सीनेट की 37^{वीं} बैठक का कार्यवृत्त MINUTES OF THE 37TH MEETING OF THE SENATE

15 अप्रैल 2011 15[™] APRIL 2011



भारतीय प्रौद्योगिकी संस्थान रूड़की रूड़की – 247 667 (भारत) INDIAN INSTITUTE OF TECHNOLOGY ROORKEE ROORKEE – 247 667 (INDIA)

INDIAN INSTITUTE OF TECHNOLOGY, ROORKEE ROORKEE-247 667 (INDIA)



Minutes of the 37th Meeting of the Senate held on 15th April 2011 at 03.00 P.M. in the Senate Hall of the Institute.

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07.0.2	To report the Matter of awarding the provisional degree of IDD B.Tech./M.Teh. to Sri Shiv Ram Meena approved by the Director, IIT Roorkee as Chairman, Senate.	ç
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INDIAN INSTITUTE OF TECHNOLOGY ROORKEE ROORKEE – 247 667



Minutes of the 37th meeting of the Senate held on 15.04.2011 in the Senate Hall of the Institute.

The following were present:-

1.	Prof. S.C. Saxena, Director	-Chairman
2.	Prof. S.Y. Kulkarni	(Architecture & Planning)
3.	Prof. (Mrs) Pushplata	(Architecture & Planning)
4.	Prof. I.M. Mishra	(Chemical Engineering)
5.	Prof. Surendra Kumar	(Chemical Engineering)
6.	Prof. I.D. Mall	(Chemical Engineering)
7.	Prof. R.N. Goyal	(Chemistry)
8.	Prof. Ravi Bhushan	(Chemistry)
9.	Prof. Anil Kumar	(Chemistry)
10.	Prof. (Mrs) Mala Nath	(Chemistry)
11.	Prof. U.P. Singh	(Chemistry)
12.	Prof. M.R. Maurya	(Chemistry)
13.	Prof. A.K. Jain	(Civil Engineering)
14.	Prof. S.S. Jain	(Civil Engineering)
15.	Prof. M.N. Viladkar	(Civil Engineering)
16.	Prof. Deepak Kashyap	(Civil Engineering)
17.	Prof. (Mrs) Renu Bhargava	(Civil Engineering)
18.	Prof. U.C. Kothyari	(Civil Engineering)
19.	Prof. P.K. Garg	(Civil Engineering)
20.	Prof. C.S.P. Ojha	(Civil Engineering)
21.	Prof. Pradeep Bhargava	(Civil Engineering)
22.	Prof. S.K. Ghosh	(Civil Engineering)
23.	Prof. Manoj K. Arora	(Civil Engineering)
24.	Prof. M. Parida	(Civil Engineering)
25.	Prof. Praveen Kumar	(Civil Engineering)
26.	Prof. N.K. Samadhiya	(Civil Engineering)
27.	Prof. D.K. Paul	(Earthquake Engineering)
28.	Prof. Ashwini Kumar	(Earthquake Engineering)
29.	Prof. H.R. Wason	(Earthquake Engineering)
30.	Prof. M.L. Sharma	(Earthquake Engineering)
31.	Prof. Ashok Kumar	(Earthquake Engineering)
32.	Prof. (Mrs.) Amita Sinvhal	(Earthquake Engineering)
33.	Prof. H. Sinvhal	(Earth Sciences)
34.	Prof. A.K. Saraf	(Earth Sciences)
35.	Prof. H.O. Gupta	(Electrical Engineering)

36.	Prof. S.P. Gupta	(Electrical Engineering)
37.	Prof. Pramod Agarwal	(Electrical Engineering)
38.	Prof. S. Mukherjee	(Electrical Engineering)
39.	Prof. S.P. Srivastava	(Electrical Engineering)
40.	Prof. R.S. Anand	(Electrical Engineering)
41.	Prof. Himanshu Joshi	(Hydrology)
42.	Prof. Satish Kumar	(Paper Technology)
43.	Prof. V.K. Nangia	(Management Studies)
44.	Prof. G.S. Srivastava	(Mathematics)
45.	Prof. S.P. Sharma	(Mathematics)
46.	Prof. Satish C. Sharma	(Mechanical & Industrial Engg.)
47.	Prof. P.K. Jain	(Mechanical & Industrial Engg.)
48.	Prof. Dinesh Kumar	(Mechanical & Industrial Engg.)
49.	Prof. Akhilesh Gupta	(Mechanical & Industrial Engg.)
50.	Prof. Ravi Kumar	(Mechanical & Industrial Engg.)
51.	Prof. R.D. Agarwal	(Metallurgical & Materials Engg.)
52.	Prof. P.K. Ghosh	(Metallurgical & Materials Engg.)
53.	Prof. (Mrs) Vijaya Agarwala	(Metallurgical & Materials Engg.)
54.	Prof. S.K. Nath	(Metallurgical & Materials Engg.)
55.	Prof. Surendra Singh	(Metallurgical & Materials Engg.)
56.	Prof. Anjan Sil	(Metallurgical &Materials Engg.)
57.	Prof. A.K. Jain	(Physics)
58.	Prof. Vir Singh	(Physics)
59.	Prof. M.L. Kansal	(WRD&M)
60.	Prof. Deepak Khare	(WRD&M)
61.	Prof. (Mrs.) Anu Singh Lather,	Dean, USMS, GGSI University, Delhi
62.	Dr. Arun Kumar, Head, AHEC	
63.	Mr. Yogendra Singh, Librarian	
64.	Dr. K.L. Yadav, Associate Profe	essor, Department of Physics

- 65. Dr. Yogendra Singh, Associate Professor, Department of Earthquake Engg.
- 66. Dr. (Ms) Babita Sinha Assistant Professor, Dept. of Hum. & Social Sciences
- 67. Mr. Prashant Garg, Offtg. Registrar Secretary

The Chairman (Director) welcomed the members to the 37th Meeting of the Senate and informed that the IIIrd campus of IIT Roorkee at Greater Noida Extension Centre has started functioning. This Centre has been inaugurated by the Chairman, Board of Governors on 3rd April 2011. He also informed the members about the future plans of conducting shortterm courses, seminars and part-time M.Tech. Programmes at GNEC and facilities available at Greater Noida Extension Centre.

Before taking up the agenda, the Chairman, Senate thanked the under-mentioned outgoing members and recorded its appreciation for their valuable contribution in the meetings of the Senate.

1. Prof. Prem K. Kalra Head, Department of Electrical Engineering IIT Kanpur

- 2. Prof. Sushil Department of Management Studies IIT Delhi
- 3. Dr. Sunil Singhal, Chief Warden, Cautley Bhawan and Scientist AHEC

The Chairman also welcomed the under-mentioned new members/renominated members to the Senate and hoped for their valuable contributions and active participation in its functioning:

New members:

- 1. Dr. Vijay K. Jain, Professor, Department of Mechanical Engineering Indian Institute of Technology Kanpur, Kanpur (U.P.)
- Prof. (Mrs.) Anu Singh Lather
 Dean, University School of Management Studies (USMS)
 GGSIP University, Kashmere Gate, Delhi–110 403
- 3. Dr. Shishir Sinha, Associate Professor, Department of Chemical Engineering & Chief Warden, Govind Bhawan.

<u>Re-nominated</u> member:

4. Prof. Karmeshu, Professor & Dean, School of Computers & Systems Sciences, Jawaharlal Nehru University, New Delhi has been renominated to the Senate.

The Senate noted the communications received from the following members for not attending the current meeting:

- 1. Prof. Karmeshu, New Delhi
- 2. Prof. V.K. Jain, Kanpur
- 3. Prof. Rama Bhargava, Department of Mathematics.
- 4. Prof. Satish Chandra, Department of Civil Engineering.
- 5. Prof. S.N. Sinha, Department of Electronics & Computer Engineering

The Agenda was then taken up:

Item No. 37.1.1: To confirm the minutes of the 36th meeting of the Senate held on 13/27.12.2010.

The minutes of the 36^{th} meeting of the Senate held on 13/27.12.2010 were confirmed with modifications in the minutes against item No.36.2.1 and 36.2.3. The revised minutes are as under:

Item No.36.2.1: To consider admitting GATE qualified candidates working against various projects to allow them to pursue Part Time M. Tech.

As discussed and recommended by the Board of Studies. the Senate decided that GATE qualified candidate be considered for admission in а PG programme, as per his/her eligibility, as Part Time PG student and also simultaneously be appointed as Project Fellow/JRF (if not already working) in a project provided the remaining duration of the project must be at least one & a half year. PG Admission Committee will examine and ensure eligibility for the admission in PG Programme. In case no other project is available for the candidate, the Institute may provide the assistantship for the remaining period not exceeding one year and his/her part time status be changed to full time with the approval of the Dean (Academic Studies) on the recommendation of the of the department. Such admissions for PG DAC programmes and simultaneous appointment in research projects be coordinated by PG Admission Office alongwith regular PG admissions.

Item No.36.2.3: To consider offering admission to additional 10% candidates in all Master's degree courses in Science Departments for which the admissions are made through JAM.

Admission to additional 10% candidates' (over and above the sanctioned strength) be offered in Master's degree courses in Science Departments for which the admissions are made through JAM. This may be annually reviewed based on the previous years' admissions in those departments where seats were left vacant. If there is a vacancy due to some of the candidates not joining a programme or leaving it just after registration the same is filled by the candidate admitted in addition to the normal sanctioned strength.

Item No. 37.1.2: To receive a report on the actions taken to implement the decisions taken by the Senate in its 36th meeting held on 13/27 December 2010.

The Senate noted that the required actions have been taken on the decisions taken by the Senate in its 36^{th} meeting held on $13/27^{\text{th}}$ December 2010.

Item No. 37.2.1: To consider the request of Prof. & Head, Department of Civil Engineering for discontinuation of M.Tech. (CAD) Programme & Distribution of allotted seats in this programme to M.Tech Geotechnical Engineering, Transportation Engineering and Geomatics Engineering Programmes.

As considered and recommended by the Board of Studies, the Senate decided that the M.Tech. (CAD) Programme presently being run in the Civil Engineering Department be discontinued. Further, the Department will introduce a new programme in the emerging or upcoming areas of Civil Engineering within 02 years. Till the new programme is started, the seats allotted for M.Tech. (CAD) programme be distributed temporarily as under:

Sl.No.	Courses	Seats
1.	M.Tech. Geotechnical Engineering	06 seats
2.	M.Tech. Transportation Engineering	06 seats
3.	M.Tech. Geomatics Engineering	06 seats
	Total	18 seats

These seats will be transferred back when the new programme will start.

Item No. 37.2.2: To consider the letter No. MMED/126/D-6 dated 2.2.2011 received from Head, Department of Metallurgical & Materials Engineering regarding changes proposed to be incorporated in P.G. Admission Brochure 2012.

As recommended by the Board of Studies, the Senate decided that the proposal of Head, Department of Metallurgical & Materials Engineering for certain changes in qualifications to be made in PG Admission Brochure 2012 be accepted as given at **Appendix 'A'**.

Item No. 37.2.3: To consider the new names in the panel of eminent personalities outside Roorkee for screening and evaluating Alumni Awards for the year 2010-2011 and 2011-2012.

