

## **Department of Mechanical Engineering**

### **Annexure – I to Resolution nos. 10 to 14 dated 12.4.2014 of the Academic Council**

#### **COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	DATA STRUCTURES
3	L-T-P Structure	3-1-0
4	Credits	3.0
5	Course number	EEM 303
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	B. Tech. (Mech.)
7.2	Overlap with any UG/PG course of another Dept./Centre	B. Tech. (Elect.)
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	This course aims at understanding and application of computer language such as C. Data processing applications like Pointers, Linked Lists, Creation, Insertion are being taught. A student will understand Data types, Operators, Control Statements, Structures and Functions. Other topics to deal with are Arrays, Stacks, Queues, Strings, Trees, Graphs, Files, Searching and Sorting algorithms.

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	C PROGRAMMING LAB
3	L-T-P Structure	0-0-3
4	Credits	1.0
5	Course number	EEM 304
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	B. Tech. (Mech.)
7.2	Overlap with any UG/PG course of another Dept./Centre	B. Tech. (Elect.)
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	Student through practical will understand the concepts of data structures and C programming.

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COURSE TEMPLATE

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	ENGLISH - III
3	L-T-P Structure	3-0-0
4	Credits	2.5
5	Course number	ENH 381
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	B. Tech. (Mech.)
7.2	Overlap with any UG/PG course of another Dept./Centre	B. Tech. (Elect.)
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	This course aims at developing communication skills of the students. At the end of this course a student will be well versed with Reading and Listening Comprehension. He/she will understand Basics and Forms of Technical and Business Communication. He/she will master Precis and Paragraph writing; Writing of Scientific and Technical Texts; Essay writing and Expansion.

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	CO-CURRICULAR ACTIVITIES
3	L-T-P Structure	
4	Credits	2.0
5	Course number	CAC 381
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	B. Tech. (Mech.)
7.2	Overlap with any UG/PG course of another Dept./Centre	B. Tech. (Elect.)
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	Student is encouraged to participate in various co-curricular activities like chart and model making, painting, hindi/English literary activities, dramatics etc.

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title ( <45 characters)	ENGINEERING MATHEMATICS – III
3	L-T-P Structure	4-0-0
4	Credits	3.0
5	Course number	MAM 381
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	B. Tech. (Mech.)
7.2	Overlap with any UG/PG course of another Dept./Centre	B. Tech. (Elect.)
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	This course aims at equipping the students with various mathematical tools/topics like Laplace transforms, Fourier transforms, and Complex analysis. He/she will understand where, when and how these tools are used. Knowledge of Inverse Laplace Transforms, Laplace transforms of error function, Heavyside Direct Delta Function; Finite and Infinite Fourier Transforms, Fourier Integral Theorem, Inversion Theorem, Analytic Function, Cuachy-Reimann Equation, Conjugate harmonic functions and other complex functions will be given.

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	PRODUCT MANUFACTURING PROJECT
3	L-T-P Structure	0-0-3
4	Credits	1.5
5	Course number	EEM 303
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	B. Tech. (Mech.)
7.2	Overlap with any UG/PG course of another Dept./Centre	B. Tech. (Elect.)
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	Students undergo in developing a new product or modification in a existing product which may be used by common man at houses or office buildings.

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	PRACTICAL TRAINING
3	L-T-P Structure	
4	Credits	2.0
5	Course number	EGC 382
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	B. Tech. (Mech.)
7.2	Overlap with any UG/PG course of another Dept./Centre	B. Tech. (Elect.)
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	Students undergo in-house and industry training. The purpose is to inculcate the habit of working on machine shop machines like lathe, milling m/cs, familiarizing with pattern and moulding techniques and also castings.

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	MECHANICS OF SOLIDS - I
3	L-T-P Structure	4-1-0
4	Credits	3.0
5	Course number	MEM 311
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	B. Tech. (Mech.)
7.2	Overlap with any UG/PG course of another Dept./Centre	NO
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	This course aims at preparing the students with the various concepts of solid of mechanics like Stress and Strain, Torsion, Bending, Deflections of Beams and Beams Columns. He/she will understand to apply the concept and theory of topics like stress, strains, Strain rosettes, Relations between E, K, G and v; Torsion of Circular shafts, Shearing stresses. Deflections of Beams, Elastic stability. Euler formula. Different end conditions.



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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	MATERIAL TESTING LAB
3	L-T-P Structure	0-0-1
4	Credits	1.0
5	Course number	MEM 312
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	B. Tech. (Mech.)
7.2	Overlap with any UG/PG course of another Dept./Centre	NO
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	Student will undergo practical for getting greater depth of the mechanics of solids. He/she will perform various experiments like Stiffness test, sheet metal test, notch bar test, brinell hardness test, universal testing with utm, Photoelastic Bench

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	BUILDING CONSTRUCTION & CONSTRUCTION MATERIAL
3	L-T-P Structure	4-1-0
4	Credits	3.0
5	Course number	CEM 301
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	NO
7.2	Overlap with any UG/PG course of another Dept./Centre	NO
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	This course aims at preparing students with basic concepts and theory of building construction materials and building construction. At the end of course student will able to apply the concepts like building construction, building byelaws, desirable conditions of comfort in building, brick masonry, plastering, pointing , foundations, floors and roofs, Stair and staircases etc.

**Course Number and Title: CEM301 – BUILDING CONSTRUCTION & CONSTRUCTION MATERIAL**

**Credits: 3, Periods (50 min each)/week: 5 (L:4 + T:1 + P:0 + S:0)**

**Unit 1: Building Construction:** Classification of buildings, Recommendations of NBC, Building byelaws, modular co-ordination; orientation of buildings, desirable conditions of comforts, and components of building area considerations.

**Unit 2: Foundations:** Types of foundations and selection criteria, Brick masonry, stone masonry. Types of walls, partition and cavity walls. Prefabricated construction. Plastering and pointing. Damp proofing materials and techniques, Antitermite treatment.

**Unit 3: Floors and Roofs:** Types floors, construction details and selection criteria Types of roofs and roof covering, treatment for water proofing.

**Unit 4: Stair and staircases:** Types, materials, proportions. Doors and windows: sizes and locations, proportions.

**Unit 5: Miscellaneous:** Lifts and escalators. White washing, colour washing, painting, distemping. Shuttering, scaffolding and centering. Expansion and construction joints Sound and fire proof construction, I.S. specifications.

**SUGGESTED READINGS:**

- Arora, S.P. & Bindra, S.P., 'A text book of Building Construction" Dhanpat Rai & Sons, Delhi, 1977.  
 Jha, J. & Sinha, S.K., "Building Construction", Khanna Publishers, Delhi,1977.  
 Kulkarni, C.J., "A text book of Engineering Construction", Ahmedabad Book Depot, Ahmedabad, 1968.  
 Kumar Sushil, " Building construction", Standard Publishers, Distributors, Delhi, 1994  
 McKay W.B., "Building Construction, "Vol.1 to 4, Orient Longman Ltd., Hyderabad, Bombay, Madras, Delhi, Vol.1 & 2 -1995,  
 Vol. 3-1996, Vol. 4-1998.  
 Punmia, B.C., "A text book of Building Construction ", Laxmi Publications, Delhi, Madras, 1987.

