S-25 March, 2013 AC after Circulars from Cirular No.153 & onwards   - 66 -

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.

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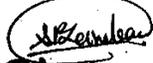
Director,
Board of College and
University Development.

..2..

:: 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.

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S/160613/-*

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD.

Revised Syllabus of

ME

(SOFTWARE ENGINEERING)

[Effective from the Academic Year 2013-14 & onwards]

M.E. & M.Tech.   - 1 -

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.

M.E. & M.Tech.   - 4 -

1.6 Evaluation System

1. Semester Grade Point Average (SGPA) =

$$\text{SGPA} = \frac{\text{SUM (course credits in passed courses X earned grade points)}}{\text{SUM (Course credits in registered courses)}}$$

2. Cumulative Grade Point Average (CGPA) =

$$\text{CGPA} = \frac{\text{SUM (course credits in passed courses X earned grade points) of all Semester}}{\text{SUM (Course credits in registered courses) of all Semester}}$$

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

M.E. & M.Tech.

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) = $\dfrac{(172)}{(24)} = 7.16$

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

M.E. & M.Tech. - 6 -

> **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)

M.E. & M.Tech. - 7 -

> **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

M.E. & M.Tech.   - 11 -

		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

M.E. & M.Tech. - 12 -

		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 (Software 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	System analysis and design	MSW601	3	1	-		4	20	80	-	-	100	3 Hrs.	4
2	Cloud Computing	MSW602	3	1	-		4	20	80	-	-	100	3 Hrs.	4
3	Business Intelligence	MSW603	3	1	-		4	20	80	-	-	100	3 Hrs.	4
4	Probability and Mathematical Modeling	MSW604	3	1	-		4	20	80	-	-	100	3 Hrs.	4
5	Elective – 1	MCE604, MSW641	3	1	-		4	20	80	-	-	100	3 Hrs.	4
6	Software Development Laboratory – 1	MSW621	-	-	4		4	-	-	-	50	100	-	2
7	Software Development Laboratory – II	MSW622			2		2			50				1
8	Seminar.	MSW623	-			2	2	-	-	-	50	50	-	1
	Total of Part – I		15	5	6	2	28	100	400	50	100	650		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. MCE604-Computer Network Protocol Design

2. MSW641-Smart Phone Programming

2

Faculty of Engineering And Technology
Tentative Structure for ME (Software 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	Credi
1	Software Reliability	MSW751	3	1	-		4	20	80	-	-	100	3 Hrs.	4
2	Advanced Software Architecture	MSW752	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	Real Time Systems	MCE642	3	1	-		4	20	80	-	-	100	3 Hrs.	4
5	Elective – II	MCE752, MCE793	4	-	-		4	20	80	-	-	100	3 Hrs.	4
6	Software Development Laboratory - III	MSW771	-	-	4		4	-	-	-	50	50	-	2
7	Software Development Laboratory - IV	MSW772			2		2			50	-	50		1
8	Mini Project	MSW773	-			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: Term work
P: Practical / Oral Examination

Elective – II

1. MCE752 - Computer Vision
2. MCE793 - Information Security

Faculty of Engineering And Technology
Tentative Structure for ME (Software Engineering)

Semester – III					Contact Hrs/Week		Examination Scheme (Marks)						
Subject	Subject code	L	T	P	CH	Total	CT	TH	TW	P	Total	Duration of Theory Examination	Credit
Dissertation (Part - I)	MSW731	-	-	-	12	12	-	-	50	50	50	-	12
Total of Part – III				-	12	12			50	50	100		12

Semester – IV					Contact Hrs/Week		Examination Scheme (Marks)						
Subject	Subject code	L	T	P	CH	Total	CT	TH,	TW	P	Total	Duration of Theory Examination	Credit
		Part – IV											
Dissertation (Part - II)	MSW781	-	-	-	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
CT: Class Test   TH: University Theory Examination TW: Termwork
P: Practical / Oral Examination

Total Credit :- 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 (SE)
Semester – I
MSW601: SYSTEM ANALYSIS AND 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 objective:
The student will gain knowledge on methods, practices and tools to design & develop a software project.

