**Maulana Abul Kalam Azad University of Technology, West Bengal**
*(Formerly West Bengal University of Technology)*
**Syllabus for B. Tech in Artificial Intelligence & Machine Learning**
**(Applicable from the academic session 2020-2021)**

## Curriculum Structure
# First Year First Semester

# Mandatory Induction Program- 3 week's duration

| Sl No. | Category | Subject Code | Subject Name | Total Number of Contact hours | | | Credits |
|---|---|---|---|---|---|---|---|
| | | | | L | T | P | |
| **Theory** | | | | | | | |
| 1 | Basic Science Course | BS-PH101 | Physics-I (Gr-A) | 3 | 1 | 0 | 4 |
| 2 | Basic Science Course | BS-M101 | Mathematics –IA* | 3 | 1 | 0 | 4 |
| 3 | Engineering Science Courses | ES-EE101 | Basic Electrical Engineering | 3 | 1 | 0 | 4 |
| | | Total Theory | | 9 | 3 | 0 | 12 |
| **Practical** | | | | | | | |
| 1 | Basic Science Course | BS-PH191 | Physics-I Laboratory(Gr-A) | 0 | 0 | 3 | 1.5 |
| 2 | Engineering Science Courses | ES-EE191 | Basic Electrical Engineering Laboratory | 0 | 0 | 2 | 1 |
| 3 | Engineering Science Courses | ES-ME192 | Workshop/Manufacturing Practices(Gr-A) | 1 | 0 | 4 | 3 |
| | | Total Practical | | 1 | 3 | 9 | 5.5 |
| | | Total credit for First Semester | | 10 | 3 | 9 | 17.5 |

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| Sl No. | Category | Subject Code | Subject Name | Total Number of Contact hours | | | Credits |
|---|---|---|---|---|---|---|---|
| | | | | L | T | P | |
| **Theory** | | | | | | | |
| 1 | Basic Science Course | BS-CH201 | Chemistry-I (Gr-A) | 3 | 1 | 0 | 4 |
| 2 | Basic Science Course | BS-M201 | Mathematics –IIA# | 3 | 1 | 0 | 4 |
| 3 | Engineering Science Courses | ES-CS201 | Programming for Problem Solving | 3 | 0 | 0 | 3 |
| 4 | Humanities and Social Sciences including Management Courses | HM-HU201 | English | 2 | 0 | 0 | 2 |
| | | Total Theory | | 11 | 2 | 0 | 13 |
| **Practical** | | | | | | | |
| 1 | Basic Science courses | BS-CH291 | Chemistry-I Laboratory (Gr-A) | 0 | 0 | 3 | 1.5 |
| 2 | Engineering Science Courses | ES-CS291 | Programming for Problem Solving | 0 | 0 | 4 | 2 |
| 3 | Engineering Science Courses | ES-ME291 | Engineering Graphics & Design(Gr-A | 1 | 0 | 4 | 3 |
| 4 | Humanities and Social Sciences including Management courses | HM-HU291 | Language Laboratory | 0 | 0 | 2 | 1 |
| | | Total Practical | | 1 | 0 | 13 | 7.5 |
| | | Total of Second Semester | | 12 | 2 | 13 | 20.5 |

The table above is titled **Second Semester**.

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| Sl No. | Category | Subject Code | Subject Name | Total Number of Contact hours | | | Credits |
|---|---|---|---|---|---|---|---|
| | | | | L | T | P | |
| **Third Semester** | | | | | | | |
| Theory | | | | | | | |
| 1 | Engineering ScienceCourse | **ESC301** | Analog and Digital Electronics | 3 | 0 | 0 | 3 |
| 2 | Professional Core Courses | PCC-CS301 | Data Structure & Algorithms | 3 | 0 | 0 | 3 |
| 3 | Professional Core Courses | PCC-CS302 | Computer Organization | 3 | 0 | 0 | 3 |
| 4 | Basic Sciencecourse | BSC AIML301 | Linear Algebra | 2 | 0 | 0 | 2 |
| 5 | Humanities &Social Sciences including Management Courses | HSMC 301 | Economics for Engineers (Humanities-II) | 3 | 0 | 0 | 3 |
| | | Total Theory | | 14 | 0 | 0 | 14 |
| Practical | | | | | | | |
| 1 | Professional Core Courses | PCC-CS391 | Data Structure & Algorithms Lab | 0 | 0 | 4 | 2 |
| 2 | EngineeringScience Course | ESC391 | Analog and Digital Electronics Lab | 0 | 0 | 4 | 2 |
| 3 | Professional Core Courses | PCC-CS392 | Computer Organization | 0 | 0 | 4 | 2 |
| 4 | Professional Core Courses | PCC- CS393 | IT Workshop(Python I) | 0 | 0 | 4 | 2 |
| | | Total Practical | | 0 | 0 | 16 | 8 |
| | | Total Credit for Third Semester | | 22 | | | |

