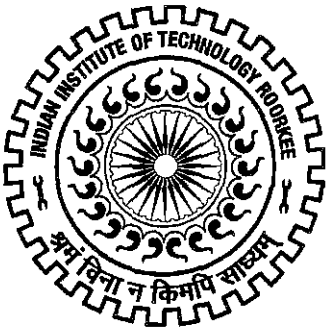
सीनेट की आपातिक बैठक (39वीं) बैठक का कार्यवृत्त

MINUTES OF THE EMERGENT MEETING (39TH MEETING) OF THE SENATE

22 जुलाई 2011
22ND JULY 2011



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

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

Minutes of the emergent meeting (39th meeting) of the Senate held on 22.07.2011 in the Senate Hall of the Institute.

I N D E X

बैठक अनुभाग

MEETING SECTION

भारतीय प्रौद्योगिकी संस्थान रूड़की

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Minutes of the emergent meeting (39th meeting) of the Senate held on 22.07.2011 in the Senate Hall of the Institute.

The following were present:-

1.	Prof. H.K.Verma, Director	-Chairman
2.	Prof. S.Y. Kulkarni	(Architecture & Planning)
3.	Prof. (Mrs) Pushplata	(Architecture & Planning)
4.	Prof. I.M. Mishra	(Chemical Engineering)
5.	Prof. Surendra Kumar	(Chemical Engineering)
6.	Prof. Shri Chand	(Chemical Engineering)
7.	Prof. I.D. Mall	(Chemical Engineering)
8.	Prof. Ravi Bhushan	(Chemistry)
9.	Prof. Kamaluddin	(Chemistry)
10.	Prof. Anil Kumar	(Chemistry)
11.	Prof. (Mrs) Mala Nath	(Chemistry)
12.	Prof. U.P. Singh	(Chemistry)
13.	Prof. M.R. Maurya	(Chemistry)
14.	Prof. A.K. Jain	(Civil Engineering)
15.	Prof. S.S. Jain	(Civil Engineering)
16.	Prof. U.C. Kothyari	(Civil Engineering)
17.	Prof. Satish Chandra	(Civil Engineering)
18.	Prof. Manoj K. Arora	(Civil Engineering)
19.	Prof. Praveen Kumar	(Civil Engineering)
20.	Prof. N.K. Samadhiya	(Civil Engineering)
21.	Prof. G.I. Prajapati	(Earthquake Engineering)
22.	Prof. Ashwani Kumar	(Earthquake Engineering)
23.	Prof. H.R. Wason	(Earthquake Engineering)
24.	Prof. M.L. Sharma	(Earthquake Engineering)
25.	Prof. J.D. Sharma	(Electrical Engineering)
26.	Prof. H.O. Gupta	(Electrical Engineering)
27.	Prof. S.P. Gupta	(Electrical Engineering)
28.	Prof. Vinod Kumar	(Electrical Engineering)
29.	Prof. Pramod Agarwal	(Electrical Engineering)
30.	Prof. S. Mukherjee	(Electrical Engineering)
31.	Prof. S.P. Srivastava	(Electrical Engineering)
32.	Prof. R.S. Anand	(Electrical Engineering)

33.	Prof. S.N. Sinha	(Electronics & Computer Engineering)
34.	Prof. N.K. Goel	(Hydrology)
35.	Prof. Himanshu Joshi	(Hydrology)
36.	Prof. M. Perumal	(Hydrology)
37.	Prof. G.S. Srivastava	(Mathematics)
38.	Prof. T.R. Gulati	(Mathematics)
39.	Prof. Roshan Lal	(Mathematics)
40.	Prof. Y.K. Gupta	(Mathematics)
41.	Prof. Pradeep Kumar	(Mechanical & Industrial Engg.)
42.	Prof. Satish C. Sharma	(Mechanical & Industrial Engg.)
43.	Prof. P.K. Jain	(Mechanical & Industrial Engg.)
44.	Prof. Dinesh Kumar	(Mechanical & Industrial Engg.)
45.	Prof. Ravi Kumar	(Mechanical & Industrial Engg.)
46.	Prof. P.K. Ghosh	(Metallurgical & Materials Engg.)
47.	Prof. S.K. Nath	(Metallurgical & Materials Engg.)
48.	Prof. Anjan Sil	(Metallurgical &Materials Engg.)
49.	Prof. A.K. Jain	(Physics)
50.	Prof. G.S. Singh	(Physics)
51.	Prof. Vir Singh	(Physics)
52.	Prof. M.L. Kansal	(WRD&M)
53.	Prof. Deepak Khare	(WRD&M)
54.	Mr. Yogendra Singh, Librarian	
55.	Dr. K.L. Yadav, Associate Professor, Department of Physics	
56.	Lt. Col. (Retd) A.K.Srivastava	Secretary

The Chairman (Director) welcomed the members to the 39th Meeting of the Senate and stated that the meeting was convened to discuss some urgent issues.

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

1. Prof. S.C. Saxena, Ex-Director & Chairman, Senate
2. Prof. D.K. Mehra, Department of Electronics & Computer Engineering
3. Prof. R.C. Joshi, Department of Electronics & Computer Engineering
4. Prof. N. Puri, Department of Civil Engineering
5. Prof. R.D. Agarwal, Department of Metallurgical & Materials Engg.
6. Prof. N.M. Bhandari, Department of Civil Engineering

The Senate noted the communication received from Prof. V.K. Jain, Department of Mechanical Engineering, IIT Kanpur for not attending the current meeting.