Unit I :Overview   **6 Hrs**
Introduction, The System Analyst, The System Development Life Cycle, System Development Methodologies, Project team roles and skills.
Project Management: Project Selection, creating the project plan, staffing the project, Project Estimation: Function point Approach, managing and controlling the project. Project management tools: Grantt Chart, PERT Chart.

Unit II: Requirement Analysis: **8 Hrs**
Requirement Determination, requirements analysis techniques, requirements gathering technique. Interviews, JAD, forms and procedure descriptions, Observe and document business processes, Build prototypes, Questionnaires.
Process Modeling – data flow diagrams: elements of DFD, using DFD to define Business process, creating DFD: case study on designing DFD.

Unit III: **6 Hrs**
Use cases. Elements of use case, building use cases. Identifying the major use cases,
Data Modeling – ER diagram.: elements of ER-diagram,data dictionary & Meta data,creating an ER Diagram,Validating an ERD,

Unit IV:Design Phase   **8 Hrs**
System Design – Transition from Requirements to Design ,Design strategies, developing the design plan, moving from logical to physical model.
Architecture Design – Elements of Architecture design, creating an Architecture Design computing architectures, infrastructure design, global issues, security.

Unit V: User Interface Design   **6 Hrs**
Principles for User Interface Design: layout, content Awareness, aesthetics, user experience, consistency, minimize user efforts.
User Interface Design process: Use Scenario Development, Interface Structure design, Interface Standards Design, Interface design prototyping, Interface Evaluation.
Navigation Design, Input Design, Output Design
Program Design – The Physical Data Flow Design structure chart, program specification.
Data Storage Design – data storage formats, optimizing data storage.

Unit VI: Implementation Phase   **6 Hrs**
Construction - managing the programming process, Coding Techniques
Designing tests - Test Plan, Unit Tests, Integration Tests, System Test, Acceptance Tests

Developing Documentation- Types of Documentation, Designing Documentation Structure, Writing Documentation Topics

Installation –The Migration Plan Conversion- Style, Location and Modules, change management,

Post implementation activities- System Support, System Maintenance, Project Assessment.

Recommended Books :

1)   Alan Dennis, Barabara Haley Wixom , Roberta M. Roth: "Systems Analysis and Design- An Applied Approach". John Wiley Publication

2)   Jeffrey A. Hoffer,Joey F. George,Joseph Valacich:" Modern System Analysis & Design ", Sixth edition Pearson.

3)   Roger S. Pressman: "Software Engineering A practitioners Approach" : TMH.

2

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY
AURANGABAD
FACULTY OF ENGINEERING AND TECHNOLOGY
First Year Engineering ME (SE)
Semester – I

MSW602: Cloud 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:
"Cloud Computing is "A large-scale distributed computing paradigm that is driven by economies of scale, in which a pool of abstracted, virtualized, dynamically-scalable, managed computing power, storage, platforms, and services are delivered on demand to external customers over the Internet.

Unit I : UNDERSTANDING CLOUD COMPUTING   6 Hrs
Cloud Computing – History of Cloud Computing – Cloud Architecture – Cloud Storage – Why Cloud Computing Matters – Advantages of Cloud Computing – Disadvantages of Cloud Computing – Companies in the Cloud Today – Cloud Services

Unit II: DEVELOPING CLOUD SERVICES   7 Hrs
Web-Based Application – Pros and Cons of Cloud Service Development – Types of Cloud Service Development – Software as a Service – Platform as a Service – infrastructure as a service(Iaas), Benefits ,Web Services

Unit III: VIRTUALIZATION   7 Hrs
 Virtualization and cloud computing - Need of virtualization – cost , administration , fast deployment , reduce infrastructure cost – limitations. Types of hardware virtualization: Full virtualization - partial virtualization. Desktop virtualization: Software virtualization – Memory virtualization - Storage virtualization – Data virtualization – Network virtualization.