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| Sl No | | Type of Course | Code | Course Title | Hours per week | | | Credits |
|---|---|---|---|---|---|---|---|---|
| | | | | | L | T | P | |
| 1 | THEORY | Professional Core Course | PCCCS401 | Discrete Mathematics | 3 | 0 | 0 | 3 |
| 2 | | Professional Core Course | PCCAIML 401 | Artificial Intelligence | 3 | 0 | 0 | 3 |
| 3 | | Professional Core Course | PCCAIML 402 | Optimization Techniques | 3 | 0 | 0 | 3 |
| 4 | | Professional Core Course | PCCCS404 | Design and Analysis of Algorithm | 3 | 0 | 0 | 3 |
| 5 | | Basic Science Course | BSC401 | Biology | 2 | 0 | 0 | 2 |
| 6 | | Mandatory Course | MC401 | Environmental Science | 2 | 0 | 0 | 2 |
| 7 | PRACTICAL | Professional Core Course | PCCAIML 491 | Artificial Intelligence Lab | 0 | 0 | 4 | 2 |
| 8 | | Professional Core Course | PCCCS494 | Design and Analysis of Algorithm Lab | 0 | 0 | 4 | 2 |
| 9 | | Professional Core Course | PCCAIML 492 | Python II / R Programming Language Lab | 0 | 0 | 4 | 2 |
| **TOTAL CREDITS** | | | | | | | | **22** |

Semester IV (Second year)

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<table>
<tr><td colspan="9" align="center"><b>Semester V (Third year)</b></td></tr>
<tr>
<td rowspan="2"><b>Sl No</b></td>
<td rowspan="2"></td>
<td rowspan="2"><b>Type of Course</b></td>
<td rowspan="2"><b>Code</b></td>
<td rowspan="2"><b>Course Title</b></td>
<td colspan="3" align="center"><b>Hours per week</b></td>
<td rowspan="2"><b>Credits</b></td>
</tr>
<tr><td><b>L</b></td><td><b>T</b></td><td><b>P</b></td></tr>
<tr>
<td>1</td>
<td rowspan="6"><b>THEORY</b></td>
<td>Professional Core Course</td>
<td>PCCAIML 501</td>
<td>Probability and Statistics</td>
<td>3</td><td>0</td><td>0</td><td>3</td>
</tr>
<tr>
<td>2</td>
<td>Professional Core Course</td>
<td>PCCCS50 2</td>
<td>Operating System</td>
<td>3</td><td>0</td><td>0</td><td>3</td>
</tr>
<tr>
<td>3</td>
<td>Professional Core Course</td>
<td>PCCCS503</td>
<td>Object Oriented Programming</td>
<td>3</td><td>0</td><td>0</td><td>3</td>
</tr>
<tr>
<td>4</td>
<td>Professional Core Course</td>
<td>PCCAIML 502</td>
<td>Introduction to Machine Learning</td>
<td>3</td><td>0</td><td>0</td><td>3</td>
</tr>
<tr>
<td>5</td>
<td>Humanities andSocial Sciences including Management</td>
<td>HSMC501</td>
<td>Introduction toIndustrial Management</td>
<td>2</td><td>0</td><td>0</td><td>2</td>
</tr>
<tr>
<td>6</td>
<td>Professional Elective</td>
<td>PECAIML501 (A/B/C)</td>
<td>Cloud Computing /Pattern Recognition/ Graph Theory</td>
<td>3</td><td>0</td><td>0</td><td>3</td>
</tr>
<tr>
<td>7</td>
<td rowspan="3"><b>PRACTICAL</b></td>
<td>Professional Core Course</td>
<td>PCCCS59 2</td>
<td>Operating System Lab</td>
<td>0</td><td>0</td><td>4</td><td>2</td>
</tr>
<tr>
<td>8</td>
<td>Professional Core Course</td>
<td>PCCCS593</td>
<td>Object Oriented Programming & Java Lab</td>
<td>0</td><td>0</td><td>4</td><td>2</td>
</tr>
<tr>
<td>9</td>
<td>Professional Core Course</td>
<td>PCCAIML 592</td>
<td>Machine Learning Lab</td>
<td>0</td><td>0</td><td>4</td><td>2</td>
</tr>
<tr>
<td colspan="8" align="center"><b>TOTAL CREDITS</b></td>
<td><b>23</b></td>
</tr>
</table>

