G.S. Mandal's

Maharashtra Institute of Technology

(An Autonomous Institute)

Affiliated to Dr. Babasaheb Ambedkar Marathwada University (Dr. BAMU), Chh. Sambhaji (Aurangabad)

AICTE Approved, (Accredited with "Grade A" by NAAC)

Emerging Science and Technology Department

Course outcome statements and mapping CO-PO

AY 2023-24 Part I

Class : - TY AI&DS

Course Code :- HSM301

Course Title:- Engineering Economics Finance & Costing

Course Outcomes :-

CO1	Define and explain economics, costing and financial concepts.
CO2	Calculate present value, future value of single cash flow and annuities using appropriate formulas.
CO3	Conduct cost estimation, including materials, labor, overhead, and other related costs.
CO4	Identify sources of risk and uncertainty in engineering projects.
CO5	Compare different economic evaluation methods (e.g., net present value, internal rate of return, payback period) to assess project feasibility.
CO6	Evaluate investment proposals for personal financial management.

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	-	-	-	-	-	-	-	-	-	-
CO2	2	3	-	-	-	-	-	-	-	-	-	-
CO3	3	-	3	-	-	-	-	-	-	-	-	-
CO4	3	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	3	-	-	-	-	-	-	-	-	-
CO6	-	3	-	-	-	-	-	-	-	-	-	-
Average	2.75	2.33	3	-	-	-	-	-	-	-	-	-
Mapping Strength	2	2	-	-	-	-	-	-	-	-	-	-

	PSO1	**PSO2**	**PSO 3**
CO1	-	-	-
CO2	-	-	3
CO3	-	-	2
CO4	-	-	1
CO5	-	-	1
CO6	-	-	-
Average	-	-	**1.75**

Course Code :- AID301 **Course Title:- Data Engineering**

Course Outcomes :-

CO1	Describe the importance of data Engineering, preprocessing techniques, ETL, data pipeline, data preprocessing techniques. (II. Understand)
CO2	Perform data cleaning, data transformation and data enriching operations (III. Apply)
CO3	To work on database on using SQL-advance, CTE and windows functions. (III. Apply)
CO4	Learn data ingestion and design and deploy a data pipeline. (V Design)
CO5	Learn data cleansing, validation, data presentation and visualization techniques. Implement different sorting and searching algorithms. (III. Apply)
CO6	Learn about data and metadata management and governance. (III. Analyze)

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	2	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	3	-	-	-	-	-	-	-	-	-
CO5	-	-	3	-	-	-	-	-	-	-	-	-
CO6	-	-	3	-	-	-	-	-	-	-	-	-
Average	1.0	1.0	1.0	-	-	-	-	-	-	-	-	-
Mapping Strength	1.0	1.0	1.0	-	-	-	-	-	-	-	-	-

	PSO1	**PSO2**
CO1	-	1
CO2	-	2
CO3	-	2
CO4	2	-
CO5	-	1
CO6	2	-
Average	2.0	1.5
Mapping Strength	2	1

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Course Code :- AID302 **Course Title:- Design and Analysis of Algorithm**

Course Outcomes :-

CO1 Explain the basic concept of algorithm & compute running time. (I Remember)
CO2 Explain the algorithm design techniques using dynamic programming. (II Understand)
CO3 Determine optimal solution for a task using Greedy approach. (III Apply)
CO4 Apply the divide and conquer strategies for sorting & searching algorithm. (III Apply)
CO5 Demonstrate the use of Backtracking and Branch and Bound Technique. (Apply)
CO6 Determine the classes P & NP complete for a given problem. (III Apply)

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	-	-	-	-	-	-	-	-	-	-	-
CO2	-	2	-	-	-	-	-	-	-	-	-	-
CO3	-	2	-	-	-	-	-	-	-	-	-	-
CO4	-	2	-	-	-	-	-	-	-	-	-	-
CO5	-	2	-	-	-	-	-	-	-	-	-	-
CO6	-	2	-	-	-	-	-	-	-	-	-	-
Average	1.0	2.0	-	-	-	-	-	-	-	-	-	-
Mapping Strength	1	2	-	-	-	-	-	-	-	-	-	-

	PSO1	**PSO2**
CO1	1	-
CO2	1	-
CO3	1	-
CO4	1	-
CO5	-	-
CO6	1	-
Average	1.0	-
Mapping Strength	1	-

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Course Code :- AID303 **Course Title:- Machine Learning**

