DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY

CIRCULAR NO. ACAD/NP/M.E./Syllabi/189/2013

It is hereby informed to all concerned that, on recommendations of the Faculty of Engineering and Technology, the Hon'ble Vice-Chancellor has accepted the following **"Revised Syllabi with Cumulative Grade Point Average [CGPA]"** under the Faculty of Engineering & Technology on behalf of the **Academic Council Under Section-14(7) of the Maharashtra Universities Act, 1994** as appended herewith :-

Sr. No.	Revised Syllabi
[1]	Revised Syllabus of M.E. [Computer Networking Engg.],
[2]	Revised Syllabus of M.E. [Structural Engineering],
[3]	Revised Syllabus of M.E. [Water Resources Engineering],
[4]	Revised Syllabus of M.E. [Environmental Engineering],
[5]	Revised Syllabus of M.E. [Software Engineering],
[6]	Revised Syllabus of M.E. [Computer Science],
[7]	Revised Syllabus of M.E. [Control System Engineering],
[8]	Revised Syllabus of M.E. [Heat Power],
[9]	Revised Syllabus of M.E. [Manufacturing Engineering],
[10]	Revised Syllabus of M.E. [Electronics],
[11]	Revised Syllabus of M.E. [Electronics & Telecommunication],
[12]	Revised Syllabus of M.E. [Embedded System],
[13]	Revised Syllabus of M.E. [Communication Engineering],
[14]	Revised Syllabus of M.E. [Digital Communication],
[15]	Revised Syllabus of M.E. [Biotechnology],
[16]	Revised Syllabus of M.E. [CAD/CAM],
[17]	Revised Syllabus of M.E. [Thermal],
[18]	Revised Syllabus of M.E. [Design Engineering],

This is effective from the Academic Year 2013-2014 and onwards.

All concerned are requested to note the contents of this circular and bring the notice to the students, teachers and staff for their information and necessary action.

University Campus,
Aurangabad-431 004.
REF.NO. ACAD/ NP/ M.E./
SYLLABI / 2013/14092-100
V.C.14[7] A-08.
Date:- 15-06-2013.

★
★
★
★
★
******

Director,
Board of College and
University Development.

..2..

Copy forwarded with compliments to :-

1] The Principals, affiliated concerned Colleges,
Dr. Babasaheb Ambedkar Marathwada University.

2] The Director, University Network & Information Centre, UNIC, with **a request to upload the above all syllabi on University Website [www.bamu.net].**

Copy to :-

1] The Controller of Examinations,
2] The Superintendent, [Engineering Unit],
3] The Programmer [Computer Unit-1] Examinations,
4] The Programmer [Computer Unit-2] Examinations,
5] The Superintendent, [Eligibility Unit] ,
6] The Director, [E-Suvidha Kendra], in-front of Registrar's Quarter,
Dr. Babasaheb Ambedkar Marathwada University,
7] The Record Keeper,
Dr. Babasaheb Ambedkar Marathwada University.

-=**=-

S/160613/-*

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD.

Revised Syllabus of

M.E. (COMPUTER SCIENCE & ENGINEERING)

[Effective from July-2013 - 2014]

Dr.Ulhas Shinde
DEAN Engineering
Dr.B.A.M.U

Dr.Vijaya Musande
Chairman,BOS
Dr.B.A.M.U

Dr. Babasaheb Ambedkar Marathwada University Aurangabad.

Faculty of Engineering & Technology

Rules and Regulations for M.E. & M.Tech. -2014

- **What is a credit system**

  A credit system is a systematic way of describing an educational program by attaching credits to its components. The definition of credits in higher education systems may be based on different parameters, such as student workload, learning outcomes and contact hours.

- **Advantages of the Credit System**
  - Represents a much-required shift in focus from teacher-centric to learner-centric education since the work load estimated is based on the investment of time in learning, not in teaching.
  - Helps to record course work and to document learner work load realistically since all activities are taken into account-not only the time learners spend in lectures or seminars but also the time they need for individual learning and the preparation of examinations etc.
  - Segments learning experience into calibrated units, which can be accumulated in order to gain and academic award.
  - Helps self-paced learning. Learners may undertake as many credits as they can cope with without having to repeat all the courses in a given semester if they fail in one or more courses. Alternatively, they can choose other courses and continue their studies.

- **What is Grading?**

  The word Grade derived from the Latin word gradus, meaning, step. Grading, in the educational context is a method of reporting the result of a learner's performance subsequent to his evaluation. It involves a set of alphabets which are clearly defined and designated and uniformly understood by all the stake holders. A properly introduced grading system not only provides for a comparison of the learner's performance but it

also indicate the quality of performance with respect to the amount of efforts put in and the amount of knowledge acquired at the end of the courses by the learners.

- **CURRICULUM:**

1.1 Curriculum:

Every program with specialization has a prescribed course structure which in general terms is known as Curriculum. It prescribes course to be studied in each semester; the relevant information containing course structure along with detail syllabus for each course of each program is updated periodically and is uploaded on the website.

1.2 Semesters:

The Faculty of Engineering & Technology implements a credit based curriculum and grade based evolution system for P.G. program is of four semesters. The academic courses are delivered in the first two semesters. Dissertation work is carried out by a student in the third and fourth semester. The first semester begins in the last week of July ends by the last week of November while the second semester begins in the first week of January and ends by the second week of May. Total duration for each semester is generally of 20 weeks including the period of examination, evaluation and grade declaration.

1.3 Course Credit:

Education is organized around the semester-based credit system of study. The prominent features of the credit system are a process of continuous evaluation of a student's performance/progress and flexibility to allow a student to progress at an optimum pace suited to his/her ability or convenience, subject to fulfilling minimum requirements for continuation.

A student's performance/progress is measured by the number of credits that he/she has earned, i.e. completed satisfactorily. Based on the course credits and grades obtained by the student, grade point average is calculated. A minimum grade point average is required to be maintained for satisfactory progress and continuation in the program. Also a minimum number of earned credits and a minimum grade point average should be acquired in order to qualify for the degree. All programmes are defined by the total credit requirement and a pattern of credit distribution over courses of different categories.

1.4 Course credits assignment

Each courses, except a few special courses, has a certain number of credits assigned to it depending upon its lecture, tutorial and laboratory contact hours in a week. This weightage is also indicative of the academic expectation that includes in-class contact and self-study outside of class hours.

Lectures and Tutorials: One lecture or tutorial hour per week per semester is assigned one credit.

Seminar/Contact Hours per week per semester is assigned one credit

Practical/Laboratory: One laboratory hour per week per semester is assigned half credit.

Example: Course: XYZ Engg: 3 credits (3-1-2)

The credits indicated for this course are computed as follows:

3 hours/week lectures = 3 credits

1 hours/week tutorial = 1 credit

2 hours/week practical = 2 x 0.5 = 1 credit

2 hours/week seminar = 2 x 0.5 = 1 credit

Dissertation seminar/Contact Hours = 1 x 1= 1 credit

(3-1-2) 3 credit course = (3 h Lectures + 1 h Tutorial + 2 h Practical/Dissertation seminar) per week i.e. 6 Contact hours per week

1.5 Earning Credits

At the end of every course, a letter grade is awarded in each course for which a student had registered. On obtaining a pass grade, the student accumulates the course credits as earned credits. A student's performance is measured by the number of credits that he/she has earned and by the weighted grade point average.

The credit system enables continuous evaluation of a student's performance, and allows the students to progress at an optimum pace suited to individual ability and convenience, subject to fulfilling minimum requirement for continuation.

1.6 Evaluation System

1. Semester Grade Point Average (SGPA) =

   SUM (course credits in passed courses X earned grade points)

   SUM (Course credits in registered courses)

2. Cumulative Grade Point Average (CGPA) =

   SUM (course credits in passed courses X earned grade points) of all Semester

   ---

   SUM (Course credits in registered courses) of all Semester

3. At the end of M.E & M. Tech Program, student will be placed in any one of the divisions as detailed below.(According to AICTE Handbooks 2013-2014)

   Ist Division with distinction : CGPA $\geq$ 8.25 and above

   Ist Division : CGPA $\geq$ 6.75 and < 8.25

   IInd Division : CGPA $\geq$ 6.75 and < 6.25

As per AICTE Handbook (2013-14), new gradation suggested as follows,

Table 1

Grade Point	Equivalent Range
6.25	55%
6.75	60%
7.25	65%
7.75	70%
8.25	75%

Conversion of CGPA to percentage marks for CGPA $\geq$ 5.0 can be obtained using equations.

