



# **AISSMS** **INSTITUTE OF INFORMATION TECHNOLOGY** **(IOIT)**



ADDING VALUE TO ENGINEERING

An Autonomous Institute Affiliated to Savitribai Phule Pune University  
Approved by AICTE, New Delhi and Recognised by Govt. of Maharashtra  
Accredited by NAAC with "A+" Grade | NBA - 5 UG Programmes

## **ACADEMIC COURSE**

### **STRUCTURE** **OF** **ARTIFICIAL INTELLIGENCE & DATA SCIENCE**

#### **B. TECH.** **4 YEAR UG COURSE**

**(Applicable for the batches admitted from 2022-2023)**

**AISSMS INSTITUTE OF**  
**INFORMATION TECHNOLOGY**  
Kennedy Road, Near RTO,  
Pune- 411-001, Maharashtra State, India  
Email: [principal@aissmsioit.org](mailto:principal@aissmsioit.org),  
Website: <http://www.aissmsioit.org>

## Vision Mission and PEOs of Departments

### Vision of Department

To be well known for imparting quality education in the field of AI & DS.

### Mission of Department

1. To Foster an environment to provide intelligent solutions applicable for multidisciplinary needs of industry & society.
2. To promote career development with ethical responsibility.

### Program Educational Objectives (PEOs)

**PEO1:** Graduates will be able to analyze, formulate and function efficiently in a multi-disciplinary context to address industrial problems.

**PEO2:** Graduates will be able to work collaboratively with professionalism and ethical responsibilities to provide innovative industry solutions.

**PEO3:** Graduates will excel in their careers by adapting to new technologies.

### Program Outcomes (POs)

1. Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems. [**Engineering knowledge**]
2. Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. [**Problem analysis**]
3. Design solutions for complex engineering problems 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. [**Design/development of solutions**]
4. 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. [**Conduct investigations of complex problems**]
5. Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations. [**Modern tool usage**]
6. Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice. [**The engineer and society**]
7. Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development. [**Environment and sustainability**]
8. Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice. [**Ethics**]
9. Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings. [**Individual and team work**]
10. Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design

documentation, make effective presentations, and give and receive clear instructions. **[Communication]**

11. Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments. **[Project management and finance]**
12. Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. **[Life-long learning]**

### **Program Specific Outcomes (PSOs)**

**PSO1 Problem Solving and Programming Skills:** Graduates will be able to apply programming skill to identify, modify and test algorithms that apply intelligence to make realistic decisions in problem solving.

**PSO2 Professional Skills:** Graduates will be able to collect, analyze, interpret and visualize data to solve problems in agriculture, automation, finance and medical domains.

**Program – Artificial Intelligence and Data Science  
(Autonomous Curriculum Structure)**

**A. Definition of Credit:**

1 Hr. Lecture (L) per week	1 credit
1 Hr. Tutorial (T) per week	1 credit
1 Hr. Practical (P) per week	0.5 credits
2 Hours Practical (Lab)/week	1 credit

**B. Range of credits –**

A range of credits from 150 to 160 for a student to be eligible to get Under Graduate degree in Engineering. A student will be eligible to get Under Graduate degree with Honors or additional Minor Engineering, if he/she completes an additional 20 credits.

**C. Credit for Under Graduate Degree in Artificial Intelligence and Data Science**

Sr. No.	Year	Semester	Credits
1	First Year	I	24
2		II	22
3	Second Year	III	22
4		IV	24
5	Third Year	V	22
6		VI	24
7	Final Year	VII	16
8		VIII	16
<b>Total Credits</b>			<b>170</b>

**D. Structure of Undergraduate Engineering program**

Sr. no.	Domains	Code	Credits	AICTE Suggested
1	Humanities and Social Sciences including Management courses	HSM	12	12
2	Basic Science courses	BSC	23	25
3	Engineering Science courses including workshop, drawing, basics of electrical/mechanical/computer etc.	ESC	27	24
4	Professional core courses	PCC	60	48
5	Professional Elective courses relevant to chosen specialization/branch	PEC	15	18
6	Open subjects – Electives from other technical and /or emerging subjects	OEC	19	18
7	Project work, seminar and internship in industry or elsewhere	PRO	14	15
<b>Total</b>			<b>170</b>	<b>160</b>