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	CONCRETE & CONSTRUCTION MATERIALS LAB
3	L-T-P Structure	0-0-1
4	Credits	1.5
5	Course number	CEM 302
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	NO
7.2	Overlap with any UG/PG course of another Dept./Centre	NO
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	Student will undergo practical of the building construction materials and building construction. Experiments like types of cements, coarse aggregates, fine aggregates, Destructive and non destructive testing on concrete, physical and mechanical properties of reinforcing steel, Bricks are done by students.

**Course Number CEM302 Title: CONCRETE & CONSTRUCTION MATERIALS LAB  
Credits: 1.5, Periods (50 min each)/week: 2 (L:0 + T:0 + P:1 + S:1)**

I. Cement (Two turns only)

1-Normal Consistency of cement 2-Initial & final setting time of cement 3-Compressive strength of cement 4-Fineness of cement by air permeability and Le-chatalier's apparatus 5-Soundness of cement 6-Tensile strength

II. Coarse Aggregate (Two turns only)

1-Crushing value of aggregate 2-Impact value of aggregate 3-water absorption of aggregate 4-Sieve Analysis of Aggregate 5-Specific gravity & bulk density 6-Grading of aggregates

III Fine Aggregate (one turn only)

1-Sieve analysis of sand 2-Silt content of sand 3-Bulking of sand

IV Destructive and non destructive testing on concrete

V Physical and mechanical properties of reinforcing steel.

VI Bricks:

1-Water absorption 2-Dimension Tolerances 3-Compressive strength 4-Efflorescence

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	FLUID MECHANICS
3	L-T-P Structure	4-1-0
4	Credits	3.0
5	Course number	CEM 303
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	B. Tech. (Mech.)
7.2	Overlap with any UG/PG course of another Dept./Centre	NO
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	Fluid mechanics is an important course for Civil, Mechanical and Chemical Engineering. It makes you understand about the nature and flow of fluid (especially water) in close and open conduits. It lays foundation for advanced courses. The various processes in River Engineering, Canal design. Dam design. Water supply & Sanitary engineering presently named as Environmental Engineering, Hydraulics Machines. Water-Power. Transport phenomena cannot be understood and design cannot be carried out properly without adequate knowledge of Fluid Mechanics. So, this course aims at fulfilling the concepts and knowledge of fluids to the students.

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1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	FLUID MECHANICS LAB
3	L-T-P Structure	0-0-1
4	Credits	1.5
5	Course number	CEM 304
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	B. Tech. (Mech.)
7.2	Overlap with any UG/PG course of another Dept./Centre	NO
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	Students will learn by carrying out experiments on various theories and concepts of fluids. Experiments will cover kinematics as well as dynamics of fluids.

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	BUILDING CONSTRUCTION MATERIALS
3	L-T-P Structure	4-1-0
4	Credits	3.0
5	Course number	CEM 305
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	NO
7.2	Overlap with any UG/PG course of another Dept./Centre	NO
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	This course aims at preparing students with basic concepts and theory of building construction materials. At the end of course student will able to apply the concepts like Properties and selection criteria of Bricks, Stone classification, Mortar, Cement, Manufacture of cement, Admixtures, Steel in Civil Engineering, Bitumen and bituminous mixes, Glass, Plastics, P.V.C., Geotextiles, FRP's, Epoxy-coated bar

**Course Number and Title: CEM305 – BUILDING CONSTRUCTION MATERIALS**

**Credits: 3, Periods (50 min each)/week: 5 (L:4 + T:1 + P:0 + S:0)**

Class: B.Tech.(Civil), Status of Course: Major Course, Approved since session: 2000-01

Total Credits:3, Periods(50 mts. each)/week: 2 for 26 weeks, Min.pds./sem: 52

**Unit 1:**

Building Materials : Classification, Properties and selection criteria of Bricks, Burning of Bricks, tests for bricks.

Stone classification, characteristics of good building stone, common building stones in India, lime, IS specifications, Field tests of Building limes,  
Timber, Characteristics of good timber, defects in timber, seasoning of timber, tests on timber, plywood.

**Unit 2:**

Mortar: Types, classification and strength, I.S. specifications.

Cement, Manufacture of cement, Different types of cement such as slag Cement, Portland Pozzolona Cement and high Alumina cement, their characteristics, composition, use and properties, Tests on Cements.

**Unit 3:**

Admixtures, Aggregates and Testing of Aggregates: Classification, source, physical and mechanical properties. Testing of Aggregates for physical and mechanical properties.

Steel in Civil Engineering: Structural, Reinforcing Bars, Wires;

**Unit 4:**

Bitumen and bituminous mixes: sources, composition, characterization, various forms, tests on bitumen preparation / characterization of bituminous mixes. Mix design

**Unit 5:**

Other Materials: Glass, Plastics, P.V.C., Geotextiles, FRP's, Epoxy-coated bar.

**SUGGESTED READINGS:**

Arora, S.P. & Bindra, S.P., 'A text book of Building Construction" Dhanpat Rai & Sons, Delhi, 1977.

Jha, J. & Sinha, S.K., "Building Construction", Khanna Publishers, Delhi,1977.

Kulkarni, C.J., "A text book of Engineering Materials", Ahmedabad book Depot, Ahmedabad, 1968.

Kulkarni, C.J., "A text book of Engineering Construction", Ahmedabad Book Depot, Ahmedabad, 1968.

Kumar Sushil, "Engineering Materials, "Standard Publishers Distributors, Delhi, 1994.

Kumar Sushil, " Building construction", Standard Publishers, Distributors, Delhi, 1994

McKay W.B., "Building Construction, "Vol.1 to 4, Orient Longman Ltd., Hyderabad, Bombay, Madras, Delhi, Vol.1 & 2 -1995,

Vol. 3-1996, Vol. 4-1998.

Punmia, B.C., "A text book of Building Construction ", Laxmi Publications, Delhi, Madras, 1987.

Singh Surendra, "Engineering Materials,", Konark Publishers Pvt. Ltd. 1994.

Civil Engg. Materials, TTTI Chandigarh, Tata McGraw- New Delhi.

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	GENERAL KNOWLEDGE & CURRENT AFFAIRS - I
3	L-T-P Structure	1-0-0
4	Credits	1.0
5	Course number	GKC 481
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	B. Tech. (Mech.)
7.2	Overlap with any UG/PG course of another Dept./Centre	B. Tech. (Elect.)
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	Students will have awareness about the events and happenings in the country and the world.



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1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	CO-CURRICULAR ACTIVITIES
3	L-T-P Structure	
4	Credits	1.0
5	Course number	CAC 481
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	B. Tech. (Mech.)
7.2	Overlap with any UG/PG course of another Dept./Centre	B. Tech. (Elect.)
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	Student is encouraged to participate in various co-curricular activities like chart and model making, painting, hindi/English literary activities, dramatics etc.

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	ENGLISH - IV
3	L-T-P Structure	3-0-0
4	Credits	2.5
5	Course number	ENH 481
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	B. Tech. (Mech.)
7.2	Overlap with any UG/PG course of another Dept./Centre	B. Tech. (Elect.)
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	This course aims at developing communication skills of the students. At the end of this course a student will be well versed with writing of Technical Reports and Proposals, Notices, Agenda, Minutes, Manuals and Handbooks. He/she will learn to read and understand Research Papers, Articles and Abstracts, Review writing, Short-Speeches, Debates and Presentation Strategies, oral Presentation- Interviews, Meetings, Seminars, Conferences and Group Discussions

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	WORK EXPERIENCE COURSE
3	L-T-P Structure	0-0-4
4	Credits	2.0
5	Course number	EEW 401/EEW 402/ EEW 403/MEW 401/ MEW 402/ MEW 403/ MEW 404
6	Status (category for program)	ELECTIVE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	B. Tech. (Mech.)
7.2	Overlap with any UG/PG course of another Dept./Centre	B. Tech. (Elect.)
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	Students will be exposed to hands on training in various work experience courses.

