

SYLLABUS
(With effect from 2014-2015)

ಪಠ್ಯಕ್ರಮ

ಶೈಕ್ಷಣಿಕ ವರ್ಷ ೨೦೧೪-೨೦೧೫ ರಿಂದ

Master of Technology in
CONSTRUCTION TECHNOLOGY



Visvesvaraya Technological University

"Jnana Sangama", Belgaum - 590 018, Karnataka.

ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ

"ಜ್ಞಾನ ಸಂಗಮ", ಬೆಳಗಾವಿ ೫೯೦ ೦೧೮, ಕರ್ನಾಟಕ

Syllabus of I to IV Semesters

(With effect from 2014-2015)

Master of Technology in

CONSTRUCTION TECHNOLOGY



Visvesvaraya Technological University, Belgaum

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Karnataka, INDIA.

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THE MASTER OF TECHNOLOGY COURSE IN ENGINEERING

(Full Time / Part Time)

OM 1 TITLE OF THE COURSE

OM 1.1 The Course shall be called Master of Technology Course, abbreviated as M.Tech. (Subject of Specialization)

OM 2 DURATION OF THE COURSE

OM 2.1 There shall be two categories:

- 1) Full Time Course and
- 2) Part Time Course

OM 2.2 Full Time Course:

The course shall extend over a period of four semesters and each semester shall have the following schedule:

First Semester: 23 weeks duration

- 16 weeks course work +7 weeks for (Preparation, Examination and Vacation).

Second Semester: 21 weeks duration

- 16 weeks course work +5 weeks for (Preparation, Examination and Vacation).

Third Semester: 21 weeks duration

- 16 weeks Internship +5 weeks for (Report Submission, Evaluation, Viva-Voce and initiation of Project Phase-II).

- Seminar and Presentation on Internship after 8 weeks from the commencement of III Semester.

- Report on Internship.

- Project Phase- I: Problem formulation and submission of synopsis within 8 weeks from the commencement of 3rd semester to the HoD with the approval of the Project Guide.

- Evaluation of Internship report and Viva-Voce, and

- Project Phase- II: Preliminary work on Project Implementation.

Fourth Semester: 24 weeks duration

Course work of 2 subjects +Project Phase-III

OM 2.3 Part Time Course:

(a) The course shall extend over 6 semesters.

(b) Each semester shall be of the duration equivalent to that of the semester for full time students, inclusive of teaching, preparation for examination and vacation.

(c) First, second, third & fourth semester shall comprise of course work and the fifth shall be entirely devoted to Internship

and sixth semester shall be entirely devoted to dissertation work.

(d) During the first semester, the candidate shall register for the subjects of first and third semesters. During the second semester, the candidate shall register for the subjects of second and fourth semesters.

(e) The candidate shall register for a maximum of three subjects per semester.

(f) The candidates shall register for Lab subject in first and second semesters along with the regular three subjects.

OM 2.4 A Full Time candidate shall be allowed a maximum duration of eight semesters from the first semester of admission to become eligible for the award of Master's Degree, failing which he/she may register once again as a fresh candidate.

OM. 2.5 A Part Time candidate shall be allowed a maximum of 12 semesters duration from the first semester of admission to become eligible for the award of Master's Degree, failing which he/she may register once again as a fresh candidate.

OM 2.6 The Calendar of events in respect of the course shall be fixed by the University from time to time.

OM 3 ELIGIBILITY FOR ADMISSION

OM 3.1 Admission to the Master of Technology Course shall be open to all the candidates who have passed B.E. / B. Tech. Examinations (as per the eligibility criteria specified from time to time) of VTU or any other recognized University / Institution. The decision of the Equivalence committee shall be final in establishing the eligibility of candidates for a particular course. For the foreign degrees Equivalence certificate from the Association of Indian Universities is a must. However, the candidates who have completed their prerequisite degree through the distance mode education are not eligible for admission to M.Tech. Courses under any quota i.e. Govt./ Management.

OM 3.2 AMIE qualification in respective branches shall be equivalent to B.E./ B. Tech. Courses of VTU for admission to M.Tech. However, the candidate seeking admission to M.Tech. courses on the basis of AMIE shall also take the Common Entrance Test.

OM 3.3 Admission to M.Tech. Course shall be open to the candidates who have passed the prescribed qualifying examination with not less than 50% of the marks in the aggregate of all the years of the degree examination. However, in the case of candidates belonging to SC/ST and Category I, the aggregate percentage of marks in the qualifying examinations shall not be less than 45%. Rounding off of percentage secured in qualifying examination is not permissible.

OM3.4 There shall be entrance examination for PG Programs from the Karnataka Examination Authority and candidates qualified for the admission through the Entrance examination or qualified for admission under GATE and issued an admission order from KEA are eligible for the admission to M.Tech. Program or through the entrance examination conducted by the University.

For admissions under Management Quota:

The candidates should have appeared for the Entrance Examination conducted by KEA or Qualified under GATE or appeared and qualified through the entrance examination conducted by the University.

Further, there shall be an Admissions Committee for PG Course in each college for each branch of PG studies consisting of the Principal of the College as the Chairman, Head of the concerned Department, one senior staff member of the concerned Department. The Admissions Committee conducts the interview of the candidates for admissions.

For admissions under Sponsored Quota:

The candidates should have appeared for the Entrance Examination conducted by KEA or Qualified under GATE or through the entrance examination conducted by the University.

OM 3.5 The candidates, who have qualified in the GATE Examination for the appropriate branch of engineering, shall be given priority. They shall be exempt from taking Entrance Examination.

OM 3.6 If sufficient number of GATE qualified candidates are not available, such seats shall be filled from amongst the candidates appeared for Entrance Examination in the order of merit.

OM 3.7 The maximum number of seats under various categories (regular, sponsored candidates and SC/ST) shall be as sanctioned by the AICTE, State Government and VTU, from time to time.