Course Outcomes :-

CO1 Explain the fundamental principles of machine learning (II Understand)
CO2 Explain the concept of artificial neural netwrks. (II Understand)
CO3 Distinguish between different types of machine learning algorithms. (II Understand)
CO4 Illustarate the working of supervised/unsupervised machine learning algorithms. (III. Apply)
CO5 Develop a model using supervised/unsupervised machine learning algorithms(III. Apply)
CO6 Evaluate performance of various machine learning algorithms on various data sets of a domain.(IV. Analyze)

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	1	-	-	-	-	-	-	-	-	-	-
CO2	-	1	-	-	-	-	-	-	-	-	-	-
CO3	-	1	-	-	-	-	-	-	-	-	-	-
CO4	-	-	2	-	-	-	-	-	-	-	-	-
CO5	-	-	2	-	-	-	-	-	-	-	-	-
CO6	-	-	-	1	-	-	-	-	-	-	-	-
Average	-	1.0	2.0	1.0	-	-	-	-	-	-	-	-
Mapping Strength	-	1	2	1	-	-	-	-	-	-	-	-

	PSO1	**PSO2**
CO1	1	-
CO2	1	-
CO3	1	-
CO4	1	-
CO5	-	-
CO6	-	-
Average	1	-
Mapping Strength	1.0	-

Course Code :- AID304 **Course Title:- Software Process and Project Management**

Course Outcomes :-

CO1 Identify software development process and basic Models. (I Knowledge)
CO2 Describe Software requirement specifications and its implementation. (I Knowledge)
CO3 Prepare software project management and organization. (I Knowledge)
CO4 Schedule project review and analyze product and process. (III Apply)
CO5 Test software product and process. (III Apply)
CO6 Examine current trends and model for software application development (IV Analyze)

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	-	-	-	-	-	-	-	-	-	-	-
CO2	-	2	-	-	-	-	-	-	-	-	-	-
CO3	-	1	-	-	-	-	-	-	-	-	-	-
CO4	-	-	1	-	-	-	-	-	-	-	-	-
CO5	-	-	2	-	1	-	-	-	-	-	-	-
CO6	-	-	-	-	1	-	-	-	-	-	-	-
Average	1.0	1.5	1.5	-	1.0	-	-	-	-	-	-	-
Mapping Strength	1	1.5	1.5	-	1	-	-	-	-	-	-	-

	PSO1	**PSO2**
CO1	1	-
CO2	1	-
CO3	-	1
CO4	-	1
CO5	-	1
CO6	-	1
Average	1	1
Mapping Strength	1	1

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Course Code :- AID324 **Course Title:- Lab IV: Seminar**

Course Outcomes :-

CO1 Able to show competence in identifying relevant information, defining and explaining the selected topics (II Understand)

CO2 Able to demonstrate a sound technical knowledge of their selected seminar topic (II Understand)

CO3 Able to communicate effectively with audience . (II Understand)

CO4 Make use of new and recent technology for creating technical documents (III Apply)

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	-	-	-	1	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	1
CO3	-	-	-	-	-	-	-	-	-	1	-	-
CO4	-	-	-	-	1	1	-	-	-		-	-
Average	-	-	-	-	1.0	1.0	-	-	1.0	1.0	-	1.0
Mapping Strength	-	-	-	-	1.0	1.0	-	-	1.0	1.0	-	1.0

	PSO1	**PSO2**
CO1	1	-
CO2	1	-
CO3	1	-
CO4	1	-
Average	1.0	-
Mapping Strength	1	-

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Course Code :- Experience Based Learning

Course Title:- Lab V: Experience Based Learning

Course Outcomes :-

CO1 Apply theoretical knowledge to real-world situations and demonstrate effective problem-solving skills in practical scenarios within

CO2 Collaborate effectively with peers and professionals while exhibiting professional behavior and ethics in practical environments.

CO3 Communicate findings and insights effectively in both written and oral forms, ensuring clarity and professionalism.

CO4 Reflect on personal learning experiences to identify strengths and areas for improvement and engage in continuous personal and professional development.

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	-	2	1	1	-	-	-	-	1
CO2	-	1	-	-	-	1	1	3	2	-	1	1
CO3	-	-	-	2	-	1	1	2	1	2	1	1
CO4	-	1	-	1	-	1	1	2	1	-	-	2
Average	-	-	-	-	-	-	-	-	-	-	-	-
Mapping Strength	-	-	-	-	-	-	-	-	-	-	-	-

	PSO1	**PSO2**
CO1	2	-
CO2	-	1
CO3	-	1
CO4	2	-
Average	2	1
Mapping Strength	2	1

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Course Code :- **Course Title:- Lab VI: Development of Skills (Computational) UI/UX Design**

Course Outcomes :-

CO1 Understand with graphical layout tools.(II Understand)
CO2 Understand user interface. (II Understand)
CO3 Implement graphical layout of an application / product.(III Apply)
CO4 Apply concepts of UI/UX design.(III Apply)