The Senate decided that the under mentioned panel of eminent personalities outside Roorkee for screening and evaluating Alumni Awards for the year 2010-2011 and 2011-2012 be approved:

- 1. Dr. Jagdish Narain, Ex-Vice-Chancellor, University of Roorkee.
- 2. Dr. D.V. Singh, Ex-Vice-Chancellor, University of Roorkee and Ex-Director, IIT Roorkee.
- 3. Shri J.P.Gaur, Founder Chairman, JP Group and Ex-Chairman, BOG, IIT Roorkee.
- 4. Dr. U.B. Desai, Director, IIT Hyderabad
- 5. Shri R.K.Tyagi, CMD, Pawan Hans Helicopters Ltd.
- 6. Shri R.K. Singh, Ex-Chairman, Railway Board
- 7. Lt. Gen. (Retd) A.K.S. Chandele, Ex-DG-EME
- 8. Prof. S.K. Khanna, Ex-Chairman, AICTE

Item No.37.2.4: To consider the request of Dr. P.K. Jain Coordinator Academic, Greater Noida Extension Centre vide letter No. GNEC/No.859, dated 20.01.2011 for part time M.Tech programs & admission criterion.

As recommended by the Board of Studies, the Senate decided that the proposed standard format of 03 years part-time M.Tech. programme, to be started at Greater Noida Extension Centre as given at **Appendix 'B'** be accepted with the condition that the admission criteria will be the same as those applicable for admission of sponsored candidates for various M.Tech programmes running at the Main Campus of IIT Roorkee.

Item No.37.2.5: To consider the change in the teaching load of EE-503 for IDD students from 3-0-2/2 to 3-0-2 with 4 credits as approved for M.Tech. students.

The Senate approved the recommendation of the Department of Electrical Engineering to change the teaching load of EE-503 for IDD students from 3-0-2/2 to 3-0-2 as approved for M.Tech. Students. The credits required for IDD programme of Electrical Engineering is this increased to 219 for this batch.

Item No.37.2.6: To consider the proposal received from Head, Department of Earthquake Engineering vide letter No. EQD/2011/576, dated February 15, 2011 to introduce a new programme elective for structural Dynamics stream.

As recommended by the Board of Studies, the Senate decided that the proposal of Head, Department of Earthquake Engineering to introduce a new programme elective for Structural Dynamics stream, namely "EQ-598: Principles of Seismology" as given in Appendix 'C' be approved.

Item No.37.2.7: To consider the e-mail letter of Prof. M. S. Ananth, Chairman, National Coordinating Board, GATE 2011, for restructuring of GATE papers.

As recommended by the Board of Studies, the Senate accepts the report of GATE Paper Restructuring Committee through NCB, on the restructuring of (i) Papers EC, EE & IN as a combined paper with the title Electrical Sciences, and (ii) papers ME & PI as a combined paper with the title Mechanical Sciences.

The Senate also suggested that in case above is implemented then the parent discipline of the candidate (i.e. EC/EE/IN/ME/PI) be also mentioned on the GATE Score Card.

Item No.37.2.8: To consider the proposal received from Prof. & Head, Mathematics Department for new teaching scheme and teaching syllabi for MCA programme.

As recommended by the Board of Studies, the Senate decided that the teaching scheme and teaching syllabi of the first year MCA programme of the Department of Mathematics, as given at **Appendix 'D'** be approved.

Item No.37.2.9: To consider the proposal received from Prof. & Head, Department of Met. & Mat. Engg. to start B.Tech. Programme in Materials Engg. and B.Tech. Programme in Metallurgical Engg. in place of B.Tech. programme in Metallurgical & Material Engg.

The Senate decided that in light of the suggestions given by the Senators, the proposal be referred back to the Department for its reconsideration. The senators opined that it would be appropriate to start IDD programme with the proposed specialisation instead of B.Tech. programme.

Item No.37.2.10: To consider the proposal from Department of Management Studies regarding Minimum Eligibility, Selection basis, number of Seats and other conditions for M.B.A. Part-time Programme at Greater Noida Extension Centre.

The issue was deferred.

Item No.37.2.11: To consider the request of Prof & Head, Civil Engg. Department to start a new IDD leading to M.Tech (Civil) Programme from the academic session 2011-2012 with 15 additional seats to be provided at B. Tech. (Civil) level for M. Tech. IDD Programme in Structural Engg.

As recommended by the Board of Studies, the Senate decided that the proposal to start a new IDD leading to M. Tech. (Civil) Programme from the academic session 2011-2012 with 15 additional seats to be provided at B.Tech. (Civil) level for M.Tech. IDD Programme in Structural Engineering be approved.

Further, the Senate decided that the structure of the M.Tech. IDD Programme in Structural Engineering as given at **Appendix 'E'** be approved.

Item No.37.2.12: To consider proposal from Prof & Head, Centre of Excellence in Disaster Mitigation and Management for approval of New M.Tech. Programme in 'Disaster Mitigation and Management' & approval of its Syllabi.

After discussions, the Senate decided that the proposal for starting new M.Tech. Programme in Disaster Mitigation and Management and its syllabi be not approved.

Arising out of this, it was also resolved that the role of the Coordinating Department of the Centres be placed before the Senate for discussions.

Item No.37.3.1: To report that the Director, on the behalf of the Senate has approved that the scheduled date of registration for New Entrants (PG programmes) which was July 22, 2011 is preponed to July 18, 2011 because it is likely that the means of transportation will halt w.e.f. July 19, 2011 to July 28, 2011 due to Kanvar Yatra. In these circumstances most of the candidates may face difficulties to reaching Roorkee on July 22, 2011.

The above is Noted.

Item No.37.3.2: To report that the Director has approved the acceptance of a proposal for the Institution of "Electro-steel Award" Two cash prizes of Rs.10,000/p.a. each for (a) M.Tech (Alternate Hydro Energy Systems), II year Dissertation, and another for (b) M.Tech. (Environment Management of Rivers and Lakes), II year best Dissertation.

The above is Noted.

Item No. 37.3.3: To report the Matter of awarding the provisional degree of IDD B.Tech./M.Tech. to Sri Shiv Ram Meena approved by the Director, IIT Roorkee as Chairman, Senate.

Noted that the Director, IIT Roorkee as Chairman, Senate has approved the awarding of provisional degree of IDD B.Tech./ M.Teh. to Sri Shiv Ram Meena

The meeting ended with a vote of thanks to the Chair.

Appendix 'A' Item No. Senate/37.2.2

Academic Department (Code)	Academic Programme s	Existing Minimum Educational Qualification	Proposed Minimum Educational Qualification	Remark on Changed Proposed
aterials Engineering (MTD)	M.Tech. Corrosion Engineering	Bachelor's degree in Metallurgical & Material Engg. Or its equivalent or Engineering graduates of all branches or M.Phil. degree in Chemistry, Physics or Materials Science	B.Tech. degree in Metallurgical/Materials Engg. And its equivalent or B.Tech. in Chemical/Mechanical/Industrial/Pr oduction/Ceramics Engineering or M.Sc. degree with Physics/Chemistry/Material Science with Mathematics at Bachelor's level.	Only specified branches of Engineering are proposed in place of all branches
Metallurgical & M	M.Tech. Industrial Metallurgy	Bachelor's degree in Metallurgical/Mechanical/Industri al/Production Engg., or equivalent.	B.Tech. degree in Metallurgical/Materials /Ceramics Engineering and its equivalent or B.Tech. in Mechanical/Industrial/Production Engineering	B.Tech Materials Engg. And Ceramics Engg. is included
•	M.Tech. Physical Metallurgy	Bachelor's degree in Metallurgical Engg. or its equivalent.	B.Tech. degree in Metallurgical/Materials/Ceramics Engineering and its equivalent or B.Tech. in Mechanical/Industrial/Production Engineering or M.Sc. degree in Physics/Materials Science with Mathematics at Bachelor's level	The programme is opened to Mechanical and Physics background students.

Program: M.Tech. Year: I

Teaching Scheme Relative Weightage Contact Hours Exam Pre Week Duration Sub. Code **Course Title** Credits Т CWS PRS MTE ETE PRE S. Sub. \mathbf{L} Т Р Р No. Area XXXX Mathematics ICC 4 25 1. 3 1 3 25 50 *= ---XXXX Program Core Course PCC 2. 4 3 3 25 25 50 1 ----3. XXXX Program Core Course PCC 25 25 4 3 50 3 1 -_ --Sub Total 08-12

Autumn Semester

Spring Semester

Teach	ing Scheme	· · · · ·			Con P	tact He re Wee	ours k	Ex: Dura	am ation		Relat	ive Weig	htage	
S. No.	Sub. Code	Course Title	Sub. Area	Credits	L	Т	Р	T	Р	CWS	PRS	MTE	ЕТЕ	PRE
1.	XXXX	Modelling and Simulation	PCC	4	3	1	-	3	-	25	_	25	50	-
2.	XXXX	Open Elective Course - I	OEC	3/4	-	-	-	3	-	25	-	25	50	-
3.	XXXX	Program Elective Course	PEC	4	3	1	-	3	-	25	-	25	50	-
Γ			Sub Total	08-12										

Appendix 'B' Item No. Senate/37.2.4

·11-

Program: M.Tech. Year: II

Autumn Semester

Teach	ing Scheme				Соп	tact H	ours ek	Ex Dura	am ation		Relati	ive Weig	htage	
S. No.	Sub. Code	Course Title	Sub. Area	Credits	L	Τ	Р	Т	P	CWS	PRS	МТЕ	ЕТЕ	PRE
1.	XXXX	Program Elective Course	PEC	4	3	1	-	3	-	25	-	25	50	-
2.	XXXX	Program Elective Course	PEC	4	3	1	-	3	-	25	-	25	50	-
			Sub Total	08										· · · ·

Spring Semester

Teach	ing Scheme				Con	tact H	ours	Ex	am		Relati	ive Weig	htage	
					P	re Wee	k	Dura	tion					
S.	Sub. Code	Course Title	Sub.	Credits	L	Т	Р	Т	P	CWS	PRS	MTE	ETE	PRE
No.			Area											
1.	XXXX	Program Elective Course	PEC	4	3	1	-	3	-	25	-	25	50	-
2.	XXXX	Open Elective Course - II	OEC	3/4		-	-	3	-	25	-	25	50	-
			Sub Total	07-08		·							L	·

·12-

Program: M.Tech.

Year: III

Autumn Semester

Teact	hing Scheme				E C G	tact Ho re Wee	ours k	EX: Dura	am tion		Relati	ive Weig	htage	
S. S.	Sub. Code	Course Title	Sub. Area	Credits	F	H	Ъ	T	Ч	CWS	PRS	MTE	ETE	PRE
1.	XXXX	Seminar	SEM	2	ı		ı			1	ı		100	1
5.	XXXX	Project	RP	4	ı	ı	ı	ı	,	I	I	,	100	ı
з.	XXXX	Dissertation*	DIS	•	ı	1	1	r	-		1	. 1	25	ı
			Sub Total	ور						1				

* NOTE: To be continued and Grade to be awarded in the next semester.