- OM 3.8** Subject to the provisions of OM 3.1 and OM 3.2, members of the Teaching/Research Staff/Teaching Assistants working in any Engineering College recognized by AICTE either in the State of Karnataka or outside and who have put in a minimum of Three years of teaching experience on full-time basis in Engineering Colleges, Polytechnic institutions / any other institutions imparting Engineering education shall be eligible for admission to PG Courses under sponsored quota, if they are sponsored by the respective Institutions / DTE. Where sufficient number of such candidates is not available, candidates with minimum Three years of teaching experience may be allowed to the course against sponsored quota.
- OM 3.9** Subject to the provisions of OM3.1 and OM3.2, members working in the State Government / Central Government / Quasi Government Organizations / Public Sector Industries / Reputed Private Industries, who have put in a minimum of Three years of working experience and are sponsored by the concerned Organizations shall also be eligible to seek admissions to PG Courses against sponsored quota.
- OM 3.10** The Engineering graduates other than the graduates of any of the Universities of Karnataka State shall have to obtain Eligibility Certificate from the VTU to seek admission to P.G. course in any of the colleges affiliated to VTU.
- OM 3.11** Part time students whose place of working is within radial distance of 40 km from the institution where they seek admission shall take admission for the course under the regulation OM 3.8 or OM3.9.
- OM 3.12** Admission to M.Tech. course shall be open under lateral entry scheme for candidates who have completed one year PG Diploma Course of VTU or equivalent course in that branch in which he / she is seeking admission and satisfies all other eligibility criteria for admission to the regular M.Tech. Course.
- OM 4 ATTENDANCE REQUIREMENT**
- OM 4.1** Each course of the semester shall be treated as a separate unit for calculation of the attendance.
- OM 4.2** Each semester is considered as a unit and the candidate has to put in a minimum attendance of 85% in each subject with a provision of condonation of 10% of the attendance by the Vice-Chancellor on the specific recommendation of the Principal of the college where the candidate is studying, showing some

reasonable cause such as medical grounds, participation in University level sports, cultural activities, seminars, workshops, paper presentation, etc. The necessary documents such as Medical Certificate, letter of participation in University level activities etc., are to be submitted along with recommendations for condonation.

- OM 4.3** A candidate, who does not satisfy the attendance requirement as mentioned above shall not be eligible to appear for the Examination of that semester and shall be required to repeat that semester along with regular students during the subsequent year.
- OM 4.4** If a candidate, for any reason, discontinues the course in the middle, he/she may be permitted to register to continue the course along with subsequent batch, subject to the condition that he/she shall complete the class work, laboratory work and seminar including the submission of dissertation within the maximum stipulated period (double the duration of the course). Such candidate shall not be eligible to be considered for the award of rank.
- OM 4.5** Principals of the concerned colleges shall notify regularly, the list of such candidates who fall short of attendance.
- OM 4.6** The list of the candidates falling short of attendance shall be sent to the University at least one week prior to the commencement of the examination.
- OM 5 INTERNAL ASSESSMENT**
- OM 5.1** A candidate shall obtain not less than 50% of the maximum marks prescribed for the Internal Assessment (IA) of each subject/Lab, including seminars.
- OM 5.2** Internal Assessment Marks shall be based on assignments, tests, oral examination and seminar conducted in respective subjects (minimum of two tests are compulsory).
- OM 5.3** Candidates obtaining less than 50% of the Internal Assessment marks in any subject(s)/Lab shall not be eligible to appear for the examination in that subject(s). Only in such cases, the Head of the Department shall arrange for the improvement of Internal Assessment marks in the subject(s)/Lab in subsequent semester.
- OM 5.4** The candidates shall write the Internal Assessment Test in Blue Books which shall be maintained by the Principal / Head of the Department for at least three months after the announcement of University results and available for verification

as per the directions of the Registrar (Evaluation).

OM 5.5 Every sheet of the Internal Assessment marks list shall bear the signatures of the concerned Teacher, Head of the Department and the Principal.

OM 5.6 The Internal Assessment marks list shall be displayed on the Notice Board and corrections, if any, shall be incorporated before sending to the University.

OM 5.7 The IA marks shall be sent to the university by the Principals well in advance before the commencement of theory examination. No corrections of the Internal Assessment marks shall be entertained after the submission of marks list to the University.

OM 6 SEMINARS

OM 6.1 All candidates shall present one seminar each in the first and the second semesters on the topics chosen from the relevant fields.

OM 6.2 The Head of the Department shall arrange for conducting such seminars through concerned faculty member of the Department.

OM 6.3 The Internal Assessment marks for the seminar shall be awarded by the concerned faculty member.

OM 7 PAPER SETTING AND EVALUATION OF THEORY ANSWER PAPERS

OM 7.1 Question papers in theory subjects shall be set by the Examiners appointed for that purpose by the University.

OM 7.2 There shall be double valuation of theory papers. The theory Answer booklets shall be valued independently by two examiners appointed by the University.

OM 7.3 If the difference between the marks awarded by the two Examiners is not more than 15 per cent of the maximum marks, the marks awarded to the candidate shall be the average of two evaluations.

OM 7.4 If the difference between the marks awarded by the two Examiners is more than 15 per cent of the maximum marks, the answer booklet shall be evaluated by a third Examiner appointed by the university. The average of the marks of nearest two valuations shall be considered as the marks secured by the candidate. However, if one of the three marks falls exactly midway between the other two, then the highest two marks shall be taken for averaging.

OM 8 INTERNSHIP

OM 8.1 Internship: The student shall undergo Internship for 16 weeks.

OM 8.2 Seminar / Presentation on Internship: The student shall make a midterm presentation of the activities undertaken during the first eight weeks of internship to a panel comprising Internship Guide, a senior faculty from the department and Head of the Department of the college.

OM 8.3 Report on Internship: The College shall facilitate and monitor the student internship program. The internship report of each student shall be submitted to the Head of the Department of the college with the approval of the Guide.

OM 8.4 Evaluation of Internship - To be carried out by the Internal Guide of the college and the respective Head of the Department.

OM 8.5 Viva-Voce on Internship Report- To be conducted internally by the Internship Guide (from the college) and the External Guide under whose supervision the student has carried out the internship.