Percentage marks = (CGPA X10) – 7.5

An example of these calculations is given below:

Typically one example for academic performance calculations of semester –I

Table 2

Course No. (1)	Course Credit (2)	Grade Awards (3)	Earned Credit (4)	Grade Points (5)	Points Secured (6)=(4) x (5)
Subject 1	4	B	4	6	24
Subject 2	4	C	4	5	20
Subject 3	4	O	4	10	40
Subject 4	4	A+	4	8	32
Subject 5	4	C	4	5	20
Lab-1	2	A+	2	9	18
Lab-2	1	A+	1	9	9
Seminar-I	1	A+	1	9	9
Total	24		24	61	172

1. Semester Grade Point Average (SGPA) = $\frac{(172)}{(24)} = 7.16$

2. Cumulative Grade Point Average (CGPA) =
Cumulative points earned in all passed courses = 172 (past semester) + 172 (this sem.) = 344

Cumulative earned credits = 24 (past semesters) +24 (this sem) = 48

$$\frac{\sum (172 + 172)}{\sum (24 + 24)} = 7.16$$

➢ **System Evaluation Table**

Table 3

Grade	Grade Points	Marks Obtained (%) Regular Semester	Description Performance
O	10	91-100	Outstanding
A++	09	86-90	Excellent
A+	08	76-85	Very Good
A	07	66-75	Good
B	06	56-65	Fair
C	05	46-55	Average
D	04	40-45	Poor
F	00	Below 40	Fail
EE			Incomplete
WW			Withdrawal
XX	--	--	Detained
ABSENT	--	--	Absent
PP	--	--	Passed (Audit Course)
NP	--	--	Not Passed (Audit Course)

➢ **Grade Awards:**

i) A ten point rating scale shall be used for the evaluation of the performance of the student to provide letter grade for each course and overall grade for the Master's Programme. Grade points are based on the total number of marks obtained by him/her in all the heads of examination of the course. These grade points and their equivalent range of marks are shown separately in Table-4.

Table 4: Ten point grades and grade description

Sr.No.	Equivalent Percentage	Grade Points	Grade	Grade Description
1	90.00 – 100	10	O	Outstanding
2	80.00 – 89.99	9	A++	Excellent
3	70.00 – 79.99	8	A+	Exceptional
4	60.00 – 69.99	7	A	Very Good
5	55.00 – 59.99	6	B+	Good
6	50.00 – 54.99	55	B	Fair
7	45.00 – 49.99	5	C+	Average
8	40.01 – 44.99	4.5	C	Below Average
9	40	4.00	D	Pass
10	<40	0.00	F	Fail

ii) Non appearance in any examination/assessment shall be treated as the student have secured zero mark in that subject examination/assessment.

iii) Minimum D grade (4.00 grade points) shall be the limit to clear/pass the course/subject. A student with F grade will be considered as 'failed' in the concerned course and he/she has to clear the course by reappearing in the next successive semester examinations.

iv) Every student shall be awarded Grade points out of maximum 10 points in each subject (based on 10 Point Scale). Based on the Grade points obtained in each subject, Semester Grade Point Average (SGPA) and then Cumulative Grade Point Average (CGPA) shall be computed. Results will be announced at the end of each semester and cumulative Grade card with CGPA will be given on completion of the course.

Proposed Coding System of M.E/M.Tech Subjects

Six Digit Code for a subject (PG Course)

	Digits →	1 2 3	4	5 6
Sr. No.	**Branch** ↓	**Branch code**	**Year**	**Subject**
1	Electronics	MEX	PG I year – 6	**Semester –I/III**
2	Electronics & Communication	MEC	PG II Year - 7	1-20 Theory
3	Electronics & Telecom.	MET		21-30 Practical
4	Digital Communication	MDC		31 Dissertation-I
5	Embedded System	MES		41-49 Electives
6	Structure Engineering	MSE		**Semester –II/IV**
7	Environmental Engineering	MEV		51-70 Theory
8	Water Resource Engineering	MWR		71-80 Practical
9	Computer Engineering	MCE		81 Dissertation-II
10	Computer Network	MCN		91-99 Electives
11	Software Engineering	MSW		
12	Mechanical Engineering	MME		
13	Thermal Engineering	MTE		
14	CAD/CAM	MCC		
15	Manufacturing	MMF		
16	Heat Power	MHP		
17	Design Engineering	MDE		
18	Machine Design	MMD		
19	Automation	MEA		
20	Chemical Engineering	MCH		
21	Computer & IT	MCI		
22	Production Process	MMP		
23	M.Tech Computer Science	MTC		
24	M.Tech Food Processing	MTF		
25	M.Tech Mechanical	MTM		

Note: - Kindly, Allot Same Code for same Electives/ subjects for different branches to avoid repetitions of Question papers/settings/assessments.

DEGREE OF MASTER OF ENGINEERING/TECHNOLOGY
(Course with effective from academic year: 2013-2014)

I	1	The examination for the Degree of Master of Engineering & Technology will be held in four semesters, M.E./M.Tech. Semester-I, M.E./M.Tech. Semester-II, M.E. ./M.Tech Semester-III, and M.E./M.Tech. Semester-IV in case of full time course. And for part time additional semester V & VI
II	**Rules & Eligibility**	
	1	Rule for admission to P.G. Degree course in Engineering and Technology as per rules and regulation of AICTE/DTE & Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.
III	**Evaluation method**	
	1	Each theory course will be of 100 marks and be divided in to internal examination of 20 marks and semester examination of 80 marks (20+80=100 marks). Each practical course will be of 50/100 marks
	2	There shall be minimum two class tests within a semester. First based on 30% syllabus taught and second based on 30% syllabus taught. The setting of question paper and assessment will be done by the concerned teacher who has taught the syllabus. Average marks obtained out of two examinations will be considered for the preparation of final sectional marks/ grade.
	3	The Question papers in theory subjects shall be set by the Examiners appointed for the purpose by the University on the recommendations of the Board of studies of the concerned PG Course.
	4	The assessment of the Practical for any subject will be done by recognized post-graduate teacher appointed by University.
	5	To pass the examination a candidate must obtain a minimum CGPA of 6.25 (CGPA to the scale of 10).
	6	Candidate who secures CGPA $\geq$ 6.25 and CGPA < 6.75 declared to have passed examination in second class.
	7	Candidate who secures CGPA $\geq$ 6.75 and CGPA < 8.25 declared to have passed examination in first class.
	8	Candidate who secures CGPA $\geq$ 8.25 declared to have passed examination in

		first class with distinction.
IV	1	In case candidates fails to get less than D grade in one or more heads of passing examination, he will be allowed at his option, to reappear for only those heads of passing in which he has failed or got less than D grade at subsequent examinations.
	2	The grades obtained by the candidate in any head of passing at the examination will be carried forward unless the candidates reappear for the head of passing in accordance with ref. IV (1)
	3	In case the candidate passes in all heads of passing under M.E./M.Tech. Semester-I, M.E./M.Tech. Semester-II examination and obtained a minimum CGPA of 6.25 in M.E./M.Tech Semester-I, M.E./M.Tech Semester-II taken together as required under ref. II(2) above, he will not be allowed to reappear for any head of passing under M.E. Semester-I, M.E. Semester-II in accordance with ref. III(5)
	4	A candidate will not be allowed to appear for M.E. /M.Tech Semester-III examination unless he passes in all heads of passing under M.E. /M.Tech Semester-I, M.E./M.Tech Semester-II examination and obtains a minimum CGPA of 6.25.
	5	Whenever a candidate reappears for M.E. /M.Tech Semester-III and M.E./M.Tech. Semester-IV examinations he will have to resubmit the dissertation with suitable modification and must also reappear for oral examination on it.
	6	A candidate registered for M.E./M.Tech Examination must clear his examination within five years from the date of registration.
V	**Attendance Requirement**	
	1	Each semester of the course shall be treated as a separate unit for calculation of the attendance
	2	A candidate shall be considered to have satisfied the attendance requirement if he/she has attended not less 75% of the class in each subject of all the semesters (Theory, Laboratory, Semester Practical training and Dissertation work) actually conducted up to the end of the semester.
	3	A Candidate, who does not satisfy the attendance required, mentioned as above, shall not be eligible to appear for the Examination of that semester and

		shall be required to repeat that semester along with regular students later.
	4	The Principal of the concerned College shall display regularly, the list of such candidates who fall short of attendance, on the Notice Boards.
	5	The list of the candidates falling short of attendance shall be sent to the University at least one week prior to the commencement of theory/practical examination, whichever is earlier.
VI	.	The following are the syllabi in the various subjects of the examination for the Degree of Master of Engineering/Technology.