Prof. Ashwani Kumar, Dean, Academic Studies on behalf of the Senate welcomed Prof. H.K.Verma, Director as the new Chairman of the Senate.

The Agenda was then taken up:

Item No.39.1: **To consider the syllabi of Architecture & Planning Department.**

As considered and recommended by the Board of Studies (BoS) in its meeting held on 6th July 2011, the Senate decided that the syllabi of Architecture & Planning Department as given at **Appendix 'A'** be approved except the following:

1. AR-102 Architectural Design-I
2. AR-106 Introduction to Building Materials & Construction-I
3. AR 201 Architectural Design-II
4. AR-203 Building Construction-II

Further decided that the Pre-requisite of AR-402: Architectural Design-VII be added in syllabus of AR-501: Project.

Item No.39.2: **To consider the issue of exceeding credits beyond permissible limits of 28 credits in a semester in respect of B.Arch. students batches 2009-10 onwards.**

The Senate agreed on the recommendations of the Department of Architecture & Planning to increase the maximum credit limit to be taken by a students of B. Arch. to 30 students. In view of this, UG Ordinances & Regulations in case of B.Arch. programme only, be read as follows:

"A student may register for a minimum of 15 credits and a maximum of 25 credits. But on the recommendation of the department/ centre, Dean, Academic Studies, may allow a student to register for a maximum of 30 credits in not more than two semesters during the entire programme for fulfilling the requirements of minimum earned credits. However, the credits for NCC/NSS/NSO/Rangering, proficiency and discipline shall not be counted for this purpose."

Item No.39.3: **To consider the syllabi of Mathematics Department, MA-624: Operations Research.**

The Senate considered the syllabus of MA-624: Operations Research, and decided that the same as given at **Appendix 'B'** be approved.

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

APPENDIX 'A'
Item No. Senate/39.1

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./CENTRE: **Department of Architecture and Planning**

1. Subject Code: **AR-301** Course Title: **Architectural Design-IV**

2. Contact Hours: **L: 1** **T: 2/2** **P: 6**

3. Examination Duration (Hrs) **Theory** [0] **Practical** [7]

4. Relative Weightage: **CWS** [10] **PRS** [50] **MTE** [20] **ETE** [0] **PRE** [20]

5. Credits: [5] 6. Semester: **Autumn** 7. Subject Area: **DCC**

8. Pre-requisite: **AR-202**

9. Objective: To develop design ability to evolve solutions for challenging sites and space constraints.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Built forms on challenging sites such as sloping sites, heritage and urban contexts.	3
2.	Building bye laws and zoning regulations.	2
3.	Space optimization and efficiency.	3
4.	Design criteria and development process.	3
5.	Interior design and space innovations.	3
	Total	14

Suggested Design Exercises

1. Low, Mid rise Housing
2. Campus planning and design

3. Auditorium / Open air theatre/ Cinema Hall
4. Interior design of an ongoing studio projector for any other building areas such as entrance hall or lounge, library, restaurant of a sizeable space

* Seminar on Architects from Indian sub continent
* Study Visits to Sites and Buildings

11. Suggested Books:

S. No.	Name of Authors/Books/Publisher	Year of Publication/Reprint
1.	Chiara, J.D., Panero, J., Zelnik, M., "Time Saver Standards for Housing and Residential Development", 2nd Ed., McGraw-Hill.	1995
2.	Neufert, P., "Architects' Data", 3rd Ed., Blackwell Science.	2000
3.	Watson, D.(Editor), "Time-saver Standards for Architectural Design: Technical Data for Professional Practice", McGraw-Hill.	2005
4.	Strange C.C., Banning. J.H., " Educating By Design : Creating campus Learning Environment That Works", Jossey Bass, A Wiley Co.	2000
5.	Slotkis J.S, " Foundation of Interior Design", Fair Child Publication.	2006
6.	Levitt. D, "Housing Design Book : A Guide to Good Practice", Routledge Taylor & Francis Group.	2010
7.	Edwards C., "Interior Design: A Critical Introduction", Berg.	2011

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./CENTRE: **Department of Architecture and Planning**

1. Subject Code: **AR-303** Course Title: **Building Construction IV**

2. Contact Hours: **L: 1** **T: 0** **P: 4**

3. Examination Duration (Hrs): **Theory** [0] **Practical** [4]

4. Relative Weightage: **CWS** [0] **PRS** [50] **MTE** [20] **ETE** [0] **PRE** [30]

5. Credits [3] 6. Semester: **Autumn** 7. Subject Area: **DCC**

8. Pre-requisite: **AR-204**

9. Objective: To impart knowledge on advanced and innovative construction details, execution drawings; machines and equipments; and pre-fabrication and modular coordination.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Advanced construction methods and materials, innovative design detailing.	2
2.	Introduction to prefabrication; Advantages and disadvantages of on-site and off-site prefabrication; prefabrication in Indian construction industry.	4
3.	Modular coordination - types, components, assembly, tolerances, and application.	2
4.	Modular kitchen and toilets detailing; built-in furniture, shop fronts, display units, counters and other furniture items.	4
5.	Machine and equipments for construction; Fire-proof construction.	2
	Total	14