OM 8.6 Failure to undergo Internship: The student will not be eligible to submit the dissertation

OM 9 DISSERTATION WORK

OM 9.1 The candidate shall submit a soft copy of the dissertation work in the form of CD which should contain the entire Dissertation in monolithic form as a PDF file (not separate chapters) Guide after checking the report for completeness shall upload the Dissertation along with name, address, mobile number of the candidate, etc. as prescribed in form available on online Dissertation evaluation portal. The guide shall also chose and submit a panel of four expert evaluators.

OM 9.2 PLAGIARISM CHECK

Once the Guide uploads the dissertation, The dissertation shall be linked for plagiarism check and the plagiarism index $\leq 25\%$. If the report indicates plagiarism index $>25\%$:

- for the first time the candidate has to resubmit the dissertation along with the penal fees of Rs 2000/- (Two thousand only)
- for the second time the candidate has to resubmit the dissertation along with the penal fees of Rs 4000/- (four thousand only)
- If the dissertation is rejected again during second

resubmission, the candidate shall redo the project and submit after a semester's time.

- OM 9.3** The date of submission of the dissertation may be extended up to a maximum of four academic years for full-time students and maximum of six academic years for part-time students, from the date of commencement of the first semester in which the candidate has taken admission to the course.
- OM 9.4** The dissertation shall be sent through email for evaluation to two examiners - one internal examiner (guide/co-guide) and one external examiner appointed by the University. The evaluation of the dissertation shall be made independently by each examiner.
- OM 9.5** The examiners shall independently evaluate and submit the marks through the specified link.
- OM 9.6** Average of the marks awarded by the two Examiners shall be the final.
- OM 9.7** Examiners shall evaluate the dissertation normally within a period of not more than three weeks from the date of receipt of dissertation through email. The dissertation shall not be accepted for passing if external examiner finds that the dissertation work and the report is not up to the expected standard and the minimum passing marks cannot be awarded. The external examiner can totally reject the dissertation or ask for its modification. The examiner shall give reasons for rejection of the dissertation or requiring its modification and where modification in the dissertation is required, he / she can make suggestion for improvement of the dissertation for resubmission. In cases where modification is recommended after incorporating suggestions, the dissertation report shall be sent to the same external examiner.
- OM 9.8** If the examiner does not approve the dissertation on its resubmission, it shall be treated as rejected. After the rejection by the first external examiner, it shall be sent to a second examiner appointed by the University. If the second examiner also does not approve the dissertation, the candidate shall have to carry out the dissertation work once again and shall submit the dissertation within the stipulated time. In such cases of Rejection, the candidate shall redo the entire procedure from the submission of Dissertation in soft copy.

- OM 9.9** The candidate may also choose another topic of dissertation under a new guide, if necessary. In such an event, the report shall be submitted within four years in case of full time student and six years in case of part time student respectively from the date of admission to the course.
- OM 9.10** If the dissertation report is approved and evaluated by both the examiners and the candidate secured minimum passing marks in the evaluation, the office of the Registrar (Evaluation) will send the link to both the examiners for the conduct of Viva-Voce Exam and submission of marks.
Internal examiner as per the direction of the University to arrive at a mutually convenient date for the conduct of viva-voce examination of the concerned candidate with intimation to the Registrar (Evaluation). In case one of the examiners expresses his inability to attend the viva-voce, the Registrar (Evaluation) shall appoint a substitute examiner in his place.
- OM 9.11** The relative weightage for the evaluation of dissertation and the performance at the viva voce shall be as per the scheme of teaching & examination.
- OM 9.12** The marks awarded by both the Examiners at the viva voce Examination shall be sent jointly to the University immediately after the examination.
Examination fee as fixed from time to time by the University for evaluation of dissertation report and conduct of viva voce shall be remitted through the Head of the Institution as per the instructions sent by the office of Registrar (Evaluation) from time to time.
- OM 9.13** If the dissertation report is approved, as per regulation OM8.11, a viva-voce examination of the candidate shall be conducted by the external examiner and internal examiner / guide. The external examiner, who will be appointed by the University, shall be contacted by the Principal / Head of the Department.
Internal examiner as per the direction of the University shall have to arrive at a mutually convenient date for the conduct of viva-voce examination of the concerned candidate with an intimation to the Registrar (Evaluation). In case one of the examiners expresses his/her inability to attend the viva-voce, the Registrar (Evaluation) shall appoint a substitute examiner in his/her place.
- OM 9.14** The relative weightage for the evaluation of dissertation and the performance at the viva voce shall be as per the scheme of teaching & examination.
- OM 9.15** The marks awarded by both the Examiners at the viva voce

Examination shall be sent jointly to the University immediately after the examination.

- OM 9.16** Examination fee as fixed from time to time by the University for evaluation of dissertation report and conduct of viva voce shall be remitted through the Head of the Institution as per the instructions sent by the office of Registrar (Evaluation) from time to time.
- OM 10 ELIGIBILITY FOR PASSING**
- OM 10.1** There shall be University examination at the end of each semester.
- OM 10.2** The candidate shall obtain a minimum of 40% of marks in each theory paper in the University examination and a minimum of 50% of marks in each laboratory examination and a minimum of 50% of marks in aggregate including the Internal Assessment marks for pass in each of the theory subject /Lab.
- OM 10.3** To pass a candidate shall obtain a minimum of 50% of maximum marks separately both in Seminar and in Dissertation.
- OM 10.4** The candidate with a maximum of two backlog subjects of first year shall be eligible for taking admission to second year (III semester).

However for part time course, candidate with one backlog subject shall be eligible for taking admission to odd semester from even semester.

- OM 10.5** The full time candidate has to pass in all the subjects of the first two semesters and Internship and the part time candidate has to pass in all the subjects of first four semester and Internship before the submission of dissertation report.
- OM 10.6** A candidate may at his/her desire reject his/her latest semester results of University examination in respect to all subjects of that semester. However, in the 4th semester the rejection shall not include the Dissertation result. Rejection shall be permitted only once during the entire course. The Internal Assessment marks of the rejected semester shall be retained.
If the rejection of the University examination results of the semester happens to be of an odd semester, the candidate can take admission to the immediate next even semester. However, if the rejection of the University result is of even semester, the candidate cannot take admission to the next odd semester.
- OM 10.7** Application for rejection shall be submitted to the Registrar (Evaluation) through the Principal of the college, within thirty days from the date of announcement of results.