Spring Semester

Teach	ing Scheme													
						act no		LX3	8		Kelati	ve weig	htage	-
					4	e Week		Durat	tion			,)	
м,	Sub. Code	Course Title	Sub.	Credits	Ţ	L	Ч	F	Р	CWS	PRS	MTE	ETE	PRE
So.			Area											
1.	XXXX	Dissertation (Contd. From V Semester)	DIS	20		1	1	,			•	1	75	
			Sub Total	20	•		•	-		-	-			
			Total	64-66										

Appendix 'C' Item No. Senate/37.2.6 INDIAN INSTITUTE OF TECHNOLOGY ROORKEE NAME OF DEPTT./CENTER: **Department of Earthquake Engineering** Course Title: Principles of Seismology 1. Subject Code: EQ: 598 2. Contact Hours: L: 03 T: 01 P: 2/2 Practical 0 Examination Duration (Hrs.): Theory 3 3. Relative Weightage: CWS MTE ETE PRE 00 PRS 30 15 40 4. 15 Credits: 6. Semester: Spring/Autumn 7.Subject Area: PEC 5. 4

- 8. Pre-requisite: Nil
- 9. Objective: To introduce the principles of seismology to engineers.
- 10. Details of Course:

S. No.	Contents	Contact Hours
1.	Introduction: Importance of science of earthquakes for engineers; Impact of historical and recent earthquake hazards on the built environment, including lifelines and infrastructure; Relevant seismological glossary; Classification of earthquakes.	4
2.	Causes of Tectonic Earthquakes: Internal structure of the earth; Faults, folds, thrusts, shear zones and lineaments; Plate margins – creative, destructive, and conservative; Triple Junction; Characteristics of earthquakes at various margins; Causes of plate motion; Anthropogenic seismicity.	8
3.	Seismicity: Global seismicity belts – Circum Pacific, Alpine Himalayan, mid oceanic ridges; Earthquakes and major topographic features in oceans and continents – ridge, trench, rift, mountain ranges; Major global and Indian earthquake disasters – inter and intra plate earthquakes.	6
4.	Ground Motion: Principles of elasticity; Equations and laws governing seismic wave propagation; Characteristics of ground motion - duration, frequency and amplitude; Factors affecting characteristics of ground motion – source, path, site; Attenuation relationships; Relation between characteristics of ground motion and damage to civil structures.	8
5.	Earthquake recording, parameters and Quantification: Seismic recording; Estimation of earthquake parameters – epicenter, focal depth, origin time, magnitude; Intensity mapping based on earthquake effects on ground, seismic response of built environment and human perception; Seismic zoning.	8
6.	Engineering Applications : Estimation of design earthquake parameters - deterministic and probabilistic approach; Estimation of vulnerability and risk – case studies; Preparedness and planning for seismic risk reduction, Estimation of depth of bedrock for large civil structures using seismic refraction method; Seismological considerations for safety of pipelines, tunnels, cavities, archeological monuments, etc.	8
1	Total	42

List of Experiments:

- 1. Familiarization with the instruments in seismological observatory
- 2. Interpretation of seismograms
- 3. Estimation of epicenter of earthquake using circle method
- 4. Estimation of magnitude of earthquake
- 5. Estimation of origin time and focal depth of an earthquake
- 6. Preparation of isoseismal maps
- 7. Fault plane solutions

S. No.	Name of Authors / Books / Publishers	Year of Publication/Reprint
1.	Agarwal, P. and Shrikhande, M., "Earthquake Resistant Design of	2006
	Structures", Prentice Hall of India, New Delhi.	
2.	Bullen, K.E. and Bolt, B.A., "An introduction to the Theory of Seismology",	1985
	Fourth Edition, Cambridge University Press, Cambridge.	
3.	McGuire, R.K., "Seismic Hazard and Risk Analysis", Monograph MNO-10,	2004
	Earthquake Engineering Research Institute.	
4.	Reiter, L., "Earthquake Hazard Analysis: Issues and Insights", Columbia	1990
	University Press.	
5.	Richter, C. F., "Elementary Seismology", W. H. Freeman and Co., San	1969
	Francisco. Indian Edition.	
6.	Sinvhal, A., "Understanding Earthquake Disasters", Tata McGraw Hill, New	2010
	Delhi.	

Scheme of MCA Programme Master of Computer Applications (M.C.A.) (Interdisciplinary Programme)

I Year

AUTUMN SEMESTER

	Teaching Scheme				Contact Hrs. Per week			Exam. Duration		Relative Weight				
S. No.	Sub Code	Course Title	Sub Area	Credits	L	Т	P	T	Р	CWS	PRS	MTE	ETE	PRE
1.	CA-501	Information Technology	PCC	4	3	1	-	3	-	25	~	25	50	-
2.	CA-503	Object Oriented Programming Languages	PCC	5	3	1	2	3	2	15	15	15	. 40	15
3.	CA-505	Computer Organizations and Architecture	PCC	4	3	1	0	3	0	25	-	25	50	-
4.	CA-507	Management Concepts and Accounting	PCC	4	3	1	-	3	-	25	-	25	50	-
5.	CA-509	Numerical Methods	PCC	5	. 3	1	2	3	2	15	15	15	40	15
		Sub 7	Fotal:	22										

SPRING SEMESTER

:	Teaching Scheme						Hrs. ek	Exam. Duration		Relative Weight					
S.	Sub	Course	Sub	Credits	L	Т	P	T	P	CW	PRS	MTE	ETE	PRE	
No.	Code	Title	Area			_				S					0
1.	CA-502	Data Structures	PCC	5	3	1	2	3	2	15	15	15	40	15	B
2.	CA-504	Microprocessor and their Interfacing	PCC	5	3	1	2	3	2	15	15	15	40	15	No.
3.	CA-506	Discrete Mathematics and Probability Theory	PCC	4	3	1	-	3	-	25	-	25	50	-	Ser
4.		Programme Elective-1	PEC	4	3	1	-	3	-	25	-	25	50	-	ຄ
5.		Programme Elective-2	PEC	4	3	1	-	3	-	25	-	25	50	-	E
		Sub 7	Fotal :	22					· · · · · ·						3

<u>-</u>16-

Appendix 'D' <u>senate/3</u>7.2.8

Scheme of MCA Programme Master of Computer Applications (M.C.A.) (Interdisciplinary Programme)

II Year

AUTUMN SEMESTER

			Contact Hrs. Per week			Exam. Duration		Relative Weight						
S. No.	Sub Code	Course Title	Sub Area	Credits	L	Т	Р	T	P	CWS	PRS	MTE	ETE	PRE
1.	CA-601	Data Base Management System	PCC	4	3	1	-	3	-	25	-	25	50	- .
2.	CA-603	Design and Analysis of Algorithms	PCC	4	3	1	-	3	-	25	-	25	50	-
3.	CA-605	Operating Systems	PCC	5	3	1	2	3	-	15	15	30	40	-
4.	CA-607	Practical lab (DBMS)	PCC	2	-	-	4	-	2	-	50		-	50
5.		Programme Elective-3	PEC	4	3	1	-	3	-	25	-	25	50	-
6.		Open Elective-1	OEC	3/4	-	-	-	-	-	-	-	-	-	-
		Sub	Total :	22/23						L				

SPRING SEMESTER

	Teaching Scheme				Contact Hrs. Per week			Exam. Duration		Relative Weight					
S. No.	Sub Code	Course Title	Sub Area	Credits	L	Т	Р	T	Р	CW S	PRS	MTE	ETE	PRE	
1.	CA-602	Simulation and Modelling	ICC	4	3	1	-	3	-	25	-	25	50		
2.	CA-604	Computer Communication Networks	PCC	5	3	1	2	3	2	15	15	15	40	15	
3.	CA-606	Software Engineering	PCC	4	3	1	-	3	-	25	-	25	50	-	
4.		Programme Elective-4	PEC	4	3	1	-	3	-	25	-	25	50	-	
5.		Open Elective-2	OEC	3/4	-	-	-	-	-	-	-	-	-	-	
	·	Sub	Total :	20/21		[~~			

Scheme of MCA Programme Master of Computer Applications (M.C.A.) (Interdisciplinary Programme)

III Year

AUTUMN SEMESTER

	Teaching Scheme						Contact Hrs. Per week			Relative Weight				
S. No.	Sub Code	Course Title	Sub Area	Credits	L	T	Р	T	Р	CWS	PRS	MTE	ETE	PRE
1.	CA-701	Organisational Behaviour	PCC	4	3	1	-	3	-	25	-	. 25	50	-
2.	CA-703	Computer Graphics	PCC	5	3	1	2	3	2	15	15	15	40	15
3.		Programme Elective-5	PEC	4	3	1	-	3	-	25	-	25	50	-
4.		Open Elective-3	OEC	3/4	-	-	-	-	-	-	-	-	-	-
5.	CA-705	Seminar & Project	SEM	8	-	-	-	-	-	-	-	40	60	-
			Sub Total :	24/25										

SPRING SEMESTER

	Teaching Scheme					Contact Hrs. Per week			am. ation	Relative Weight					
S. No.	Sub Code	Course Title	Sub Area	Credits	L	Τ	P	T	Р	CWS	PRS	MTE	ETE	PRE	
1.	CA-702	Dissertation	DIS	20	-	-	-	-	-	-	-	25	-	75	
	· · · · · · · · · · · · · · · · · · ·		Sub Total :	20											

PROGRAMME ELECTIVE COURSES (PEC)

I Year

AUTUMN SEMESTER

				Con Pe	itact] er wee	Hrs. ek	Exam. Duration		Relative Weight					
S. No.	Sub Code	Course Title	Sub Area	Credits	L	T	Р	T	Р	CWS	PRS	MTE	ETE	PRE
1.	CA-711	Operation Research	PCC	4	3	1	-	3	-	25	-	25	50	-
2.	CA-712	Theory of Computation	PCC	4	3	1	-	3	-	25	-	25	50	-
3.	CA-713	Artificial Intelligence and Applications	PCC	4	3	1	-	3	-	25	-	25	50	-
4.	CA-714	Parallel and Distributed Processing	PCC	4	3	1	-	3	-	25	-	25	50	-
5.	CA-715	Soft Computing Techniques	PCC	4	3	1	-	3	-	25	-	25	50	-
6.	CA-716	Cryptography	PCC	4	3	1	-	3	-	25	-	25	50	-
7.	CA-717	Computer Aided Designs	PCC	4	3	1	-	3	-	25	-	25	50	-
8.	CA-718	Internet Technology & Applications	PCC	4	3	1	-	3	-	25	-	25	50	-
9.	CA-719	Image Processing	PCC	4	3	1	-	3	-	25	-	25	50	-
10.	CA-720	Principles of Compiler Writing	PCC	4	3	1	-	3	-	25	-	25	50	-
11.	CA-721	System Programming	PCC	4	3	1	-	3	-	25	-	25	50	-

NAME OF DEPTT./CENTRE:	Department of I	Mathematics
1. Subject Code: CA-501	Course Title: Infor	mation Technology
2. Contact Hours: L: 3	T: 1	P: 0
3. Examination Duration (Hrs.):	Theory 3	Practical 0
4. Relative Weightage: CWS 25	PRS 0 MTE	25 ETE 50 PRE 0
5. Credits: 4 6. Sem	ester: Autumn	7. Subject Area: PCC