Exercises:

- Detailing of prefab components- wall, slab, structural components
- Innovative construction details of modular coordination system
- Coordination drawings with services
- Construction details of modular kitchen, toilet, shop-front

Visit to construction sites at different stages of construction to learn:

- site preparation, layout and management
- building construction process and technology
- machines and equipment used for the stages
- application of pre-fabrication or system building construction

Visit to consultants' office handling system buildings and coordination drawings and to workshops manufacturing different prefabrication units

11. Suggested Books:

S. No.	Name of Authors/Books/Publisher	Year of Publication/Reprint
1.	Goyal, M.M., "Handbook of Building Construction", Thomson Press	2004
2.	National Building Code-2005, BIS	2005
3.	Ching, F.D.K., "Building Construction Illustrated", Wiley	2008
4.	Smith R.E., "Prefab Architecture: A Guide to Modular Design and Construction", John Wiley & Sons	2010
5.	Funkenbusch P.D., "Practical Guide to Designed Experiments: A Unified Modular Approach", CRC Press	2004

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./CENTRE: **Department of Architecture and Planning**

1. Subject Code: **AR-305** Course Title: **Quantity, Pricing and Accounts**

2. Contact Hours: **L: 2** **T: 1** **P: 0**

3. Examination Duration (Hrs) **Theory** [2] **Practical** [0]

4. Relative Weightage: **CWS** [25] **PRS** [0] **MTE** [25] **ETE** [50] **PRE** [0]

5. Credits: [3] 6. Semester: **Autumn** 7. Subject Area: **DCC**

8. Pre-requisite: **Nil**

9. Objective: To impart knowledge of cost estimation of building construction work, use of management techniques for time scheduling of site work, computer software for costing estimation, cost accountancy and book keeping.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Introduction to cost estimation and definitions of terms related to estimates.	2
2.	Types of preliminary estimates and their preparation.	3
3.	Introduction and types of detailed estimates, methods of details of measurement and their application, items of work, measurements of typical elements, viz., arches, steps and polygonal rooms, measurement of RCC work in slabs, beams, columns, stair cases etc.	10
4.	Preparation of abstract of estimated cost/bill of quantities, use of schedule of rates, analysis of rates and break up of material requirements.	4
5.	CPM and PERT management techniques.	3
6.	Introduction to computer software for cost estimation	3
7.	Introduction to cost accountancy and book keeping	3
	Total	**28**

11. Suggested Books:

S. No.	Name of Authors/Books/Publisher	Year of Publication/Reprint
1.	Singh, S.C. and Sofat, C.G., Ed., "Handbook on Building Economics and Productivity", Central Building Research Institute.	1988
2.	Dutta, B.N., "Estimating and Costing in Civil Engineering", 24th Ed., UBS Publishers Distributors Ltd.	1998
3.	Punmia, B.C. and Khandelwal, K. K., "Project Planning and Control with PERT and CPM", Laxmi Publications Pvt. Ltd.	2000
4.	Ramaswamy, R., "Practical Handbook on Construction Management for Architects and Engineers", Nabhi Publications.	2004
5.	Birdie, G.S., "Text Book of Estimating and Costing (Civil Engineering)", Dhanpat Rai Publishing Company (P) Ltd.	2005

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./CENTRE: **Department of Architecture and Planning**

1. Subject Code: **AR-307** Course Title: **History of Architecture -II**

2. Contact Hours: **L: 2** **T: 1** **P: 0**

3. Examination Duration (Hrs): **Theory** [2] **Practical** [0]

4. Relative Weightage: **CWS** [25] **PRS** [0] **MTE** [25] **ETE** [50] **PRE** [0]

5. Credits: [3] 6. Semester: **Autumn** 7. Subject Area: **DCC**

8. Pre-requisite: **Nil**

9. Objective: To expose students to evolution of architecture through various historical periods pertaining to India.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Introduction to Ancient Indian Architecture of Indus Valley civilization and the Vedic Aryans.	3
2.	Buddhist and Maurya's architecture, early Hindu and golden Age of Gupta Architecture, Chalukyan Architecture.	4
3.	Dravidian Architecture (South) caves/rock cut architecture, Pallavas, Cholas, Pandavas, Hoishalas and Nayaks.	5
4.	IndoAryan architecture (North), Bhubaneshwar and Khajuraho styles, Jain Architecture.	5
5.	Indo-Islamic Architecture in India; Imperial Architecture; Slave, Khilji, Tughalaq, Sayyed and Lodhi dynasties of Delhi.	3
6.	Provincial/Regional Architecture of Bengal, Gujarat, Jaunpur, Deccan, Malwa and Bijapur.	4
7.	Mughal Architecture of Babar, Humayun, Akbar, Jahangir and Shahajahan.	4
	Total	**28**

11. Suggested Books:

S. No.	Name of Authors/Books/Publisher	Year of Publication/Reprint
1.	Brown, P., "Indian Architecture", D.B. Taraporevala.	1965
2.	Hardy, A., "Indian Temple Architecture: Form and Transformation", Abhinav Publications.	1995
3.	Parihar, S., "Some Aspects of Indo-Islamic Architecture", Abhinav Publishers.	1999
4.	Moffet, M., Fazio, M. and Wodehouse, L., "A World History of Architecture", McGraw-Hill.	2008
5.	Grover,S., "Buddhist and Hindu Architecture in India", CBS Publishers.	2003
6.	Grover,S., "Islamic Architecture in India", CBS Publishers.	2002
7.	Tadgell,C., "The History of Architecture in India", Phaidon Press.	1994