- OM 10.8** A candidate, who opts for rejection shall be eligible for the award of class and distinction, but shall not be eligible for the award of rank.
- OM 11 AWARD OF CREDITS :** A candidate, who satisfactorily completes a subject/lab/seminar/project/ internship shall be awarded the credits prescribed for the subject/lab/seminar/project/ internship
- OM 12 AWARD OF CLASS AND RANK**
- OM 12.1** Candidates who have complied to the academic requirements for the award of the degree of Master of Technology shall be declared to have passed the course.
- OM 12.2** The class shall be awarded at each semester based on the aggregate marks of the semester obtained in the first attempt.
- OM 12.3** A candidate who secures 70% or more marks in the aggregate in the first attempt shall be declared to have passed in First class with Distinction.
- OM 12.4** A candidate who secures 60% or more marks but less than 70% marks in the aggregate in the first attempt shall be declared to have passed in First Class.
- OM 12.5** A candidate who secures 50% or more marks but less than 60% marks in the aggregate in the first attempt shall be declared to have passed in Second Class.
- OM 12.6** The class shall be awarded on the aggregate marks obtained in the first attempt in all semesters.
- OM 12.7** There shall be three ranks in each PG course, provided the minimum full time strength is 10. The ranks shall be declared only for full time students who have passed every semester in the first attempt, on the basis of the aggregate marks of all the semesters taken together.
- OM 12.8** Candidates who have rejected as per the regulation OM9.6 or discontinued the course as per regulation OM4.4 or do not submit the dissertation report within the stipulated period as per OM 2.2 are not eligible for award of ranks.

NOTE: These regulations governing the Degree of Master of Technology of Visvesvaraya Technological University shall be binding on all and may be modified from time to time.

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI
SCHEME OF TEACHING AND EXAMINATION FOR
M.Tech. in Construction Technology

I Semester

CREDIT BASED

14

Subject Code	Name of the Subject	Teaching hours/week		Duration of Exam in Hours	Marks for		Total Marks	CREDITS
		Lecture	Practical / Field Work / Assignment/ Tutorials		I.A.	Exam		
14CCT11	Mechanization in Construction	4	2	3	50	100	150	4
14CCT12	Construction Project Management	4	2	3	50	100	150	4
14CCT13	Advances in Construction Materials	4	2	3	50	100	150	4
14CCT14	Structural Masonry	4	2	3	50	100	150	4
14CCT15x	Elective - I	4	2	3	50	100	150	4
14CCT16	Material Characterization Laboratory	--	3	3	25	50	75	2
14CCT17	Seminar	--	3	--	25	--	25	1
Total		20	16	18	300	550	850	23

Elective – 1

14CCT151	Advanced Reinforced Concrete Design
14CCT152	RS & GIS Application in Construction
14CCT153	Advanced Design of Sub Structures
14CCT154	Building Science

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI
SCHEME OF TEACHING AND EXAMINATION FOR
M.Tech. in Construction Technology

II Semester

CREDIT BASED

15

Subject Code	Name of the Subject	Teaching hours/week		Duration of Exam in Hours	Marks for		Total Marks	CREDITS
		Lecture	Practical / Field Work / Assignment/ Tutorials		I.A.	Exam		
14CCT21	Construction Economics and Finance	4	2	3	50	100	150	4
14CCT22	Pre-Engineered Construction Technology	4	2	3	50	100	150	4
14CCT23	Construction and Contract Management	4	2	3	50	100	150	4
14CCT24	Construction Quality and Safety	4	2	3	50	100	150	4
14CCT25X	Elective - II	4	2	3	50	100	150	4
14CCT26	Software Applications Laboratory		3	3	25	50	75	2
14CCT27	Seminar	--	3	--	25	--	25	1
Total		20	16	18	300	550	850	23

Elective – II

14CCT251	Remedial Engineering
14CCT252	Pavement Design & Construction
14CCT253	Soil Exploration & Ground Improvement Techniques
14CCT254	Design of Earthquake Resistant Structures

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI
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M.Tech. in Construction Technology

III Semester: INTERNSHIP

CREDIT BASED

16

Course Code	Subject	No. of Hrs./Week		Duration of the Exam in Hours	Marks for		Total Marks	CREDITS
		Lecture	Practical / Field Work		I.A.	Exam		
14CCT31	Seminar / Presentation on Internship (After 8 weeks from the date of commencement of the semester).	-	-	-	25	-	25	
	Project Phase: I – Problem formulation and submission of synopsis within 8 weeks from the commencement of 3 rd semester.	-	-	-	-	-	-	
14CCT32	Evaluation of Internship - To be carried out by the Internal Guide of the college and the respective Head of the Department.	-	-	-	50		50	
14CCT33	Viva-Voce on Internship Report - To be conducted <i>internally</i> by the Internship Guide (from the college) and the External Guide under whose supervision the student has carried out the internship.	-	-	-	-	75	75	
	Project Phase: II – Preliminary work on Project Implementation.	-	-	-	-	-	-	
	Total	-	-	-	75	75	150	20

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI
SCHEME OF TEACHING AND EXAMINATION FOR
M.Tech. in Construction Technology

IV Semester

CREDIT BASED

17

Subject Code	Subject	No. of Hrs./Week		Duration of Exam in Hours	Marks for		Total Marks	CREDITS
		Lecture	Field Work / Assignment / Tutorials		I.A.	Exam		
14CCT41	Energy and Buildings	4	2	3	50	100	150	4
14CCT42X	Elective-III	4	2	3	50	100	150	4
14CCT43	Interim Evaluation of Project work (after 10 weeks from the commencement of 4 th Semester).	-	-	-	50	-	50	2
14CCT44	Final Evaluation of Project Work and Viva-voce.	-	-	3	-	100+100	200	18
	Total	8	04	09	150	400	550	28
Grand Total (I to IV Sem.) : 2400 Marks; 94 Credits								