**Minor Structure: Artificial Intelligence and Data Science**

Sr. No.	Courses Name	Offered in semester	Credits
1	Python Programming for Artificial Intelligence	3 <sup>rd</sup>	3
2	Python Programming for Artificial Intelligence Lab		2
3	Artificial Intelligence	4 <sup>th</sup>	3
4	Artificial Intelligence Laboratory		2
5	Machine Learning	5 <sup>th</sup>	3
6	Machine Learning Laboratory		2
7	Deep Learning	6 <sup>th</sup>	3
8	Deep Learning Laboratory		2
<b>Total</b>			<b>20</b>

**Major (Honors) Structure: DevOps**

Sr. No.	Courses Name	Offered in semester	Credits
1	DevOps and Agile Software Development	5 <sup>th</sup>	5
2	Continuous Integration and Continuous Delivery	6 <sup>th</sup>	5
3	Application Containerization and Orchestration	7 <sup>th</sup>	5
4	System Provisioning and Configuration Management	8 <sup>th</sup>	5
<b>Total</b>			<b>20</b>

Sr. no.	Code	Credits								Total	AICTE
		Semesters									
		I	II	III	IV	V	VI	VII	VIII		
1	HSM	1	1	2	3	2	3	-	-	12	12
2	BSC	9	8	3	3	-	-	-	-	23	25
3	ESC	14	13	-	-	-	-	-	-	27	24
4	PCC	-	-	14	15	13	14	4	-	60	48
5	PEC	-	-	-	-	4	4	7	-	15	18
6	OEC	-	-	3	3	3	3	3	4	19	18
7	PRO	-	-	-	-	-	-	2	12	14	15
<b>Total Credits</b>		<b>24</b>	<b>22</b>	<b>22</b>	<b>24</b>	<b>22</b>	<b>24</b>	<b>16</b>	<b>16</b>	<b>170</b>	<b>160</b>
<b>Exam Total</b>		<b>700</b>	<b>700</b>	<b>700</b>	<b>700</b>	<b>700</b>	<b>700</b>	<b>700</b>	<b>700</b>	<b>5600</b>	<b>-</b>
<b>Total Working Hours per Week</b>		<b>31</b>	<b>29</b>	<b>27</b>	<b>27</b>	<b>27</b>	<b>28</b>	<b>21</b>	<b>26</b>	<b>216</b>	<b>-</b>

\* **End Semester Examination (ESE)** based on subjective questions.

\*\* **Practical or Activity based Evaluation.**

# **In Semester Evaluation** based on Presentation/Group Discussion/Laboratory Work/Course Project/Home Assignment/Comprehensive Viva Voce/Blog Writing/Case Study/Survey/Multiple-Choice Question (MCQ) examination.

\$ **For MOOCs:** Assignments marks will be converted on the scale of 40 marks.

\$\$ **For MOOCs:** Score of examination conducted by the respective authority of MOOC or Score of ESE Conducted by Institute will be converted on the scale of 60 marks.

Artificial Intelligence and Data Science - Second Year (Semester –III)												
Sr. No.	Code	Course Title	Hours per week			Credits	Examination scheme					
			Lecture	Tutorial	Practical		ISE	ESE	TW	PR	OR	Total
1	ADHSM301	Democracy Election & Constitution	2	--	--	2	--	--	25	--	25	50
2	ADBSC302	Discrete Mathematics and Statistics	3	--	--	3	40 <sup>#</sup>	60*	---	--	--	100
3	ADPCC303	Software Engineering	3	--	2	4	40 <sup>#</sup>	60**	--	--	--	100
4	ADPCC304	Data Structure	3	--	--	3	40 <sup>#</sup>	60*	--	--	--	100
5	ADPCC305	Object Oriented Programing	3	--	--	3	40 <sup>#</sup>	60*	--	--	--	100
6	ADOEC306	Digital Forensics	3	--	--	3	40 <sup>\$</sup>	60 <sup>\$\$</sup>	---	--	--	100
7	ADPCC307	Object Oriented Programmin g Laboratory	--	--	4	2	--	--	25	50	--	75
8	ADPCC308	Data Structure Laboratory	--	--	4	2	--	--	25	50	--	75
<b>Total</b>			<b>17</b>	<b>--</b>	<b>10</b>	<b>22</b>	<b>200</b>	<b>300</b>	<b>75</b>	<b>100</b>	<b>25</b>	<b>700</b>
9	ADMC309	Audit course-3	Foreign Language Level 1 (Japanese or German)/JAVA /Yoga Level-1/ Competitive Examination-1/ Drawing and Music(Lecture of one hour per week)									

**MOOC: Digital Forensics:** <https://www.infosecinstitute.com/skills/courses/introduction-to-mobile-forensics/>

\* **End Semester Examination (ESE)** based on subjective questions.