Unit IV: CLOUD COMPUTING SECURITY   6 Hrs
Cloud security fundamentals, Vulnerability assessment tool for cloud, Privacy and Security in cloud. Cloud computing security challenges: Virtualization security management- virtual threats, VM Security Recommendations, VM-Specific Security techniques, Secure Execution Environments and Communications in cloud. Security concerns - privacy concern with a third party - security level of third party - security benefits

Unit V: GOVERNANCE AND ENTERPRISE RISK MANAGEMENT   6 Hrs
Governance and Enterprise Risk Management - Information security governance processes, Governance and enterprise risk management in Cloud Computing, Governance Recommendations, Enterprise Risk Management Recommendations, , Third Party Management Recommendations, Compliance and Audit - Cloud customer responsibilities, Compliance and Audit Security Recommendations

Unit VI: INTRODUCTION TO SALEFORCE PLATFORM   8 Hrs
Designing Applications on Force.com-Develop Custom Object, Fields, Master-Details Relationship, Lookup relationship, Page Layout, Workflow Rules, Approval Process, Field Level Security, Roles Profile & User Concept-Roles, Profiles, Sharing Rule, Public Group, Manual Sharing, Managing Data – export, delete, insert, update, and upsert data ,Data Loader tool, Visual Force pages & Apex Coding basic.

Reference Books:

For First 2 UNIT Reference Book-
1. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way
You Work and Collaborate Online, Que Publishing, August 2008.
2. Haley Beard, Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008.
3. Cloud Computing a practical approach—Anthony T. Velte, Toby J. Velte Robert Elsenpeter TATA McGraw-Hill,New Delhi-2010
4. Cloud Computing: Web based applications that change the way you work and ollaborate Online-Michael Miller-Que 2008
5.Cloud Security and Privacy" Tim Mather Subra Kumaraswamy,O 'Really,2009
For Unit 5 Refer
1. Security Guidance for Critical Areas of Focus in Cloud Computing V2.1 Prepared by the Cloud Security Alliance December 2009

FOR UNIT 6 Refer –
1. Building Applications with Force.com and Visualforce (DEV401)

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FACULTY OF ENGINEERING AND TECHNOLOGY
First Year Engineering ME (SE)
Semester – I
MSW603: BUSSINESS INTELLIGENCE

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:
- Differentiate between Transaction Processing and Analytical applications and describe the need for Business Intelligence
- Demonstrate understanding of technology and processes associated with Business Intelligence framework
- Demonstrate understanding of Data Warehouse implementation methodology and project life cycle

Unit I : Introduction to Business Intelligence
Introduction to OLTP and OLAP, BI Definitions & Concepts, Business Applications of BI, BI Framework, Role of Data Warehousing in BI, BI Infrastructure Components – BI Process, BI Technology, BI Roles & Responsibilities   (4 Hrs)

Unit II : Basics of Data Integration (Extraction Transformation Loading)
Concepts of data integration need and advantages of using data integration, introduction to common data integration approaches, introduction to ETL using SSIS, Introduction to data quality, data profiling concepts and applications   (10 Hrs)

Unit III: Introduction to Multi-Dimensional Data Modeling
Introduction to data and dimension modeling, multidimensional data model, ER Modeling vs. multi dimensional modeling, concepts of dimensions, facts, cubes, attribute, hierarchies, star and snowflake schema, introduction to business metrics and KPIs, creating cubes using SSAS
                                                                                                                (6 Hrs)

Unit IV: Basics of Enterprise Reporting
Introduction to enterprise reporting, concepts of dashboards, balanced scorecards, introduction to SSRS Architecture, enterprise reporting using SSRS , Oracle Business Intelligence – OBIEE, OBIEE; Online analytical processing (OLAP): cubes, attribute hierarchies, and measures/metrics. Using Oracle Analytic Workspace Manager (AWM) to build cubes. Business performance management   (8 Hrs)

Unit V: Text and Web Mining

Text mining concepts,data mining vs Text mining,text mining application area,Text mining terminology,NLP,Text mining applications,Text mining process,web mining overview,web contents mining,web usage mining   (6 Hrs)

Unit VI : Implementing BI
Managerial issues, Connecting BI system to databases on demand BI, benefits of on demand BI, Limitations, issues of legality ,privacy and ethics, web 2.0 revolution, online social networking, virtual tradeshows, collaborative decision making, reality mining.   (6 Hrs)

Reference Books:

1.Business Intelligence: A Managerial Approach, 2nd Edition, Prentice Hall (2011) Turban, Sharda, Delen, and King
   2. Business Intelligence, David Loshin, Morgan Kaufmann publisher
   3. Corlo Vercellis, "Bussiness untelligence and Data mining and optimization for decision making,"Wiley publication.