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./CENTRE: **Department of Architecture and Planning**

1. Subject Code: **CE-391** Course Title: **Theory of Structures-II**

2. Contact Hours: **L: 2** **T: 1** **P: 0**

3. Examination Duration (Hrs) Theory [2] Practical [0]

4. Relative Weightage: **CWS** [25] **PRS** [0] **MTE** [25] **ETE** [50] **PRE** [0]

5. Credits: [3] 6. Semester: **Autumn** 7. Subject Area: **DCC**

8. Pre-requisite: **CE-292**

9. Objective: To evaluate elastic deformations in beams and frames and to find forces and deflection in redundant structures.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Slopes and deflections of beams and frames (simple cases only), moment-area method.	4
2.	Conjugate beam method for analysis of continuous beam, portal frames and multistoried structures.	4
3.	Virtual work (unit load) method, principles of virtual work and theorem of reciprocal deflections.	4
4.	Redundant structures, introduction to force and displacement approaches, method of consistent deformation.	6
5.	Slope deflection method for analysis of continuous beam, portal frames and multistoried structures.	6
6.	Moment distribution method for analysis of continuous beam, portal frames and multistoried structures (simple cases only).	4
	Total	**28**

11. Suggested Books:

S. No.	Name of Authors/Books/Publisher	Year of Publication/Reprint
1.	Tung, A. and Christano, P., "Structural Analysis", Prentice Hall International.	**1987**
2.	Jain, A.K., "Advanced Structural Analysis", Nem Chand & Bros.	**2007**
3.	Rao P. D.S., "Structural Analysis", University Press (India) Ltd.	**2007**
4.	Jain, A.K., "Strength of Materials and Structural Analysis",(2nd Ed.), Nem Chand & Bros.	**2008**

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./CENTRE: **Department of Architecture and Planning**

1. Subject Code: **AR-309** Course Title: **Solar Architecture**

2. Contact Hours: **L: 2** **T: 1** **P: 0**

3. Examination Duration (Hrs): **Theory** [2] **Practical** [0]

4. Relative Weightage: **CWS** [25] **PRS** [0] **MTE** [25] **ETE** [50] **PRE** [0]

5. Credits: [3] 6. Semester: **Autumn** 7. Subject Area: **DEC**

8. Pre-requisite: **Nil**

9. Objective: To impart knowledge of various factors, methods, problems and prospects of solar architecture.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Introduction : Definition of energy and related terms; Various types of conversion factors; Principles of energy and entropy; Facts and figures about solar energy; Earth's energy balance; Solar architecture - context, need, scope and fundamental principles.	3
2.	Solar Radiation : Movement of sun and characteristics of solar radiation and daylight; Seasonal effects of orientation and ground slope; Factors affecting air temperature; Control of solar radiation through building forms, grouping; Wind flow patterns and traditional means of thermal control through air movement.	3
3.	Solar Architectural Design : Fundamentals of planning and design of solar architecture; Elements and principles of design; Study of design standards; Application of relevant principles.	7
4.	Case Studies : Case studies from India and abroad to draw useful inferences	8
5.	Materials and Construction Techniques: Thermal properties of building materials suitable for solar architecture; Innovative and appropriate construction techniques for solar architecture.	7
	Total	**28**

11. Suggested Books:

S. No.	Name of Authors/Books/Publisher	Year of Publication/Reprint
1.	Szokolay, S V , "Solar Energy Building", Halsted Press.	1975
2.	Bradea III, "Successful Solar Energy Solutions",Van Nostrand Reinhold Co.	1980
3.	Wright, D., "Natural Solar Architecture : A Passive Primer", Van Nostrand Reinhold Co.	1978
4.	Boran. G., Mirko. Z, (Eds). " Sorry, Out of Gas : Architecture's Response to the 1973 Oil Crises", Canadian Centre for Architecture.	2008
5.	Guzowski. M., " Towards Zero Energy - Architecture: New Solar Design", Laurence King.	2010
6.	David, W. "Passive Solar Primer : Sustainable Architecture", Schiffer Publication.	2008

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./CENTRE: **Department of Architecture and Planning**

1. Subject Code: **AR-311** Course Title: **Fire Prevention and Protection Systems**

2. Contact Hours: **L: 2** **T: 1** **P: 0**

3. Examination Duration (Hrs): **Theory** 2 **Practical** 0

4. Relative Weightage: **CWS** 25 **PRS** 0 **MTE** 25 **ETE** 50 **PRE** 0

5. Credits 3 6. Semester: **Autumn** 7. Subject Area: **DEC**

8. Pre-requisite: **Nil**

9. Objective: To impart understanding of fire prevention and protection systems in buildings.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Introduction: Basic understanding about fire, fire triangle, growth decay curve, fire properties.	3
2.	Reaction to Fire: Basic fire properties of materials - ignitability, combustibility, surface-spread of flame, fire propagation, toxicity.	6
3.	Fire Retardance: General behaviour of materials, imparting fire retardance, combination of fire retardance material and non combusitible materials.	3
4.	Active Fire Protection: Understanding of active fire protection, manual alarm system; Detectors - basic understanding, heat detectors, smoke detectors, flame detectors; Fire fighting equipments - sprinkler systems, hydrant systems, water requirements; Special protected areas like basements, high rise buildings; Life safety considerations.	7
5.	Passive Fire Protection: Fire properties of construction materials, fire resistance of building elements, compartmentation, fire protection of structural elements.	6
6.	Security Systems: Fire alarm systems, PA. systems, detectors	3
	Total	**28**