8. Pre-requisite: Nil

9. Objective : To introduce the basics of computers and information technology.

10.Details of Course:

S.No.	Contents	Contact Hours
1.	Introduction: Data and information concepts. importance of information	2
2.	Hardware: CPU, storage devices and media, Ram and ROM. input- output devices, VDU, TFT monitor, keyboard, mouse, printers, data communication equipment	7
3.	Software: System software, operating systems – concepts as resource manager and coordinator of processor, devices and memory; Typical commands of DOS/UNIX/ Windows. Application software, audio card, CD-ROM	8
4.	Languages: Classification, machine code, assembly language, high level language, compilers and interpreters	3
5.	JAVA Programming : Features of JAVA, elements of JAVA programming	7
6.	Computer Networks: Topologies, network protocols, LAN, WAN, modem	4
7.	Internet applications: e-mail, FTP, www, browser, html, web page designing	8
8.	Data communications: Communications protocols	3
	TOTAL	42

S.No.	Name of Authors/Book/Publisher	Year of Publication/ Reprint
1.	Shepherd, R. D., "Introduction to Computers and Technology", Crest Publishing House,New Delhi	2001
2.	Rajaraman, V., "Introduction to Information Technology", PHI	2003
3.	Jain, V.K., "Information Technology", BPB Pulications	2003
4.	Dove Taylor and Armstrong, J.C., "Teach Yourself UNIX", Techmedia New Delhi	2000
5.	Balagurusamy E., "Programming with JAVA", Tata McGraw-Hill	2000

NAME OF DEPTT./CENTRE:	Department of I	Mathematics
1. Subject Code: CA-502	Course Title: Data	Structures
2. Contact Hours: L: 3	T: 1	P: 2
3. Examination Duration (Hrs.):	Theory 3	Practical 2
4. Relative Weightage: CWS 15	PRS 15 MTE	15 ETE 40 PRE 15
5. Credits: 5 6. Sem	ester: Spring	7. Subject Area: PCC

8. Pre-requisite: Nil

9. Objective : To impart the basic knowledge of Data Structures with C++.

10.Details of Course:

S. No.	Contents	Contact Hours
1.	Arrays: One and two dimensional arrays, storage allocation	3
2.	Stacks and Queues: Array and linked representation, operations and applications	5
3.	Linear list: Array and linked representation, operations and applications	6
4.	Binary trees: Definition, array, linked and threaded representations; Operations and applications	6
5.	Sorting: Selection sort, bubble sort, exchange sort, quick sort, Heap sort and Merge sort; Analysis of sorting techniques	4
6.	Searching: Sequential search, binary search, search trees AVL trees, B trees; hash tables, hashing functions, collision resolution techniques	6
7.	General lists: Representations, Operations; Dynamic storage management, garbage collection, compaction	6
8.	Graphs: Array and Linked representation, operations and applications	6
	TOTAL	42

	List of Practicals	. <u></u>	
C++	programme for implementing		
(i)	Arrays		
(ii)	Stacks, Queues		
(iii)	Linked lists		

(iv)	Binary trees	
(v)	Sorting: Quick sort, Heap Sort	
(vi)	Searching: Search trees, AVL trees, B Trees, hash tables	
(vii)	General lists	
(viii)	Graphs	

S. No.	Name of Authors/ Book/Publisher	Year of Publication/ Reprint
1.	Langman, Y., Augenstein, M. and Tennenbaum A.M., "Data Structure Using C and C++", Prentice Hall of India	1998
2.	Sahni S., "Data Structures Algorithms and Applcations in C++", Tata McGraw Hill	2005
3.	Dale N., "C++ Plus Data Structures", Narosa Publications	2000

NAME OF DEPTT./CENTRE:	Department of	Mathematics	
1. Subject Code: CA-503	Course Title: Obje	ct Oriented Progra	amming Languages
2. Contact Hours: L: 3	T: 1	P: 2	
3. Examination Duration (Hrs.):	Theory 3	Practical	2
4. Relative Weightage: CWS 15	5 PRS 15 MTE	15 ETE 40	PRE 15
5. Credits: 5 6. Sen	nester: Autumn	7. Subject Area: PC	c

8. Pre-requisite: Nil

9. Objective : To introduce the concepts of object oriented programming.

10.Details of Course:

S.No.	Contents	Contact Hours
1.	Console I/0, data types, expressions, logic control, loops	5
2.	Functions, storage classes, scope rules, recursion	4
3.	Arrays one and two dimensional, passing arrays to functions, pointers, pointer arithmetic and arrays; Dynamic arrays	6
4.	Object oriented concepts, classes, objects, function and operator overloading, friend functions	8
5.	Inheritance, containership concepts, virtual functions, dynamic binding, abstract classes	8
6.	Strings, functions for manipulating strings, String class; Graphic functions	4
7.	Function and class templates; Exception handling	3
8.	Files and streams	4
	TOTAL	42

	List of Practicals on C++
(i)	Program for Simple I/O, conditions looping, functions
(ii)	Developing and testing classes with and without constructors
(iii)	Function and operator overloading, friend functions
(iv)	Implementing intreritence, containershop, virtual functions, abstract
(v)	classes
(vi)	File handling
(vii)	Exception handling,
	Functions and class templates

S.No.	Name of Authors/Book/Publisher	Year of Publication/ Reprint
1.	Dietel, H.M. and Deitel, P.J., "C++, How to program", Pearson Prentice Hall	2007
2.	Herbert Schildt, "The complete Reference C++", Tata McGraw Hill.	2004
3.	Balagurusamy. E, "Object Oriented Programming with C++",Tata McGraw Hill	2007
4.	Malik, D.S., "C++ Programming from problem analysis to program Design", Cengage Learning	2007

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NAME OF DEPTT./CENTRE:	Department of I	Wathematics
1. Subject Code: CA-504	Course Title: Micro	oprocessors and Interfacing
2. Contact Hours: L: 3	T: 1	P: 2
3. Examination Duration (Hrs.):	Theory 3	Practical 2
4. Relative Weightage: CWS 15	PRS 15 MTE	15 ETE 40 PRE 15
5. Credits: 5 6. Sem	ester: Spring	7. Subject Area: PCC

8. Pre-requisite: Nil

9. Objective : To acquaint the students with the concept of microprocessors, its interfacing and assembly language programming.

10.Details of Course:

S. No.	Contents	Contact
1.	Review of 8086/8088 microprocessor: Architecture, instruction set and programming, power on reset circuit along with 8284A clock generator	8
2.	Modes of Operation of Pentium processor: Execution environment, modes of operation: Real, protected, SMM and virtual 8086 modes, privilege Level protection, real and protected mode memory reference, application program descriptors	5
3.	IA-32 Instruction Set: Intel generalized instruction set format, prefix instruction bytes, 16-bit and 32-bit instruction addressing modes; ALP instruction statements and corresponding MLP codes, 16-bit and 32-bit default usage of internal registers	8
4.	Assembly level Programming under DOS window: PSP and SPP; Assembler directives, MODEL approach; Fundamentals of programming; DOS function calls and BIOS function calls, procedures, use of INT N as software interrupt, hardware interrupt and exceptions	5
5.	Special features of Pentium : (a) Memory management registers, GDTR, LDTR, IDTR and TR (b) System descriptors (c) Task management data structures (d) Memory paging unit (e) Privilege level operation, procedures and software interrupt	8
6.	Interfacing: Memory and I/O technique, polled and interrupt I/O, programmable IC chips such as 8255A PPI, 8253 PTI and 8259 PIC	8
	Total	42

11. List of Experiments:

(i)	Use of DEBUG.EXE under DOS Window in Window-XP operating system
(ii)	Video & keyboard operations using BIOS and DOS function routines
(iii)	Use of MRTC in producing variable time delays; background & foreground color
	attributes
(iv)	Conversion of Hex numbers to decimal and binary and display on CRT screen
(v)	Conversion from Decimal to Hex and display; use of extended ASCII character set
(vi)	Decimal arithmetic operation; decimal up and down counters and display
(vii)	Examples of ISR for execution with INT N instructions
(viii)	Use of mother-board speaker in generating various tones with the help of MRTC
	and ASCII keyboard
(ix)	Assembly Level programming for message retrieval; universal & .MODEL approach
	for both >EXE and >COM programs
(x)	An example for the usage of command line parameters and PSP in writing
	Assembly Level Programs
(xi)	Combining different modules developed in different files to get .EXE program; use of
	PUBLIC and EXTRN directives

S. No.	Name of Authors/Book/Publisher	Year of Publication/ Reprint
1.	Barry B. Brey, Programming the 80286, 80386, 80486 and Pentium based Personal Computer, PHI (EEE)	1999
2.	Barry B. Brey, "The Intel Microprocessors Architecture, Programming, and Interfacing", 8 th Edition, PHI (EEE)	2009
3.	James L. Antonakos, "The Pentium Microprocessor", Pearson Education Asia (LPE)	2002
4.	Kip R. Irvine, "Assembly Language for Intel-Based Computer", 4 th Edition, Pearson Education Asia (LPE)	2005
5.	Douglas V. Hall, "Microprocessors And Interfacing Programming and Hardware", Tata McGraw-Hill, 2 nd Edition	2001

NAME OF DEPTT./CENTRE:	Department	t of Mathematics
1. Subject Code: CA-505	Course Title:	Computer Organisation and Architecture
2. Contact Hours: L: 3	T: 1	P: 0
3. Examination Duration (Hrs.):	Theory 3	B Practical 0
4. Relative Weightage: CWS 28	5 PRS 0	MTE 25 ETE 50 PRE 0
5. Credits: 4 6. Sen	nester: Autumn	7. Subject Area: PCC
8. Pre-requisite: Nil		

9. Objective: To acquaint the students with the concept of interfacing memory, I/O devices and Computer Architecture and Organisation.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Number system : Decimal, hex and binary. Real numbers: single, double & extended double precision, IEEE 754 formats Computer data types and assembler directives	8
2.	Arithmetic and Logic Unit (ALU): Switching theory and gate circuits. Multiplexers, demultiplexers & decoders, ALU design, multiplication & division algorithms	6
3.	Bus-organized Computer Systems: Flip-flops & counters, power on RESET, synchronous CLEAR Registers & register logics, micro-operations, tri-state buffers & bus-organized computer systems	6
4.	Von Neumann first IAS computer: IAS computer architecture, instruction set, instruction cycle and fundamental of programming, addressing modes	4
5.	Cache Memory: Memory organized as a hierarchy, memory interfacing to 8- bit, 16-bit, 32-bit & 64-bit BDB, cache memory organization & mapping, direct, associative & set-associative, replacement policy & write policy	6
6.	Pipeline Architecture: Introduction, instruction cycle state diagram, instruction pipelining, arithmetic pipelining	4
7	8086 / 8088 microprocessor: 8086/8088 processor as a Central Processing unit (CPU), its architecture, Instruction set, assembly level programming & machine level programming	8
	Total	42

S. No.	Name of Authors/Book/Publisher	Year of Publication/ Reprint
1.	William Stallings, "Computer Organization & Architecture", 6 th Ed, Pearson Education Asia	2003
2.	M. Morris Mano, "Computer System Architecture", 3 rd Ed, Prentice Hall of India	2001
3.	Behrooz Parhami, "Computer Architecture (From microprocessors to Supercomputers)", Oxford	2005
4.	B Govindarajalu, "Computer Architecture and Organization", Tata McGraw –Hill	2004