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AURANGABAD
FACULTY OF ENGINEERING AND TECHNOLOGY
First Year Engineering ME (SE)
Semester – I
MSW604: Probability and Mathematical Modeling

Teaching Scheme
Lectures: 3 Hrs/Week
Tutorial:1 Hr/Week

Examination Scheme
Theory: 80 Marks
Class Test: 20 Marks
Duration of theory paper: 03 Hrs.

Course objectives:
- To introduce techniques for carrying out probability calculations and identifying probability distributions
- To develop an ability to analyze some basic stochastic processes and analytical methods
- Gain an understanding of the physical phenomenon of randomness through mathematical modeling

Unit I: PROBABILITY   8   Hrs
Introduction, Population and Sample, Representation of Data, Mean, Variance and Standard Deviation, Random System and probability, Discrete & Conditional probability, Repeated Trials, outcomes and probabilities, Probability Trees, Applications, Probability Distribution Functions.

Unit II: STOCHASTIC PROCESSES   6 Hrs
Renewal Processes- Reward and Cost Models, Poisson Process, Point Process, Regenerative Process, Renewal Theorems

Unit III: MARKOV MODEL   6 Hrs
Discrete Time Markov Chain- Transition Probabilities, Communication Classes- Irreducible Chains, Continuous Markov Chain-Pure Jump Continuous- Time Chains, Regular Chains, Birth and Death Process, Semi-Markov Processes.

Unit IV: MATHEMATICAL MODELING   6 Hrs
Introduction, Classifications of models, Stages of modeling, Building models: Systems analysis, choosing mathematical equations, Solving equations, Testing Models

Unit V: QUEUEING MODEL   6 Hrs
Introduction: Notation, Rules for all Queues: Little's Law, Types of Stochastic Process, Analysis of Single Queue, Analysis of Open Queuing Network: Mean Value Analysis (MVA), Approximate MVA, Balanced Job Bounds

Unit VI: PETRI NETS AND SYSTEM PERFORMANCE   8 Hrs
Petri Nets – Classical Petri Nets , Timed Petri Nets , Priority-based Petri Nets, Colored Petri Nets, Generalized Petri Nets , Tool Selection, Validation of Results, Performance Metrics, Evaluation, Multiple Server Computer System Analysis.

Reference Books:

1. Ronald W. Wolff, stochastic Modeling and Theory of Queues, Prentice- Hall International Inc 1989
2. Raj Jain, "The Art of Computer Systems Performance Analysis", Wiley- India, 1991.
3. Paul J. Fortier, Howard E. Michael, "Computer Systems Performance Evaluation and Prediction", Elsvier Science (USA), 2003.

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FACULTY OF ENGINEERING AND TECHNOLOGY
First Year Engineering ME (CSE/SE)
Semester – I
MCE604: Elective I – 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)

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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.

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DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY
AURANGABAD
FACULTY OF ENGINEERING AND TECHNOLOGY
First Year Engineering ME (SE)
Semester – I
MSW641: Elective I – Smart Phone Programming

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.

Objectives:
1. Students should able to understand various aspects of smart phone
2. Students should able to differentiate various smart phone Operating Systems and their functionalities.

Unit-I :Introduction (8 Hrs)
Basic Android architecture, comparison of Android ,iOS and windows phone 8.development environment for Android iOS and windows phone 8.
Difference between Wphone8 and Android development., difference between phone 8 and iOS development. comparing application project structure for Android and iOS. comparing application model and life cycles in Android and iOS

Unit-II : Designing UI (6 Hrs)
UI design principles, comparing the wp8 display to Android and iOS . using controls, Android and iOS, Wphone8 control set.

Unit –III : Application storage on mobile devices (6 Hrs)
Local files and databases, using isolated storage, saving data to the cloud, data storage design considerations

Unit –IV (6 Hrs)
Consuming web services on iphone and Android, consuming web services on wp7, push notifications on Wphone8,Android and iOS, mobile advertising basics, mobile advertising providers, locating frameworks on smartphones, location and maps support on Wphone8, Android, and iOS.

Unit-V : Multimedia (6 Hrs)
multimedia architectural overview, iOS multimedia,Wphone 8 multimedia, Android multimedia, supported media codecs, sound, picture, and graphics integration, playing video on wp7,Android and iOS.