11. Suggested Books:

S. No.	Name of Authors/Book/Publisher	Year of Publication/ Reprint
1.	National Building Code-2005, Part IV, BIS	2005
2.	Latalie, J., "Fire Protection Engineering in Building Design", Butterworth-Heinemann	2002
3.	Capel, V., "Security Systems and Intruder Alarms", Butterworth-Heinemann	1999

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./CENTRE: **Department of Architecture and Planning**

1. Subject Code: **AR-313** Course Title: **Prefabrication and Modular Coordination**

2. Contact Hours: **L: 2** **T: 1** **P: 0**

3. Examination Duration (Hrs): **Theory** [2] **Practical** [0]

4. Relative Weightage: **CWS** [25] **PRS** [0] **MTE** [25] **ETE** [50] **PRE** [0]

5. Credits: [3] 6. Semester: **Autumn** 7. Subject Area: **DEC**

8. Pre-requisite: **Nil**

9. Objective: To impart knowledge of building design using prefabrication and modular coordination.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Introduction: Concept of standardization in building system and components.	2
2.	Prefabricated construction : Advantages and disadvantages of on site and off-site prefabrication with respect to Indian conditions.	4
3.	Building Systems: System building with details of open and closed systems, Study of international systems.	5
4.	Modular Coordination: Objectives; Basic planning and design modules; Modular grid system; Terminology and notations of modular coordination; National Building Code specifications; Standardization-dimensioning of products, preferred dimensions and size, tolerances and deviations; Layout and processes.	9
5.	Prefabrication : Classification; Foundation, column, beam, roof and floor panel; Clay units – execution and assembly.	8
	Total	**28**

11. Suggested Books:

S. No.	Name of Authors/Books/Publisher	Year of Publishing/Reprint
1.	Courbusier. Le," Modular Coordination", Vols. I and II, Harvard University Press.	1955
2.	C B R I, "Building Research Notes".	-
3.	BRE Digests, "Services and Environmental Engineering", Construction Press.	1977
4.	Kaufmamm, M, Ramick, C. "Prefeb Green", Gibbs Smiths.	2009
5.	Smith, R.E., "Prefab Architecture : A Guide to Modular Design and Construction" John Wiley & Sons.	2010

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./CENTRE: **Department of Architecture and Planning**

1. Subject Code: **AR-302** Course Title: **Architectural Design-V**

2. Contact Hours: **L: 1** **T: 2/2** **P: 6**

3. Examination Duration (Hrs): **Theory** [0] **Practical** [7]

4. Relative Weightage: **CWS** [10] **PRS** [50] **MTE** [20] **ETE** [0] **PRE** [20]

5. Credits: [5] 6. Semester: **Spring** 7. Subject Area: **DCC**

8. Pre-requisite: **AR-301**

9. Objective: To develop ability to design large scale built forms with complex program briefs integrating sustainability issues.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Design process of buildings with complex programs.	3
2.	Sustainable design principles.	3
3.	Integration of space and form of large scale buildings.	3
4.	Structural systems for large scale buildings.	3
5.	Introduction to building performance evaluation.	2
	Total	**14**

- **Suggested Design Exercises**

1. Mixed use buildings and complexes
2. Hospitals
3. Hotels
4. Museums, Cultural centers

- Working Drawing

  Study visits to sites and buildings

11. Suggested Books:

S. No.	Name of Authors/Books/Publisher	Year of Publication/Reprint
1.	Watson, D.(Editor), "Time-saver Standards for Architectural Design: Technical Data for Professional Practice", McGraw-Hill.	2005
2.	Onouys, B, Donglas, Z., Ching, F., "Building Structures Illustrated : Patterns, Systems and Design", John Wiley	2009
3.	Kliment. S.A., "Retail and Mixed Use Facilities", John Wiley & Sons	2004
4.	Williams. D.E., "Sustainable Design – Ecology Architecture and Planning, John Wiley & Sons	2007
5.	Kobus. R.L., Skaggs, R.L. "Building Type Basics for Health Care Building, John Wiley & Sons	2008
6.	Fairweather V, Tumasetti. R, Thromton, C, "Expressing Structure: the Technology of Large Scale Buildings", Birkhauser	2004

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./CENTRE: **Department of Architecture and Planning**