NAME OF DEPTT./CENTRE:	Department of Mathematics	
1. Subject Code: CA-506	Course Title: Discrete Mathematics and Probability Theorem	у
2. Contact Hours: L: 3	T: 1 P: 0	
3. Examination Duration (Hrs.):	Theory 3 Practical 0	
4. Relative Weightage: CWS 2	5 PRS 0 MTE 25 ETE 50 PRE 0	
5. Credits: 4 6. Set	mester: Spring 7. Subject Area: PCC	
8. Pre-requisite: Nil	· · · · · · · · · · · · · · · · · · ·	

9. Objective: To impart knowledge in Discrete Mathematics and probability.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Logic: Propositions, connectives, tautologies, arguments and proofs, theory of inference and predicates	4
2.	Relations: Relations, digraphs, matrix of relation, equivalence and partial order relation, paths, closures	2
3.	Algebraic Structures: Lattices, boolean algebra and boolean functions with applications, logic gates and minimization of circuits	4
4.	Numeric functions: Asymptotic behavior of numeric functions, generating functions, big o and big O notations	2
5.	Recurrence relations Recursive algorithms: Linear recurrence relations with constant coefficients, solution by the method of generating functions, sorting algorithms	4
6.	Languages: Grammars, finite state machines, language recognition and Turing machines	8
7.	Graph theory: Basic terminology, multigraph and weighted graph, path and circuits, shortest paths in weighted graphs, eulerian paths and circuits, Hamiltonian paths and circuits; Trees: rooted trees, spanning trees, minimum spanning trees and cut-sets	8
8.	Probability Theory: Definition of probability through axiomatic approach, conditional probability and statistical independence, Bayes theorem and its applications	5

9.	Random Variables:	Discrete	and	continuous	random	variables,	5
	Binomial, geometric a	nd Poisson	distri	butions, unifo	orm, expo	nential and	
	normal distributions, e	xpectation,	varia	ince and high	ner order i	noments	
						Total	42

S.No.	Name of Author(s)/ Book/Publisher	Year of Publication/ Reprint
1.	Mott J. L., Kendal Abraham and Baker T. P., "Discrete Mathematics for Computer Scientists and Mathematicians", 2 nd edition, PHI	2001
2.	Liu C.L., "Elements of Discrete Mathematics", 2 nd edition, Tata McGraw Hill	2000
3.	Grimaldi R. P. and Ramana B. V., "Discrete and Combinatorial Mathematics", 5 th edition, Pearson Education	2006
4.	Ross, S. M., "Introduction to Probability Models", 9 th edition, Elsevier. (Indian Reprint)	2007
5.	Montgomery D. C. and Runger G. C., "Applied Statistics and Probability of Engineers", 3 rd edition, Wiley Student Edition	2002

NAME OF DEPTT./CENTRE:	Department of N	Mathematics	
1. Subject Code: CA-507	Course Title: Mana	gement Concepts and Acco	ounting
2. Contact Hours: L: 3	T: 1	P: 0	
3. Examination Duration (Hrs.):	Theory 3	Practical 0	
4. Relative Weightage: CWS 25	PRS 0 MTE	25 ETE 50 PRE 0	
5. Credits: 4 6. Sem	ester: Autumn	7. Subject Area: PCC	

8. Pre-requisite: Nil

9. Objective: To introduce the basic concepts of management and accounting.

10. Details of Course:

S.No.	Contents	Contact Hours
1.	Introduction of Management: Managerial Processes, functions, skill and roles	3
2.	Planning and decision making: Planning processes; Tpes of plans, MBO, rational model of decision making, individual decision making and problem solving	4
3.	Organizing: Organizational design and structure departmentation, organizational structure, line/staff authority, delegation and decentralization	4
4.	Leadership: Leading, leadership styles, managerial grid model, Fiedler's Model and Hersey and Blenchard's model; Types of leadership	4
5.	Controlling: Process and techniques of control	2
6.	Functional classification: Cost through cost sheet	2
7.	Absorption costing: Importance of overheads, absorption of overhead, over and under recovery of overheads	2
8.	Marginal costing: Practical application of marginal costing technique, key factor analysis, optimizing product mix, contribution analysis, make or buy decision, price fixation, discontinuance of product, diversification of product line, accept or reject new order, temporary cessation of operation	4
9.	Profit analysis: Break even and cost volume	3

10.	Basic accounting terms: Assumptions in accounting, accounting	2
	principles, double entry book keeping system	
11.	Books: Original entry, journal, ledger, trial balance	4
12.	Financial statement analysis: Vertical analysis, horizontal analysis and ratio analysis, Preparation of financial statements including year end adjustments	8
	Total	42

S.No.	Name of Authors/book/Publisher	Year of Publication/ Reprint
1.	Stoner J.A.F, Freeman E and Daniel Gilbert, "Management", 7 th Edition, Pearson Education, New Delhi	2007
2.	Robbins S.P and Mary Coulter, "Management", 5 th Edition, Pearson Education, New Delhi	2007
3.	Weilrich, Koontz, Harold, "Management: A Global Perspective", 12 th Edition, Tata McGraw Hill, New Delhi	2009
4.	Schmermerhorn John R., "Management", 8 th Edition, John Wiley, United States of America	2007
5.	Goel, D.K. and Goel, Rajesh, "Accountancy", Arya Publications, New Delhi	2006
6.	Jain, S.P. and Narang, K.L., "Cost and Management Accounting", Kalyani Publishers, New Delhi	2008
7.	Mittal, S.N. and Maheshwari, S.N., "Cost and Management accounting", Sultan Chand & Sons, New Delhi	2009

NAME OF DEPTT./CENTRE:	Department of I	Wathematics
1. Subject Code: CA-509	Course Title: Num	erical Methods
2. Contact Hours: L: 3	T: 1	P: 2
3. Examination Duration (Hrs.):	Theory 3	Practical 2
4. Relative Weightage: CWS 15	PRS 15 MTE	15 ETE 40 PRE 15
5. Credits: 5 6. Sem	ester: Spring	7. Subject Area: PCC

8. Pre-requisite: Nil

9. Objective: To expose the students about various Numerical Methods.

10. Details of Course:

S.No.	Contents	Contact Hours
1.	Error Analysis : Types of errors, propagation of errors, significant digits	2
2.	Solution of system of linear and nonlinear equations: Gauss	6
Í	Doolittle and Crout's methods. Jacobi and Gauss-Seidel iterative methods	
3.	Eigen values and eigen vectors: Dominant and smallest eigen values and eigen vectors by power method	3
4.	Roots of non-linear equations: Bisection, Regula-falsi, Atkin's, Newton- Raphson methods, direct iterative method with convergence criteria; Newton-Raphson methods for the solution of non-linear equations	6
5.	Interpolation: Finite difference operators, difference table and interpolation formulae-Newton's forward, backward, Stirling's and Bessel's formulae; Newton's divided difference and Lagrange's interpolation formulae; Errors in various interpolation formulae; Cubic spline interpolation	6
6.	Numerical differentiation and integration: formulae for first and second order derivatives; Trapezoidal, Simpson's 1/3 and 3/8 rules; Romberg integration and Gaussian quadrature formulae	5
7.	Solution of two point boundary value problems: Finite difference method	4
8.	Solution of Partial Differential Equations: Heat conduction, wave and Poisson's equations	8
9.	Case studies	2
	TOTAL	42

	List of Practicals: C++ for
(i)	Solution of Non-linear equation using, Bisection method,
	Newton-Raphson method
(ii)	Solution of Linear Simultaneous equations using
	Elimination with partial pivoting
	Crouts method
	Gauss-siedal method
(iii)	Interpolation using
	Divided difference interpolation
	Central difference interpolation (Stirlings formula)
(iv)	Integration using Trapezoidal and Simpson's 1/3 rule
_(v)	Solving Eigenvalue Problem using power method
(vi)	Solving Initial Value Problems using
	Modified Euler's Method
	4 th order Runge-Kulta Method
(vii)	Solving Boundary Value Problems and case study using Finite difference
	method

S.No.	Name of Authors/Book/Publisher	Year of Publication/ Reprint
1.	Gerald, Curtis F. and Wheatley, Patrick, "Applied Numerical Analysis", 6 th Edition, Addison Weley	2006
<u>´</u> 2.	Jain M.K., Iyengar, S.R.K. & Jain, R.K., "Numerical Methods for Scientific and Engineering Computation", New Age Int. Pvt. Ltd., Pub. New Delhi, 3 rd Edition	2006
3.	Conte, S.D. & de Boor C., "Elementary Numerical Analysis", Koga Kusha	1982
4.	Smith, G.D., "Numerical Solution of Partial Differential Equations", Oxford University Press	2006

NAME OF DEPTT./CENTRE:	Department of M	lathematics
1. Subject Code: CA-711	Course Title: Opera	tions Research
2. Contact Hours: L: 3	T: 1	P: 0
3. Examination Duration (Hrs.):	Theory 3	Practical 0
4. Relative Weightage: CWS 25	PRS 0 MTE	25 ETE 50 PRE 0
5. Credits: 4 6. Sem	ester: Both	7. Subject Area: PEC

- 8. Pre-requisite: Nil
- 9. Objective: To acquaint the students with advanced topics of Operations Research
- 10. Details of Course:

S. No.	Contents	Contact Hours
1.	Various OR models	2
2.	Linear Programming, graphical method, simplex method, revised Simplex Method	4
3.	Duality Theory, dual simplex method, sensitivity analysis	6
4.	Multi objective and goal programming	3
5.	Cutting planes, branch and bound techniques for integer and mixed integer problems	4
6.	Algorithms for 0-1, traveling salesman and cargo loading problems	5
7.	Optimzation of processing of jobs through machines	5
8:	Sequencing, Scheduling CPM and PERT	5
9.	Game Theory: Pure and mixed strategies, solution by graphical and simplex method	4
10.	Queing Theory	2
11.	Case study	2
	TOTAL	42

S. No.	Name of Authors/Book/ Publisher	Year of publication/ Reprints
1.	Taha H.A., "Operations Research : An Introduction", MacMillan Pub Co., NY, Seventh Edition.	2003
2.	Pant J.C., "Introduction to Optimization/ Operations Research", Jain Brothers, New Delhi.	2005
3.	Mohan C. and Kusum Deep: "Optimization Techniques", New Age India Pvt. Ltd., New Delhi.	2009
4.	Ravindran A., Phillips D.T. and Solberg J.J., "Operations Research: Principles and Practice", John Wiley and Sons, NY, Second Edition.	2001
5.	Mittal K.V. and Mohan C., "Optimization Methods in System Analysis and Operations Research", New Age India Pvt. Ltd, New Delhi.	1996

NAME OF DEPTT./CENTRE:	Department of I	Nathematics
1. Subject Code: CA-712	Course Title: Theo	ry of Computation
2. Contact Hours: L: 3	T: 1	P: 0
3. Examination Duration (Hrs.):	Theory 3	Practical 0
4. Relative Weightage: CWS 25	PRS 0 MTE	25 ETE 50 PRE 0
5. Credits: 4 6. Sem	ester: Autumn	7. Subject Area: PEC

