Subject Code: 01CA0403

Subject Name: IOT for Manufacturing

M.Tech. II Year – (Sem-3) CAD/CAM

Type of course: Programme Elective

Prerequisite: NA

Rationale: The course is prepared to provide the detailed understating of IOT for manufacturing

Teaching and Examination Scheme:

Teaching Scheme(Hours)			Credits	Evaluation Scheme					Total Marks
				Theory Marks			Practical Mar s		
Theory	Tutorial	Practical		ESE (E)	IA	CSE	Viva (V)	TermWork (TW)	
3	0	2	4	50	30	20	25	25	150

Course Outcome

Students will be able to

1. Design an IoT system with cloud infrastructure
2. Implement the M2M Communication protocols in a prototype
3. Understand the basic concepts of the main sensors used in electromechanical systems
4. Understand/implement computer models of common engineering information types.
5. Understand storage mechanisms / analysis algorithms for data management in distributed & data intensive applications.

Course Content

Sr No	Contents	Total	Weightage
1	**IoT and Cloud Computing** Introduction, Physical design of IoT, Logical design of IoT, IoT enabling technologies, Domain specific IoTs ,IoT design methodology, logical design ,IoT physical devices (such as Raspberry Pi, pcDuino, Beaglebone black, Cubieboard) , Introduction to cloud computing: cloud models, cloud service examples, cloud based services & applications, Cloud service and platforms	8	18

2	**Applied Machine to Machine Communication** Introduction to M2M, Description of M2M Market, Segments/Applications – Automotive, Smart Telemetry, Surveillance and Security, M2M Industrial Automation, M2M Terminals and Modules	6	14
3	**Mechatronic Systems Design** Introduction: Mechatronic, history, applications, and trends, Sensors and transducers, Signal conditioning, Mechanical components, Software development, Pneumatic and hydraulic actuators, Microcontrollers, Basic closed-loop control	6	14
4	**Information Systems in Manufacturing** Manufacturing organizations, management, and the networked enterprises, Globalization challenges and opportunities, Dimensions of Information systems, Approaches to study information system, Technical and Behavioral approach, Information Technology Infrastructure	12	27
5	**Analytics & Systems of Big Data** Mapreduce abstraction, Google paper, Google systems, GFS, BigTable, Cluster and Data center network, Distributed Storage, Facebook photo storage, Azure storage systems. Data duplication storage systems, Venti and DDFS, Data preprocessing, predictive techniques, association rules, classification, clustering, supervised v/s unsupervised learning, algorithms, domain specific feature extraction, similarity measures, Shingles and minhashing, locality sensitive hashing, Dimensionality reduction techniques, Clustering in high dimensional space, Web link analysis.	12	27

Distribution of Theory Marks

R Level	U Level	A Level	N Level	E Level
15	20	25	25	15

Legends: R: Remembrance**; U:** Understanding**; A:** Application, **N:** Analyze**, and E:** Evaluate

Reference Books:
1. Bahga and V. Madisetti, Internet of Things, A hands-on approach, Create Space Independent Publishing Platform, 1st edition, 2014, ISBN: 978-0996025515.
2. Bahga and V. Madisetti, Cloud Computing, A hands-on approach, Create Space Independent Publishing Platform, 1st edition, 2013, ISBN: 978-1494435141

3. D. Boswarthick, O. Elloumi, and O. Hersent, M2M communications: A systems approach, Wiley, 1st edition, 2012, ISBN: 978-1119994756

4. J. Edward Carryer, et al., Introduction to Mechatronic Design, Prentice Hall, 1st edition, 2010, ISBN: 978- 8131788257.

5. K. Laudon and J. Laudon, Management Information Systems, 14th edition, Pearson Higher Education, 2016, ISBN: 9780136093688.

6. A Rajaraman, J. Leskovec, J. Ullmann, Mining of Massive Data sets, Cambridge University Press, 2011, ISBN: 1107015359.

List of experiments

1. Case study on application of IOT in casting industry
2. Case study on application of IOT in fabrication industry
3. Case study on application of IOT in machining industry
4. Case study on application of IOT in forming industry
5. Case study on application of IOT in quality control
6. Case study on application of IOT in production planning
7. Case study on application of IOT in maintenance

List of Open Source Software/learning website:

1. nptel.ac.in
2. https://www.tinkercad.com