1. Subject Code: **AR-304** Course Title: **Contemporary World Architecture**
2. Contact Hours: **L: 3** **T: 1** **P: 0**
3. Examination Duration (Hrs) **Theory** [3] **Practical** [0]
4. Relative Weightage: **CWS** [25] **PRS** [0] **MTE** [25] **ETE** [50] **PRE** [0]
5. Credits: [4] 6. Semester: **Spring** 7. Subject Area: **DCC**
8. Pre-requisite: **Nil**
9. Objective: To impart knowledge of the evolution and trends in contemporary architecture in the 20th and early 21st century.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Beginning of modern architecture - Neoclassicism in the 18th century; Industrial revolution - eclecticism and the architectural predicament in the 19th century; Art Nouveau- morphed forms, plastic treatment of plans; Chicago School- evolution of the highrise office building.	4
2.	F.L. Wright - Organic Architecture; Le Corbusier- Domino System and points of a new architecture; Expressionism; Mies Van der Rohe- Minimalism, long span and tall buildings in steel and glass.	4
3.	Walter Gropius and Bauhaus; Adolf Loos; Internationalism; G.T. Reitveld and De Stil Architecture; Alvar Aalto and Scandinavian Regionalism; Works of the early 20th century architects like Louis Kahn, Richard Neutra, Eero Saarinen, Bruce Goff, P.L. Nervi, Philip Johnson and other architects.	4
4.	Beginning of modern architecture in India; Contributions of Le Corbusier and Louis Kahn; Early works of Charles Correa, A.P. Kanvinde, U.C. Jain, B.V. Doshi, J.A. Stein, Laurie Baker and other architects.	2
5.	Late and Post Modernism through the works of Richard Meier, Arata Isozaki, Kisho Kurokawa, Peter Eisenmann, Michael Graves, Robert Venturi and other architects; Hi-Tech architecture of Norman Foster, Richard Rogers, Renzo Piano; Frank Gehry	6

	and Deconstructivism .	
6.	Evolution of various building types - houses, apartments, museums, mediatheques, galleries, transportation hubs, educational buildings, skyscrapers.	**6**
7.	Emerging concepts – adaptive reuse, parametric design, biomimcry, mobius strip, application of Fibonacci series and fractals in architecture; New materials and their application.	**5**
8.	Works of Shigeru Ban, Santiago Calatrava, Bernard Schumi, Tadao Ando, Rem Koolhaas, Herzog and de Meuron, Jean Nouvel, Nicholas Grimshaw, Ben Van Berkel, Toyo Ito, Neil Denari.	**5**
9.	Seismic safety in the buildings and their integration with architectural problems.	**2**
10.	Energy efficient built environment with emphasis on energy simulation modeling, estimation of energy and carbon emissions; zero energy and energy plus buildings; Green building design with case studies.	**4**
	Total	**42**

11. Suggested Books:

S. No.	Name of Authors/Book/Publisher	Year of Publication/Reprint
1.	Phaidon (Editor), "The Phaidon Atlas of Contemporary Architecture", Phaidon Press.	**2004**
2.	Gossel. P., "Architecture in the 20th Century", Vol.1, Taschen.	**2005**
3.	Gossel. P., "Architecture in the 20th Century", Vol.2, Taschen.	**2005**
4.	Ballard B. and Rank, V.P., "Materials for Architectural Design", Laurance King.	**2006**
5.	Vidiella, A.S., "The Sourcebook of Contemporary Architecture", Harper Collins.	**2007**
6.	Jodidio, P., "Architecture Now!7", Taschen.	**2010**

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./CENTRE: **Department of Architecture and Planning**

1. Subject Code: **CE-392** Course Title: **Structural Design - I**

2. Contact Hours: **L: 3** **T: 1** **P: 0**

3. Examination Duration (Hrs): **Theory** [3] **Practical** [0]

4. Relative Weightage: **CWS** [25] **PRS** [0] **MTE** [25] **ETE** [50] **PRE** [0]

5. Credits: [4] 6. Semester: **Spring** 7. Subject Area: **DCC**

8. Pre-requisite: **Nil**

9. Objective: To impart knowledge of simple steel and masonry structures elements.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Properties of Structural Materials: Steel, masonry and B.I.S. specifications, design loads as per B.I.S. codes.	4
2.	Riveted and Welded Connections: Simple connections and connections subjected to moments (simple cases only).	6
3.	Members Subjected to Axial Compressions: Steel struts and columns including built-up columns.	6
4.	Beams: Steel beams and built-up sections.	6
5.	Introduction to Steel Trusses and Industrial Buildings.	5
6.	Bases and Footings: Types, design of slabs and gusseted bases.	5
7.	Masonry: Walls, columns and footings.	10
	Total	**42**

11. Suggested Books:

S. No.	Name of Authors/Books/Publisher	Year of Publication/Reprint
1.	Dayaratnam, P., "Brick and Reinforced Brick Structures", Oxford & IBH Publishing Co.	1997
2.	Arya, A.S., "Masonry and Timber Structures Including Earthquake Resistant Design", Nem Chand Bros.	2001
3.	Arya, A.S., Ajmani, J.L., "Design of Steel Structures", Nem Chand Bros.	2004
4.	Chandra, R., "Design of Steel Structures", Standard Book House.	2006
5.	Duggal, S.K., "Design of Steel Structures", 2nd Ed., Tata McGraw Hill.	2007
6.	Kazmi, S.M.A., Jindal, S.K., "Design of Steel Structures", Prentice Hall.	2007

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./CENTRE: **Department of Architecture and Planning**