Faculty of Engineering And Technology

Tentative Structure for ME (COMPUTER SCIENCE & ENGINEERING)

Sub	Semester – I				Contact Hrs/Week			Examination Scheme (Marks)						
	Subject	Subject Code	L	T	P	CH	Total	CT	TH	TW	P	Total	Duration of Theory Examination	Credi
1	Machine Learning	MCE601	3	1	-		4	20	80	-	-	100	3 Hrs.	4
2	Advanced Database Management System	MCE602	3	1	-		4	20	80	-	-	100	3 Hrs.	4
3	Advanced Algorithm	MCE603	3	1	-		4	20	80	-	-	100	3 Hrs.	4
4	Computer Network Protocol design	MCE604	3	1	-		4	20	80	-	-	100	3 Hrs.	4
5	Elective – I	MCE641, MCE642, MCE643	3	1	-		4	20	80	-	-	100	3 Hrs.	4
6	Software Development Laboratory – I	MCE621	-	-	4		4	-	-	-	50	50	-	2
7	Software Development Laboratory – II	MECE622			2		2			50	-	50		1
7	Seminar.	MCE623	-			2	2	-	-	-	50	50	-	1
Total of Part – I			15	5	6	2	28	100	400	50	100	650	15	24

L: Lecture hours per week **T:** Tutorial Hours per week **P:** Practical hours per week
CH: Contact Hours **CT:** Class Test **TH:** University Theory Examination
TW: Termwork **P:** Practical / Oral Examination

Elective – I

1. MCE641-Advanced Computer Architecture
2. MCE642-Real Time Systems
3. MCE643-Remote Sensing

Faculty of Engineering And Technology
Tentative Structure for ME (COMPUTER SCIENCE & ENGINEERING)

Sub	Semester – II		Contact Hrs/Week					Examination Scheme (Marks)						
	Subject	Subject Code	L	T	P	CH	Total	CT	TH	TW	P	Total	Duration of Theory Examination	Credit
1	Internal of Operating System	MCE751	3	1	-	-	4	20	80	-	-	100	3 Hrs.	4
2	Computer Vision	MCE752	3	1	-	-	4	20	80	-	-	100	3 Hrs.	4
3	Performance Analysis and Simulation	MCE753	3	1	-	-	4	20	80	-	-	100	3 Hrs.	4
4	Data Mining and Big Data	MCE754	3	1	-	-	4	20	80	-	-	100	3 Hrs.	4
5	Elective – II	MCE791, MCE792, MCE793	3	1	-	-	4	20	80	-	-	100	3 Hrs.	4
6	Software Development Laboratory – III	MCE771	-		4	-	4	-	-	-	50	50	-	2
7	Software Development Laboratory – IV	MCE772			2					50		50		1
8	Mini Project	MCE773	-			2	2	-	-	-	50	50	-	1
Total of Part – II			15	5	6	2	28	100	400	50	100	650	15	24

L: Lecture hours per week **T:** Tutorial Hours per week **P:** Practical hours per week
CH: Contact Hours **CT:** Class Test **TH:** University Theory Examination
TW: Termwork **P:** Practical / Oral Examination

Elective – II

1. MCE791-Object Oriented System and Design
2. MCE792-Wireless Communication and Mobile Computing
3. MCE793-Information Security

Faculty of Engineering And Technology

Tentative Structure for ME (COMPUTER SCIENCE & ENGINEERING)

Sub	Semester – III				Contact Hrs/Week			Examination Scheme (Marks)					Duration of Theory Examination	Credit
	Subject	Subject Code	L	T	P	CH	Total	CT	TH	TW	P	Total		
1	Dissertation (Part - I)	MCE731	-	-		12	12	-	-	50	50	100	-	12
Total of Part – III						12	12			50	50	100		12

Sub	Semester – IV					Contact Hrs/Week		Examination Scheme (Marks)					Duration of Theory Examination	Credit
	Subject	Subject Code	L	T	P	CH	Total	CT	TH	TW	P	Total		
1	Dissertation (Part - II)	MCE781	-	-	-	20	20	-	-	100	200	300	-	20
Total of Part – IV						20	20			100	200	300		20

L: Lecture hours per week **T:** Tutorial Hours per week **P:** Practical hours per week
CH: Contact Hours **CT:** Class Test **TH:** University Theory Examination
TW: Term work **P:** Practical / Oral Examination

Total:- SEM-I + SEM-II + SEM-III + SEM-IV
= 24 + 24 + 12 + 20
= 80

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY

AURANGABAD

FACULTY OF ENGINEERING AND TECHNOLOGY

First Year Engineering ME (CSE)

Semester – I

MCE601:Machine Learning

Teaching Scheme	Examination Scheme
Lectures: 3 Hrs/Week	Theory: 80 Marks
Tutorial:1 Hr/Week	Class Test : 20 Marks
	Duration of theory paper: 03 Hrs.

Course objectives:

- To study machine learning methods and their types
- To explore concepts of genetic algorithm

Prerequisites: Basic concepts of Artificial Neural Network at UG level.

Unit I : Introduction **(6 Hrs)**

Well-posed learning problems, Designing a learning system, perspectives and issues in machine learning

Concept learning and the General-to-specific ordering:

A concept learning task, Concept learning as search, FIND-S: Finding a maximality specific hypothesis, Version spaces and the candidate-elemination algorithm, Remarks on version spaces and candidate-elimination, Inductive bias

Unit II : Decision Tree Learning **(8 Hrs)**

Introduction, Decision tree representation, Approximate problems for decision tree learning, The basic decision tree learning algorithm, Hypothesis space in decision tree learning, Issues in decision tree learning

Artificial Neural Networks:

Introduction, Neural Network Representations, Appropriate problems for neural network learning, Perceptrons, multilayer networks and the backpropogation algorithm, Remarks on the backpropagation rule, an illustrative example, Advanced topics in artificial neural networks

Unit III : Evaluating Hypotheses **(6 Hrs)**

Motivation, Estimating hypotheses accuracy, basicss of sampling theory, a general approach for deriving confidence intervals, difference in error of 2 hypotheses, comparing learning algorithms

Unit IV : Bayesian learning **(7 Hrs)**

Introduction, Bayes theorem Bayes theorem and concept learning, maximum likelihood and least-squared error hypothese, maximum likelihood hypotheses for predicting probabilities, minimum description length principle, Bayes optimal classifier, Gibbs algorithm, Naïve Bayes classifier, an example: learning to classify text, Bayesian belief networks, The EM algorithm

Unit V : Computational Learning Theory **(7 Hrs)**

Introduction, Probably learning an approximately correct hypothesis, Sample complexity for finite hypothesis spaces, sample complexity for infinite hypothesis spaces, the mistake bound model of learning,

Instance- based learning:

Introduction, K-nearest neighbor learning, Locally weighted regression, radial basis functions, case-based reasoning, remarks on Lazy and Eager learning.

Unit VI : Genetic Algorithms **(6 Hrs)**

Motivation, Genetic algorithms, An illustrative example, Hypotheses space search, Genetic programming, models of evolution and learning, parallelizing genetic algorithms

Text Book:

1. Tom M. Mitchell, Machine Learning, MGH International, 1997.

Reference Books:

1. S.N. Sivanandanam,S.Sumathi, S. Deepa, "Introduction to Neural Networks using Matlab6.0," TMH .
2. S.N.Sivanandam,S.N.Deepa, "Principals of soft computing"Wiley Publication.
3. 2. S.Rajasekaran, G.A. Vijayalakshmi, "Neural Networks, Fuzzy Logic and Genetic Algorithm "

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY
AURANGABAD
FACULTY OF ENGINEERING AND TECHNOLOGY
First Year Engineering ME (CSE)
Semester – I
MCE602:Advanced Database Management System

Teaching Scheme	**Examination Scheme**	
Lectures: 3 Hrs/Week	Theory:	80 Marks
Tutorial:1 Hr/Week	Class Test :	20 Marks
	Duration of theory paper:	03 Hrs.

Course objectives:

- To cover advanced concepts of Database Management System.
- To study parallel, object oriented and distributed architectures of database systems.
- To understand web databases using XML.
- To familiarize with mobile and multimedia database systems.

Prerequisites: Basic concepts o DBMS & RDBMS at UG level.

UNIT I **(06 Hrs)**
Transaction Processing
Transaction-Processing Monitors, Transactional Workflows, Main-Memory Databases, Real-Time Transaction Systems, Long-Duration Transactions, Transaction Management in Multi-databases.

UNIT 2 **(06 Hrs)**
Parallel Databases
Database System Architectures: Centralized and Client-Server Architectures , Server System Architectures, Parallel Systems, Distributed Systems – Parallel Databases: I/O Parallelism – Inter and Intra Query Parallelism – Inter and Intra operation Parallelism, Query Optimization, Parallelism on Multicore Processors.

UNIT 3 **(08 Hrs)**
Distributed Databases
Distributed Database Concepts: Data Fragmentation, Replication, and Allocation Techniques for Distributed Database Design- Types of Distributed Database Systems, Query Processing in Distributed Databases, Overview of Concurrency Control and Recovery in Distributed Databases-An Overview of 3-Tier Client-Server Architecture-Distributed Databases in Oracle, Cloud-Based Databases.