\*\* **Practical or Activity based Evaluation.**

# **In Semester Evaluation** based on Presentation/Group Discussion/Laboratory Work/Course Project/Home Assignment/Comprehensive Viva Voce/Blog Writing/Case Study/Survey/Multiple-Choice Question (MCQ) examination.

\$ **For MOOCs:** Assignments marks will be converted on the scale of 40 marks.

\$\$ **For MOOCs:** Score of examination conducted by the respective authority of MOOC or Score of ESE Conducted by Institute will be converted on the scale of 60 marks.

Artificial Intelligence and Data Science - Second Year (Semester –IV)

Sr. No.	Code	Course Title	Hours per week			Credits	Examination scheme					
			Lecture	Tutorial	Practical		ISE	ESE	TW	PR	OR	Total
1	ADHSM401	Project Management	2	--	--	2	--		25	--	25	50
2	ADBSC402	Artificial Intelligence	3	--	--	3	40 <sup>#</sup>	60*	--	--	--	100
3	ADPCC403	Database Management Systems	3	--	--	3	40 <sup>#</sup>	60*	--	--	--	100
4	ADPCC404	Exploratory Data Analysis	3	--	--	3	40 <sup>#</sup>	60*	--	--	--	100
5	ADPCC405	Operating Systems	3	--	2	4	40 <sup>#</sup>	60**	--	--	--	100
6	ADOEC406	Mobile Phone Forensics	3	--	--	3	40 <sup>\$</sup>	60 <sup>\$\$</sup>	--	--	--	100
7	ADPCC407	Database Management Systems Laboratory	--	--	4	2	--	--	25	50	---	75
8	ADPCC408	Artificial Intelligence and Data Analysis Laboratory	--	--	4	2	--	--	25	50	--	75
9	ADHSMEC1	Lifelong Learning Skills-1	--	--	--	1	--	--	--	--	--	--
10	ADPCCCC1	Lifelong Learning Skills-2	--	--	--	1	--	--	--	--	--	--
<b>Total</b>			<b>17</b>	<b>--</b>	<b>10</b>	<b>24</b>	<b>200</b>	<b>300</b>	<b>75</b>	<b>100</b>	<b>25</b>	<b>700</b>
11	ADMC409	Audit course-4	Foreign Language Level 2 (Japanese or German)/Advanced JAVA /Yoga Level-2/ Competitive Examination-2/ Dance and Acting(Lecture of one hour per week)									

**MOOC:** Mobile Phone Forensics:

<https://www.infosecinstitute.com/skills/courses/introduction-to-mobile-forensics/>

\* **End Semester Examination (ESE)** based on subjective questions.

\*\* **Practical or Activity based Evaluation.**

# **In Semester Evaluation** based on Presentation/Group Discussion/Laboratory Work/Course Project/Home Assignment/Comprehensive Viva Voce/Blog Writing/Case Study/Survey/Multiple-Choice Question (MCQ) examination.

\$ **For MOOCs:** Assignments marks will be converted on the scale of 40 marks.

\$\$ **For MOOCs:** Score of examination conducted by the respective authority of MOOC or Score of ESE Conducted by Institute will be converted on the scale of 60 marks.

Artificial Intelligence and Data Science - Third Year (Semester –V)

Sr. No.	Code	Course Title	Hours per week			Credits	Examination scheme					
			Lecture	Tutorial	Practical		ISE	ESE	TW	PR	OR	Total
1	ADHSM501	Intellectual Property Rights	2	--	--	2	--	--	25	--	25	50
2	ADPCC502	Computer Network	3	--	--	3	40 <sup>#</sup>	60*	--	--	--	100
3	ADPCC503	Machine Learning	3	--	--	3	40 <sup>#</sup>	60*	--	--	--	100
4	ADPCC504	Web Technology	3	--	2	4	40 <sup>#</sup>	60**	--	--	--	100
5	ADPEC505	Elective-I	3	--	--	3	40 <sup>#</sup>	60*	--	--	--	100
6	ADOEC506	User Interface and User Experience	3	--	--	3	40 <sup>\$</sup>	60 <sup>\$\$</sup>	---	--	--	100
7	ADPCC507	Machine Learning Laboratory	--	--	4	2	--	--	25	25	---	50
8	ADPCC508	Computer Network Laboratory	--	--	2	1	--	--	25	25	--	50
9	ADPEC509	EL-I Laboratory	--	--	2	1	--	--	25	25	--	50
<b>Total</b>			<b>17</b>	<b>0</b>	<b>10</b>	<b>22</b>	<b>200</b>	<b>300</b>	<b>100</b>	<b>75</b>	<b>25</b>	<b>700</b>
10	ADMC5010	Audit course-4	Professional Etiquettes(Lecture of one hour per week)									