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	INDUSTRIAL VISITS
3	L-T-P Structure	
4	Credits	1.0
5	Course number	EGC 481
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	B. Tech. (Mech.)
7.2	Overlap with any UG/PG course of another Dept./Centre	B. Tech. (Elect.)
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	Students will be required to visit a site and understand the working and methodology of the work at site being done. The students will undergo to write a report regarding their learning and experiences at the site.

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	INSTRUMENTATION
3	L-T-P Structure	3-1-0
4	Credits	3.0
5	Course number	MEM 401
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	B. Tech. (Mech.)
7.2	Overlap with any UG/PG course of another Dept./Centre	NO
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	As the civil engineers, counter various instruments and appliances during their work, they should have working knowledge and the concept used in instruments being used by them. The objective of the course is to familiarize with different types of main sensors and transducers used in Industry and to familiarize how signal conditioning is to be carried out for farther use. Then how to acquire this data for computer and to telemeter it over a distance. Some basic fundamental of virtual instrumentation system and display devices is stressed.

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	ENGINEERING MECHANICS - II
3	L-T-P Structure	4-1-0
4	Credits	3.0
5	Course number	MEM 402
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	B. Tech. (Mech.)
7.2	Overlap with any UG/PG course of another Dept./Centre	NO
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	Since, the course- Engineering Mechanics-1 is not sufficient to cover all the knowledge required by the civil engineer, Engineering Mechanics-2 is incorporated to suffice the content of the subject.

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	ENGINEERING MECHANICS LAB
3	L-T-P Structure	0-0-3
4	Credits	1.0
5	Course number	MEM 403
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	B. Tech. (Mech.)
7.2	Overlap with any UG/PG course of another Dept./Centre	NO
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	Experiments related to Friction in Bearings, Worm and Worm Wheel, Inclined Plane, Screw Jack, Wheel and Differential Axis, Fly Wheel will done by the students.

**Annexure – I to Resolution nos. 10 to 14 dated 12.4.2014 of the Academic Council**

**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	HYDRAULICS AND HYDRAULICS MACHINES
3	L-T-P Structure	4-1-0
4	Credits	3.0
5	Course number	CEM 402
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	B. Tech. (Mech.)
7.2	Overlap with any UG/PG course of another Dept./Centre	NO
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	Hydraulics and hydraulic machines is an important course for civil engineers it makes you to understand the mechanism of water flow by gravity in open channels, canals and rivers, it allows you to calculate the velocity of flow in open channel if physical parameters of the channel are given and the discharge through it. You will be able to understand and calculate the depth and scope of backwater surface behind weirs, barrages and spillway, it helps you appreciate the phenomena of hydraulic jump forming under spillway and the amount of energy lost through it. This course aims at preparing the students with the principles and working of the hydraulic machines. Various types of machines like turbine and pumps will be studied by the students.



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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	WATER SUPPLY AND SEWERAGE
3	L-T-P Structure	4-1-0
4	Credits	3.0
5	Course number	CEM 401
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	NO
7.2	Overlap with any UG/PG course of another Dept./Centre	NO
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	This course aims at imparting the knowledge to the students about water supply and sewerage system. Student will be able to understand the source of water supply, water quality, water collection and treatment, Water distribution, storage reservoirs and distribution networks, Water transportation, water conservation, rain water harvesting, small water supply systems and Sewage Systems.

**Course Number and Title: CEM401 – WATER SUPPLY AND SEWERAGE**

**Credits: 3, Periods (50 min each)/week: 5 (L:4 + T:1 + P:0 + S:0)**

**Unit 1:** Introduction and scope, source of water supply, water quality: physical, chemical and biological characteristics, water demand.

**Unit 2:** Water collection and treatment, conventional treatment, settling, coagulation-flocculation, filtration and disinfection, advanced treatment, activated carbon adsorption and ozonation, design of facilities.

**Unit 3:** Water distribution, storage reservoirs and distribution networks.

**Unit 4:** Water transportation, water pipes, water leakage, Water supply in buildings, plumbing and fixtures;

**Unit 5:** Water conservation, rain water harvesting, small water supply systems and Sewage Systems.

**SUGGESTED READINGS:**

Hammer M.J. and Hammer M.J., Water and waste water Technology, 4th edn, PHI

Davis M.L. and Cornwell, D.A., Introduction to Environmental Engineering, McGraw Hill

McGhee, T.J., Water supply and Sewerage, McGraw Hill

Peavy, H.S., D.R. and Tehobanoglous, G., Environmental Engineering, McGraw Hill

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	HYDRAULIC MACHINES LAB
3	L-T-P Structure	0-0-2
4	Credits	0.5
5	Course number	CEM 403
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	B. Tech. (Mech.)
7.2	Overlap with any UG/PG course of another Dept./Centre	NO
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	This course aims at imparting the practical knowledge to the students. Various experiment which will be conducted are- Testing of 15 H.P. centrifugal pumps; Testing of variable special centrifugal pumps; Determination of coefficient of friction in Disc friction Apparatus; Load test on Pelton turbine; Muchal curves of Pelton turbine; Load test a Francis turbine; ISI efficiency curves of Francis turbine.

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	GEOMATICS - I
3	L-T-P Structure	4-1-0
4	Credits	3.0
5	Course number	CEM 404
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	NO
7.2	Overlap with any UG/PG course of another Dept./Centre	NO
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	This course aims at imparting the the knowledge about the Geomatics. Students will understand the concepts like control networks, locating topographic details; Taping; curvature and refraction effects; Direction/Angle measurements, Plane Tabling, Tacheometric surveys, Coordinate systems and datum transformation, Control surveys, Total station surveys; GPS survey; Construction surveys

## **Course Number and Title: CEM404 – Geomatics-I**

**Credits: 3, Periods (50 min each)/week: 5 (L:4 + T:1 + P:0 + S:0)**

### **Unit 1: Introduction:**

**Basic concepts of surveying:** Objectives; Basic measurements, control networks, locating topographic details; Units of measurement; Error in measurement and their types, indices of precision, weight, outliers; Error sources, types; accuracy and precision, propagation of variance/covariance

**Linear measurements:** Taping; Optical distance measurement; Electronic distance measurement, classification and calibration; Errors in distance measurement and precautions

**Vertical control:** Level surface; Levelling principles, determination of height, leveling instruments; Sources of error and minimization, curvature and refraction effects; closure tolerances; Types of levelling; Characteristics of contours; methods of contouring

### **Unit 2:**

**Direction/Angle measurements:** Concept of direction, azimuth, meridian; Theodolite, fundamental characteristic of theodolite and adjustment, measuring angles, sources of error

**Plane Tabling (PT):** Accessories in PT, methods of PT, resection methods, preparation of map

### **Unit 3:**

**Tacheometric surveys :** Principle and basic system, subtense bar, various types of tachometers, plotting with tachometers

**Coordinate systems and datum transformation:** Important surfaces in geodesy: earth surface, geoids, MSL, reference ellipsoid; Reference systems: 2D and 3D coordinate systems and transformations; map projection, UTM projection

### **Unit 4:**

**Control surveys:** Traversing: balancing of traverse, Triangulation, Trilateration, and Triangulation: Purpose, classification, strength of figure, well-conditioned triangle, triangulation figures, reconnaissance and station selection, inter-visibility of stations, signal and towers, base lining, computation and adjustment in triangulation, satellite station,