UNIT 4 **(08 Hrs)**
Object And Object Relational Databases
Concepts for Object Databases: Overview, Object Identity, Object structure, Type Constructors, Encapsulation of Operations, Methods, Persistence, Type and Class Hierarchies, Inheritance, Complex Objects , Other Object-Oriented Concepts. Object Database Standards, Languages and Design: ODMG Model, ODL, OQL – Object Relational and Extended – Relational Systems : Overview of SQL and Its Object-Relational Features, Evolution of Data Models and Current Trends of Database Technology, Object Relational features of Oracle

UNIT 5 **(06 Hrs)**

Xml and Web Databases

Web Database: Structured, Semi structured, and Unstructured Data, A Simple PHP Example, Overview of Basic Features of PHP, Overview of PHP Database Programming XML Databases: XML Hierarchical (Tree) Data Model, XML Documents, DTD, and XML Schema, XML Documents and Databases, XML Querying

UNIT 6 **(06 Hrs)**

Mobile & Multimedia Databases

Mobile Databases: Location and Handoff Management, Effect of Mobility on Data Management– data categorization, Location Dependent Data Distribution, Mobile Transaction Models,-Concurrency Control, Transaction Commit Protocols, Mobile Database Recovery Schemes. Multimedia Databases: Types of multimedia information, multimedia database applications, multimedia object characteristics, MDDMS components, MMDBMS Architecture.

Text Books:

1. R. Elmasri, S.B. Navathe, "Fundamentals of Database Systems", Fifth Edition, Pearson Education/Addison Wesley, 2009. ISBN : 978-81-317-1625-0

2. Henry F Korth, Abraham Silberschatz, S. Sudharshan, "Database System Concepts", 6th Edition, McGraw Hill, 2006. ISBN: 9780071289597

3. Vijay Kumar, " Mobile Database Systems", John Wiley & Sons, 2006. ISBN : 13 978-0-4714-6792-2

4. Multimedia Database Management Systems by B. Prabhakaran ISBN: 8181286529, 9788181286529

Reference Books:

1. C.J.Date, A.Kannan and S.Swamynathan,"An Introduction to Database Systems", Eighth Edition, Pearson Education, 2006. ISBN: 9788177585568

2. V.S.Subramanian, "Principles of Multimedia Database Systems", Harcourt India Pvt Ltd.,2001. ISBN-13: 978-1558604667.

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY
AURANGABAD
FACULTY OF ENGINEERING AND TECHNOLOGY
First Year Engineering ME (CSE)
Semester – I
MCE603:Advanced Algorithms

Teaching Scheme	**Examination Scheme**	
Lectures: 3 Hrs/Week	Theory:	80 Marks
Tutorial:1 Hr/Week	Class Test :	20 Marks
	Duration of theory paper:	03 Hrs.

Course objectives:

- To develop the appropriate background, foundation and experience for advanced study in Computer Science
- To develop the necessary skills from both a theoretical perspective as well as applying their knowledge on various problem sets
- To develop the skills to design and implement efficient programming solutions to various problems

Unit 1:ROLE OF ALGORITHMS IN COMPUTING **8 Hrs**
Algorithms: Introduction, Analysis, Design, Asymptotic Notations, Standard notations and common functions; Divide and Conquer: The maximum-subarray problem, The master method for solving recurrences; Greedy Algorithm: An activity selection problem; Dynamic programming: Rod cutting

Unit 2: PROBABILISTIC ANALYSIS AND RANDOMIZED ALGORITHMS **6 Hrs**
The Hiring Problem, Indicator Random Variables, Randomized AlgorithmsNetwork Flow and Matching: Flows and Cuts, maximum Flow, Maximum Bipartite Matching, Minimum-Cost Flow, Efficiency Analysis

Unit 3: SORTING AND ORDER STATISTICS **6 Hrs**
The sorting problem, Radix sorting, sorting by comparisons, Heap sort- an O (n log n) comparison sort, Quick sort- an O (n log n) expected time sort, order statistics, Expected time for order statistics

Unit 4: NUMBER THEORY ALGORITHMS **8 Hrs**
The similarity between integers and polynomials, Integer multiplication and division, Polynomial multiplication and division, Euclid's GCD algorithm, an asymptotically fast algorithm for polynomial GCD's, The DFT and FFT, efficient FFT implementations

Unit 5: STRING AND PATTERN MATCHING ALGORITHMS **6 Hrs**
The naïve string matching algorithm, The Rabin-Karp Algorithm, String matching with finite automata Finite Automata and Regular expressions, Recognition of regular expression patterns, Recognition of substrings, Position trees and substring identifiers

Unit 6:NP-Completeness **6 Hrs**
The classes P and NP, Cooks theorem, NP-complete problems: 3-SAT, clique, vertex-cover problem, Hamiltonian cycle , independent set, feedback edge set.

Reference Books:

1. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein, "Introduction to Algorithms", MIT Press, 3rd Edition, 2009.
2. Aho, Hopcrpft, Ullman, " The Design and Analysis of Computer Algorithms",Addison Wesley,Pearson.

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY
AURANGABAD
FACULTY OF ENGINEERING AND TECHNOLOGY
First Year Engineering ME (CSE/SE)
Semester – I
MCE604: Computer Network Protocol Design

Teaching Scheme	**Examination Scheme**	
Lectures: 3 Hrs/Week	Theory:	80 Marks
Tutorial:1 Hr/Week	Class Test:	20 Marks
	Duration of theory paper:	03 Hrs.

Course Objectives:

1. Student should able to understand internals of computer networking
2. Students should able to design network traffic modeling.

Unit-I Random Processes **(6 Hrs)**

Introduction ,Poisson Process, Exponential Process , Deterministic and Nondeterministic Processes, Ensemble Average , Time Average, Autocorrelation Function, Stationary Processes, Cross-Correlation Function,Covariance Function, CorrelationMatrix, Covariance Matrix

Unit-II : Markov Chains **(6 Hrs)**

Markov Chains, Discrete-TimeMarkov Chains, Memoryless Property of Markov Chains, Markov Chain Transition Matrix, MarkovMatrices , The Diagonals of P, Eigenvalues and Eigenvectors of P, Constructing the State Transition Matrix P, Definition of Reducible Markov Chain, Closed and Transient States, Transition Matrix of Reducible Markov Chains, Composite Reducible Markov Chains, Transient Analysis, Periodic Markov Chains

Unit-III : Queuing Analysis **(6 Hrs)**

Introduction, Queue Throughput, M/M/1 Queue, M/M/1/B Queue, *Mm/M/*1*/B* Queue, *M/Mm/*1*/B* Queue, *D/M/*1*/B* Queue, *M/D/*1*/B* Queue and performance each queue type.

Unit-IV Modeling Traffic Flow and error Control Protocols **(8 Hrs)**

Modeling the Leaky Bucket Algorithm, Single Arrival/Single Departure Model (*M/M/1 /B*) , Leaky Bucket Performance (*M/M/1 /B* Case), Multiple Arrival/Single Departure Model (*Mm/M/1 /B*) . Leaky Bucket Performance (*Mm/M/1 /B* Case); Modeling the Token Bucket Algorithm Single Arrival/Single Departures Model (*M/M/1 /B*)

Token Bucket Performance (*M/M/1 /B* Case), Multiple Arrivals/Single Departures Model (*Mm/M/1 /B*), Token Bucket Performance (Multiple Arrival/Departure Case); Modeling Stop-and-Wait ARQ, ARQ Performance

Modeling Go back n protocol and GBN ARQ Performance.

Unit V: Modeling Network Traffic **(7 Hrs)**

Flow Traffic Models , Modulated Poisson Processes , On–Off Model , Markov Modulated Poisson Process , Autoregressive Models , Continuous-Time Modeling: Poisson Traffic Description , Memoryless Property of Poisson Traffic,, Realistic Models for Poisson Traffic,, Flow Description ,, Interarrival Time Description

, Discrete-Time Modeling: Interarrival Time for Bernoulli Traffic

5 Self-Similar Traffic, Self-Similarity and Random Processes

Unit-VI : Scheduling Algorithms **(7 Hrs)**

Packet Selection Policy , Packet Dropping Policy, Fair Sharing Policy, Scheduling as an Optimization Problem, Scheduler Design Issues, Rate-Based Versus Credit-Based Scheduling, Analysis of Common Scheduling Algorithms, First-In/First-Out (FIFO), Static Priority (SP) Scheduler, Round Robin Scheduler (RR), Weighted Round Robin Scheduler (WRR) and Max–Min Fairness Scheduling

Reference Books:

1. Fayez Gebali,"Analysis of Computer and Communication network,"Springer Publication.
2. Behrouz A. Forouzan, "Data Communications And Networkingcomputer networks," McGraw-Hill publication
3. Dayanand Ambawade,Dr.Deven Shah,Mahendra Mehra,"Advanced Computer network"dreamtech press.

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY
AURANGABAD
FACULTY OF ENGINEERING AND TECHNOLOGY
First Year Engineering ME (CSE)
Semester – I
MCE641:Elective I – Advanced Computer Architecture

Teaching Scheme	**Examination Scheme**	
Lectures: 3 Hrs/Week	Theory:	80 Marks
Tutorial:1 Hr/Week	Class Test:	20 Marks
	Duration of theory paper:	03 Hrs.

Unit –I **7 hrs**
Introduction to subject , Principles of scalable performance:-Performance metrics and measures, parallel processing applications, scalability analysis and approaches.
Bus, cache and shared memory:-Back plane bus systems, Cache memory organization and shared memory organizations. Flynn's classifications.