Unit-VI : Utilizing system hardware (8 Hrs)
An overview of smartphone hardware, smartphone hardware components, accessing the microphone on iOS,Android and wphone 8, accessing the camera on iOS,Android and wWphone8, using sensors on iOS,Android and Wphone8, utilizing bluetooth.

Reference Books:

1. Zhinan Zhou,Robert Zhu,Pei Zheng and Baijian Yang , "Windows Phone 8 Programming for Android™ and iOS Developers ," Wrox publications.

2. Charles Petzold, "Programming Windows Phone 8,"Microsoft press.

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FACULTY OF ENGINEERING AND TECHNOLOGY
First Year Engineering ME (SE)
Semester – I
MSW621: Software Development Laboratory -I

Teaching Scheme
Practical: 4 Hrs/Week

Examination Scheme
Practical : 50 Marks

Software Development Laboratory –I shall be based on the subjects Cloud Computing, Business Intelligence

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

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

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FACULTY OF ENGINEERING AND TECHNOLOGY
First Year Engineering ME (SE)
Semester – I
MSW622: Software Development Laboratory -II

Teaching Scheme
Practical: 2 Hrs/Week

Examination Scheme
Term Work : 50 Marks

Software Development Laboratory –I shall be based on the subjects System analysis and design and Elective -I.

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

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

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FACULTY OF ENGINEERING AND TECHNOLOGY
First Year Engineering ME (SE)
Semester – I
MSW623: Seminar

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

Seminar should be evaluated on the following basis

- **Depth of Literature survey**

- **PPT prepared and Presentation skills**

- **Understanding of subject**

- **Report preparation**

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FACULTY OF ENGINEERING AND TECHNOLOGY
First Year Engineering ME (SE)
Semester – II
MSW751: Software Reliability

Teaching Scheme
Lectures: 3 Hrs/Week
Tutorial: 1 Hr/Week

Examination Scheme

Theory:	80 Marks
Class Test:	20 Marks
Duration of theory paper:	03 Hrs.

Course Objectives:
- To explore students significance of software reliability
- To develop students skills to understand and predict software reliability

UNIT-I : Introduction   **(6 Hrs)**
Definition of software reliability,Probabilistic nature of software reliability,The magnitude of the problem,software development life cycle and reliability,software error models

Unit-II : Reliability Prediction and Modeling   **(6 Hrs)**
Black box based reliability and White box based reliability ,Binary reliability and multistate reliability, limitations of reliability prediction,the practical approach,the basic series reliability model,

Unit III : Reliability prediction using Architectural analysis   **(8 Hrs)**
modular design, Architectural(block diagram) analysis.cut and tie sets, active redundancy, m out of n redundancy,standby redundancy. Availability of repairable systems, , Path based models, state based models And Additive models, Model Driven Engineering

Unit-IV :   **(8 Hrs)**
Multi state system reliability measures,Multis state system reliability indices evaluation based on Universal generating function and Importance and sensitivity analysis of multistate system

Unit V: **(6 Hrs)**

Multi-state System Structure Optimization Problems , Optimization Techniques, Structure Optimization of Series–Parallel System with Capacity-based Performance Measure, Structure Optimization of Multi-state System with Two Failure Modes, Structure Optimization for Multi-state System with Fixed Resource Requirements and Unreliable Sources

Unit –VI : *N*-Modular Redundancy   **(8 Hrs)**
Introduction, The History of *N*-Modular Redundancy, Triple Modular Redundancy, System Reliability, System Error Rate, *N*-Modular Redundancy, System Voting, Limitations on Voter Reliability, TMR Reliability, Comparison of TMR, Parallel, and Standby Systems

Reference Books:
1.   Hoang Pham,"Handbook of Reliability Engineering, "Springer Publications
2.   Martin L.Shooman,"Relaibility of Computer Systems and Networks, "John Willey and sons pp.202-246
3.   John Musa," Software Reliability Engineering"McGraw Hill publications
4.   Patric D.T.O'Connor ,"Practical reliability engineering ,"Wiley publication

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FACULTY OF ENGINEERING AND TECHNOLOGY
First Year Engineering ME (SE)
Semester – II
MSW752: Advanced Software 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.