8. Pre-requisite: Discrete Structures

- 9. Objective: To provide an understanding of the theoretical development of computer science, particularly for finite representations of languages and machines.
- 10. Details of Course:

S. No.	Contents	Contact Hours
1.	Abstract machines and computation, formal languages and grammars.	3
2.	Regular languages, finite state machines, deterministic and non-	9
	deterministic finite state machines, regular grammars, regular expressions, equivalence of the three models, state equivalence and minimization.	
3.	Properties of finite state languages, closure, decidability, Pumping lemma.	5
4.	Context-free language models, context-free grammars, simplification of content-free grammars, Chomsky normal form, Greibach normal form.	5
5.	Pushdown automata, deterministic and non-deterministic pushdown automata and their equivalence with context free languages, parsing.	7
6.	Closure properties of context-free languages.	3
7.	Turing machines, computable languages and functions, modifications of Turing machines, restricted Turing machines, Church's hypothesis.	6
8.	Recursive, and recursively enumerable languages; Undecidability, notion of reduction.	4
	Total	42

S. No.	Name of Authors/Book/Publisher	Year of Publication/ Reprints
1.	Hopcropt, J.E., Motwani, R. and Ullman, J.D., "Introduction to Automata theory, Languages and Computation", Pearson Education.	2001
2.	Lewis, H.R. and Papadimitriou, C.H., "Elements of the Theory of Computation", 2 nd Ed., Prentice-Hall.	1998
3.	Linz, P., "An Introduction to Formal Languages and Automata", Narosa Publishing House.	1998
4.	Cohen, D.I.A., "Introduction to Computer Theory", John Wiley & Sons.	1991
5.	Denning, P.J., Dennis, J.B., and Qualitz, J.E., "Machine Languages and Computation", Prentice- Hall.	1978

NAME OF DEPTT./CENTRE:	Department of Mathematics	
1. Subject Code: CA-713	Course Title: Artifi	cial Intelligence and Applications
2. Contact Hours: L: 3	T: 1	P: 0
3. Examination Duration (Hrs.):	Theory 3	Practical 0
4. Relative Weightage: CWS 25	PRS 0 MTE	25 ETE 50 PRE 0
5. Credits: 4 6. Sem	nester: Both	7. Subject Area: PEC
8. Pre-requisite: Nil		

9. Objective: To acquaint the students with the theoretical and computational techniques in Artificial Intelligence

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Fundamental Concepts: Agents, environments, general model; Problem solving techniques.	4
2.	Search Techniques: Uninformed search, heuristic search, adversarial search and game trees; Solution of constraint satisfaction problems using search.	6
3.	Knowledge Representation: Propositional and predicate calculus, semantics for predicate calculus, inference rules, unification, semantic networks, conceptual graphs, structured representation, frames, scripts.	8
4.	Prolog: Basic constructs, answer extraction.	4
5.	Bayesian Reasoning: Bayesian networks, dynamic Bayesian networks.	4
6.	Planning: State-space search, planning graphs.	4
7.	Learning: Inductive learning, decision tree learning.	4
8.	Languages and Soft Computing Techniques: Role of knowledge in language understanding, stages of language analysis, parsing using context free grammars, transition network parser, Chomsky hierarchy and context sensitive grammars, rule based expert systems, neural networks, genetic algorithms.	8
	Total	42

S. No.	Name of Authors/Book/Publisher	Year of Publication/ Reprint
1.	Russell, S. and Norvig, P., "Artificial Intelligence : A Modern Approach", Pearson Education.	2006
2.	Rich, E. and Knight, K., "Artificial Intelligence", Tata McGraw-Hill.	2006
3.	Nilsson, N. J., "Artificial Intelligence: A New Synthesis", Morgan Kaufmann.	1998
4.	Bratko, I., "Prolog Programming for Artificial Intelligence", 3 rd Edition, Pearson Education.	2001

NAME OF DEPTT./CENTRE:	Department of Mathematics		
1. Subject Code: CA-714	Course Title: Parallel and Distributed Proces		ed Processing
2. Contact Hours: L: 3	T: 1	P: 0	
3. Examination Duration (Hrs.):	Theory	3 Practical	0
4. Relative Weightage: CWS 2	5 PRS 0	MTE 25 ETE 50	PRE 0
5. Credits: 4 6. Sen	nester: Both	7. Subject Area: F	PEC
8. Pre-requisite: Nil			

9. Objective: To acquaint the students with parallel and distributed computing techniques.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Parallel processing: Introduction, data and control parallelism, PARAM model of parallel computation, parallel algorithm design	7
2.	Multiprocessors and Multicomputers: Processor organisation, shared memory and message passing systems, message passing interface programming with respect to cluster	10
3.	Array processing: SIMD array processing, communications, SIMD interconnection networks, algorithms for array processing	7
4.	Applications: Parallel algorithms for matrix multiplication, fast Fourier transform, linear systems, sorting, numerical integration, optimization	10
5.	Parallel programming languages: C++, high performance FORTRAN	6
6.	Introduction: Basics of cloud and grid computing	2
<u> </u>	TOTAL	42

S. No.	Name of Authors/Book/ Publisher	Year of publication/ Reprint
1.	Quinn M.J., "Parallel Computing : Theory and Practice", Tata McGraw Hill	1994
2.	Rajaraman V. and Siva Ram Murthy C., "Parallel Computers Architecture and Programming", Prentice Hall of India	2000
3.	Peter S. Pacheco, "Parallel Programming with MPI", Morgan Kaufmann Publishers Inc., California	1997
4.	Akl S.G., "The Design and Analysis of Parallel Algorithms", Prentice Hall, Englewood Cliffs, New Jersey	1989
5.	A.T. Velte, T.J. Velte and Robert Elsenpeter, "Cloud Compting – A Practical Approach", Tata McGrawhill	2010

NAME OF DEPTT./CENTRE:	Department of Mathematics		
1. Subject Code: CA-715	Course Title: Soft	Computing Techniques	
2. Contact Hours: L: 3	T: 1	P: 0	
3. Examination Duration (Hrs.):	Theory 3	Practical 0	
4. Relative Weightage: CWS 25	PRS 0 MTE	25 ETE 50 PRE 0	
5. Credits: 4 6. Sem	ester: Both	7. Subject Area: PEC	
8. Pre-requisite: Nil			

9. Objective: To acquaint the students with advanced Soft Computing Techniques

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Neural Networks: Fundamentals, neural network architectures, feedforward networks, back propagation networks	7
2.	Fuzzy Logic: Fuzzy sets, fuzzy systems	5
3.	Genetic Algorithms: Encoding, fitness function, reproduction, crossover, mutation	8
4.	Real Coded Genetic Algorithms: Encoding, fitness functions, reproduction, crossover, mutation	6
5.	Memetic Algorithms: Implementation and applications	3
6.	Particle swarm optimization: Implementation and applications	3
7.	Hybrid Systems: Genetic algorithm based backpropagation network, fuzzy – backpropagation, fuzzy logic controlled genetic algorithms	8
8.	Case studies	2
	TOTAL	42

S. No.	Name of Authors/Book/Publisher	Year of publication/ Reprint
1.	Rajasekaran S. and Vijayalakshmi Pai, G.S., "Neural Networks, Fuzzy Logic and Genetic Algorithms: Synthesis and Applications", Prentice Hall of India, New Delhi	2003
2.	Jang S.R., Sun C.T., E. Mizutani: "Nuro – Fuzzy and Soft Computing", Prentice Hall of India, New Delhi	2002
3.	Andrea Tettamanzi and Marco Tomassini : "Soft Computing: Integrating Evolutionary, Neural, and Fuzzy Systems", Springer	2001

NAME OF DEPTT./CENTRE:	Department of I	Mathematics
1. Subject Code: CA-716	Course Title: Cryp	otography
2. Contact Hours: L: 3	T: 1	P: 0
3. Examination Duration (Hrs.):	Theory 3	Practical 0
4. Relative Weightage: CWS 2	5 PRS 0 MTE	25 ETE 50 PRE 0
5. Credits: 4 6. Ser	nester: Both	7. Subject Area: PEC
8. Pre-requisite: Nil		
9. Objective: To introduce	basic concepts of C	ryptography

10. Details of Course:

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S.No.	Contents	Contact Hours
1.	Mathematical Background: Complexity theory, Modular arithmetic, Chinese remainder theorem, Introduction to group theory, Fermat's Little Theorem	08
2.	Classical Cryptography: The shift cipher: The substitution cipher, The affine cipher, The Vigenere cipher, stream cipher – introduction to LFSR Cryptanalysis: Cryptanalysis of the shift cipher, the substitution cipher, the affine cipher, the Vigenere cipher, LFSR based stream cipher	08
3.	Shannon's Theory: Perfect secrey, Entropy, Properties of entropy, Spurious keys and unicity distance, Product cryptosystem	06
4.	Block Cipher and Stream Ciphers: Description of at least two block ciphers including DES. Description of at least two state-of-the-art stream ciphers: suitable for hardware and software implementation	04
5.	Public Key Cryptography: The RSA cryptosystem, Legendre symbol and Jacobi symbol, Euler pseudoprimes, primality testing algorithms – Solovay Strassen algorithm, Miller and Rabin algorithm	08
6.	Cryptographic Hash Functions: Security of hash functions, The random oracle model, Iterated hash functions, The Merkle Damgard construction	08
	Total	42

S.No.	Name of Author(s)/Book/Publisher	Year of Publication/ Reprint
1.	Stinson D., "Cryptography Theory and Practice", 3 rd edition, Chapman & Hall / CRC	2006
2.	Buchman J., "Introduction to Cryptography", 2 nd edition, Springer (Indian Reprint)	2005
3.	Koblitz N., "A Course in Number Theory and Cryptography", 2 nd edition, Springer (Indian Reprint)	1994
4.	Das A. and Venimadhavan C. E., "Public-Key Cryptography-Theory and Practice", Pearson Education Inc	2009

NAME OF DEPTT./CENTRE:	Departmen	it of Mathematics	
1. Subject Code: CA-717	Course Title:	Computer Aided Designs	
2. Contact Hours: L: 3	T: 1	P: 0	
3. Examination Duration (Hrs.):	Theory	3 Practical 0	
4. Relative Weightage: CWS 25	5 PRS 0	MTE 25 ETE 50 PRE 0)
5. Credits: 4 6. Sen	nester: Both	7. Subject Area: PEC	
8. Pre-requisite: Nil			

To know the basic techniques of Computer Aided Design.