Unit –II **7 hrs**
Pipelining Techniques:-Linear pipeline processors, nonlinear pipeline processors, Instruction pipeline design, Arithmetic pipeline design.

Unit –III **7 hrs**
Super Scalar techniques : , Super scalar and super-pipeline design
SIMD array processors: - features and organization, interconnecting networks, parallel algorithms for array processors,

Unit IV **6 hrs**
Associative array processing and processors, Performance enhancement of array processors. Vector processing principles and vector instructions, Vector processors

Unit –V **7 hrs**
Multiprocessor and multicomputer:-Structures, multiprocessor system interconnects, cache coherence and synchronization mechanisms, Three generations of multi-computers , message passing mechanisms.

Unit –VI **6 hrs**
RISC processors, the VLIW Architecture, case studies of at least two of the architectures studied above. Brief introduction to parallel processing models and languages

Reference Books :

1. Advanced Computer Architecture by Kai Wang ,TMH.
2. Computer Architecture and parallel preprocessing, by Kai Wang and F.A.Briggs. Mc Graw Hill (IE)
3. Computer Organization and Architecture by W. Stalling, MC Millan.
4. High Performance Computer Architecture H.S.Store, Addition Wesley.
5. Modern processor Design: Fundamentals of Super scalar Processors Shen and Lipasti,TMH

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY
AURANGABAD
FACULTY OF ENGINEERING AND TECHNOLOGY
First Year Engineering ME (CSE)
Semester – I
MCE642:Elective I – Real Time Systems

Teaching Scheme	**Examination Scheme**	
Lectures: 3 Hrs/Week	Theory:	80 Marks
Tutorial:1 Hr/Week	Class Test:	20 Marks
	Duration of theory paper:	03 Hrs.

Course Objective :

- The contents aims to develop the knowledge of the student in the direction of Real Time Systems and solving the practical problems in the development of typical real time application.

Unit-I : Introduction and Requirement analysis of real time systems (6 Hrs)
Real time systems, Types of real time systems, Basic architecture of real time systems,Task description, Characteristics of real time systems, What is requirement analysis? Difference between analysis of general purpose systems and real time systems, Estimation of execution time, Framing of task's various parameters such as release time, period of invocation, computation time and deadlines

Unit-II:Design issues in real time systems and Programming in real time systems (8 Hrs)
Difference between design of general purpose systems and real time systems. Use of model driven engineering in real time system design, Real time system design using Event Studio, Feature descriptive language to describe design of real time systems, Case studies of real time system design, Difference between programming of general purpose systems and real time systems. Various programming languages for real systems, Ada, Real Time Java

Unit-III:Real time operating systems (6Hrs)
Difference between operating system of general purpose systems(GPOS) and real time operating systems. Monolythic OS and Modular OS, Kernel, microkernel and nano kernel, RT LINUX,POSIX APIs, LynxOS, VxWorks,Resourse management in real time systems

Unit-IV:Real time database systems (6 Hrs)
Difference between data base system of general purpose systems and real time Database systems, Architecture of real time database systems, Concurrency issues of real time database systems, Scheduling of RTDB transaction, Quality service in real time database , In memory database systems, Design issues of in memory database systems

Unit-V:Real Time Communication (6Hrs)
Need for real time communication, Network topology in real time communication, Message sending techniques, Real time communication network design issues, Various real time communication protocols

Unit-VI:Real time scheduling (8 Hrs)

What is real time scheduling, classification of real time scheduling algorithms, various scheduling properties, Various scheduling metrics, Independent task scheduling algorithms, Aperiodic task scheduling algorithms, Precedence constraint task scheduling algorithms

Reference Books:

1. **C.M.krishna and Kang G.Shin_**, "Real-Time Systems," **McGraw Hill publication**
2. **Phillips A.Laplante, "**Real time systems design and analysis" **IEEE and Wiley publication**
3. **Jane W.S.Liu, "**Real Time Systems" **Pearson publication**

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY
AURANGABAD
FACULTY OF ENGINEERING AND TECHNOLOGY
First Year Engineering ME (CSE)
Semester – I
MCE643:Elective I – Remote Sensing

Teaching Scheme	**Examination Scheme**	
Lectures: 3 Hrs/Week	Theory:	80 Marks
Tutorial:1 Hr/Week	Class Test:	20 Marks
	Duration of theory paper:	03 Hrs.

Course objectives:

- To articulate the basics of how electromagnetic energy enables remote
- Sensing and be able to describe why different wavelength regions of the electromagnetic spectrum are useful for different types of remote sensing as well as why various portions of the electromagnetic spectrum cannot be used for remote sensing.
- To explain the concepts of spatial, spectral, radiometric and temporal resolution and how they impact the selection of the most appropriate data source(s) for a particular analytical task. Students will also be able to compare and contrast current common sensors on the basis of these properties and explain if a sensor is useful for particular tasks.
- To describe spectral signatures and use this knowledge to explain how different wavelengths can successfully be used to differentiate between different land surface types.
- To explain and perform fundamental digital image processing tasks including: radiometric preprocessing, and supervised and unsupervised image classification.
- To perform Remote Sensed Image analysis and classification using ENVI/MatLab on different data sets.

Section-A

Unit 1:Concepts of Remote Sensing **8 hrs**

- Principles of Remote sensing
- History of Remote sensing
- Remote sensing in India,
- Electromagnetic radiation:
  - Electromagnetic Radiation and Electromagnetic Spectrum, EMR quantities: Nomenclature and Units
  - Thermal Emission of Radiation, Radiation Principles, Interaction of EMR with the Earth Surface
  - Spectral signature, Reflectance characteristics of Earths cover types, Remote sensing systems
  - Human vision colors
  - Spectral signatures and their interpretation

Unit 2: Airborne & Space borne platforms and sensors **6 hrs**

- Platforms, Types of sensors, resolutions sensor, Passive and Active Sensors, Optical sensors,
- Classification of RS, Selection of Sensor Parameter, Spatial Resolution, Spectral Resolution, Radiometric Resolution, Temporal Resolution.

- Satellite missions: Landsat series, SPOT series, IRS

Unit 3: Multispectral, thermal and Hyperspectral Sensing **6 hrs**

- Multispectral Sensing Concept,
- thermal Sensing Concept
- Hyperspectral Sensing Concept
- Sample imagery

Section-B

Unit 4: Interpretations of Remote Sensing Images **8 hrs**

- Types of interpretation, Interpretation Phase.
- Visual Interpretation, Criteria for visual interpretation, Elements for visual analysis.
- Digital image processing enhancement and correction: Structure, Media and data organization, Equipments, visual enhancement, image correction, Radiometric and Geometric corrections.

Unit 5: Image information extraction **6 hrs**

- Supervised classification
- Unsupervised classification
- Fuzzy classification
- Expert systems

Unit 6: Accuracy assessment & Application of Remote Sensing **6 hrs**

- Accuracy assessment method
- Agriculture and forestry
- Urban and regional development

Lab Course

1. Electromagnetic radiation.
2. Photo interpretation: Spaceborne systems.
3. Introduction to image processing: (1) Spectral signatures.
4. Introduction to image processing: Image interpretation.
5. Geometric correction and image matching: Image restoration and enhancement
6. Image statistics, enhancement and filters: Image information extraction
7. Image arithmetic, indices and classification Accuracy assessment.

Text Books:

- Fundamentals of Satellite Remote Sensing, Emilio Chuvieco, Alfredo Huete (2010), CRC Press, Taylor & Francis Group.
- Remote Sensing and Image Interpretation. 6th ed. Lillesand, T.M., Kiefer, R.W. and Chipman.J.W. 2008. New York: John Wiley & Sons.
- Fundamentals of Remote Sensing, George Joseph (2004), Universities Press (India) Private Limited.

- Remote Sensing Models and Methods for Image Processing, 3rd ed, Robert A. Schowengerdt, Academic Press is an imprint of Elsevier, 2007.

Reference Books

- Remote Sensing of the Environment - an Earth Resource Perspective 2nd ed. Jensen, J.R. 2007. Upper Saddle River, NJ, Prentice Hall.
- Remote Sensing Principles and Interpretation, Floyd, F. Sabins, Jr: Freeman and Co., San Franscisco, 1978.
- Manual of Remote Sensing Vol. I&II, 2nd Edition, American Society of Photogrammetry.
- Remote Sensing: The quantitative approach, P.H. Swain and S.M. Davis, McGraw Hill.
- Introductory Digital Image Processing: A remote sensing perspective, John R. Jensen, Prentice Hall.
- Imaging Radar for Resource Survey: Remote Sensing Applications, 3, W Travelt, Chapman & Hall.
- Remote sensing Notes –Edited by Japan Associates of Remote sensing- JARS 1999
- Introduction to Remote Sensing, Campbell James, Taylor & Francis London.
- Photogrammetry and Remote Sensing (2000), Lecture notes, Module I, IIRS
- Remote Sensing, Agarwal C.S. and Garg, P. K. (2000): A. H. Wheeler and Co. Ltd., New Delhi.