**Adjustments:** Adjustment of errors using Least squares: observation equation and condition equation approach (preferably matrix-based solution)

### **Unit 5:**

**Total station surveys:** Principles, classification, salient features of total station

**GPS survey:** Principles, errors, DGPS, DOP, GPS survey Methods and plans

**Construction surveys:** Principle of setting out; Special instruments for setting out: Setting out a building, Setting out a highway curve

#### SUGGESTED READINGS:

1. Arora, K. R., *Surveying*, Standard Book House, Delhi.
2. Anderson, J.M. and Mikhail, E.M., *Surveying theory and practice*, 7<sup>th</sup> ed, McGraw-Hill 1997.
3. Ghilani, C. D. and Wolf, P. R., *Elementary Surveying: An Introduction to Geomatics*, 13 ed, Prentice Hall, 2011.
4. Schofield, W., *Engineering Surveying*, 6<sup>th</sup>ed, Butterworth Heinemann, Oxford.
5. Sickle, J. V., *GPS for Land Surveyors*, 3<sup>rd</sup>ed. CRC Press, 2008.
6. Agor, R. "Surveying", Vol. I & II Khanna Publications, Delhi.
7. Arora, K.R., "Surveying" , Vol. I & II Standard Book House, Delhi,
8. Bannister, A. and Baker, R., "Solving Problems in Surveying", Longman Scientific Technical, U.K., 1994.

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	SURVEYING LAB
3	L-T-P Structure	0-0-2
4	Credits	1.0
5	Course number	CEM 405
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	NO
7.2	Overlap with any UG/PG course of another Dept./Centre	NO
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	This course aims at understanding and experimentation how the surveying is done. The student will be exposed to instruments used in chain surveying and to measure distance between two points by ranging; to solve two point / three point problem in plane tabling; to find out the reduced levels of given points using level, etc.

**Course Number and Title: CEM405 – SURVEYING-I LAB**

**Credits: 1, Periods (50 min each)/week: 2 (L:0 + T:0 + P:2 + S:0)**

1. Visit to Lab. for the study of:
2.     a. Maps from Survey of India Publication.
3.     b. Conventional Symbol Charts and Different types of maps.
4. To study instruments used in chain surveying and to measure distance between two points by ranging.
5. To determine the bearing of sides of a given traverse using Prismatic Compass, and plotting of the traverse.
6. To plot details using radiation and intersection methods in plane tabling.
7. To solve two point / three point problem in plane tabling.
8. To find out the reduced levels of given points using level. (Reduction by Height of Collimation method and Rise and Fall Method).
9. To determine and draw the longitudinal and cross-section profiles along a given route.
10. Practice for temporary adjustments of a Vernier Theodolite and taking Horizontal and Vertical angular measurements, by Reiteration method.
11. Measurement of horizontal angles by Repetition method.
12. Determination of the Tacheometric constants of a given theodilite.

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	BUILDING PLANNING AND DRAWING
3	L-T-P Structure	0-0-3
4	Credits	2.0
5	Course number	CEM 406
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	NO
7.2	Overlap with any UG/PG course of another Dept./Centre	NO
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	This course emphasizes on the drawing of building and their planning. Students will understand various important concepts regarding building planning and its drawing.

**Course Number and Title: CEM 406 – BUILDING PLANNING & DRAWING**

**Credits: 2, Periods (50 min each)/week: 3 (L:0 + T:0 + P:3 + S:0)**

Introduction, size of drawings, layout of drawings, scales, graphic symbols: doors, windows, graphical symbols for drains and pipes, alphabetical symbols, symbols for sanitary plumbing, abbreviations.

Masonry: Brick work, technical terms, bonds, T-junction, bonds for pillars and piers, coping, jambs and reveal, stone masonry and stone masonry joints.

Foundation and plinth, Damp proof course – methods and materials, Basement, Cavity walls, constructional details. Floors and their types, Arches and lintel, Door and window–types, parts, metal framed windows and doors, aluminum doors and windows, Recommended symbols.

Experiments:

1. Basic elements and planning residential buildings- method of making line plane and preparation of sheets
2. Detailed drawing of a simple 2 rooms building- drawing, plan, elevation and sections.
3. Drawing a building 3 rooms and services.
4. Preparation of drawing a double storey building including stairs.
5. Preparation of drawing for school building/ official building.

Drafting of following Using Any CAD software (AutoCAD, Solid Works etc.)

1. Symbols used in Civil Engineering drawing, Masonry Bonds
2. Doors, Windows and staircases.
3. Typical Layout plans for Mechanical and Electrical Plants, Services in different buildings
4. Comprehensive Drawing of Residential building (Layout, plan, elevation & sectional elevation, plumbing & electrical fillings in out)
5. Preparation of Layout planning of different civil engg. Projects.
6. Preparation of lay out plan/Maps and building drawing using computer

SUGGESTED READINGS:

V.B. Sikka: A course in Civil Engineering Drawing- S.K. Kataria & sons.

M. Chakrabarti: Civil Engineering Drawing

Handbook of concrete, reinforcement and detailing; SP:34(1987)

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	WASTE MANAGEMENT
3	L-T-P Structure	4-0-0
4	Credits	3.0
5	Course number	CEM 407
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	NO
7.2	Overlap with any UG/PG course of another Dept./Centre	NO
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	Managing the waste is one of the biggest challenges for human race. This course aims at preparing the students about various techniques and methods for managing the waste. Various waste to be considered in this course are wastewater Collection; Wastewater Characterization; Wastewater Treatment; Pre-and Primary Treatment; Secondary Treatment; Wastewater and Sludge Disposal; Municipal Solid Waste.

**Course Number CEM-407**

**Course Title: Waste Management**

Class: B.Tech., Status of Course: Major Course, Approved since session: 2014-15

Total Credits:3, Periods(50 mts. each)/week:4(L:4-0+P:0+S:0), Min.pds./sem:52

**Wastewater Collection:** Plumbing, types of sewers, design considerations, construction & maintenance, storm water sewers.

**Wastewater Characterization:** Constituents

**Wastewater Treatment:** On site and centralized treatment systems.

**Pre-and Primary Treatment :** Screen, grit removal, oil and grease removal.

**Secondary Treatment :** Activated sludge process, conventional and extended aeration, waste stabilization ponds, UASB process, UASB post treatment.

Advanced Wastewater Treatment

**Wastewater and Sludge Disposal:** Reuse systems, wastewater disposal on land and water bodies, disposal of sludge.

**Municipal Solid Waste:** Collection, characterization, transport, treatment & disposal,

**Types of Industrial Waste:** Liquid, solid, atmospheric and hazardous, Hazardous wastes : Characterization and treatment.

Practical studies on Sewage Treatment Plants

SUGGESTED READINGS:

1. Davis, M.L. and Cornwell, D.A., "Introduction to Environmental Engineering", McGraw Hill.
2. Masters, G.M., "Introduction to Environmental Engineering and Science", Prentice Hall of India.
3. Peavy, H.S., Rowe, D.R. and Tchobanoglous, G., "Environmental Engineering", McGraw Hill.
4. Arcievala, S.J., "Wastewater Treatment for Pollution Control", Tata McGraw Hill.