10. Details of Course:

9. Objective:

S. No.	Contents	Contact
		Hours
1.	Introduction: Elements of CAD, essential requirements of CAD, concepts of	4
	integrated CAD/CAM, necessity and its importance, engineering applications	
2.	Graphics Hardware for CAD/CAM systems: Graphics input devices-cursor	6
	control devices, digitizers, keyboard terminals, image scather, speech control devices and touch pender. Craphics display devices activate ray tube	
	random and ractor scap display colour CRT monitors direct view storage	
	tubes, flat panel display; Hard copy printers and plotters	
3.	3D Modeling and Viewing: three modeling approaches, types of geometric	6
	models, coordinate systems, sketching and sketch planes, parameters and	
	dimensions, basic features, datum features, modeling operations, model	
	viewing, VRML web based viewing	
4.	Modeling Aids and Tools: Geometric modifiers, layers, colors, grids,	4
	groups, clipping, transformations, geometric measurements	
5.	CAD/CAM Programming: Relational and object databases, object concepts,	5
	inheritance, parametric design and objects, macros, programming the	
	CAD/CAM interface	
6.	Geometric Modeling: Details of curves, surfaces, nurbs and solids	5
7.	3D Graphics: Polygon surfaces-polygon mesh representations, quadric and	7
	superquadric surfaces and blobby objects; Solid modeling-solid entities,	

	fundamentals of solid modeling-set theory, regularized set operations; Half spaces, boundary representation, constructive solid geometry, sweep representation, color models, application commands for AutoCAD and ProE software	
8.	Animation: Conventional animation, computer animation, engineering animation, animation types, animation techniques, key frame technique, simulation technique	5
	Total	42

S. No.	Name of Authors/Book/Publisher	Year of Publication/ Reprint
1.	Hearn D. and Baker M.P., "Computer Graphics", Prentice Hall of India	1997
2.	Groover H.P. and Zimmers E., "CAD/CAM", Jr. Prentice Hall India Ltd.	1992
3.	Ibrahim Zeid and Sivasubramaniam R., "CAD/CAM Theory and Practice", Tata McGraw Hill	2009
4.	Rogers D.F. and Adams J.A., "Mathematical Elements for Computer Graphics", Tata McGraw Hill	1997

NAME OF DEPTT./CENTRE:	Department o	f Mathematics	
1. Subject Code: CA-718	Course Title: In	ternet Technology and Applica	ations
2. Contact Hours: L: 3	T: 1	P: 0	
3. Examination Duration (Hrs.):	Theory 3	Practical 0	
4. Relative Weightage: CWS 25	PRS 0 MT	E 25 ETE 50 PRE 0]
5. Credits: 4 6. Sem	lester: Both	7. Subject Area: PEC	
8. Pre-requisite: Nil			

9. Objective: To impart knowledge of internet protocols and CGI Programming

10. Details of Course:

S.No.	Contents	Contact Hours
1.	Introduction: Computer networks and the Internet, end Systems, Clients and Servers, OSI model, TCP, UDP, IP addresses, domain name System, URL, DNS.	6
2.	Internet Applications: Network application, client-server and P2P architectures; Web and HTTP, web browsers; File Transfer FTP; e-mail, SMTP,MIME, Mail Access Protocols- POP and IMAP, Internet Mail; P2P File Sharing	12
3.	Socket Programming: Client and server socket programming with TCP and UDP; Design of simple web server and mail server.	6
4.	Multimedia Networking: Accessing Audio and Video through a Web Server, RTP, RTCP and SIP protocols, working of Internet telephone.	6
5.	CGI Programming: CGI Scripts, CGI Interface, writing server scripts in PERL, form designing for taking input, storing data in remote server, user authentication and registration, user query handling.	12
	TOTAL	42

S.No.	Name of Authors/Book/Publisher	Year of Publication/ Reprint
1.	Kurose J.F. and Ross K.W., "Computer Networking", Pearson Education (Sigapore) Pvt. Ltd.	2006
2.	Deitel H.M., Deitel P.J. and Goldberg A.B., "Internet and World Wide Web", Pearson Education, Inc.	2008
3.	Comer D.E., "Internetworking with TCP/IP", Vol. I, PHI Publication.	2002
4.	Meltzer K. and Michalski B., "Writing CGI Applications with Perl", Addison-Wesley Professional.	2001

NAME OF DEPTT./CENTRE:	Department of	lathematics
1. Subject Code: CA-719	Course Title: Imag	e Processing
2. Contact Hours: L: 3	T: 1	P: 0
3. Examination Duration (Hrs.):	Theory 3	Practical 0
4. Relative Weightage: CWS 25	PRS 0 MTE	25 ETE 50 PRE 0
5. Credits: 4 6. Sem	ester: Both	7. Subject Area: PEC
8. Pre-requisite: Nil		

9. Objective: To introduce the basic concepts of Image Processing

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Introduction	2
2.	Digital Images: The eye, brightness, image sampling, neighbors of pixels, distance.	4
3.	Multiview Geometry: Stereo vision, correspondence problem; algorithms for stereo matching.	4
4.	Spatial Image Enhancements: Transformations, negative, log, power, Histogram, subtraction, averaging, laplacian, smoothing.	4
5.	Frequency Domain Image Enhancements : 1D FT, inverse, 2D FT, filtering, lowpass, highpass, unsharp, high-boost, use of FT, fast FT	4
6.	Image Restoration: Noise, mean filter, median, min, max, midpoint, adaptive filters, frequency domain, etc	4
7.	Color Image Processing: RGB, CMY, CMYK, HSI, operations on color images.	4
8.	Applications of Wavelets: Image pyramids, multiresolution expansions, wavelet transform in 1D and 2D, the fast wavelet transform.	4
9.	Mathematical morphology of Images: Labeling, symmetrical difference, dilation and erosion, morphological gradient, distance transform, opening and closing, conditional dilation.	4
10.	Image Compression and Segmentation: Image compression models, error-free compression, lossy compression, image compression standards, detection of discontinuities, edge linking and boundary detection, thresholding, region-based segmentation.	8
	Total	42

S. No.	Name of Authors/Book/Publisher		
1.	Gonzalez R.C. and Woods R.E., "Digital Image Processing", Addison-Wesley.	2004	
2.	Forsyth D.A. and Ponce J., "Computer Vision : A Modern Approach", Prentice Hall.	2003	
3.	Shalkoff R.J., "Digital Image Processing and Computer Vision", John Wiley and Sons, New York.	2000	

NAME OF DEPTT./CENTRE:	Department of I	l athematics
1. Subject Code: CA-720	Course Title: Princ	ciples of Compiler Writing
2. Contact Hours: L: 3	T: 1	P: 0
3. Examination Duration (Hrs.):	Theory 3	Practical 0
4. Relative Weightage: CWS 25	PRS 0 MTE	25 ETE 50 PRE 0
5. Credits: 4 6. Sem	nester: Both	7. Subject Area: PEC

8. Pre-requisite: Nil

9. Objective: To introduce the basic theory for designing a compiler

10. Details of Course:

S.No.	Contents	Contact Hours
1.	Introduction to translators, phases of compilation.	2
2.	Lexical analysis, finite automata, DFA and states minimization.	4
3.	Grammar, classification, language and sentence derivation, parse tree.	3
4.	Parsing Top-down parsing, LL(1) parser, syntax diagram, predictive parser.	5
5.	Bottom-up parsing, shift-reduce parsing, LR, SLR and LALR parsing tables, precedence relations and parsing.	10
6.	Semantic Analysis syntax directed translation, intermediate codes, post fix notation, quadruples, direct and indirect triples, syntax tree. Assignment statement, arithmetic and boolean expressions.	8
7.	Code Optimization Machine independent and dependant optimization, data flow diagram, loop detection, assembly code generation.	8
8.	Design of an interpreter .	2
	TOTAL	42

S.No.	Name of Authors/Book/Publisher	Year of Publication/ Reprint
1.	Aho A.V. and Ullman J.D., "Principles of Compiler Design", Addison-Wesley Publication.	1999
2.	Niklaus Wirth, "Compiler Construction", Addison-Wesley Publication.	2005
3.	Barrett W.A. and Couch J.D., "Compiler Construction: Theory and Practice", SRA Publisher.	1980

NAME OF DEPTT./CENTRE:	Department of	Mathematics
1. Subject Code: CA-721	Course Title: Syst	em Programming
2. Contact Hours: L: 3	T: 1	P: 0
3. Examination Duration (Hrs.):	Theory 3	Practical 0
4. Relative Weightage: CWS 25	PRS 0 MTE	25 ETE 50 PRE 0
5. Credits: 4 6. Sem	ester: Both	7. Subject Area: PEC
- · · · · · · · · · · · · · · · · · · ·		

8. Pre-requisite: Nil

9. Objective: To impart knowledge of system programming

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Introduction: System software, machine architecture, machine level representation of programs, language processors, activities, language processor development tools, data structures for processing scanning and parsing	4
2.	Assemblers: Elements of assemly language programming, machine dependent and independent assembler features, assembler design options, simple assembly scheme, one-pass, two-pass and multi-pass assembler design.	10
3.	Macros and Macro-processors: Basic functions, macro definition and call expansion, nested macro calls, advanced macro facilities, design of a macro processor.	8
4.	Compilers and interpreters: Aspects of compilation, memory allocation, compilation of expressions and control structures, code optimization, interpreters.	8
5.	Loaders and linkers: Relocation and linking concepts, design of a linker, self relocating programs, linking for overlays; Relocating loaders and dynamic linking loader designs.	8
6.	Software tools: Tools for program development, editors, debug monitors, programming environments, user interfaces	4
	Total	42

S.No.	Name of Authors/Books/Publisher	Year of Publication/ Reprint
1.	Beck, L.L., "System Software", 3rd Edition, Addison Wesley.	2007
2.	Dhamdhere, D.M., "System Programming & Operating Systems", 2 nd Edition, Tata McGraw-Hill.	2001
3.	Abel, P., "IBM PC Assembly Language and Programming", 3rd Edition, Prentice-Hall of India.	2000

DEPARTMENT OF CIVIL ENGINEERING IIT ROORKEE, ROORKEE

FIVE YEAR INTEGRATED DUAL DEGREE (IDD) PROGRAMME B. Tech. (Civil Engg.) & M. Tech. (Structural Engg.)

PREAMBLE

The Department of Civil Engineering is running 2 Master's level Programmes namely, M. Tech. (Structural Engineering) and M. Tech. (Building Science Technology), now renamed as Building Technology, since early 1960s. Besides our regular students, this course is attended by many sponsored candidates. There is a great demand for these two branches all over the country. The demand is increasing due to greater emphasis on infrastructure development in the country. With the flexibility available in the IIT system, it is proposed to start IDD Programme in Structural Engineering so that we can take some students through JEE. These students will have an additional advantage of completing the M. Tech. degree in 5 years against the normal time i.e. 4+2=6 years. In view of the tremendous job potential in the area of Structural Engineering in mind, the DFB of the Department has proposed the IDD course in M. Tech. (Structural Engineering) with 10 additional seats which have to come through JEE. The number of seats is restricted to 10 due to limitation of the class room size.