Web Resources

- www.esriindia.com
- http://www.exelisvis.com/ProductsServices/ENVI.aspx
- http://rst.gsfc.nasa.gov/start.html
- http://www.isro.org/

Journals

- Journal of the Indian Society of Remote Sensing,Springer
- IEEE Transactions on Geo-science and Remote sensing.
- International Journal of Remote Sensing.
- Canadian Journal of Remote Sensing.
- GeoCarto International.
- ITC Journal.
- ISPRS Journal of Photogrammetry and advances in space research.

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY
AURANGABAD
FACULTY OF ENGINEERING AND TECHNOLOGY
First Year Engineering ME (CSE)
Semester – I
MCE621:Software Development Laboratory -I

Teaching Scheme	**Examination Scheme**
Practicals: 4 Hrs/Week	Practical/Oral : 50 Marks

Software Development Laboratory –I shall be based on the subjects Machine Learning and protocol design in computer network

Minimum 6 experiments of each of the above subjects shall be implemented by students.

Practical examination will consist of a practical and viva based on the practical work done during the semester.

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY
AURANGABAD
FACULTY OF ENGINEERING AND TECHNOLOGY
First Year Engineering ME (CSE)
Semester – I
MCE622:Software Development Laboratory -II

Teaching Scheme	**Examination Scheme**
Practicals: 2 Hrs/Week	Term Work : 50 Marks

Software Development Laboratory –II shall be based on the subjects Advanced database management systems and Elective I

Minimum 6 experiments of each of the above subjects shall be implemented by students.

Internal submission examination will consist of a practical and viva based on the practical work done during the semester.

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY

AURANGABAD
FACULTY OF ENGINEERING AND TECHNOLOGY
First Year Engineering ME (CSE)
Semester – I
MCE623:Seminar

Teaching Scheme	**Examination Scheme**
Contact Hours: 2 Hrs/Week	Term Work : 50 Marks

Seminar should be evaluated on the following basis :

- **Depth of Literature survey**
- **PPT prepared and Presentation skills**
- **Understanding of subject**
- **Report preparation**

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY
AURANGABAD
FACULTY OF ENGINEERING AND TECHNOLOGY
First Year Engineering ME (CSE)
Semester – II
MCE751:Internal of Operating System

Teaching Scheme	**Examination Scheme**	
Lectures: 3 Hrs/Week	Theory:	80 Marks
Tutorial:1 Hr/Week	Class Test :	20 Marks
	Duration of theory paper:	03 Hrs.

Course objectives:

- Expose students to current and classical operating systems literature
- Give students an understanding of various operating systems flavors required for various purposes

Section-A

Unit 1:Windows internals **6 Hrs**
Architecture Overview, Local Procedure Calls, process and Thread management, Memory management in Windows, I/O management and storage management and File systems in Windows.

Unit 2: Linux internals **6 hrs**
Architecture of Linux, system calls, The Standard I/O Library, Process management in Linux, Representing processes in Linux, Organising the task structures, Wait queues, Scheduling, Interrupting Linux, Interprocess communication ,File systems in Linux. File and Directory Maintenance.

Unit 3: Windows Azure Operating System for Cloud Computing **8 hrs**
Windows Azure architecture, The Lifecycle of a Windows Azure Service Creating the Host VM and the First Guest VM on a Physical Server, Adding Guest VMs to a Host VM ,Maintaining Role Instance Health Upgrading Service Software and Windows Azure, Securing and Isolating Services and Data Reliance on Cloud-Computing Vendors' Security Claims, Isolating Private Data of Multiple Tenants , Assuring Fabric Controller Availability, Virtualizing Windows Servers for Azure ,Deploying the Azure Hypervisor in Non-Microsoft Data Centers

Section-B

Unit 4: Operating System for Multicore Processors **8 hrs**
Processors, Architectural Trends, Generic diagram of multicore processor system, multi micro kernel OS for multicore ,Resource management in Multi kernel OS, Why Parallel Architecture?, The Parallelization Process, steps in process, Partitioning for Performance, Load Balance and Synchronization Wait Time, Determining How to Manage Concurrency: Static versus Dynamic Assignment, Determining the Granularity of Tasks, Scaling Workloads and Machines, Shared Memory Multiprocessors, Cache Coherence

Unit 5: RTOS and EOS **6 hrs**

RTOS Vs. GPOS, RTLinux kernel Vs Linux kernel, Design, microkernel, nano kernel architectures Issues of RTOS,EOS VS RTOS, Design issues of EOS, RTLinux, QNX, VxWorks, LynxOS, Windows CE

Unit6:Operating system Security **6 hrs**

Security Ratings, Trusted Computer System Evaluation Critiera,Common criteria,Difference between security of Windows and Linux,why linux is more secure than Windows?,Windows and Linux security components,Account rights and policy,security auditing mechanism windows and Linux.

Reference Books:

1. Mark E. Russinovich, David A. Solomon," Microsoft Windows Internals," Fourth Edition, Microsoft Press
2. John O'Germon,"The Linux Process manager"Wiley publication
3. Neil Matthew,Richard Stones ,"Beginning of Linux Programming,"Wrox publication
4. David Culler, Jaswinder Pal Singh," Parallel Computer Architecture," Morgan Kaufmann Publishers
5. Rami Matarneh ,"Multi Micro kernel Operating systems for Multi core processors"Journal of Computer Science5(7),2009,pp.493-500.
6. Dr.K.V.K.K.Prasad "Embedded Real time systems:concepts ,Desgn and programming",Black book,Dreamtech press.

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY
AURANGABAD
FACULTY OF ENGINEERING AND TECHNOLOGY
First Year Engineering ME (CSE/SE)
Semester – II
MCE752:Computer Vision

Teaching Scheme	**Examination Scheme**
Lectures: 3 Hrs/Week	Theory: 80 Marks
Tutorial: 1 Hr/Week	Class Test : 20 Marks
	Duration of theory paper: 03 Hrs.

Course Objectives:
- To provide a glimpse of what computer vision is about
- To give an understanding of image processing for computer vision
- To study 3D vision
- To analyse motion images

Unit –I **(7 Hrs)**
Introduction to Computer Vision, Review of image processing concepts like filtering elementary segmentation techniques, transforms etc.
Image segmentation: Mean shift segmentation, Active controls model, 3D graph based segmentation and graph Cut segmentation.

Unit –II **(7 Hrs)**
Object and Pattern Recognition:- Elementary methods of Statistical, syntactic and neural net object /pattern recognition.

Unit –III **(6 Hrs)**
Recognition as graph matching, Dimensionality Reduction : PCA and LDA , non parametric methodologies (clustering) for grouping of objects

Unit –IV **(7 Hrs)**
Shape representation and description: Contour based and region based.
Image Understanding:- Image Understanding control strategies, RANSAC: filtering via random sample consensus., point distribution models, Active apperance models.

Unit-V **(7 Hrs)**
3D Vision:- 3D Vision tasks ,Basics of projective geometry, A single perspective camera, Scéne construction form multiple views.
Textures: Statistical and symentatic texture description methods, Applications

Unit –VI **(6 Hrs)**
Motion Analysis:- Differential motion Analysis methods ,optical flow, video tracing ,detection of specific motion patterns.

Reference Books:

1. 'Digital Image Processing and Computer Vision ', Sonka Hlarac , Boyle. Cengage learning Indian edition.
2. 'Computer Vision : A Modern Approach' , Frosyta and Ponce , PH 2nd edition.
3. 'Computer Vision :Algorithms and Application', R Sezliski , Springer 2011
4. 'A .pattern recognition , Statistical Structural and Neural Approach ', R.Schalkot Wiley student edition

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY
AURANGABAD
FACULTY OF ENGINEERING AND TECHNOLOGY
First Year Engineering ME (CSE/SE)
Semester – II
MCE753: Performance Analysis and Simulation

Teaching Scheme	**Examination Scheme**
Lectures: 3 Hrs/Week	Theory: 80 Marks
Tutorial:1 Hr/Week	Class Test : 20 Marks
	Duration of theory paper: 03 Hrs.

Course objectives:

- To explore fundamentals of computer systems performance analysis
- To develop experience in the "practice" of systems analysis
- To introduce simulation techniques applied in performance modeling of computer systems

Unit 1:INTRODUCTION **6 Hrs**
Introduction to performance Evaluation; Common Mistakes in Performance Analysis and How to avoid them; Selection of Techniques and Metrics: selecting an evaluation technique, selecting performance metrics, commonly used performance metrics, utility classification and setting performance requirements

Unit 2: MEASUREMENT TECHNIQUES AND TOOLS **6 Hrs**
Types of Workloads; Workload Selection; Workload Characterization Techniques: Terminology, averaging, specifying dispersion, single-parameter and multi-parameter histograms, principal component analysis, markov models, clustering, Hardware and Software monitors

Unit 3: ANALYSIS **8 Hrs**
OS Components: System Architecture, Workloads, Design, Simulation, Analysis; Database System Performance; Computer Networks Components: Simulation and Modeling of LAN.