Elective – III

14CCT421	Pre-Stressed Concrete
14CCT422	Building Services and Maintenance
14CCT423	Disaster Management Techniques
14CCT424	Construction & Demolition Waste Management

I SEMESTER
MECHANIZATION IN CONSTRUCTION

Subject Code	: 14 CCT 11	IA Marks	: 50
No. of Lecture Hrs/ Week	: 04	Exam Hrs	: 03
Total no. of Lecture Hrs.	: 52	Exam Marks	: 100

Introduction to mechanization: Definition, advantages and limitations of mechanization, Indian scenario and Global scenario

Mechanization through construction equipment: Equipment cost, Machine Power, Production cycle - Dozers, scrapers, Excavators, Finishing equipment, Trucks and Hauling equipment, Hoisting equipment, Draglines and Clamshells - Mechanization in aggregate manufacturing: Natural aggregates and recycled aggregates

Mechanization in rebar fabrication

Mechanization in concrete production and placement

Mechanization through construction: formwork and scaffolding-types, materials and design principles.

Mechanization through construction methods/technologies: segmental construction of bridges/flyovers, box pushing technology for tunneling, trench-less technology.

Safety and Environmental issues in mechanization

REFERENCE BOOKS:

1. Peurifoy R L, "Construction Planning, Equipment and Methods", Mc Graw Hill
2. James F Russell, "Construction Equipment", Prentice Hall
3. Current Literature

erngo Internship for 16 weeks.
nip: The student shall make a midterm
ertaken during the first eight weeks of
Internship Guide, a senior faculty from
Department of the college.

ulation and submission of synopsis of
tment of the college with the approval
om the commencement of III Semester.
lege shall facilitate and monitor the
internship report of each student shall
e Department of the college with the

carried out by the Internal Guide of
ad of the Department.

- To be conducted internally by the
e) and the External Guide under whose
ed out the internship.

work on Project Implementation.

mprising Evaluation of Project Phase –
ternal Guide after Ten weeks from the
r.

of Project work, dissertation report
ation report.

Project:
carried out after 24 weeks from the date

t guide with a teaching experience of at
Examiner shall be appointed by the
of Project.

the evaluation for 100 Marks, and
the evaluation for 100 Marks.

ed by the Internal Examiner and the
l marks of the Project Evaluation.

shall be conducted jointly by Internal
r 100 Marks.

PROJECT MANAGEMENT

12 **IA Marks** : 50
 Exam Hrs : 03
 Exam Marks : 100

Work Breakdown Structure, Time estimates, Scheduling, Monitoring and Updating. Line leveling-levelling and Allocation. Time-Cost Construction. Introduction to Material and inventory control. Introduction to

ing, Equipment and Methods"- Mc Graw

st West Press Pvt Ltd New Delhi.

r, "Modern Construction Management"-

ADVANCES IN CONSTRUCTION MATERIALS

Subject Code : 14CCT 13 **IA Marks** : 50
No. of Lecture Hrs/ Week : 04 **Exam Hrs** : 03
Total no. of Lecture Hrs. : 52 **Exam Marks** : 100

Concrete making materials-cement, aggregates, admixtures (both mineral and chemical). Microstructure of concrete, Fresh concrete and its rheology, Mechanical, deformational behaviour of hardened concrete. Creep and Shrinkage of Concrete. Durability of Plain and Reinforced Concrete. Proportioning of Mixes- Normal Concrete, High Strength/Performance Concrete, Fibre Reinforced Concrete, Reactive Powder Concrete, Roller Compacted Concrete, Self-Compacting Concrete, Geo-polymer Concrete and Decorative Concrete, Types of Reinforcements. Corrosion of Reinforcing Steel- Electro-chemical process, measures of protection. Polymers, fibres, adhesives and sealants-types and their uses. Structural glazing.

REFERENCE BOOKS:

1. Neville A.M. "Properties of Concrete"-4th Ed., Longman.
2. Mehta .P.K., and Paulo J.M. Monteiro, "Concrete- Microstructure, Properties and Materials"-(Indian Ed., Indian Concrete Institute), McGraw Hill.
3. "Current Literature".

AL MASONRY

14 **IA Marks** : 50
 Exam Hrs : 03
 Exam Marks : 100

Materials for Masonry, Strength and
factors influencing Masonry properties,
shear, and axial loads (static and dynamic),
masonry arches and Shells, Introduction to

Pre-stressed Masonry”
“Brick Structures”-Oxford and IBH pub.

ADVANCED REINFORCED CONCRETE DESIGN

Subject Code : CCT 151 **IA Marks** : 50
No. of Lecture Hrs/ Week : 04 **Exam Hrs** : 03
Total no. of Lecture Hrs. : 52 **Exam Marks** : 100

1. Yield line method of design of slabs.
2. Design of grid floors.
3. Design of continuous beams.
4. Design of portal frames.
5. Design of silos and bunkers.
6. Design of flat slabs.
7. Art of detailing earthquake resistant construction – expansion and construction joints

REFERENCE BOOKS:

1. A Park and Paulay, “Reinforced Reinforced and Prestressed Concrete”-John Wiley & Sons
2. Lin TY and Burns N H, “Reinforced Concrete Design”. John Wiley & Sons
3. Kong KF and Evans T H “Design of Prestressed Concrete Structures”
4. P.C.Varghese, "Advanced Reinforced Concrete Design"- Prentice-Hall of India, New Delhi, 2005.
5. Dr.B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, “ Comprehensive RCC Design”

CTIONS IN CONSTRUCTION

152	IA Marks	: 50
	Exam Hrs	: 03
	Exam Marks	: 100

and spatial models – Introduction, spatial conceptual models of spatial information, information.

on, data acquisition, preliminary data evaluation, spatial search and analysis, graphics

Data storage Fundamentals of computers and binary files, file organization, linked systems and map projection: Rectangular, types of map projections, choosing a map

ographic map model, Geo- relation model, spatial data base structure viz.. hierarchical editing and Structuring map data – the non- spatial, associated attributes, data, and use of digitizers and scanners of

- Sources of errors in GIS data, obvious processing errors and accuracy. Principles of regular and object oriented decomposition analysis and overlay analysis, raster analysis,

egration techniques in spatial decision multi-criteria evaluation, rule based system modeling, Virtual GIS.

desirable characteristics of data base systems of a data base management system, modeling. Global positioning system, hyper

spectral remote sensing, DIP techniques, hardware and software requirements for GIS, overview of GIS software.