STRUCTURE OF FIVE YEAR INTEGRATED DUAL DEGREE (IDD) (B. TECH. & M. TECH.) PROGRAMMES

	Curricular Components	Credits							
	- -	Institute	Proposed						
		Requirement	Course						
(A) Instit	ute Core (IC) Courses								
1	Humanities, Social Sciences and	10	10						
	Management (HSSMC)								
2	Basic Sciences (BSC)	21	21						
3	General Sciences (GSC)	06	06						
4	Engineering Sciences (ESC)	28	28						
	Total	65	65						
(B) Depa	rtment Core Courses (DCC)								
1	Class Contact Core Courses including	62-65	64						
ļ	Modelling & Simulation								
2	Communication Skills	02	02						
3	Practical / Field Training	02	02						
	Total	66-69	68						
(C) Depar	rtmental Elective Courses (DEC)	12	12						
(D) Institu	Ite Elective Courses (IEC)	17-23	17						
(E) M. Te	ch. Specialization Courses (MSC)	18-21	20						
(F) Projec	t (RP)	04	04						
(G) Semir	nar (SEM)	02	02						
(H) Disser	tation (DIS)	20-24	20						
(I) Extra	Curricular Activities (ECA)								
1	Discipline (2 Credits / year for 3 years)	06	06						
2	NCC/NSS/NSO (First year)	02	02						
3	MSO/Proficiency (Second year to Fourth	03	03						
	year)								
	Total	11	11						
	GRAND TOTAL		219						

* Total no. of credits is within the permissible range of 213 – 219.

Program Code : 21 Integrated Dual Degree (B. Tech. (Civil Engineering) & M. Tech. (Structural Engineering)

Department : CE Civil Engineering

_Year	:													
		Teaching Scheme			Contact Hours per week			Exam. Duration (Hrs.)		Relative Weightage (%)				
S. No.	Sub. Code	Course Title	Sub. Area	Crs.	L	Т	·P	Т	Р	CWS	PRS	MTE	ETE	PRE
		SE	MESTER	I (AUT	UMN	l)	E I	<u>,</u>					1	
1.	MA-101	Mathematics-I	BSC	4	3	1	0	3	0	25	-	25	50	-
2.	PH-101	Physics-I	BSC	5	3	1	2	3	2	15	15	15	40	15
3.	EE-101	Electrical Science	ESC	4	3	1	2/2	3	0	15	15	30	40	-
4.	EC-101A EC-101B	Computer Systems & Programming Fundamentals of Object Oriented Programming	ESC	4	3	0	2	3	0	15	15	30	40	-
5.	MI-102	Manufacturing Techniques	ESC	3	2	0	2	2	0	15	15	30	40	. –
6.	BT-101	Fundamentals of Biotechnology	GSC	2	2	0	0	2	0	15	-	35	50	-
7.	HS-101	Technical Communication	HSSMC	2	1	0	2	2	0	25		25	50	-
		Total		24	17	3	9				:			
		SI	EMESTER	II (SPF	RING)					-			· ·
1.	MA-102	Mathematics-II	BSC	4	3	1	0	3	0	25	-	25	50	-
2.	CY-101	Chemistry	BSC	5	3	1	2	3	2	15	15	15	40	15
3.	EC-102	Fundamentals of Electronics	ESC	4	3	1	2/2	3	0	15	15	30	40	-
4.	CE-101	Engineering Graphics	ESC	4	2	· 0	4	3	0	-	25	25	50	-
5.	MI-101	Thermodynamics	ESC	3	2	1	0	2	0	25	-	25	50	-
6.	CE-102	Environmental Studies	GSC	2	2	0	0	2	0	15	-	35	50	-
7.	HS-102	Behavioral Science	HSSMC	2	2	0	0	2	0	15	-	35	50	-
<u> </u>		Total		24	17	4	7					[

Program Code : Integrated Dual Degree (B. Tech. (Civil Engineering) & M. Tech. (Structural Engineering) 21

Department : CE **Civil Engineering**

Year :

Year	:	11						_						
				Contact Hours per week			Exam. Duration (Hrs.)		Relative Weightage (%)					
S. No.	Sub. Code	Course Title	Sub. Area	Crs.	L	T	Р	Т	Ρ	CWS	PRS	MTE	ETE	PRE
	SEMESTER III (AUTUMN)													
1.	PH-201	Physics-II	BSC	3	3	0	0	3	0	15	-	35	50	-
2	CE-201	Computer Aided Graphics	ESC	2	1	0	2	2	0		25	25	50	
3.	HS-201	Economics	HSSMC	3	2	1	0	2	0	25	-	25	50	-
4.	MI-201	Solid Mechanics	ESC	4	3	1	0	3	0	25	-	25	50	-
5.	CE-241	Fluid Mechanics	DCC	4	3	1	2/2	3	0	15	15	30	40	-
6.	CE-251	Building Materials Construction and Estimation	DCC	4	3	1	2/2	3	0	15	15	30	40	-
7.	CE-IEI	Institute Elective – I	BGSEC	3	2	1	0	2	0	25	0	25	50	_
		Total		23	17	5	4							
 		· · · · · · · · · · · · · · · · · · ·				ē.								
		SE	MESTER	IV (SP	RING	i)								
1.	BM-201	Management Concepts and Practices	HSSMC	3	2	1	0	2	0	25	-	25	50	-
2.	ES-201	Introduction to Geo-Science	GSC	2	2	0	0	2	0	15	-	35	50	
3.	CE-212	Water Supply Engineering	DCC	4	2	.1	2	2	2	15	15	15	40	15
4.	CE-222	Principles of Surveying	DCC	4	3	0	3	3	3	15	15	15	40	15
5.	CE-242	Channel Hydraulics	DCC	4	3	1	2/2	3	2	15	15	15	40	15
6.	CE-252	Structural Analysis – I	DCC	4	3	1	2/2	3	2	15	15	15	40	15
7.	CE-IE2	Institute Elective – II	BGSEC	3	2	1	0	2	0	25	-	25	50	
		Total		24	17	5	7							

Integrated Dual Degree (B. Tech. (Civil Engineering) & M. Tech. (Structural Engineering) Program Code : 21

Civil Engineering Department : CE

	Teaching Scheme					Contact Hours per week		Exam. Duration (Hrs.)		Relative Weightage (%)				
S. No.	Sub. Code	Course Title	Sub. Area	Crs.	L	Т	Р	Т	Ρ	CWS	PRS	MTE	ETE	PRE
_	<u> </u>	SE	MESTER	V (AU	TUM	N)	1 1		<u> </u>		L	L		•
1.	CE-311	Waste Management	DCC	4	3	1	0	3	0	25	-	25	50	-
2	CE-321	Geomatics Engineering	DCC	4	3	0	3	3	Ō	15	15	30	40	-
3.	CE-331	Soil Mechanics and Engineering Geology	DCC	5	3	1	2	3	2	15	15	15	40	15
4.	CE-341	Hydrology	DCC	2	2	0	2/2	2	0	15	15	30	40	-
5.	CE-351	Structural Analysis-II	DCC	4	3	1	0	3	0	25	-	25	50	-
6.	CE-IE3	Institute Elective – III	ESEC	4	3	1	0	3	0	25	-	25	50	-
		Total		23	17	4	6			,				
		SI	EMESTER	VI (SP	RING	3)								
1.	CE-300	Communication Skills	DCC	2	0	2	0	0	0	100	-		-	_
2.	CE-332	Foundation Engineering	DCC	4	3	1	2/2	3	0	15	15	30	40	-
3.	CE-352	Design of Reinforced Concrete Elements	DCC	4	3	1	2/2	3	2	15	15	15	40	15
4.	CE-354	Design of Steel Elements	DCC	3	2	1	0	3	0	25	-	25	50	-
5.	CE-362	Transportation Engineering – I	DCC	4	3	1	2/2	3	2	15	15	15	40	15
6.	CE-IE4	Institute Elective – IV	ESEC	4	3	1	0	3	0	25	-	25	50	-
		Total		21	14	7	3							

Program Code : Integrated Dual Degree (B. Tech. (Civil Engineering) & M. Tech. (Structural Engineering)) 21

Department : CE **Civil Engineering**

Year	· :	IV · · ·												
	Teaching Scheme				Contact Hours per week			Exam. Duration (Hrs.)		Relative Weightage (%)				
S. No.	Sub. Code	Course Title	Sub. Area	Crs.	L	Т	Ρ	Т	Р	CWS	PRS	MTE	ETE	PRE
SEMESTER VII (AUTUMN)														
1.	CE-451	Design of Reinforced Concrete Structures	DCC	3	2	1	2/2	3	0	15	15	30	40	-
2.	CE-XXX*	Advanced Steel Design	DCC	3	2	1	0	3	0	25	0	25	50	-
3.	CE-512	Analysis and Design for Dynamic Effects	MSC	4	3	1	0	3	0	25	0	25	50	-
4.	CE-561	Computer Applications in Structural Analysis	MSC	4	3	0	2	3	0	15	15	30	40	-
5.	CE-ELE1	Departmental Elective - I	DEC	4	3	1	0	3	0	25	0	25	50	-
6.	CE-IE5	Institute Elective -V	HSSMC	3	2	1	0	2	0	25	0	25	50	. '
7.	CE-403	Training and Seminar	DCC	2	0	2	0	0	0	100	0	0	0	-
		Total		24						• . 				
		S	EMESTER \	/III (SP	RING	G)								
1.	CE- ELE3	Departmental Elective – II	DEC	4	3	1	0	3	0	25	0	25	50	-
2.	CE- CLE4	Departmental Elective - III	DEC	4	3	1	0	3	0	25	0	25	50	-
3.	CE-661	Finite Element Method	MSC	4	3	0	2	3	0	15	15	30	40	-
4.	CE-663	Design of Bridge Superstructure	MSC	4	3	0	2	3	0	15	15	30	40	-
5.	CE-665	Design of Plates and Shells	MSC	4	3	1	0	3	0	25	0	25	50	-
		Total		20										

* To be decided later

6<u>3</u>-

Program Code : 21 Integrated Dual Degree (B. Tech. (Civil Engineering) & M. Tech. (Structural Engineering)

Civil Engineering Department : CE

Year :

Year	· _ :	V														
	Teaching Scheme					Contact Hours per week			Exa Dura (Hi	am. ation rs.)	Relative Weightage (%)					
S. No.	Sub. Code	Course Title		Sub. Area	Crs.	L	T	P	T	Р	CWS	PRS	MTE	ETE	PRE	
	I		SE	MESTER	IX (AU	TUM	N)	.l. <u>.</u>	1	L.,	I,	J	L	1.	<u>, </u>	
1.	CE-761	Seminar		SEM	2	0	0	0	0	0	100	0	0	0	0	
2.	CE-762	Project		RP	4	0	0	0	0	0	100	0	0	0	0	
3.	CE-760	Dissertation		DIS	0	0	0	0	0	0	0	0	0	25	0	
			Total		6											
								*			L		· .			
			SE	EMESTER	X (SP	RINC	3)									
1.	CE-760	Dissertation		DIS	20	0	0	0	0	0	0	0	0	75	0	
			Total		20											

List of Electives for IDD with B. Tech. (Civil) and M. Tech. (Structural Engineering)

Departmental Electives

Autumn Semester

- CE-513 : Analysis and Design of Multistoreyed Buildings
- CE-533 : Basic Remote Sensing and Digital Image Processing
- CE-562 : Continuum Mechanics
- CE-572 : Pavement Analysis and Design

Spring Semester

- CE-582 : Expert Systems, Neural Networks and Fuzzy Systems
- CE-624 : Environmental Impact and Risk Assessment
- CE-631 : Theory and Applications of GIS
- CE-641 : Advanced Foundation Engineering
- CE-643 : Soil Dynamics and Machine Foundations
- CE-658 : Computational Methods in Fluid Mechanics
- CE-671 : Advanced Highway Materials and Construction