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	DATA STRUCTURES
3	L-T-P Structure	3-1-0
4	Credits	3.0
5	Course number	EEM 303
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	B. Tech. (Mech.)
7.2	Overlap with any UG/PG course of another Dept./Centre	B. Tech. (Elect.)
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	This course aims at understanding and application of computer language such as C. Data processing applications like Pointers, Linked Lists, Creation, Insertion are being taught. A student will understand Data types, Operators, Control Statements, Structures and Functions. Other topics to deal with are Arrays, Stacks, Queues, Strings, Trees, Graphs, Files, Searching and Sorting algorithms.



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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	C PROGRAMMING LAB
3	L-T-P Structure	0-0-3
4	Credits	1.0
5	Course number	EEM 304
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	B. Tech. (Mech.)
7.2	Overlap with any UG/PG course of another Dept./Centre	B. Tech. (Elect.)
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	Student through practical will understand the concepts of data structures and C programming.

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	ENGLISH - III
3	L-T-P Structure	3-0-0
4	Credits	2.5
5	Course number	ENH 381
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	B. Tech. (Mech.)
7.2	Overlap with any UG/PG course of another Dept./Centre	B. Tech. (Elect.)
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	This course aims at developing communication skills of the students. At the end of this course a student will be well versed with Reading and Listening Comprehension. He/she will understand Basics and Forms of Technical and Business Communication. He/she will master Precis and Paragraph writing; Writing of Scientific and Technical Texts; Essay writing and Expansion.

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	CO-CURRICULAR ACTIVITIES
3	L-T-P Structure	
4	Credits	2.0
5	Course number	CAC 381
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	B. Tech. (Mech.)
7.2	Overlap with any UG/PG course of another Dept./Centre	B. Tech. (Elect.)
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	Student is encouraged to participate in various co-curricular activities like chart and model making, painting, hindi/English literary activities, dramatics etc.

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	ENGINEERING MATHEMATICS – III
3	L-T-P Structure	4-0-0
4	Credits	3.0
5	Course number	MAM 381
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	B. Tech. (Mech.)
7.2	Overlap with any UG/PG course of another Dept./Centre	B. Tech. (Elect.)
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	This course aims at equipping the students with various mathematical tools/topics like Laplace transforms, Fourier transforms, and Complex analysis. He/she will understand where, when and how these tools are used. Knowledge of Inverse Laplace Transforms, Laplace transforms of error function, Heavyside Direct Delta Function; Finite and Infinite Fourier Transforms, Fourier Integral Theorem, Inversion Theorem, Analytic Function, Cuachy-Reimann Equation, Conjugate harmonic functions and other complex functions will be given.

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	PRODUCT MANUFACTURING PROJECT
3	L-T-P Structure	0-0-3
4	Credits	1.5
5	Course number	EEM 303
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	B. Tech. (Mech.)
7.2	Overlap with any UG/PG course of another Dept./Centre	B. Tech. (Elect.)
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	Students undergo in developing a new product or modification in a existing product which may be used by common man at houses or office buildings.

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	PRACTICAL TRAINING
3	L-T-P Structure	
4	Credits	2.0
5	Course number	EGC 382
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	B. Tech. (Mech.)
7.2	Overlap with any UG/PG course of another Dept./Centre	B. Tech. (Elect.)
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	Students undergo in-house and industry training. The purpose is to inculcate the habit of working on machine shop machines like lathe, milling m/cs, familiarizing with pattern and moulding techniques and also castings.

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	MECHANICS OF SOLIDS - I
3	L-T-P Structure	4-1-0
4	Credits	3.0
5	Course number	MEM 311
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	B. Tech. (Mech.)
7.2	Overlap with any UG/PG course of another Dept./Centre	NO
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	This course aims at preparing the students with the various concepts of solid of mechanics like Stress and Strain, Torsion, Bending, Deflections of Beams and Beams Columns. He/she will understand to apply the concept and theory of topics like stress, strains, Strain rosettes, Relations between E, K, G and $\nu$ ; Torsion of Circular shafts, Shearing stresses. Deflections of Beams, Elastic stability. Euler formula. Different end conditions.

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	MATERIAL TESTING LAB
3	L-T-P Structure	0-0-1
4	Credits	1.0
5	Course number	MEM 312
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	B. Tech. (Mech.)
7.2	Overlap with any UG/PG course of another Dept./Centre	NO
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	Student will undergo practical for getting greater depth of the mechanics of solids. He/she will perform various experiments like Stiffness test, sheet metal test, notch bar test, brinnel hardness test, universal testing with utm, Photoelastic Bench



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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	BUILDING CONSTRUCTION & CONSTRUCTION MATERIAL
3	L-T-P Structure	4-1-0
4	Credits	3.0
5	Course number	CEM 301
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	NO
7.2	Overlap with any UG/PG course of another Dept./Centre	NO
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	This course aims at preparing students with basic concepts and theory of building construction materials and building construction. At the end of course student will able to apply the concepts like building construction, building byelaws, desirable conditions of comfort in building, brick masonry, plastering, pointing , foundations, floors and roofs, Stair and staircases etc.

**Course Number and Title: CEM301 – BUILDING CONSTRUCTION & CONSTRUCTION MATERIAL**

**Credits: 3, Periods (50 min each)/week: 5 (L:4 + T:1 + P:0 + S:0)**

**Unit 1: Building Construction:** Classification of buildings, Recommendations of NBC, Building byelaws, modular co-ordination; orientation of buildings, desirable conditions of comforts, and components of building area considerations.

**Unit 2: Foundations:** Types of foundations and selection criteria, Brick masonry, stone masonry. Types of walls, partition and cavity walls. Prefabricated construction. Plastering and pointing. Damp proofing materials and techniques, Antitermite treatment.

**Unit 3: Floors and Roofs:** Types floors, construction details and selection criteria Types of roofs and roof covering, treatment for water proofing.

**Unit 4: Stair and staircases:** Types, materials, proportions. Doors and windows: sizes and locations, proportions.

**Unit 5: Miscellaneous:** Lifts and escalators. White washing, colour washing, painting, distempering. Shuttering, scaffolding and centering. Expansion and construction joints Sound and fire proof construction, I.S. specifications.

**SUGGESTED READINGS:**

- Arora, S.P. & Bindra, S.P., 'A text book of Building Construction" Dhanpat Rai & Sons, Delhi, 1977.  
 Jha, J. & Sinha, S.K., "Building Construction", Khanna Publishers, Delhi,1977.  
 Kulkarni, C.J., "A text book of Engineering Construction", Ahmedabad Book Depot, Ahmedabad, 1968.  
 Kumar Sushil, " Building construction", Standard Publishers, Distributors, Delhi, 1994  
 McKay W.B., "Building Construction, "Vol.1 to 4, Orient Longman Ltd., Hyderabad, Bombay, Madras, Delhi, Vol.1 & 2 -1995,  
 Vol. 3-1996, Vol. 4-1998.  
 Punmia, B.C., "A text book of Building Construction ", Laxmi Publications, Delhi, Madras, 1987.

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	CONCRETE & CONSTRUCTION MATERIALS LAB
3	L-T-P Structure	0-0-1
4	Credits	1.5
5	Course number	CEM 302
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	NO
7.2	Overlap with any UG/PG course of another Dept./Centre	NO
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	Student will undergo practical of the building construction materials and building construction. Experiments like types of cements, coarse aggregates, fine aggregates, Destructive and non destructive testing on concrete, physical and mechanical properties of reinforcing steel, Bricks are done by students.