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	1	-	-	-	-	-	-	-	-	-	-
CO2	-	1	-	-	-	-	-	-	-	-	-	-
CO3	-	1	-	-	-	-	-	-	-	-	-	-
CO4	-	1	-	-	-	-	-	-	-	-	-	-
CO5	-	1	-	1	-	-	-	-	-	-	-	-
Average	-	1.0	-	1.0	-	-	-	-	-	-	-	-
Mapping Strength	-	1	-	1	-	-	-	-	-	-	-	-

	PSO1	**PSO2**
CO1	1	-
CO2	-	1
CO3	-	1
CO4	-	1
Average	1.0	1.5
Mapping Strength	1	1

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AY 2023-24 Part II

Course Code :- AID351 **Course Title:- Data Analytics and Modelling**

Course Outcomes :-

CO1 Apply data management and indexing techniques to categorize and organize data for analysis. (III)
CO2 Apply data transformation methods (Box-Cox, power, etc.) to prepare data for statistical analysis. (III)
CO3 Calculate and interpret descriptive statistics (measures of central tendency, dispersion, shape) to summarize data characteristics. (IV)
CO4 Perform hypothesis testing using various statistical tests (Chi-square, Z-test, T-test) to assess data relationships. (IV)
CO5 Analyze variance and covariance between variables using techniques like ANOVA, MANOVA, and ANCOVA. (IV)
CO6 Apply exploratory data analysis (EDA) and inferential statistics to uncover patterns and draw conclusions from data. (IV)

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	-	-	-	-	-	-	-	-	-	-
CO2	-	2	-	-	-	-	-	-	-	-	-	-
CO3	1	1	-	1	1	-	-	-	-	-	-	-
CO4	-	1	-	1	1	-	-	-	-	-	-	-
CO5	-	-	-	2	1	-	-	-	-	-	-	-
CO6	-	-	-	2	1	-	-	-	-	-	-	-
Average	1.0	1.25	-	1.5	2.0	-	-	-	-	-	-	-
Mapping Strength	1.0	1.0	-	1.5	2.0	-	-	-	-	-	-	-

	PSO1	**PSO2**
CO1	2	-
CO2	2	-
CO3	2	-
CO4	2	-
CO5	2	-
CO6	2	-
Average	2.0	-
Mapping Strength	2	-

Course Code :- AID352 **Course Title:- Artificial Neural Network and Deep Learning**

Course Outcomes :-

CO1 Explain the fundamental principles of Deep learning (II Understand)
CO2 Apply the concept of Convolutional Neural Network. (III. Apply)
CO3 Distinguish between different types of Deep learning algorithms. (III. Apply)
CO4 Illustrate the working of Recurrent Neural Network deep learning algorithms. (III. Apply)
CO5 Develop a model using Generative adversarial network and reinforcement learning deep learning algorithms(III. Apply)
CO6 Evaluate performance of various deep learning algorithms on various data sets of a domain.(IV. Analyze)

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	1	-	-	-	-	-	-	-	-	-	-
CO2	-	1	-	-	-	-	-	-	-	-	-	-
CO3	-	1	-	-	-	-	-	-	-	-	-	-
CO4	-	-	2	-	-	-	-	-	-	-	-	-
CO5	-	-	2	-	-	-	-	-	-	-	-	-
CO6	-	-	-	1	-	-	-	-	-	-	-	-
Average	-	1	2.0	1	-	-	-	-	-	-	-	-
Mapping Strength	-	1.0	2.0	1.0	-	-	-	-	-	-	-	-

	PSO1	**PSO2**
CO1	1	-
CO2	1	-
CO3	1	-
CO4	1	-
CO5	-	1
CO6	-	1
Average	1	1
Mapping Strength	1.0	1.0

Course Code :- AID353 **Course Title:- Operating System**

Course Outcomes :-

CO1 Students will be able to understand the basics, structures, and functions of the Operating System.
CO2 Students will be able to apply the process management concepts and scheduling algorithms.
CO3 Students will be able to understand the File management system of the Operating System with Storage management.
CO4 Apply the knowledge of Memory management and segmentation.
CO5 Understand the Device Management in the operating system.
CO6 Students will be able to identify Deadlock.