**MOOC:** User Interface and User Experience:<https://www.coursera.org/specializations/ui-ux-design>

\* **End Semester Examination (ESE)** based on subjective questions.

\*\* **Practical or Activity based Evaluation.**

# **In Semester Evaluation** based on Presentation/Group Discussion/Laboratory Work/Course Project/Home Assignment/Comprehensive Viva Voce/Blog Writing/Case Study/Survey/Multiple-Choice Question (MCQ) examination.

\$ **For MOOCs :** Assignments marks will be converted on the scale of 40 marks.

\$\$ **For MOOCs:** Score of examination conducted by the respective authority of MOOC or Score of ESE Conducted by Institute will be converted on the scale of 60 marks.

**Elective-I**

1. Design and Analysis of Algorithm
2. Data Analytics using Power BI and Tableau
3. Application Programming Interface



Artificial Intelligence and Data Science - Third Year (Semester –VI)

Sr. No.	Code	Course Title	Hours per week			Credits	Examination scheme					
			Lecture	Tutorial	Practical		ISE	ESE	TW	PR	OR	Total
1	ADHSM601	Seminar and Technical Paper Writing	1	--	2	2	--	--	50	--	---	50
2	ADPCC602	Deep learning	3	--	--	3	40 <sup>#</sup>	60*	--	--	--	100
3	ADPCC603	Cloud Computing	3	--	--	3	40 <sup>#</sup>	60*	--	--	--	100
4	ADPCC604	ML Ops	3	--	2	4	40 <sup>#</sup>	60**	--	--	--	100
5	ADPEC605	<b>Elective-II</b>	3	--	--	3	40 <sup>#</sup>	60*	--	--	--	100
6	ADOEC606	Evolutionary Computation	3	--	--	3	40 <sup>\$</sup>	60 <sup>\$\$</sup>	--	--	--	100
7	ADPCC607	Deep Learning Laboratory	--	--	2	1	--	--	25	25	---	50
8	ADPCC608	ML Ops Laboratory	--	--	4	2	--	--	25	50	--	75
9	ADPEC609	EL-II Laboratory	--	--	2	1	--	--	--	25	--	25
10	ADHSMEC2	Lifelong Learning Skills-3	--	--	--	1	--	--	--	--	--	--
11	ADPCCCC2	Lifelong Learning Skills-4	--	--	--	1	--	--	--	--	--	--
<b>Total</b>			<b>16</b>	<b>0</b>	<b>12</b>	<b>24</b>	<b>200</b>	<b>300</b>	<b>100</b>	<b>100</b>	<b>--</b>	<b>700</b>
12	ADMC6010	Audit course-4	Entrepreneurship Development Program(Lecture of one hour per week)									

**MOOC:** Evolutionary Computation: <https://nptel.ac.in/courses/112103301>

\* **End Semester Examination (ESE)** based on subjective questions.

\*\* **Practical or Activity based Evaluation.**

# **In Semester Evaluation** based on Presentation/Group Discussion/Laboratory Work/Course Project/Home Assignment/Comprehensive Viva Voce/Blog Writing/Case Study/Survey/Multiple-Choice Question (MCQ) examination.

\$ **For MOOCs:** Assignments marks will be converted on the scale of 40 marks.

\$\$ **For MOOCs:** Score of examination conducted by the respective authority of MOOC or Score of ESE Conducted by Institute will be converted on the scale of 60 marks.