**Course Number CEM302 Title: CONCRETE & CONSTRUCTION MATERIALS LAB Credits: 1.5, Periods (50 min each)/week: 2 (L:0 + T:0 + P:1 + S:1)**

**I. Cement (Two turns only)**

1-Normal Consistency of cement 2-Initial & final setting time of cement 3- Compressive strength of cement 4-Fineness of cement by air permeability and Le-chatalier's apparatus 5-Soundness of cement 6-Tensile strength

**II. Coarse Aggregate (Two turns only)**

1-Crushing value of aggregate 2-Impact value of aggregate 3-water absorption of aggregate 4-Sieve Analysis of Aggregate 5-Specific gravity & bulk density 6- Grading of aggregates

**III Fine Aggregate (one turn only)**

1-Sieve analysis of sand 2-Silt content of sand 3-Bulking of sand

**IV Destructive and non destructive testing on concrete**

V Physical and mechanical properties of reinforcing steel.

**VI Bricks:**

1-Water absorption 2-Dimension Tolerances 3-Compressive strength 4-Efflorescence

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	FLUID MECHANICS
3	L-T-P Structure	4-1-0
4	Credits	3.0
5	Course number	CEM 303
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	B. Tech. (Mech.)
7.2	Overlap with any UG/PG course of another Dept./Centre	NO
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	Fluid mechanics is an important course for Civil, Mechanical and Chemical Engineering. It makes you understand about the nature and flow of fluid (especially water) in close and open conduits. It lays foundation for advanced courses. The various processes in River Engineering, Canal design. Dam design. Water supply & Sanitary engineering presently named as Environmental Engineering, Hydraulics Machines. Water-Power. Transport phenomena cannot be understood and design cannot be carried out properly without adequate knowledge of Fluid Mechanics. So, this coarse aims at fulfilling the concepts and knowledge of fluids the to the students.

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	FLUID MECHANICS LAB
3	L-T-P Structure	0-0-1
4	Credits	1.5
5	Course number	CEM 304
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	B. Tech. (Mech.)
7.2	Overlap with any UG/PG course of another Dept./Centre	NO
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	Students will learn by carrying out experiments on various theories and concepts of fluids. Experiments will cover kinematics as well as dynamics of fluids.

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	BUILDING CONSTRUCTION MATERIALS
3	L-T-P Structure	4-1-0
4	Credits	3.0
5	Course number	CEM 305
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	NO
7.2	Overlap with any UG/PG course of another Dept./Centre	NO
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	This course aims at preparing students with basic concepts and theory of building construction materials. At the end of course student will able to apply the concepts like Properties and selection criteria of Bricks, Stone classification, Mortar, Cement, Manufacture of cement, Admixtures, Steel in Civil Engineering, Bitumen and bituminous mixes, Glass, Plastics, P.V.C., Geotextiles, FRP's, Epoxy-coated bar

**Course Number and Title: CEM305 – BUILDING CONSTRUCTION MATERIALS**

**Credits: 3, Periods (50 min each)/week: 5 (L:4 + T:1 + P:0 + S:0)**

Class: B.Tech.(Civil), Status of Course: Major Course, Approved since session: 2000-01

Total Credits:3, Periods(50 mts. each)/week: 2 for 26 weeks, Min.pds./sem: 52

**Unit 1:**

Building Materials : Classification, Properties and selection criteria of Bricks, Burning of Bricks, tests for bricks.

Stone classification, characteristics of good building stone, common building stones in India, lime, IS specifications, Field tests of Building limes,

Timber, Characteristics of good timber, defects in timber, seasoning of timber, tests on timber, plywood.

**Unit 2:**

Mortar: Types, classification and strength, I.S. specifications.

Cement, Manufacture of cement, Different types of cement such as slag Cement, Portland Pozzolona Cement and high Alumina cement, their characteristics, composition, use and properties, Tests on Cements.

**Unit 3:**

Admixtures, Aggregates and Testing of Aggregates: Classification, source, physical and mechanical properties. Testing of Aggregates for physical and mechanical properties.

Steel in Civil Engineering: Structural, Reinforcing Bars, Wires;

**Unit 4:**

Bitumen and bituminous mixes: sources, composition, characterization, various forms, tests on bitumen preparation / characterization of bituminous mixes. Mix design

**Unit 5:**

Other Materials: Glass, Plastics, P.V.C., Geotextiles, FRP's, Epoxy-coated bar.

**SUGGESTED READINGS:**

Arora, S.P. & Bindra, S.P., 'A text book of Building Construction" Dhanpat Rai & Sons, Delhi, 1977.

Jha, J. & Sinha, S.K., "Building Construction", Khanna Publishers, Delhi,1977.

Kulkarni, C.J., "A text book of Engineering Materials", Ahmedabad book Depot, Ahmedabad, 1968.

Kulkarni, C.J., "A text book of Engineering Construction", Ahmedabad Book Depot, Ahmedabad, 1968.

Kumar Sushil, "Engineering Materials, "Standard Publishers Distributors, Delhi, 1994.

Kumar Sushil, " Building construction", Standard Publishers, Distributors, Delhi, 1994

McKay W.B., "Building Construction, "Vol.1 to 4, Orient Longman Ltd., Hyderabad, Bombay, Madras, Delhi, Vol.1 & 2 -1995,

Vol. 3-1996, Vol. 4-1998.

Punmia, B.C., "A text book of Building Construction ", Laxmi Publications, Delhi, Madras, 1987.

Singh Surendra, "Engineering Materials,", Konark Publishers Pvt. Ltd. 1994.

Civil Engg. Materials, TTTI Chandigarh, Tata McGraw- New Delhi.

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	GENERAL KNOWLEDGE & CURRENT AFFAIRS - I
3	L-T-P Structure	1-0-0
4	Credits	1.0
5	Course number	GKC 481
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	B. Tech. (Mech.)
7.2	Overlap with any UG/PG course of another Dept./Centre	B. Tech. (Elect.)
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	Students will have awareness about the events and happenings in the country and the world.

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	CO-CURRICULAR ACTIVITIES
3	L-T-P Structure	
4	Credits	1.0
5	Course number	CAC 481
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	B. Tech. (Mech.)
7.2	Overlap with any UG/PG course of another Dept./Centre	B. Tech. (Elect.)
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	Student is encouraged to participate in various co-curricular activities like chart and model making, painting, hindi/English literary activities, dramatics etc.



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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	ENGLISH - IV
3	L-T-P Structure	3-0-0
4	Credits	2.5
5	Course number	ENH 481
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	B. Tech. (Mech.)
7.2	Overlap with any UG/PG course of another Dept./Centre	B. Tech. (Elect.)
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	This course aims at developing communication skills of the students. At the end of this course a student will be well versed with writing of Technical Reports and Proposals, Notices, Agenda, Minutes, Manuals and Handbooks. He/she will learn to read and understand Research Papers, Articles and Abstracts, Review writing, Short-Speeches, Debates and Presentation Strategies, oral Presentation- Interviews, Meetings, Seminars, Conferences and Group Discussions

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	WORK EXPERIENCE COURSE
3	L-T-P Structure	0-0-4
4	Credits	2.0
5	Course number	EEW 401/EEW 402/ EEW 403/MEW 401/ MEW 402/ MEW 403/ MEW 404
6	Status (category for program)	ELECTIVE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	B. Tech. (Mech.)
7.2	Overlap with any UG/PG course of another Dept./Centre	B. Tech. (Elect.)
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	Students will be exposed to hands on training in various work experience courses.

