Syllabus for ME (Computer Engineering)
Course 2013 (w.e.f 2013)

Subject Code	Subject	Teaching Scheme Hrs/Week		Examination Scheme					Credits
		Lect.	Pract	Paper		Tw	Oral/Presentation	Marks	
				In Semester Assessment	End Semester Assessment				
SEM — I									
510101	Applied Algorithms	04	—	50	50	—	—	100	4
510102	High Performance Databases	04	—	50	50	—	—	100	4
510103	Advanced Computer Architecture	04	—	50	50	—	—	100	4
510104	Research Methodology	04	—	50	50	—	—	100	4
510105	Elective –I	05	—	50	50#	—	—	100	5
510106	Laboratory Practice-I	—	04	—		50	50	100	4
	Total	**21**	**04**	**250**	**250**	**50**	**50**	**600**	**25**

Subject Code	Subject	Teaching Scheme Hrs/Week		Examination Scheme					Credits
		Lect.	Pract	Paper		Tw	Oral/Presentation	Marks	
				In Semester Assessment	End Semester Assessment				
SEM— II									
510107	Operating System Design	04	—	50	50	—	—	100	4
510108	Software Design and Architecture	04	—	50	50	—	—	100	4

510109	**Advanced Computer Networks**	04	—	50	50	—	—	100	**4**
510110	Elective –II	05	—	50	50#	—	—	100	**5**
510111	Laboratory Practice-II	—	04	—		50	50	100	**4**
510112	Seminar-I	—	04	—		50	50	100	**4**
	Total	**17**	**08**	**200**	**200**	**100**	**100**	**600**	**25**

Subject Code	**Subject**	**Teaching Scheme Hrs/Week**		**Examination Scheme**					**Credits**
		Lect.	**Pract**	**Paper**		**Tw**	**Oral/Presentation**	**Marks**	
				In Semester Assessment	**End Semester Assessment**				
SEM— III									
610101	**Advanced Storage Systems and Infrastructure Management**	04	—	50	50	—	—	100	**4**
610102	**Advanced Unix Programming**	04	—	50	50	—	—	100	**4**
610103	Elective-III	05	—	50	50#	—	—	100	**4**
610104	Seminar –II	04	—			50	50	100	**5**
610105	Dissertation Stage – I	—	08	—		50	50	100	**8**
	Total	**17**	**08**	**150**	**150**	**100**	**100**	**500**	**25**

Subject Code	**Subject**	**Teaching Scheme Hrs/Week**		**Examination Scheme**					**Credits**
		Lect.	**Pract**	**Paper**		**Tw**	**Oral/Presentation**	**Marks**	
				In Semester Assessment	**End Semester Assessment**				

SEM— IV									
610106	Seminar –III	—	05	—	—	50	50	100	**5**
610107	Dissertation Stage – II	—	20	—	—	150	50	200	**20**
	Total		**25**	—	—	**200**	**100**	**300**	**25**

#: Ref. Rule R-1.3 for Examination Rules of "*Rules and Regulations for M.E. Programs under faculty of Engineering effective from June 2013*".

Electives:

Elective I		Elective II	
510105A	**Intelligent Systems**	**510110A**	**Business Intelligence and Data Mining**
510105B	**IR and Web Mining**	**510110B**	**Usability Engineering**
510105C	**Machine Learning and Translation**	**510110C**	**Advanced Complier Design**
510105D	**Open Elective /Real Time Systems**	**510110D**	**Open Elective/ Embedded System Design**

Elective III		Non Credit Courses	
610103A	**Network Security**	**Semester -I**	**Cyber Security**
610103B	**Cloud Computing**	**Semester-II**	**Information and Cyber Warfare**
610103C	**Computer Vision and Pattern Recognition**	**Semester-III**	**Bio-Metrics and Cyber Security**
610103D	**Open Elective/ Soft Computing**	**Semester -IV**	**Cyber Forensics and Information Security**

The dissertation must result into the publication of at least two research papers (at Stage–I and Stage-II respectively) preferably in the Journal having Citation Index 2.0 and ISSN number; or paper can be published in reputed International Journal recommended by the guide of the Dissertation and the BoS supported cPGCON event for paper presentation and participation. The guides certificate covering originality of the work and plagiarism-testing result shall be included in the report along with the Published Journal Papers and. cPGCON paper presentation and participation certificates. The comments received by the journal paper reviewers be attached in the Dissertation report and shall be made available during dissertation presentation/viva to the examiners.

Note 1: Refer R-2.7 for Examination Rules of "*Rules and Regulations for M.E. Programs under faculty of Engineering effective from June 2013*". Non-credit courses are mandatory for the grant of the term and shall be completed by the students as a self study either by referring to the Hand books, Journal/Conference papers (atleast 25 in number), open source software, tools and in addition may be by organizing educational visits to the technological/professional centers in the subject, *if any*. Each student is required to produce in own words, one 10 pages innovative, technical paper to be submitted as a part of the semester course work of non-credit courses.

510101- Applied Algorithms

Teaching Scheme **Examination Scheme**

Lectures: 4Hrs/week **Theory In-semester Assessment: 50 Marks**

Theory End-semester Assessment: 50 Marks

Total Credits : 04

Objectives

- This course covers selected topics in algorithms that have found applications in areas such as geometric modeling, graphics, robotics, vision, computer animation, etc.
- The course objective is to teach problem formulation and problem solving skills.
- The course aims at keeping a sound balance between programming and analytical problem solving.

Unit I. Analysis of Algorithms

Review of algorithmic strategies, Asymptotic analysis: upper and lower complexity bounds. Identifying differences among best, average and worst Case Behaviors. Big O, little O, omega and theta notations, Standard complexity classes. Empirical measurements of performance. Time and space trade-offs in algorithms. Analyzing recursive algorithms using recurrence relations.

Unit II. Fundamental Computing Algorithms

Numerical algorithms, Sequential and binary search algorithms. Quadratic sorting algorithms and O (n log n) sorting algorithms. Algorithms on graphs and their complexities using Greedy Approach for --- Prim's and Krushkal's Algorithm for minimum spanning tree, Single source shortest path Algorithm, all pair shortest paths in Graph

Unit III. Approximation Algorithms

Introduction, Absolute approximation, Epsilon approximation, Polynomial time Approximation schemes, probabilistically good algorithms.

Unit IV. Geometric Algorithms

Prerequisites – Basic properties of line, intersection of line, line segment, polygon,etc. Line segment properties, detaining segment intersection in time complexity (n log n),Convex full problem – formulation, solving by Graham scan algorithm, Jarvis march algorithm; closest pair of points – problem formulation, solving by divide & conquer method.

Unit V. Linear Programming

Standard and Slack forms, formulation of problems as linear programs, simplex algorithm, duality, initial basic feasible solution.

Problem formulation for – single source shortest path, maximum flow problem, Vertex cover problem, Knapsack problem.

Unit VI. Probability Based Analysis

Expectations**:** Introduction, Moments, Expectations of functions of more than one random variable, transform methods, moments and transforms of distributions, computation of mean time to failure, inequalities and limit theorems

Reference Books:

1. Kishore S. Trivedi, "Probability & Statistics with Reliability, Queing, and Computer Science Applications" PHI
2. Cormen, Leiserson, Rivest, "Algorithms", PHI
3. Bressard, "Fundamentals of Algorithms", PHI
4. Horowitz, Sahni, "Fundamentals of Computer Algorithm", Galgotia