  |  |
| CS203.3 | 3 | 2 | 2 |  | 2 |  |  | 3 |  | 3 |  |  |  |  |
| CS203.4 | 3 |  | 2 |  |  |  |  | 3 |  | 3 |  |  |  |  |
| CS203.5 |  | 2 |  |  | 2 |  |  | 3 |  | 3 |  |  |  |  |
| CS203.6 | 3 |  | 3 | 2 | 3 |  |  | 3 |  | 3 |  |  | 2 | 3 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| PO Total | 15 | 7 | 10 | 2 | 11 |  |  | 18 |  | 18 |  |  |  |  |
| Target PO **Strength** | 15/5=**3** | 7/3=2.3 | 2.5 | 2 | 2.2 |  |  | 3 |  | 3 |  |  | **2** | **3** |

PO target is default maximum: 3

Departments may apply the following formula to choose a PO/PSO target if they prefer to use a value lesser than the default value

PO1-PO5--: 80% of maximum value: 0.8\*3 =2.4

PO6-PO12: 60% of maximum value: 0.6\*3 =1.8

When a PO/PSO target set is attained in a specific academic year, the HoD and Program coordinator have to assign a higher target (of +5%) for the next academic year

**Table 2: Course Outcomes Assessment Tools Mapping**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Outcome** | **Assessment Tool (Direct)** | **Max.**  **Marks** | **Assessment Tool Indirect** |
| **CS203.1:** Conceptualize basic computer structure with its models and compute performance metrics. | ISE1: Quiz  MSE  ESE  EXP1,2,9 | 05  12  20  30 | Course Exit  Survey |
| **CS203.2:**Design algorithms to solve ALU operations | ISE1: Quiz  MSE  ESE  EXP3,4 | 05  12  20 |
| **CS203.3:**Comprehend processor organization with various design methods of CPU with comparative analysis | ISE1: Quiz  MSE  ESE  EXP11 | 05  06  10 |
| **CS203.4:**Design memory systems with analysis of mapping techniques for cache and virtual memory | ISE1: Quiz  ESE  EXP10 | 05  10 |
| **CS203.5:**Comprehend different types of I/O buses, compare and contrast different types of data transfer methods and arbitration techniques | ESE  EXP 5, 6 | 20 |
| **CS203.6:**Analyze different parallel organizations that includes pipelined and parallel processors | ESE  EXP 11 | 10 |

**Table 3: Assessment target Rubric for PO/PSO Attainment**

**Attainment Levels versus Target:**

|  |  |  |  |
| --- | --- | --- | --- |
| **CO Attainment Method** | **Attainment Level** | | |
| **Low 1** | **Medium 2** | **High 3** |
| **ESE/MSE** | <40% student scoring more than class average in the final examination | 40-60% student scoring more than class average in the final examination | >60% students scoring more class average in the final examination |
| **ISE** | <50% students score more than class average in the internal assessment | 50-70% students score more than class average in the internal assessment | >70% students score more than class average in the internal assessment |
| **Course Exit Survey** | <60% weight age average in course exit analysis | 60-80% weight age average in course exit analysis | >80% weight age average in course exit analysis |

**Table 4: Course Outcomes Attainment (Theory):**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course Outcomes** | **ISE (Theory)** | | | | **MSE (Theory)** | **ESE (Theory)** | **ISE**  **CO Attainment** | **MSE**  **CO Attainment** | **ESE**  **CO Attainment** | **Direct CO Attainment Level** |
| **ISE1** | **-** |  | **ISE Avg** | **MSE** |
| CS203.1 |  |  |  |  |  |  |  |  |  |  |
| CS203.2 |  |  |  |  |  |  |  |  |  |  |
| CS203.3 |  |  |  |  |  |  |  |  |  |  |
| CS203.4 |  |  |  |  |  |  |  |  |  |  |
| CS203.5 |  |  |  |  |  |  |  |  |  |  |
| CS203.6 |  |  |  |  |  |  |  |  |  |  |

**Direct CO Attainment Level = 0.2ISE+0.2MSE+0.6ESE**

**Table 5: Course Outcomes Attainment (Lab):**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Course Outcomes | **ISE (Lab)** | | | | | | | | | | | | **ESE (Lab)** | **ISE**  **CO Attainment** | **ESE**  **CO Attainment** | **Direct CO Attainment Level** |
| EX1 | EX2 | EX3 | EX4 | EX5 | EX6 | EX7 | EX8 | EX9 | EX10 | EX11 | Overall Avg. |
| CS203.1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| CS203.2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| CS203.3 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| CS203.4 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| CS203.5 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| CS203.6 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

**E=Experiment**

**Direct CO Attainment Level = 0.8ISE+0.2ESE**

**Table 6: Course Outcomes Attainment (Theory + Lab):**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Outcomes** | **Direct CO Attainment Level** | | **Direct CO Attainment Level**  **X=(0.5Theory+0.5Lab)** |
| **Theory** | **Lab** |
| CS203.1 |  |  |  |
| CS203.2 |  |  |  |
| CS203.3 |  |  |  |
| CS203.4 |  |  |  |
| CS203.5 |  |  |  |
| CS203.6 |  |  |  |