REFERENCE BOOKS:

1. Peter A Burrough Rachael A Mc Donnel, Principles of GIS (Oxford), 2000.
2. Christopher Jones. "GIS and Computer cartography "(Longman), 2000.
3. Lillesand, "Remote Sensing and Image interpretation"-(John Wiley and Sons), 2000.

DESIGN OF SUB STRUCTURES

CEET 153	IA Marks	: 50
	Exam Hrs	: 03
	Exam Marks	: 100

Structure, definition, purpose, requirements, selection criteria, requirements, load computation,

Types of footings, loads, principles of design, rectangular, trapezoidal, combined footings (problems on proportioning, raft foundation- soil-lift reaction.

Necessity, various classifications, load carrying capacity of piles in sand and clay, negative skin friction, group efficiency, numerical problems on load test, concept of batter piles.

Types of piles: driven pier, merits & demerits of drilled piers, and floating caissons concept, advantages, types of caissons. Well foundation types, shapes, types of wells, tilts and shifts.

Types of breakwater, wharves, design loads, combined loads, and design

Design of towers: Introduction, necessary forces, design procedure.

“Basic and Applied Soil Mechanics”, New

“Design of Sub-Structures”, IBH & Oxford University Press, London.

“Soil Mechanics and Foundation Engineering”, McGraw-Hills

International Edition, India

“Soil Mechanics and foundation engineering”, Standard

BUILDING SCIENCE

Subject Code	: CCT 154	IA Marks	: 50
No. of Lecture Hrs/ Week	: 04	Exam Hrs	: 03
Total no. of Lecture Hrs.	: 52	Exam Marks	: 100

Climatic factors, Classification of tropical climates, site climate, micro climate of human settlements, ventilation requirements for health, mechanisms and estimation of natural ventilation, airflow patterns in building

Thermal comfort factors, thermal indices, thermal quantities, heat exchange in buildings, periodic heat flow, mechanical and structural means of thermal control.

Propagation of sound, sound insulation, absorption, transmission reverberation roofing and walling system for sound absorption and insulation, noise and noise control in buildings.

Principles of day lighting in buildings

REFERENCE BOOKS:

1. Koenigsberger, “Manual of Tropical Housing and Building- Climatic Design”, Orient Longman
2. Deodhat, S V , “Building Science and Planning”, Khanna Pub.
3. B C Punmia, “Building Construction”, Laxmi Pub
4. SP:41- Functional Requirements for Buildings, BIS, New Delhi

CHARACTERIZATION LABORATORY**14CCT 16** **IA Marks** **: 50**

ures, test methods available, planning of in
ethods-Rebound Hammer equipment, its
ng, factors influencing rebound no., calibra-
ts, applications and limitations, Ultrasonic
t, its use, different transducer arrangements,
retation of results, Exposure to IS and other

rete and masonry

ng High Performance/Strength concrete
ss-strain behavior (Modulus of Elasticity)
ting and testing of stack-bonded masonry
rain behavior (Modulus of Elasticity) under

urement

uments (accelerometers), data acquisition
ystems-free vibration tests to obtain natural

n M Sabnis, "Structural Modeling and
C Press
stress analysis", McGraw Hill
s of stress and strain", S Chand & Co.
te in structures", Surrey University Press

**II SEMESTER
CONSTRUCTION ECONOMICS AND FINANCE**

Subject Code	: 14CCT 21	IA Marks	: 50
No. of Lecture Hrs/ Week	: 04	Exam Hrs	: 03
Total no. of Lecture Hrs.	: 52	Exam Marks	: 100

Engineering economics, Time value of money, discounted cash flow, NPV, ROR, Bases of comparison, Incremental analysis, Benefit-Cost analysis, Replacement analysis, Breakeven analysis, Capital budgeting, Taxation and Inflation, Working capital management, Construction accounting, Income statement, Financial statements, Appraisal through financial statements-ratio's analysis, Long term Financing, Practical problems and case studies.

REFERENCE BOOKS:

1. Courtland A. Collier and William B. Ledbetter, "Engineering Economics and Cost Analysis"- Harper & Row.
2. Kuchal S.C, "Financial Management"
3. Van Horne J.C, "Fundamentals of Financial Management" Prentice Hall.

ED CONSTRUCTION TECHNOLOGY

: 14 CCT 22 IA Marks : 50
: 04 Exam Hrs : 03
: 52 Exam Marks : 100

tion
construction – Types of prefabrication – site and
my of prefabrication – Modular coordination –
for Components of prefabricated structures –
sign of simple rectangular beams and I beams –
es – Elimination of erection stresses – Beams,

floor panels – wall panels – footings – Joints
ons – Effective sealing of joints for water proof-
tural fastenings – Expansion joints in pre-cast
etailing of precast unit for factory structures –
trusses, lattice girders, gable frames – Single
Single storeyed buildings – slabs, beams and

ology
Manufacturing methods – Stationary and mo-
duction setup – Storage of precast elements
eleration of concrete hardening. Equipments
niques for erection of different types of mem-
els and Columns – Vacuum lifting pads.

Engineered Buildings Vs Conventional Steel
red Buildings (PEB) – Applications

crete for Industrial and Public Structures,
rian Academy of Sciences, Budapest, 2007.
Concrete Construction, Vol. I, II, III & IV,

Prefabricates, Elsevier Publishing Company,

Amsterdam, London, New York, 1998.