1. Subject Code: **CE-394** Course Title: **Building Services**

2. Contact Hours: **L: 2** **T: 1** **P: 0**

3. Examination Duration (Hrs) **Theory** [2] **Practical** [0]

4. Relative Weightage: **CWS** [25] **PRS** [0] **MTE** [25] **ETE** [50] **PRE** [0]

5. Credits: [3] 6. Semester: **Spring** 7. Subject Area: **DCC**

8. Pre-requisite: **Nil**

9. Objective: To cover various aspects of water supply, drainage and solid waste disposal from buildings.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Basic principles of plumbing, terminology.	2
2.	Systems of water supply of buildings – upfeed and downfeed systems and critical fixtures.	4
3.	Units, most probable simultaneous demand and design.	3
4.	Hot water supply systems – tank, cylinder and combinations.	2
5.	Fire water supply, wet and dry standpipes, automatic fire sprinkler systems.	4
6.	Drainage systems – two pipes, one pipe, single stack and MOP systems.	3
7.	Septic tank disposal and soakage pit design.	4
8.	Solid waste disposal from high rise buildings.	2
9.	Water supply to high rise buildings, problems encountered and systems adopted.	4
	Total	**28**

11. Suggested Books:

S. No.	Name of Authors/Books/Publisher	Year of Publication/Reprint
1.	Bureau of Indian Standards, "Relevant IS Codes".	1995
2.	Pachauri, A.K., "Water Supply and Sanitary Installations, Design, Construction and Maintenance", New Age International Ltd.	1999
3.	Manas Handbook of Plumbing, Manas Publishers.	2000
4.	BIS, "National Building Code".	2005

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./CENTRE: **Department of Architecture and Planning**

1. Subject Code: **CE-396** Course Title: **Introduction to Soil Mechanics and Foundation Engineering**

2. Contact Hours: **L: 2** **T: 1** **P: 0**

3. Examination Duration (Hrs) **Theory** 2 **Practical** 0

4. Relative Weightage: **CWS** 25 **PRS** 0 **MTE** 25 **ETE** 50 **PRE** 0

5. Credits: 3 6. Semester: **Spring** 7. Subject Area: **DCC**

8. Pre-requisite: **Nil**

9. Objective: To impart knowledge on soil mechanics and foundation structures.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Soil formation and resulting soil deposits, nomenclature of different soil types, basic physical properties and their inter-relationships, Indian Standard System of Classification.	4
2.	Total effective and neutral stresses, stresses due to building loads, concept of shear strength, Mohr's strength theory, unconfined compression test.	4
3.	Concept of consolidation of clays, compressive index using liquid limit, computation of consolidation settlement.	3
4.	Soil exploration methods, standard penetration test, dynamic cone penetration test, concept of borelog for soil description, ground water table.	3
5.	Retaining walls – where adopted, types and tentative proportioning.	3
6.	Footing foundations – types, guidelines for depth for footing, dimensioning of footings on basis of given values of bearing	4

	capacity/allowable pressure and soil borelog, codal provisions, use of plate load test data, effect of variation of ground water table.	
7.	Rafts – situations where adopted, raft with basement, water proofing of basements below ground water table.	3
8.	Pile foundations – situations where adopted, types of piles, methods of construction, pile capacity from pile loading tests, under reamed piles.	4
	Total	**28**

11. Suggested Books:

S. No.	Name of Authors/Books/Publisher	Year of Publication/Reprint
1.	Gulathi, S.K. and Datta, M., "Geotechnical Engineering", Tata McGraw Hill.	2005
2.	Varghese, P.C., "Foundation Engineering", Prentice-Hall of India.	2005
3.	Ranjan, G. and Rao, A.S.R., "Basic and Applied Soil Mechanics", New Age International (P) Ltd.	2007
4.	Murthy, V.N.S., "Soil Mechanics and Foundation Engineering", CBS.	2007

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./CENTRE: **Department of Architecture and Planning**

1. Subject Code: **AR-308** Course Title: **Ekistics**

2. Contact Hours: **L: 2** **T: 1** **P: 0**

3. Examination Duration (Hrs): **Theory** [2] **Practical** [0]

4. Relative Weightage: **CWS** [25] **PRS** [0] **MTE** [25] **ETE** [50] **PRE** [0]

5. Credits: [3] 6. Semester: **Spring** 7. Subject Area: **DEC**

8. Pre-requisite: **Nil**

9. Objective: To expose students to the basics of the historical development and contemporary practices in the art and science of human settlements.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Introduction: Meaning and scope in relation to town planning and architecture; Ekistics grid of Doxiadis.	2
2.	Settlements through civilizations : Evolution of human settlements through Mesopotamian, Egyptian, Greek, Roman and Indus Valley civilizations; Settlement patterns in later periods of history; Changing form and pattern of human settlements in ancient, medieval, colonial and modern India.	4
3.	Early town planning movement : Industrial Revolution and its impact on settlements; Early developments in town planning; Contributions of visionaries and social reformers; City Beautiful Movement by Daniel Burnham; Concepts of an ideal city by F L Wright, Le Corbusier and others; Clarence Perry's neighborhood concept; Contributions of Ebenezer Howard and other English and European personalities; Patrick Geddes contributions and works in India; Development of new towns in post war England.	4
4.	Urban structure : City plan patterns based on road systems; Foreign and Indian examples; Categories of urban structures and growth; Functional components and dynamics of towns; Categories of urban and rural settlement in terms of size and function; Definition and explanation of the concepts of density, FAR, land use and zoning; Case studies of land use of Indian cities.	7