**Elective-II**

1. Natural Language Processing
2. High Performance Computing
3. Distributed Systems

**Artificial Intelligence and Data Science - Final Year (Semester –VII)**

Sr. No.	Code	Course Title	Hours per week			Credits	Examination scheme					
			Lecture	Tutorial	Practical		ISE	ESE	TW	PR	OR	Total
1	ADPCC701	Soft Computing	3	--	--	3	40 <sup>#</sup>	60*	--	--	--	100
2	ADPEC702	Elective III	3	--	--	3	40 <sup>#</sup>	60*	--	--	--	100
3	ADPEC703	Elective IV	2	--	--	2	40 <sup>#</sup>	60*	--	--	--	100
4	ADOEC704	Principle of Optimization	3	--	--	3	40 <sup>\$</sup>	60 <sup>\$\$</sup>	---	--	--	100
5	ADPCC705	Soft Computing Laboratory	--	--	2	1	--	--	25	25	--	50
6	ADPEC706	EL-III Laboratory	--	--	2	1	--	--	25	25	--	50
7	ADPEC707	EL-IV Laboratory	--	--	2	1	--	--	25	25	--	50
8	ADPRO708	Project stage – I	--	--	4	2	--	--	50	--	100	150
<b>Total</b>			<b>11</b>	<b>0</b>	<b>10</b>	<b>16</b>	<b>160</b>	<b>240</b>	<b>125</b>	<b>75</b>	<b>100</b>	<b>700</b>

MOOC: Principle of Optimization: <https://nptel.ac.in/courses/112105235>

\* **End Semester Examination (ESE)** based on subjective questions.

\*\* **Practical or Activity based Evaluation.**

# **In Semester Evaluation** based on Presentation/Group Discussion/Laboratory Work/Course Project/Home Assignment/Comprehensive Viva Voce/Blog Writing/Case Study/Survey/Multiple-Choice Question (MCQ) examination.

\$ **For MOOCs:** Assignments marks will be converted on the scale of 40 marks.

\$\$ **For MOOCs:** Score of examination conducted by the respective authority of MOOC or Score of ESE Conducted by Institute will be converted on the scale of 60 marks.

**Elective-III**

1. Advance Imaging System
2. Cyber security
3. Edge Artificial Intelligence Computing

**Elective-IV**

1. Software Testing & Quality Assurance
2. Human Computer Interaction
3. Artificial Intelligence Internet of Things (AI-IoT)

**Artificial Intelligence and Data Science - Final Year (Semester –VIII)**

Sr. No.	Code	Course Title	Hours per week			Credits	Examination scheme					
			Lecture	Tutorial	Practical		ISE	ESE	TW	PR	OR	Total
1	ADOEC801	Intelligent Process Automation (Online Mode)/MOOC	4	--	--	4	40 <sup>\$</sup>	60 <sup>\$\$</sup>	---	--	--	100
2	ADPROJ802	Internship/ 2 MOOCs	2	--	8	6	--	--	200 <sup>@</sup>	--	100	300
3	ADPROJ803	Project Stage-II	--	--	12	6	--	--	200	--	100	300
<b>Total</b>			<b>6</b>	<b>0</b>	<b>20</b>	<b>16</b>	<b>40</b>	<b>60</b>	<b>400</b>	<b>0</b>	<b>200</b>	<b>700</b>

\$ **For MOOCs:** Assignments marks will be converted on the scale of 40 marks.

\$\$ Score of examination conducted by the respective authority of MOOC or Score of ESE Conducted by Institute will be converted on the scale of 60 marks.

@ Marks obtained in two MOOCs will be converted on the scale of 200 marks.

**Intelligent Process Automation** <https://www.udemy.com/course/beginners-guide-to-cognitive-automation-anywhere/>

**Under ADPROJ802 Massive Open Online Courses (not less than 8 week) listed below:**

Data Science: Productivity Tools [https://www.edx.org/course/data-science-productivity-tools?hs\\_analytics\\_source=referrals&utm\\_source=mooc.org&utm\\_medium=referral&utm\\_campaign=mooc.org-course-list](https://www.edx.org/course/data-science-productivity-tools?hs_analytics_source=referrals&utm_source=mooc.org&utm_medium=referral&utm_campaign=mooc.org-course-list)

Principles, Statistical and Computational Tools for Reproducible Data Science [https://www.edx.org/course/principles-statistical-and-computational-tools-for?hs\\_analytics\\_source=referrals&utm\\_source=mooc.org&utm\\_medium=referral&utm\\_campaign=mooc.org-course-list](https://www.edx.org/course/principles-statistical-and-computational-tools-for?hs_analytics_source=referrals&utm_source=mooc.org&utm_medium=referral&utm_campaign=mooc.org-course-list)

Emotional Intelligence [https://onlinecourses.nptel.ac.in/noc22\\_hs11/preview](https://onlinecourses.nptel.ac.in/noc22_hs11/preview)