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	INDUSTRIAL VISITS
3	L-T-P Structure	
4	Credits	1.0
5	Course number	EGC 481
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	B. Tech. (Mech.)
7.2	Overlap with any UG/PG course of another Dept./Centre	B. Tech. (Elect.)
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	Students will be required to visit a site and understand the working and methodology of the work at site being done. The students will undergo to write a report regarding their learning and experiences at the site.

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	INSTRUMENTATION
3	L-T-P Structure	3-1-0
4	Credits	3.0
5	Course number	MEM 401
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	B. Tech. (Mech.)
7.2	Overlap with any UG/PG course of another Dept./Centre	NO
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	As the civil engineers, counter various instruments and appliances during their work, they should have working knowledge and the concept used in instruments being used by them. The objective of the course is to familiarize with different types of main sensors and transducers used in Industry and to familiarize how signal conditioning is to be carried out for farther use. Then how to acquire this data for computer and to telemeter it over a distance. Some basic fundamental of virtual instrumentation system and display devices is stressed.

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	ENGINEERING MECHANICS - II
3	L-T-P Structure	4-1-0
4	Credits	3.0
5	Course number	MEM 402
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	B. Tech. (Mech.)
7.2	Overlap with any UG/PG course of another Dept./Centre	NO
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	Since, the course- Engineering Mechanics-1 is not sufficient to cover all the knowledge required by the civil engineer, Engineering Mechanics-2 is incorporated to suffice the content of the subject.

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	ENGINEERING MECHANICS LAB
3	L-T-P Structure	0-0-3
4	Credits	1.0
5	Course number	MEM 403
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	B. Tech. (Mech.)
7.2	Overlap with any UG/PG course of another Dept./Centre	NO
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	Experiments related to Friction in Bearings, Worm and Worm Wheel, Inclined Plane, Screw Jack, Wheel and Differential Axis, Fly Wheel will done by the students.

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	HYDRAULICS AND HYDRAULICS MACHINES
3	L-T-P Structure	4-1-0
4	Credits	3.0
5	Course number	CEM 402
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	B. Tech. (Mech.)
7.2	Overlap with any UG/PG course of another Dept./Centre	NO
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	Hydraulics and hydraulic machines is an important course for civil engineers it makes you to understand the mechanism of water flow by gravity in open channels, canals and rivers, it allows you to calculate the velocity of flow in open channel if physical parameters of the channel are given and the discharge through it. You will be able to understand and calculate the depth and scope of backwater surface behind weirs, barrages and spillway, it helps you appreciate the phenomena of hydraulic jump forming under spillway and the amount of energy lost through it. This course aims at preparing the students with the principles and working of the hydraulic machines. Various types of machines like turbine and pumps will be studied by the students.

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	WATER SUPPLY AND SEWERAGE
3	L-T-P Structure	4-1-0
4	Credits	3.0
5	Course number	CEM 401
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	NO
7.2	Overlap with any UG/PG course of another Dept./Centre	NO
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	This course aims at imparting the knowledge to the students about water supply and sewerage system. Student will be able to understand the source of water supply, water quality, water collection and treatment, Water distribution, storage reservoirs and distribution networks, Water transportation, water conservation, rain water harvesting, small water supply systems and Sewage Systems.

**Course Number and Title: CEM401 – WATER SUPPLY AND SEWORAGE**

**Credits: 3, Periods (50 min each)/week: 5 (L:4 + T:1 + P:0 + S:0)**

**Unit 1:** Introduction and scope, source of water supply, water quality: physical, chemical and biological characteristics, water demand.

**Unit 2:** Water collection and treatment, conventional treatment, settling, coagulation-flocculation, filtration and disinfection, advanced treatment, activated carbon adsorption and ozonation, design of facilities.

**Unit 3:** Water distribution, storage reservoirs and distribution networks.

**Unit 4:** Water transportation, water pipes, water leakage, Water supply in buildings, plumbing and fixtures;

**Unit 5:** Water conservation, rain water harvesting, small water supply systems and Sewage Systems.

**SUGGESTED READINGS:**

Hammer M.J. and Hammer M.J., Water and waste water Technology, 4th edn, PHI  
 Davis M.L. and Cornwell, D.A., Introduction to Environmental Engineering, McGraw Hill  
 McGhee, T.J., Water supply and Sewerage, McGraw Hill  
 Peavy, H.S., D.R. and Tehobanoglous, G., Environmental Engineering, McGraw Hill



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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	HYDRAULIC MACHINES LAB
3	L-T-P Structure	0-0-2
4	Credits	0.5
5	Course number	CEM 403
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	B. Tech. (Mech.)
7.2	Overlap with any UG/PG course of another Dept./Centre	NO
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	This course aims at imparting the practical knowledge to the students. Various experiment which will be conducted are- Testing of 15 H.P. centrifugal pumps; Testing of variable special centrifugal pumps; Determination of coefficient of friction in Disc friction Apparatus; Load test on Pelton turbine; Muchal curves of Pelton turbine; Load test a Francis turbine; ISI efficiency curves of Francis turbine.

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	GEOMATICS - I
3	L-T-P Structure	4-1-0
4	Credits	3.0
5	Course number	CEM 404
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	NO
7.2	Overlap with any UG/PG course of another Dept./Centre	NO
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	This course aims at imparting the the knowledge about the Geomatics. Students will understand the concepts like control networks, locating topographic details; Taping; curvature and refraction effects; Direction/Angle measurements, Plane Tabling, Tacheometric surveys, Coordinate systems and datum transformation, Control surveys, Total station surveys; GPS survey; Construction surveys

**Course Number and Title: CEM404 – Geomatics-I**

**Credits: 3, Periods (50 min each)/week: 5 (L:4 + T:1 + P:0 + S:0)**

**Unit 1: Introduction:**

**Basic concepts of surveying:** Objectives; Basic measurements, control networks, locating topographic details; Units of measurement; Error in measurement and their types, indices of precision, weight, outliers; Error sources, types; accuracy and precision, propagation of variance/covariance

**Linear measurements:** Taping; Optical distance measurement; Electronic distance measurement, classification and calibration; Errors in distance measurement and precautions

**Vertical control:** Level surface; Levelling principles, determination of height, leveling instruments; Sources of error and minimization, curvature and refraction effects; closure tolerances; Types of levelling; Characteristics of contours; methods of contouring

**Unit 2:**

**Direction/Angle measurements:** Concept of direction, azimuth, meridian; Theodolite, fundamental characteristic of theodolite and adjustment, measuring angles, sources of error

**Plane Tabling (PT):** Accessories in PT, methods of PT, resection methods, preparation of map

**Unit 3:**

**Tacheometric surveys :** Principle and basic system, subtense bar, various types of tachometers, plotting with tachometers

**Coordinate systems and datum transformation:** Important surfaces in geodesy: earth surface, geoids, MSL, reference ellipsoid; Reference systems: 2D and 3D coordinate systems and transformations; map projection, UTM projection

**Unit 4:**

**Control surveys:** Traversing: balancing of traverse, Triangulation, Trilateration, and Triangulation: Purpose, classification, strength of figure, well-conditioned triangle, triangulation figures, reconnaissance and station selection, inter-visibility of stations, signal and towers, base lining, computation and adjustment in triangulation, satellite station,

**Adjustments:** Adjustment of errors using Least squares: observation equation and condition equation approach (preferably matrix-based solution)

**Unit 5:**

**Total station surveys:** Principles, classification, salient features of total station

**GPS survey:** Principles, errors, DGPS, DOP, GPS survey Methods and plans

**Construction surveys:** Principle of setting out; Special instruments for setting out: Setting out a building, Setting out a highway curve

**SUGGESTED READINGS:**

5. Arora, K. R., *Surveying*, Standard Book House, Delhi.
6. Anderson, J.M. and Mikhail, E.M., *Surveying theory and practice*, 7<sup>th</sup> ed, McGraw-Hill 1997.
7. Ghilani, C. D. and Wolf, P. R., *Elementary Surveying: An Introduction to Geomatics*, 13 ed, Prentice Hall, 2011.
8. Schofield, W., *Engineering Surveying*, 6<sup>th</sup>ed, Butterworth Heinemann, Oxford.
5. Sickle, J. V., *GPS for Land Surveyors*, 3<sup>rd</sup>ed. CRC Press, 2008.
6. Agor, R. "Surveying", Vol. I & II Khanna Publications, Delhi.
7. Arora, K.R., "Surveying" , Vol. I & II Standard Book House, Delhi,
8. Bannister, A. and Baker, R., "Solving Problems in Surveying", Longman Scientific Technical, U.K., 1994.