Unit 4: INTRODUCTION TO SIMULATION AND MODELING **6 Hrs**
Simulation – introduction, appropriate and not appropriate, advantages and disadvantage, application areas, history of simulation software, an evaluation and selection technique for simulation software, general – purpose simulation packages. System and system environment, components of system, type of systems, model of a system, types of models and steps in simulation study.

Unit 5: RANDOM NUMBER GENERATION **6 Hrs**
Properties of random numbers, generation of true and pseudo random numbers, techniques for generating random numbers, hypothesis testing, various tests for uniformity (Kolmogorov-Smirnov and chi-Square) and independence (runs, autocorrelation, gap, poker).

Unit 6: VERIFICATION AND VALIDATION OF SIMULATION MODEL **8 Hrs**

Introduction; model building; verification of simulation models; calibration and validation of models: validation process, face validity, validation of model, validating input-output transformation, t-test, power of test, input output validation using historical data and Turing test.

Reference Books:

3. Raj Jain, "The Art of Computer Systems Performance Analysis", Wiley- India, 1991.
4. Paul J. Fortier, Howard E. Michael, "Computer Systems Performance Evaluation and Prediction", Elsvier Science (USA), 2003.
5. Banks J., Carson J. S., Nelson B. L., and Nicol D. M., "Discrete Event System Simulation", 3rd edition, Pearson Education, 2001.

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY
AURANGABAD
FACULTY OF ENGINEERING AND TECHNOLOGY
First Year Engineering ME (CSE)
Semester – II
MCE754: Data Mining and Big Data

Teaching Scheme	**Examination Scheme**
Lectures: 3 Hrs/Week	Theory: 80 Marks
Tutorial:1 Hr/Week	Class Test : 20 Marks
	Duration of theory paper: 03 Hrs.

Course Objectives :

1. The explore different techniques of data mining
2. To apply data mining in real world application
3. To introduce Big Data Tools and applications

Unit 1: **(6 Hrs)**
Mining Frequent Patterns, Associations: Basic Concepts, Efficient and Scalable Frequent Itemset Mining methods (AprioriAlgoithm, improving efficiency of Apriori, Mining frequent Itemsets without Candidate generation, using vertical data formats, closed frequent itemsets). Mining various kinds of association rules, from association analysis to Correlation analysis, constraint-based association mining

Unit 2: **(6 Hrs)**
Types of data in cluster analysis, classical Partitioning methods : k-Means and k-Medoids, Hierarchical clustering, outliers

Unit 3: **(8 hrs)**
Graph Mining, Social Network Analysis ,Web Mining : Types of Web mining, information retrieval and web search, Temporal Mining, Sequence mining, Spatial Mining

Unit 4: **(4 Hrs)**
Introduction to Big Data, Getting Up to Speed with Big Data -What Is Big Data?,What is apache hadoop,Why Big Data is Big.

(8 Hrs)
Unit 5: Big Data Tools, Techniques, and Strategies : Designing Great Data Products , What It Takes to Build Great Machine Learning Products, Data Issues

(8 Hrs)
Unit 6: The Application of Big Data, What to Watch for in Big Data, The Application of Big Data: Product and Processes

Reference Books:

1. Data Mining: Concepts and Techniques by Jiawei Han, Micheline Kamber, Morgan Kaufmann Publishers
2. Margaret H. Dunham. Data Mining: Introductory and Advanced Topics, Pearson Education
3. Web Data Mining- Exploring Hyperlinks, Contents, Usage Data by Bing Liu,Springer
4. Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses by Michael Minelli, Michele Chambers, AmbigaDhiraj
5. Frank Ohlhorst, "Big data Analytics"Wiely Publication.
6. Big Data Now: 2012 Edition by O'Reilly Media, Inc.
   Big Data Now:Current Perspectives from O'Reilly Radar, O'Reilly Media,Inc.

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY
AURANGABAD
FACULTY OF ENGINEERING AND TECHNOLOGY
First Year Engineering ME (CSE)
Semester – II
MCE791:Elective-II: Object Oriented System & Design

Teaching Scheme	**Examination Scheme**	
Lectures: 3 Hrs/Week	Theory:	80 Marks
Tutorial:1 Hr/Week	Class Test:	20 Marks
	Duration of theory paper:	03 Hrs.

Course objectives:

- To apply the process of object-oriented analysis and design for software development
- To develop the skills to determine which processes & OOAD techniques should be applied to a given project.
- Use the widely adopted graphical modeling language - the Unified Modeling Language (UML)

Section-A

Unit 1:Introducing Object Oriented Software Development Process **6 Hrs**

- The inherent complexity of software
- The structure of complex systems bringing order to chaos, on designing complex systems
- categories of analysis & design methods
- Object-Oriented Software Development (OOSD) process
- Structure Analysis Vs OO Analysis
- Modeling and OOSD process
- Requirements Gathering, Requirements Analysis

Unit 2:Class Diagram **6 hrs**

- Identify a set of candidate key abstractions
- Identify the key abstractions using CRC analysis
- Constructing the Problem Domain Model
- Components of a UML Class diagram
- Construct a Domain model using a Class diagram
- Components of a UML Object diagram
- Validate the Domain model with one or more Object diagrams

Unit 3:Use Case Diagrams **8 hrs**

- Use Case diagram
- Components of UML Use Case diagram
- Develop a Use Case diagram for a software system
- Recognize and document use case dependencies using UML notation for extends, includes, and generalization
- UML packaged views
- Identify and document scenarios for a use case

- Create a Use Case form describing a summary of the scenarios in the main and alternate flows
- Describe how to reference included and extending use cases.
- Identify and document non-functional requirements (NFRs), business rules, risks, and priorities for a use case

Section-B

Unit 4: Transitioning from Analysis to Design using Interaction Diagrams **5 hrs**

- Purpose and elements of the Design model
- Components of a UML Communication diagram
- Create a Communication diagram view of the Design model
- Components of a UML Sequence diagram
- Create a Sequence diagram view of the Design model

Unit 5: State Machine Diagrams & Activity Diagrams **5 hrs**

- Model object state
- Components of a UML State Machine diagram
- Components of a UML Activity diagram
- Model a Use Case flow of events using an Activity diagram

Unit 6: Applying Design Patterns to the Design Model **10 hrs**

- Define the essential elements of a software pattern
- Describe the Creational pattern
- Describe the Structural pattern
- Describe the Behavioral pattern

Reference Books:

1. Grady Booch, James Rambaugh, Ivar Jacobson," The Unified Modeling Language User Guide", Pearson Education.
2. Grady Booch," Object Oriented Analysis & Design with Applications", Third Edition, Pearson Education.
3. Ali Bahrami," Object Oriented System Development", McGraw Hill International Edition
4. Gamma, Belm, Johnson, "Design Patterns: Elements of Reusable Object Oriented Software"
5. Alan Dennis, Barabara Haley Wixom , Roberta M. Roth: "Systems Analysis and Design-An Applied Approach". John Wiley Publication

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY
AURANGABAD
FACULTY OF ENGINEERING AND TECHNOLOGY

First Year Engineering ME (CSE)
Semester – II

MCE792:Elective-II: Wireless Communication & Mobile Computing

Teaching Scheme	**Examination Scheme**	
Lectures: 3 Hrs/Week	Theory:	80 Marks
Tutorial:1 Hr/Week	Class Test:	20 Marks
	Duration of theory paper:	03 Hrs.

Course objectives:
• To learn the basics of Wireless communications technologies.
• To build working knowledge on various telephone and satellite networks.
• To study the working principles of wireless LAN and its standards.
• To build knowledge on various Mobile Operating Systems.
• To build skills in working with Wireless application Protocols to develop mobile content applications.

Section-A

Unit 1: Fundamentals of Wireless Communication **6 Hrs**

- Evolution of Wireless Communications, Applications,Examples of Wireless Communication Systems,
- Multiple Access Technique- TDMA, CDMA, FDMA,SDMA,
- Introduction to Medium Access Control, Telecommunication System,Satellite System, Broadcasting Systems.
- Emerging Technologies- Bluetooth, WiFi, WiMAX, 3G, WAT, EDGE.

Unit 2: Wireless Protocols **6 Hrs**

- WAP- Model, Architecture, WML,
- Media Access Techniques- ALOHA, CSMA, Wireless LAN, MAN, WAN, IEEE 802.11,
- Wireless Routing Protocols- Mobile IP, IPv4, IPv6, Wireless TCP ,
- Mobility Management & Hand off Management

Unit 3: GSM & GPRS **8 Hrs**

- Global System for Mobile (GSM) - Features, Architecture, GSM Channel, Network Aspect,Operations, Administration and Maintenance.
- General Packet Radio Service (GPRS) -Features,Architecture, Network Operations, Applications.