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	-	-	-	-	-	-	-	-	-	-	2
CO2	1	-	1	-	-	-	-	-	-	-	-	1
CO3	1	-	-	-	-	-	-	-	-	-	-	1
CO4	1	-	1	-	-	-	-	-	-	-	-	1
CO5	1	-	-	-	-	-	-	-	-	-	-	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-
Average	1	-	1	-	-	-	-	-	-	-	-	1.2
Mapping Strength	1	-	1	-	-	-	-	-	-	-	-	1

	PSO1	**PSO2**
CO1	-	2
CO2	3	-
CO3	-	2
CO4	3	-
CO5	-	2
CO6	2	-
Average	2.6	2.0
Mapping Strength	2	2

Course Code :- AID354 **Course Title:- Dependable AI**

Course Outcomes :-

CO1 Explain the models, cases and factors of Dependable AI. (II Understand)
CO2 Explain Transparent AI and its limits and trust factors. (II Understand)
CO3 Describe explainable AI functions, values, and approaches. (II Understand)
CO4 Explain accountable AI with Balancing Laws and Practices. (II Understand)
CO5 Explain responsible AI using corporate responsibilities. (II Understand)
CO6 Use trustworthy AI with relevant dimensions to cultivate trust. (III Apply)

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	-	-	-	-	-	-	-	-	-	-	-
CO2		2	-	-	-	-	-	-	-	-	-	-
CO3		2	-	-	-	-	-	-	-	-	-	-
CO4		2	-	-	-	-	-	-	-	-	-	-
CO5		2	-	-	-	-	-	-	-	-	-	-
CO6		2	-	-	-	-	-	-	-	-	-	-
Average	1	2	-	-	-	-	-	-	-	-	-	-
Mapping Strength	1.0	2.0	-	-	-	-	-	-	-	-	-	-

	PSO1	**PSO2**
CO1	1	-
CO2	1	-
CO3	1	-
CO4	1	-
CO5	1	-
CO6	1	-
Average	1.0	-
Mapping Strength	1	-

Course Code :- AID391 **Course Title:- Business Intelligence**

Course Outcomes :-

CO1 Explain the Fundamental Concepts of Business Intelligence(II Understand)
CO2 Differentiate between Business Intelligence technology counterparts.(II Understand)
CO3 utilize Business Intelligence user interfaces effectively.(III Apply)
CO4 Apply an analytics framework for decision-making in Business Intelligence. (III Apply)
CO5 Explore On-Line Analytical Processing (OLAP) concepts and architecture. (IV Analyze)
CO6 Analyze enterprise vs. departmental BI and strategic vs. tactical BI. (IV Analyze)

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	-	-	-	-	-	-	-	-	-	-
CO2	-	2	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	3	-
CO5	2	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	3	-	-	-	-	-	-	2	-
Average	2.0	2.0	3.0	3.0	3.0		-	-	-	-	2.5	-
Mapping Strength	2	2	3	3	3	-	-	-	-	-	2	-

	PSO1	**PSO2**
CO1	-	2
CO2	-	2
CO3	3	-
CO4	3	-
CO5	2	-
CO6	2	-
Average	2.5	2.0
Mapping Strength	2	2

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Course Code :- AID374 **Course Title:- Visualization Tools**

Course Outcomes :-

CO1 Demonstrate familiarity with various data visualization tools.(II Understand)
CO2 Effectively communicate insights through visualizations.(II Understand)
CO3 Interpret data using data visualization techniques.(IVAnalyz)
CO4 Develop applications using data visualization tools and techniques. (V Create)

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	2	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	3	-	-
CO3	-	-	-	2	-	-	-	-	-	-	-	-
CO4	-	-	-	-	2	-	-	-	-	-	2	-
Average	-	-	-	2	2	-	-	-	-	3	2	-
Mapping Strength	-	-	-	2	2	-	-	-	-	3	2	-

	PSO1	**PSO2**
CO1	-	1
CO2	-	2
CO3	1	-
CO4	2	-
Average	1.5	1.5
Mapping Strength	1	1

Course Code :- AID375 **Course Title:- Major Project I**

Course Outcomes :-

CO1 Formulate an analytical model for an engineering problem and obtain its solution with necessary tools.

CO2 Perform and manage as an individual or as a member of a team with ethical values.

CO3 Examine the concepts of environment and sustainability

CO4 Write effective reports and communicate effectively on civil engineering problems.

CO5 Present the conclusions in a way to benefit the society

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	3	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	3	3	-	-	-
CO3	-	-	-	-	-	-	2	-	-	-	-	-
CO4	-	-	-	1	-	-	-	-	-	3	-	-
CO5	-	-	-	-	-	3	-	-	-	-	-	-
Average	3	-	-	2	-	3	2	3	3	3	-	-
Mapping Strength	3	-	-	2	-	3	2	3	3	3	-	-

	PSO1	**PSO2**
CO1	3	-
CO2	-	2
CO3	1	-
CO4	-	2
CO5	-	2
Average	-	-
Mapping Strength	-	-

HESTD