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| Sl No | | Type of Course | Code | Course Title | Hours per week | | | Credits |
|---|---|---|---|---|---|---|---|---|
| | | | | | L | T | P | |
| 1 | | Professional Core Course | PCCAIML 601 | Machine Learning Applications | 2 | 0 | 0 | 2 |
| 2 | | Professional Core Course | PCCAIML 602 | Deep Learning | 3 | 0 | 0 | 3 |
| | | Professional Core Course | PCCAIML 603 | Soft Computing | 3 | 0 | 0 | 3 |
| 3 | | Professional Core Course | PCCCS602 | Computer Networks | 3 | 0 | 0 | 3 |
| 4 | | Professional Elective | PECAIML601 (A/B/C/D) | Big Data Analytics /Data Mining/ Distributed System/ Game Theory | 3 | 0 | 0 | 3 |
| 5 | | Open Elective | OECAIML601 (A/B/C/D) | Database Management System/Human Computer Interaction/Neural Network/Cryptography andNetwork Security | 3 | 0 | 0 | 3 |
| 6 | PRACTICAL | Professional Core Course | PCCAIML 691 | Machine Learning Applications lab | 0 | 0 | 4 | 2 |
| 7 | | Professional Core Course | PCCAIML 693 | Soft Computing Lab | 0 | 0 | 4 | 2 |
| 8 | | Professional Core Course | PCCCS692 | Computer Networks Lab | 0 | 0 | 4 | 2 |
| **TOTAL CREDITS** | | | | | | | | **23** |

Semester VI (Third year)

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| SI No | | Type of Course | Code | Course Title | Hours per week | | | Credits |
|---|---|---|---|---|---|---|---|---|
| | | | | | L | T | P | |
| 1 | | Professional Elective Course | PECAIML701 (A/B/C/D) | Social NetworkAnalysis/ Computer Vision/ Quantum Computing/ Multi Agent Intelligent System | 3 | 0 | 0 | 3 |
| 2 | | Professional Elective Course | PECAIML702 (A/B/C/D) | Ecommerce andERP/ Information Theory and Coding/Computer Aided Design/Digital SignalProcessing | 3 | 0 | 0 | 3 |
| 3 | | Open ElectiveCourse | OECAIML701 (A/B/C/D) | Internet of Things/Bio Informatics /Robotics Compiler Design | 3 | 0 | 0 | 3 |
| 4 | | Humanities and Social Sciences including Management | HSMC701 | Project Management and Entrepreneurship | 2 | 0 | 0 | 2 |
| | | Project | PROJAIML781 | Project I | 0 | 0 | 12 | 6 |
| **TOTAL CREDITS** | | | | | | | | **17** |

Semester VII (Fourth year)

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| SI No | | Type of Course | Code | Course Title | Hours per week | | | Credits |
|---|---|---|---|---|---|---|---|---|
| | | | | | L | T | P | |
| 1 | | Professional Elective Course | PECAIML801 (A/B/C) | Natural language Processing/Cyber Law and Ethics/Mobile Computing | 3 | 0 | 0 | 3 |
| 2 | | Open ElectiveCourse | OECAIML801 (A/B/C) | Economic Policiesin India/ Microelectronicsand VLSI/Software Engineering | 3 | 0 | 0 | 3 |
| 3 | | Open ElectiveCourse | OECAIML802 (A/B/C) | Organization Behaviour/ Research Methodology/ Soft skill and Interpersonal Communication | 3 | 0 | 0 | 3 |
| 4 | | Project | PROJAIM L881 | Project II | 0 | 0 | 12 | 6 |
| **TOTAL CREDITS** | | | | | | | | **15** |

*Table title (spanning row above header): Semester VIII (Fourth year)*