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	SURVEYING LAB
3	L-T-P Structure	0-0-2
4	Credits	1.0
5	Course number	CEM 405
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	NO
7.2	Overlap with any UG/PG course of another Dept./Centre	NO
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	This course aims at understanding and experimentation how the surveying is done. The student will be exposed to instruments used in chain surveying and to measure distance between two points by ranging; to solve two point / three point problem in plane tabling; to find out the reduced levels of given points using level, etc.

**Course Number and Title: CEM405 – SURVEYING-I LAB**

**Credits: 1, Periods (50 min each)/week: 2 (L:0 + T:0 + P:2 + S:0)**

13. Visit to Lab. for the study of:
14. a. Maps from Survey of India Publication.
15. b. Conventional Symbol Charts and Different types of maps.
16. To study instruments used in chain surveying and to measure distance between two points by ranging.
17. To determine the bearing of sides of a given traverse using Prismatic Compass, and plotting of the traverse.
18. To plot details using radiation and intersection methods in plane tabling.
19. To solve two point / three point problem in plane tabling.
20. To find out the reduced levels of given points using level. (Reduction by Height of Collimation method and Rise and Fall Method).
21. To determine and draw the longitudinal and cross-section profiles along a given route.
22. Practice for temporary adjustments of a Vernier Theodolite and taking Horizontal and Vertical angular measurements, by Reiteration method.
23. Measurement of horizontal angles by Repetition method.
24. Determination of the Tacheometric constants of a given theodolite.

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**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	BUILDING PLANNING AND DRAWING
3	L-T-P Structure	0-0-3
4	Credits	2.0
5	Course number	CEM 406
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	NO
7.2	Overlap with any UG/PG course of another Dept./Centre	NO
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	This course emphasizes on the drawing of building and their planning. Students will understand various important concepts regarding building planning and its drawing.

**Course Number and Title: CEM 406 – BUILDING PLANNING & DRAWING  
Credits: 2, Periods (50 min each)/week: 3 (L:0 + T:0 + P:3 + S:0)**

Introduction, size of drawings, layout of drawings, scales, graphic symbols: doors, windows, graphical symbols for drains and pipes, alphabetical symbols, symbols for sanitary plumbing, abbreviations.

Masonry: Brick work, technical terms, bonds, T-junction, bonds for pillars and piers, coping, jambs and reveal, stone masonry and stone masonry joints.

Foundation and plinth, Damp proof course – methods and materials, Basement, Cavity walls, constructional details. Floors and their types, Arches and lintel, Door and window–types, parts, metal framed windows and doors, aluminum doors and windows, Recommended symbols.

Experiments:

1. Basic elements and planning residential buildings- method of making line plane and preparation of sheets
  2. Detailed drawing of a simple 2 rooms building- drawing, plan, elevation and sections.
  3. Drawing a building 3 rooms and services.
  4. Preparation of drawing a double storey building including stairs.
  5. Preparation of drawing for school building/ official building.
- Drafting of following Using Any CAD software (AutoCAD, Solid Works etc.)
6. Symbols used in Civil Engineering drawing, Masonry Bonds
  7. Doors, Windows and staircases.
  8. Typical Layout plans for Mechanical and Electrical Plants, Services in different buildings
  9. Comprehensive Drawing of Residential building (Layout, plan, elevation & sectional elevation, plumbing & electrical fillings in out)
  10. Preparation of Layout planning of different civil engg. Projects.
  6. Preparation of lay out plan/Maps and building drawing using computer

SUGGESTED READINGS:

V.B. Sikka: A course in Civil Engineering Drawing- S.K. Kataria & sons.

M. Chakrabarti: Civil Engineering Drawing

Handbook of concrete, reinforcement and detailing; SP:34(1987)

**Annexure – I to Resolution nos. 10 to 14 dated 12.4.2014 of the Academic Council**

**COURSE TEMPLATE**

1	Department /Centre proposing the course	MECHANICAL ENGINEERING
2	Course Title (<45 characters)	WASTE MANAGEMENT
3	L-T-P Structure	4-0-0
4	Credits	3.0
5	Course number	CEM 407
6	Status (category for program)	CORE
7	Status vis-à-vis other courses(give course number/title)	
7.1	Overlap with any UG/PG course of the Dept./Centre	NO
7.2	Overlap with any UG/PG course of another Dept./Centre	NO
8	Frequency of offering	1
9	Faculty who will teach the course	
10	Will the course require visiting faculty?	
11	Course Objectives(about 50 words) indicating motivation and aims)	Managing the waste is one of the biggest challenges for human race. This course aims at preparing the students about various techniques and methods for managing the waste. Various waste to be considered in this course are wastewater Collection; Wastewater Characterization; Wastewater Treatment; Pre-and Primary Treatment; Secondary Treatment; Wastewater and Sludge Disposal; Municipal Solid Waste.

**Course Number CEM-407**

**Course Title: Waste Management**

Class: B.Tech., Status of Course: Major Course, Approved since session: 2014-15  
Total Credits:3, Periods(50 mts. each)/week:4(L:4-0+P:0+S:0), Min.pds./sem:52

**Wastewater Collection:** Plumbing, types of sewers, design considerations, construction & maintenance, storm water sewers.

**Wastewater Characterization:** Constituents

**Wastewater Treatment:** On site and centralized treatment systems.

**Pre-and Primary Treatment :** Screen, grit removal, oil and grease removal.

**Secondary Treatment :** Activated sludge process, conventional and extended aeration, waste stabilization ponds, UASB process, UASB post treatment.

Advanced Wastewater Treatment

**Wastewater and Sludge Disposal:** Reuse systems, wastewater disposal on land and water bodies, disposal of sludge.

**Municipal Solid Waste:** Collection, characterization, transport, treatment & disposal,

**Types of Industrial Waste:** Liquid, solid, atmospheric and hazardous, Hazardous wastes : Characterization and treatment.

Practical studies on Sewage Treatment Plants

SUGGESTED READINGS:

1. Davis, M.L. and Cornwell, D.A., "Introduction to Environmental Engineering", McGraw Hill.
2. Masters, G.M., "Introduction to Environmental Engineering and Science", Prentice Hall of India.
3. Peavy, H.S., Rowe, D.R. and Tchobanoglous, G., "Environmental Engineering", McGraw Hill.
4. Arcievala, S.J., "Wastewater Treatment for Pollution Control", Tata McGraw Hill.