4. Structural Design Manual, Precast Concrete Connection Details, Society for the Studies in the use of Precast Concrete, Netherland Betor Verlag, 2009.
5. Hass, A.M. Precast concrete design and Applications, Applied Science Publishers, 1983.

LAND CONTRACT MANAGEMENT

14CCT 23	IA Marks	: 50
04	Exam Hrs	: 03
52	Exam Marks	: 100

te analysis-labour, materials and equipment
s, Bidding models and strategies, Qualification

cedures, Indian Contract Act 1872 as applied to
acts, International contracts, Conditions and
tract administration, Claims, compensation and
chniques, Arbitration and Conciliation Act 1996
thics, Duties and responsibilities of parties.

ssional Practice”

to Building & Civil Engg. Contracts in India”

Construction Contracts”

CONSTRUCTION QUALITY AND SAFETY

Subject Code	: 12CCT 24	IA Marks	: 50
No. of Lecture Hrs/ Week	: 04	Exam Hrs	: 03
Total no. of Lecture Hrs.	: 52	Exam Marks	: 100

Construction Quality, Inspection and Testing, Quality control, Quality Assurance, Quality Certification for companies and laboratories (ISO Certification, NABL certification), Total Quality Management, Critical factors of TQM, TQM in Projects, Benchmarking, concepts of quality policy, standards, manual, Third Party Certification

Construction Safety-meaning and scope, Safety in construction- Technological aspects, organizational aspects and behavioural aspects, Safety legislation and Standards, Contract conditions on safety in civil Engineering projects, Safety rules in construction, Safety in construction operations, Safety in the use of construction equipment, Ergonomics, Accident Prevention and safety, Construction Safety Management.

REFERENCE BOOKS:

1. N. Logothetis, “Management for Total Quality”, Prentice Hall
2. David Gold Smith, “Safety Management in construction and Industry”, Mc Graw Hill
3. K N Vaid, “Construction Safety Management”, NICMAR, Bombay
4. D S Rajendra Prasad, “Quality Management System in Civil Engineering”, Sapna Book House, Bangalore
5. “The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996, Universal Law Publishing Co. Pvt. Ltd.

CT 251	IA Marks	: 50
4	Exam Hrs	: 03
2	Exam Marks	: 100

se of deterioration of concrete structures, is, preliminary investigations, experimental

And Durability: Effects due to climate, and erosion, Design and construction errors, of cover thickness and cracking, methods of inhibitors, corrosion resistant steels, coatings,

l concretes and mortar, concrete chemicals, d strength gain, Expansive cement, polymer crete, Ferro cement, Fiber reinforced concrete. eliminators and polymers coating for rebar mortar and dry pack, vacuum concrete, Gunitie ion, Mortar repair for cracks, shoring and

ures Repairs to overcome low member strength, l disruption, weathering wear, fire, leakage, molition techniques for dilapidated structures

oration Maintenance and Repair of Structures” of Structures”- Edited by, Vol. 1, 2 and 3, Proc., a Indian Chapter of ACI, Bombay & Harold Roper, “ Concrete Structures– Repair”- Longman Scientific and Technical and Rehabilitation of RCC Buildings, DG(W), ment, New Delhi, 2002.

Subject Code	: CCT 252	IA Marks	: 50
No. of Lecture Hrs/ Week	: 04	Exam Hrs	: 03
Total no. of Lecture Hrs.	: 52	Exam Marks	: 100

Introduction: Highway and airport pavements, Types and component parts of pavements, their differences - Factors affecting design and performance of pavements.

Stresses and Deflections In Flexible Pavements: Stresses and deflections in homogeneous masses. wheel load stresses, various factors in traffic wheel loads; ESWL and EWL factors.

Flexible Pavement Design Methods For Highways : CBR method-Principle – Testing as per IRC, AASHTO and Asphalt Institute and Shell Method. Problems on above

Stresses in Rigid Pavements: Factors affecting design and performance of pavements. Types of stresses and causes, factors influencing the stresses; general considerations in rigid pavement analysis, EWL, wheel load stresses, warping stresses, frictional stresses, combined stresses. Problems on above Rigid Pavement Design: Types of joints in cement concrete pavements and their functions, joint spacing; design of CC pavement for roads and runways, design of joint details for longitudinal joints, contraction joints and expansion joints. IRC method of design by stress ratio method. Design of continuously reinforced concrete pavements, Problems on above

Equipment in Highway Construction: Various types of equipment for excavation, grading and compaction - their working principle, advantages and limitations. Special equipment for bituminous and cement concrete pavement and stabilized soil road construction

Subgrade: Earthwork grading and construction of embankments and cuts for roads. Preparation of subgrade, quality control tests

Flexible Pavements: Specifications of materials, construction method and field control checks for various types of flexible pavement layers – WBM-BM-SDBCBC

specifications and method of cement concrete
/ control tests; Construction of various types

Principles of Pavement Design"- 2nd ed. John

Pavements"- McGraw Hill Book Co.

Book of Highway Engineering"- Nemchand

"- Elsevier Publications

Conference on "Structural Design of Asphalt

Equipment and its Management"- Khanna

SOIL EXPLORATION AND GROUND IMPROVEMENT TECHNIQUES

Subject Code	: CCT 253	IA Marks	: 50
No. of Lecture Hrs/ Week	: 04	Exam Hrs	: 03
Total no. of Lecture Hrs.	: 52	Exam Marks	: 100

Principles of exploration: Geophysical and sounding methods, Modern methods of boring and sampling ; Preservation and transportation of samples; Sampling records, Soil profiles, Various types of field tests; Instrumentation; Investigation below sea/river bed; offshore investigation; investigation; interpretation of exploration data and report preparation; economics of field testing & lab testing. Engineering properties of soft & weak and compressible deposits; principles of treatment; Methods of soil improvement- lime stabilization and injection; thermal, electrical and chemical methods; Dynamic consolidation; vibroflotation; compaction by blasting; pre- consolidation with vertical drains; Granular piles; soil nailing; Anchors; Grouting; Electro-osmosis; Soil freezing; Vacuum consolidation; Case histories Soil confinement

