Title (Units): **COMP7630 Web Intelligence and Its Applications (3,3,0)**

Course Aims: To introduce the fundamental concepts as well as practical applications of Web Intelligence (WI) which combines contemporary Artificial Intelligence and advanced Information Technology in the context of Web-empowered systems, environments, and activities. To introduce some advanced topics of Web Intelligence as well as their possible impact to different sectors of the society. Students after taking this subject should be able to 1) identify the possible impact of Web Intelligence in the society, and 2) apply WI related techniques to advance existing Web-based systems and on-line business platforms.

Prerequisite: Nil

Course Intended Learning Outcomes (CILOs):
Upon successful completion of this course, students should be able to:

No.	Course Intended Learning Outcomes (CILOs)
	Knowledge
1	Describe the concepts and applications of contemporary Artificial Intelligence and advanced Information Technology in the context of Web empowered systems, environments, and activities
2	Explain the techniques and issues central to the development of WI computing systems
3	Explain the practical applications of Web intelligence
	Professional Skill
4	Solve advanced technical problems in generic Web environment
5	Apply specific methods and techniques in a number of Intelligent Web applications
	Attitude
6	Develop team spirit in tackling challenging problem in Web

Calendar Description: This course introduces the fundamental concepts as well as practical applications of Web Intelligence (WI) which combines contemporary Artificial Intelligence and advanced Information Technology in the context of Web-empowered systems, environments, and activities. Also, advanced topics related to Web Intelligence (WI) and their impact to different sectors of the society will be covered. After taking this course, students should be able to 1) identify the possible impact of Web Intelligence in the society, and 2) apply WI related techniques to advance existing Web-based systems and on-line business platforms.

Teaching and Learning Activities (TLAs):

CILOs	Type of TLA
1-3	Student will learn the concepts from lecture
4-5	Student will achieve the outcomes via assignment
4-5	Student will achieve the outcomes via guided laboratory
4-6	Student will achieve the outcomes via group project

Assessment:

No.	Assessment Methods	Weighting	CILOs to be addressed	Description of Assessment Tasks
1	Continuous Assessment	40%	4-6	Assignments and Labs will be used to consolidate their knowledge and develop their skills in Web intelligence. Group project or term paper will further strength their understanding and problem solving skills.
2	Examination	60%	1-5	Final Examination questions are designed to evaluate how far students have achieved their intended learning outcomes. Analysis based questions will be used to assess the understanding

				of WI computing systems. Problem solving questions will be used to assess the students' ability in tackling Web applications.

Assessment Rubrics:

	Excellent (A)	Good (B)	Satisfactory (C)	Fail (F)
Describe concepts and applications of AI and advanced IT in Web empowered systems,	Thorough description of almost all concepts and applications	Description of most of the concepts and applications	Description of some of the concepts and applications	Description of a limited number of concepts and applications
Explain the techniques and issues central to the development of WI computing systems	Thorough explanation of almost all techniques and issues	Explanation of most of techniques and issues	Explanation of some of techniques and issues	Explanation of a limited number of techniques and issues
Explain the practical applications of Web intelligence	Thorough explanation of almost all applications	Explanation of most of the applications	Explanation of some of the applications	Explanation of only a few applications
Solve advanced technical problems in generic Web environment	Solving almost all technical problems	Solving most of the technical problems	Solving some of the technical problems	Solving of only a very small number of technical problems
Apply specific methods and techniques in a number of Intelligent Web applications	Application of almost all relevant methods and techniques to applications, including those involving novel solutions	Application of most of the correct methods and techniques to applications	Application of some of the correct methods and techniques to applications	Application of only a very small number of correct methods and techniques to applications

Course Content and CILOs Mapping:

Content		CILO No.
I	Introduction to Web Intelligence (WI) Concepts and Applications	1
II	WI Methodologies and Algorithms	2,4
III	Applications of WI technologies	3,5
IV	Advance Topics	3-6

References:

- W. Lawless, R. Mittu, D. Sofge, I.S.S. Moskowitz, S. Russell. Artificial Intelligence for the Internet of Everything, First Edition, 2019.
- Reza Zafarani, Mohammad Ali Abbasi, and Huan Liu. Social Media Mining: An Introduction, Cambridge University Press, 2014.
- Tzung-Pei Hong, Leticia Serrano-Estrada, Akrati Saxena, and Anupam Biswas. Deep Learning for Social Media Data Analytics (Studies in Big Data, 113), 1st ed., 2022.
- Satya Prakash Yadav, Dharmendra Prasad Mahato, and Nguyen Thi Dieu Linh. Distributed Artificial Intelligence: A Modern Approach (Internet of Everything (IoE)), 1st Edition, 2020.
- Jing Zhang, Jipeng Qiang, and Cangqi Zhou. New Horizons in Web Search, Web Data Mining, and Web-Based Applications, 2024.
- Bing Liu, Web Data Mining: Exploring Hyperlinks, Contents, and Usage Data (Data-Centric Systems and Applications), Springer, Second Edition, 2013.

- M. Russell and M. Klassen, Mining the Social Web: Data Mining Facebook, Twitter, LinkedIn, Instagram, GitHub, and More, Oreilly, Third Edition, 2018.
- Web Intelligence and Agent Systems, IOS Press.
- N. Zhong, J. Liu, and Y.Y. Yao, (Eds.) Web Intelligence, Springer-Verlag, 2003.
- Articles in IEEE Computer, Special Issue on Web Intelligence, November, 2002.

Course Content:

Topic

I. Introduction to Web Intelligence (WI) Concepts and Applications

II. WI Methodologies and Algorithms
   A. Distributed Problem Solving
   B. Autonomy-Oriented Computing
   C. Web Information Filtering and Retrieval
   D. Web Mining and Farming
   E. Social Networks Mining and Social Intelligence
   F. Sentiment and Opinion Mining

III. Applications of WI technologies
   A. Autonomous Knowledge and Information Agents
   B. Personalization
   C. Collaborative filtering

IV. Advance Topics