Course Objectives:
- To study various software architectures
- To study significance of software architecture
- To study application of architectural styles

Unit – I   (6 Hrs)
Architecture Business Cycle, Influences on the architecture, Software processes and the architecture business cycle, good architecture, Software architecture's importance, Architectural Structures and Views , Functional and Non-functional Properties

Unit – II   (8 Hrs)
From Classic Architecture to Software Architecture , Architecture and the System Concept , Architecture and the Building Blocks of a System, Architecture Levels, Architecture Views Requirements Characteristics and Types , Organizational Requirements, System Requirements , Building Block Requirements

Unit III   (6 Hrs)
Architecture Principles, Basic Architecture Concepts, Quality Attributes: Availability, Modifiability, Performance, Security,Testability,Usability, Efficiency, Interoperability, Reliability, Fault tolerant software - scenarios, Tactics

Unit – IV   (8 Hrs)
Architectural Styles: Pipes and Filters, Data Abstraction and Object-Orientation, Event-Based, Implicit Invocation, Layered Systems, Repositories, Interpreters, Process Control, Heterogeneous Architectures

Unit – V   (6 Hrs)
Middle Ware Architectures, Aspect Oriented Architectures, Model-Driven Architecture, Product Line Software

Unit – VI   (6 Hrs)
Service-Oriented Architectures , Software Agent, Web Services, Client server Architecture, Software Architecture Document

References Books:

1. M. Shaw: Software Architecture Perspectives on an Emerging Discipline, Prentice-Hall.
2. Len Bass, Paul Clements, Rick Kazman: Software Architecture in Practice, Pearson
3. Oliver Vogel , Ingo Arnold , Arif Chughtai, Timo Kehrer : Software Architecture
   A Comprehensive Framework and Guide for Practitioners,Springer
4. Essential Software Architecture, Ian Gorton Springer;

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FACULTY OF ENGINEERING AND TECHNOLOGY
First Year Engineering ME (SE)
Semester – II
MCE753: Performance Analysis and Simulation

Teaching Scheme	Examination Scheme	
Lectures: 4 Hrs/Week	Theory:	80 Marks
	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:

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

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FACULTY OF ENGINEERING AND TECHNOLOGY
First Year Engineering ME (CS/SE)
Semester – II
MCE642: Real Time Systems

Teaching Scheme
Lectures: 3 Hrs/Week
Tutorial: 1 Hr/Week

Examination Scheme
Theory: 80 Marks
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 nanokernel, 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**

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FACULTY OF ENGINEERING AND TECHNOLOGY
First Year Engineering ME (CS/SE)
Semester – II
MCE752: Elective II : 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

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FACULTY OF ENGINEERING AND TECHNOLOGY
First Year Engineering ME (CS/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)
25

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.

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FACULTY OF ENGINEERING AND TECHNOLOGY
First Year Engineering ME (SE)
Semester – II
MSW771: Software Development Laboratory -III

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

Software Development Laboratory –II shall be based on the subjects Software Reliability, and Real Time System

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

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

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FACULTY OF ENGINEERING AND TECHNOLOGY
First Year Engineering ME (SE)
Semester – II
MSW772: Software Development Laboratory -IV

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

Software Development Laboratory –II shall be based on the subjects Advanced Software Architecture and Elective -II.

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

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

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FACULTY OF ENGINEERING AND TECHNOLOGY
First Year Engineering ME (SE)
Semester – II
MSW773: 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 (CS/SE)
Dissertation Guidelines

Student's Dissertation can be categorize into two category

1)Application based

2)Algorithmic based

1)Application based

If student's Dissertation is application based then Dissertation should evaluate 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 principle's of programming language norms

4) Testing: unit testing , Test cases and batch form,   Intergrated testing

5) Deployment observations

2)Algorithmic based

If student's Dissertation is algorithmeic based then Dissertation should be evaluated on basis of following criteria

1)Literature survey

2)Algorithm & its mathematical modelling

3)Simulation /Implementation

4)Performance evaluation considering various test cases

5)Comparative analysis with performance of previous algorithms of same line.

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY
AURANGABAD
FACULTY OF ENGINEERING AND TECHNOLOGY
Second Year Engineering ME (SE)
Semester – III
MSW731: 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.

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DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY
AURANGABAD
FACULTY OF ENGINEERING AND TECHNOLOGY
Second Year Engineering ME (SE)
Semester – IV
MSW781: 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 conference.

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