REFERENCE BOOKS:

1. Hvorslev MJ, "Subsurface Exploration and Sampling of Soils for Civil Engg. Purposes" Elsevier Pub. Co
2. Manfredd RH, "Engineering Principles of Ground Modification", Mc Graw Hill
3. Head KH, "Manual of Soil Laboratory Testing".
4. Purushotham Raj, "Ground Improvement Techniques".
5. "Current Literature", Laxmi Pub

EARTHQUAKE RESISTANT STRUCTURES

CT 254 IA Marks : 50
 Exam Hrs : 03
 Exam Marks : 100

ology, characteristics of earthquake and its instrumentation in buildings, introduction to , Seismic response of buildings and sites – s and sites, building code requirements for mic response, structural response, structural behaviour of ordinary construction, site fail- s. Desirable features of earthquake resistant d energy absorption in buildings, details of lessons from structural damage during past ysis of linear systems- Response history analysis. Earthquake analysis of multistoried code provisions of Earthquake resistant sic structural elements (Reinforced concrete) os subjected to dynamic loads by limit state e resistant masonry – IS codal provisions

Design of Earthquake Resistant Buildings”-

of Structures – Theory and Application to 1 ed., Pearson Education pub.

als of Vibrations”- Mc Millan

920: 1993, IS – 4326: 1993, IS-13828: 1993

and Structural Dynamics”-VanNostrand Co.,

ics of Structures”.

and Structural Dynamics”- Oxford & IBH

/ergun, “ Design for Earthquakes”.

gn Practice for Buildings”, Thomas Telford.

SOFTWARE APPLICATIONS LABORATORY

Subject Code : 14CCT 26 IA Marks : 50
No. of Practical Hrs/ Week : 03

Software Application

Use of construction management softwares (MS-PROJECTS, PRIMAVERA)
Analysis of skeletal and continuum structures using standard FEM packages, BIM.

REFERENCE BOOKS:

1. “Software Manuals”
2. Harry G Harris and Gajanan M Sabnis, “Structural Modeling and Experimental Techniques”, CRC Press

V SEMESTER
SUSTAINABLE BUILDINGS

CCT 41	IA Marks	: 50
	Exam Hrs	: 03
	Exam Marks	: 100

Buildings – Zero carbon buildings, energy efficiency, modeling, carbon reduction in buildings,

Energy, life cycle energy assessment - case

standards – case studies.

Technologies.

Antamouris “ A hand book of Sustainable Building – An Integrated approach to energy, health Earthscan publishing house, 2009.

PRE-STRESSED CONCRETE

Subject Code	: CCT 421	IA Marks	: 50
No. of Lecture Hrs/ Week	: 04	Exam Hrs	: 03
Total no. of Lecture Hrs.	: 52	Exam Marks	: 100

High strength materials, Pre-stressing systems, losses in pre-stress, Analysis of P.C. Members for flexure, shear, torsion,. Design of reinforcement for shear, flexure and torsion. Anchorage zone stresses in Pre-tensioned and Post – tensioned members. Concept of transmission, length, bond stresses, Design of anchorage zone reinforcement, Introduction to Post-tensionin of flat slabsd.

REFERENCE BOOKS:

1. A Park and Paulay, “Reinforced Reinforced and Pre-stressed Concrete”, John Wiley & Sons.
2. Lin TY and Burns N H, “Reinforced Concrete Design”.
3. Kong KF and Evans T H “Design of Pre-stressed Concrete Structures”

CCT 422 IA Marks : 50
 Exam Hrs : 03
 Exam Marks : 100

Classification of buildings, means of escape,
 as a system, Lifts, escalators, cold and hot
 ns and electrical systems.
 e and protective maintenance, Scheduled and
 ning, M.I.S. for building maintenance.
 c maintenance decisions.

w Delhi
 g Complex and High Rise Buildings”, Khanna
 ce of Buildings.

Subject Code : CCT 423 IA Marks : 50
 No. of Lecture Hrs/ Week : 04 Exam Hrs : 03
 Total no. of Lecture Hrs. : 52 Exam Marks : 100

Introduction: Disaster preparedness, Goals and objectives of ISDR Programme, Risk identification, Risk sharing, Disaster and development: Development plans and disaster management, alternative to dominant approach, Disaster development linkages, Principle of risk partnership

Application of Technology in disaster risk reduction: Application of various technologies: Data bases RDBMS-Management information systems-Decision support system and other systems-Geographic information systems-Intranets and extranets-video teleconferencing-Trigger mechanism-Remote sensing-an insight- contribution of remote sensing and GIS

Awareness of Risk reduction: Trigger mechanism-constitution of trigger mechanism- risk reduction by education-disaster information network- risk reduction by public awareness

Development of Planning on disaster: Implication of development planning- financial arrangements- areas of improvement-disaster preparedness- community based disaster management-emergency response

Seismicity: Seismic waves-Earthquakes and faults-measures of earthquake, magnitude and intensity-ground damage-Tsunamis and earthquakes.

REFERNCE BOOKS:

1. Pardeep Sahni, Madhavi Malalgoda and Ariyabandu, “Disaster risk reduction in south Asia”, PHI
2. Amita sinvhal, “Understanding earthquake disasters”, TMH, 2010
3. Pardeep sahani, Alka Dhameja and Uma Medury, “Disaster Mitigation: Experiences and reflections”, PHI

DEMOLITION WASTE MANAGEMENT

WT 424 **IA Marks : 50**
 Exam Hrs : 03
 Exam Marks : 100

le materials, Governmental role in waste
nd recycle
of virgin aggregates by various methods,
ved aggregates by various techniques
: Classification, steps in handling C & D
wastes, Reuse as fine aggregate, coarse
ruction demolition wastes, Properties of
standards, national policy etc.

urce Recovery Engineering”, Springer-Verlag

nstruction and Demolition waste: A LEED-
Google ebook), Mc Graw Hill Professional
euse of Construction and Demolition Waste
va Science Publishers, 2008