Section-B

Unit 4: Mobile Computing Environment **6 Hrs**

- Functions-architecture-design considerations
- Content architecture -CC/PP exchange protocol ,context manager
- Data management issues
- Data replication for mobile computers
- File system
- Caching schemes
- Mobility QOS.

Unit 5: Wireless Devices and Their Operating Systems **6 Hrs**

- PalmOS
- Windows CE
- EPOC
- Symbian OS
- Linux for Mobile Devices
- Mobile Agents

Unit 6: Issues and Challenges **8 Hrs**

- Issues and challenges of mobile networks - Location Management, Resource Management, Routing
- Security Issues , Security Models,Authentication in mobile applications, Privacy Issues, Power management, Energy awareness computing
- Mobile IP and Ad-hoc networks
- VoIP applications

Reference Books

1. Jachan Schiller ,"Mobile Communication", Adison-Wesley.
2. Yi-Bing Lin,"Wireless and Mobile Network Architecture", Wiley
3. Ivan Stojmenovic , Handbook of Wireless Networks and Mobile Computing, John Wiley & sons Inc, Canada, 2002.
4. Theodore S. Rappaport, "Wireless Communications, Principles and Practice", Prentice Hall, 1996.
5. S: Stallings, W., "Wireless Communications and Networks"
6. Dr. Sunilkumar Manvi, M. Kakkasageri,"Wireless and Mobile Network Concepts & Protocols, Wiley-India

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY
AURANGABAD
FACULTY OF ENGINEERING AND TECHNOLOGY
First Year Engineering ME (CSE/SE)
Semester – II
MCE793: Elective II : Information Security

Teaching Scheme	**Examination Scheme**	
Lectures: 3 Hrs/Week	Theory:	80 Marks
Tutorial:1 Hr/Week	Class Test :	20 Marks
	Duration of theory paper:	03 Hrs.

Course Objectives:

- Students should able to understand various issues of computer security
- Student should able to design security policies and various mechanisms required for the same.

Unit-I : Introduction **(6 Hrs)**

The Need for Security, Fundamental Aspects of Security , Informational Assurances , The Information Society, General Framework , Privacy and Informational Self-Determination , Enforcement of Informational Self-Determination Legislation , Security Evaluation Criteria and Security Agencies , Notions of Security, Outline of a Formal Theory , A Practical Checklist for Evaluations , The Design Cycle for Secure Computing Systems, Compositionality and Refinement , Construction Principles

Unit-II : Security Policies **(6 Hrs)**

Types of Security Policies, Policy Languages, Example: Academic Computer Security Policy, Confidentiality Policies, Goals of Confidentiality Policies, The Bell-LaPadula Model, Tranquility, The Controversy over the Bell-LaPadula Model, Integrity Policies, Biba Integrity Model, Clark-Wilson Integrity Model, Chinese Wall Model, Role-Based Access Control.

Unit-III : Cryptography **(7 Hrs)**

What Is Cryptography?, Classical Cryptosystems, Public Key Cryptography, Key Management, Session and Interchange Keys, Key Exchange, Key Generation, Cryptographic Key Infrastructures, The RSA Asymmetric Block Cipher, The DES Symmetric Block Cipher,modes of DES, The IDEA Symmetric Block Cipher, The AES–Rijndael Symmetric Block Cipher, Digital Signatures.

Unit - IV :Logical Design & Physical Design **(8 Hrs)**

Blueprint for Security, Information Security Policy, Standards and Practices, ISO 17799/BS 7799, NIST Models, VISA International Security Model, Design of Security Architecture, Planning for Continuity, Security Technology, IDS, Honey Pots, Honey Nets, and Padded Cell Systems, Scanning and Analysis Tools, Access Control Devices, Physical Security, Security and Personnel, Implementing Information Security, Project Management for Information Security.

Unit-V : Anti-Virus Techniques **(6 Hrs)**

Detection: Static Methods, Dynamic Methods,Comparison of Anti-Virus Detection Techniques, Verification, Quarantine, and Disinfection,Virus Databases and Virus Description Languages Anti-Stealth Techniques,Macro Virus Detection , Compiler Optimization
Anti-anti-virus techniques : Retroviruses, Entry Point Obfuscation , Anti-Emulation , Armoring Tunneling Integrity Checker Attacks Avoidance.

Unit-VI :Cellular Network Security **(7 Hrs)**

Introduction,Overview of Cellular Networks ,The State of the Art of Cellular,Network Security,,Cellular Network Attack Taxonomy , Cellular Network Vulnerability ,Analysis,Trends in mobility,credit cards frauds in mobile,security challenges posed by mobile devices,registry settings for mobile devices, Authentication service security,mobile devices : security implications for organizations, organizational Measures for handling mobile devices related security issues

Reference Books:

1. Joachim Biskup, "Security in Computing Systems: Challenges, Approaches and Solutions,"Springer publication,2009.
2. Matt Bishop, "Computer Security: Art and Science," Addison Wesley Publications
3. John Ay cock, "Computer Viruses and Malware," Springer,2006.
4. John R. Vacca, "Computer and Information Security Handbook,"Elsevier publications
5. Nina Godbole ,"Information Systems security," Wiley publications,2012.

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY
AURANGABAD
FACULTY OF ENGINEERING AND TECHNOLOGY
First Year Engineering ME (CSE)
Semester – II
MCE771:Software Development Laboratory -III

Teaching Scheme	**Examination Scheme**
Practical: 4 Hrs/Week	Practical : 50 Marks

Software Development Laboratory –III shall be based on the subjects Computer Vision and Internals of Operating System.

Minimum 6 experiments of each of the above subjects shall be implemented by students.

Practical examination will consist of a practical and viva based on the practical work done during the semester

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY
AURANGABAD
FACULTY OF ENGINEERING AND TECHNOLOGY
First Year Engineering ME (CSE)
Semester – II
MCE772:Software Development Laboratory -IV

Teaching Scheme	**Examination Scheme**
Practical: 2 Hrs/Week	Term Work : 50 Marks

Software Development Laboratory –IV shall be based on the subjects Data Mining and Big Data and Elective -II.

Minimum 6 experiments of each of the above subjects shall be implemented by students.

Internal submission will consist of a practical and viva based on the practical work done during the semester

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY
AURANGABAD
FACULTY OF ENGINEERING AND TECHNOLOGY
First Year Engineering ME (CSE)
Semester – II
MCE773: Mini Project

Teaching Scheme	**Examination Scheme**
Contact Hours: 2 Hrs/Week	Practical : 50 Marks

The student will have to make a literature survey and should select a mini project (as suggested by faculty adviser) relevant to subjects which they study in Software Engineering. The candidate should submit a comprehensive report on the work done and should demonstrate a project at the end of the semester which will be judged by external examiner.

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY
AURANGABAD
FACULTY OF ENGINEERING AND TECHNOLOGY
Second Year Engineering ME (CSE)
Dissertation Guidelines

Student's Dissertation can be categorized into two categories:
1)Application based
2)Algorithmic based

1)Application based

If student's dissertation is application based then dissertation should be evaluated based on following criteria

1)Requirement analysis: (Industry standard documents need to be prepared)
2)System design:
i) Use case diagrams
ii) Data flow diagrams
iii) Architectural design
iv) Sequence diagrams
v) Activity diagrams
vi) HCI design
vii) E-R diagrams

3)Implementation : Implementation phase should follow principles of programming language norms
4) Testing: unit testing , Test cases and batch form, Integrated testing
5) Deployment observations

2)Algorithmic based

If student's dissertation is algorithmic based then Dissertation should be evaluated on basis of following criteria
1)Literature survey
2)Algorithm & its mathematical modeling
3)Simulation /Implementation
4)Performance evaluation considering various test cases
5)Comparative analysis with performance of previous algorithms designed on similar line.

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY
AURANGABAD
FACULTY OF ENGINEERING AND TECHNOLOGY
Second Year Engineering ME (CSE)
Semester – III
MCE731:Dissertation Part -I

Teaching Scheme
Contact Hours: 2 Hrs/Week

Examination Scheme
Term work:50 marks
Practical viva : 50 Marks

1. Step 1 & 2 of guidelines to be completed. Project report must be submitted in the prescribed format only.

2. The dissertation -seminar will consist of a typewritten report covering the work completed so far. The work will be judged by two examiners (one internal guide and one external) by taking viva-voce and practical examination marks will be given accordingly.

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY
AURANGABAD
FACULTY OF ENGINEERING AND TECHNOLOGY
Second Year Engineering ME (CSE)
Semester – IV
MCE781:Dissertation Part -II

Teaching Scheme
Contact Hours: 2 Hrs/Week

Examination Scheme
Term Work : 100 Marks
Practical Viva : 200 Marks

The student should complete the dissertation work taken in Part-III. All steps of guidelines need to be completed.

1. The final examination will consist of the demonstration of work which will be judged by two examiners (one internal and one external) and the practical examination marks will be given accordingly.
2. The student should publish at least one paper based on his/her topic in international (Springer/ACM/IEEE etc.) journals or international conference.

==========