**Course Exit Feedback:**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **CO** | **No. of students/Level of attainment** | | | | | **Weighted**  **Average%** | **Indirect CO Attainment Level (Y)** |
| **5** | **4** | **3** | **2** | **1** |
| CS203.1 |  |  |  |  |  |  |  |
| CS203.2 |  |  |  |  |  |  |  |
| CS203.3 |  |  |  |  |  |  |  |
| CS203.4 |  |  |  |  |  |  |  |
| CS203.5 |  |  |  |  |  |  |  |
| CS203.6 |  |  |  |  |  |  |  |

**Indirect Attainment Calculation (Feedback)**

**Weighted Average** = (%. of 1's\*1+%. of 2's\*2+ %. of 3's\*3+ %. Of4’s\*4+%. Of fives\*5)/5

**Table 7: CO Quality closure loop table**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **CO** | **Direct CO Attainment Level (X)** | **Indirect CO Attainment Level (Y)** | **Total attainment**  **0.8\*X+0.2\*Y** | **CO Target %** | **CO Target Level** | **Action plan**  **( if Total attainment < CO target level)** | **Modification of target were achieved**  **(if Total attainment**  **>= CO target Level)** |
| CS203.1 |  |  |  | 70% | 0.7\*3=2.1 |  |  |
| CS203.2 |  |  |  | 70% | 2.1 |  |  |
| CS203.3 |  |  |  | 70% | 2.1 |  |  |
| CS203.4 |  |  |  | 70% | 2.1 |  |  |
| CS203.5 |  |  |  | 70% | 2.1 |  |  |
| CS203.6 |  |  |  | 80% | 2.4 |  |  |

**Table 8: PO/PSO Attainment Table**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **PO/ PSO** | **Target Correlation/ Strength** | **COs** | **Overall Direct Attainment Level**  **(D)** | **Overall**  **Indirect Attainment Level**  **(ID)** | **PO attainment**  **Dx0.8+IDx0.2** | **Action plan**  **from Table 5**  **consolidated as per PO** |
| **PO1** | **3** | CO1-CO4, CO6 | (2.3+2.3+2.4+2.4+2.7+2.7/6) \***3**/3  =2.47 | (3+2+3+3+2+3/6) \***3**/3  =2.66 |  |  |
| **PO2** | 2.3 | CO2, CO3, CO5 |  |  |  |  |
| **PO3** | 2.5 | CO2, CO3, CO4, CO6 |  |  |  |  |
| **PO4** | 2 | CO6 |  |  |  |  |
| **PO5** | 2.2 | CO1, CO2, CO3, CO5, CO6 |  |  |  |  |
| **PO8** | 3 | CO1- CO6 |  |  |  |  |
| **PO10** | 3 | CO1- CO6 |  |  |  |  |
| **PSO1** | 2 | CO6 |  |  |  |  |
| **PSO2** | 3 | CO6 |  |  |  |  |

**Overall Direct attainment Level = Avg. the attainment of (total COs mapped to that PO) x Strength/3**

**Overall Indirect attainment Level = Avg. the attainment of (total COs mapped to that PO) x Strength/3**

**PO Attainment = 0.8 X Direct Attainment Level + 0.2 X Indirect Attainment Level**

**Subject In-charge Head of Department**

**Direct CO attainment Level = 0.2\*ISE CO Attainment + 0.2\*MSE CO Attainment + 0.6\*ESE CO Attainment**

**If only ISE & ESE:**

Direct CO attainment Level =(0.2\*ISE CO Attainment + 0.6\*ESE CO Attainment) \* 1.25

((0.2\*3)+(0.6\*3))\*x = 3

Direct CO attainment Level =0.4\*ISE CO Attainment + 0.3\*MSE CO Attainment + 0.3\*ESE CO Attainment

**If only ESE/MSE:**

Direct CO attainment Level = (0.3\*ESE CO Attainment)\*3.33

**If only ISE & ESE:**

Direct CO attainment Level =(0.4\*ISE CO Attainment + 0.3\*ESE CO Attainment) \*1.42

**If only MSE & ESE:**

Direct CO attainment Level =(0.3\*MSE CO Attainment + 0.3\*ESE CO Attainment) \*1.66

**If only MSE and ISE**

Direct CO attainment Level =(0.4\*ISE CO Attainment + 0.3\*MSE CO Attainment) \*1.42

**If only ISE**

Direct CO attainment Level =(0.4\*ISE CO Attainment ) \* 2.5

**Attainment Result Analysis:**

1. Sum of the marks = 371
2. No of students present = 68
3. Average = Sum of the marks / No of students present = 371/68 = 5
4. Number of students Above Average = 49
5. Attainment = (Number of students Above Average / Total Students) X 100 = 49/68 x 100 = 72.06