5.	City planning and management: Emergence of the metropolitan phenomenon; Comparative study of cities and metropolises in the developed and developing countries; Planning problems of cities and solutions; City management and governing institutions; Planning and development agencies; Development Plan / Master Plan- its preparation and contents; Case studies.	6
6.	Rural and regional Systems: The rural – urban relationships; Types of regions and their classification systems; Physical and socio-economic structure and dynamics of rural settlements; Rural planning.	5
	Total	**28**

11. Suggested Books:

S. No.	Name of Authors/Books/Publisher	Year of Publication/Reprint
1.	Abercombie P., "Town and Country Planning", 3rd Edition, Oxford University Press	1967
2.	Bacon, E, "Design of Cities", Penguin	2006
3.	Brown, H.H., A J and Sherrad,, "An Introduction to Town & Country Planning", American Elservier Pub., TBS	1951
4.	Whittick, A, "Encyclopedia of Urban Planning", Krieger Pub. Co.	1980

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./CENTRE: **Department of Architecture and Planning**

1. Subject Code: **AR-310** Course Title: **Acoustics and Lighting**

2. Contact Hours: **L: 2** **T: 1** **P: 0**

3. Examination Duration (Hrs): **Theory** 2 **Practical** 0

4. Relative Weightage: **CWS** 25 **PRS** 0 **MTE** 25 **ETE** 50 **PRE** 0

5. Credits 3 6. Semester: **Spring** 7. Subject Area: **DEC**

8. Pre-requisite: **Nil**

9. Objective: To impart knowledge of acoustics and lighting in buildings.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	General principles of transmission and passage of sound, reverberation, absorption, reflection; Types of absorbents and reflectors; Study of acoustical design for various enclosures for speech, music and conference.	9
2.	Noise and its control; Special problems related to structure borne noise; Basics of noise insulation; Insulation of A.C. ducts and plants from acoustical point of view.	9
3.	Lighting in buildings, light and its sources, lighting criteria, the visual field, daylight prediction methods.	4
4.	Artificial lighting, lighting levels for various activities, calculation for lighting levels, practical examples/case studies.	6
	Total	**28**

11. Suggested Books:

S. No.	Name of Authors/Books/Publisher	Year of Publication/ Reprint
1.	Cavanaugh, W.J., Gregory, C.T. and Wilkes, J.A. (Editors), "Architectural Acoustics: Principles and Practice", 2nd Ed., John Wiley	2010
2.	Vigran, T.E., "Building Acoustics", Taylor and Francis	2008
3.	Steffy, G., "Architectural Lighting Design, 2nd Ed., Wiley	2001
4.	Philips, D., "Lighting Modern Buildings", Butterworth-Heinemann	2000

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT/CENTRE: **Department of Architecture and Planning**

1. Subject Code: **AR- 312** **Course Title: Applied Art**

2. Contact Hours: **L: 2** **T: 1** **P: 0**

3. Examination Duration (Hrs): **Theory** [2] **Design** [-]

4. Relative Weightage: **CWS** [25] **PRS** [0] **MTE** [25] **ETE** [50] **PRE 0**

5. Credits [3] **6. Semester : Spring** **7. Subject Area: DEC**

8. Pre-requisite: **Nil**

9. Objective: To provide requisite knowledge of various forms and techniques of Applied Art.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Introduction to application of art in architecture, purpose of Applied Art, principles and nature.	2
2.	Paintings, Murals and Sculptures; Materials and techniques Study of styles and changing trends in India from ancient times.	4
3.	Decorative elements such as Jali design; Inlay work; Relief art work; Study of changing trends in different periods – Dravidian, Gandhara, Gupta, Mughal, Rajput; Materials and techniques.	4
4.	Application of colors and textures in sculptures, murals, paintings, fountains etc., psychological effects of colours and textures.	5
5.	Art expression, appreciation and symbolism; Two and three dimensional forms; Aesthetic order; Functional importance.	3
6.	Interior and exterior space organization, graphic techniques of communication, form-space relation.	3
7.	Modern trends in applied art, contribution of science and technology in terms of new materials.	3
8.	Styles and techniques of modern masters.	4
	Total	**28**

11. Suggested Books:

Sl. No.	Name of Authors/ Books/ Publishers	Year of Publication/ Reprint
1.	Barry A. Berkus AIA, "Architecture/ Art/ Parallels/ Connections", The Image Publication Group Pvt. Ltd.	2000
2.	Scott, R. G., "Design Fundamentals", McGraw Hill	1951
3.	Preble, D, Preble, S, Patrick F, "Artforms: An Introduction to the Visual Arts", Longman	1999
4.	Pal, P, "Indian Sculpture", University of California Press	1988
5.	Arnason, H. H., Elizabeth C., Mansfield H., "History of Modern Art: Painting, Sculpture, Architecture, Photography", Prentice Hall	2009
6.	Liff, S. and Posey, P.A. "Seeing is Believing"; American Management Association, Broadway	2004

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./CENTRE: Department of Architecture and Planning

1. Subject Code: **AR-401** Course Title: **Architectural Design-VI**

2. Contact Hours: **L: 1** **T: 2/2** **P: 6**

3. Examination Duration (Hrs): **Theory** 0 **Practical** 7

4. Relative Weightage: **CWS** 10 **PRS** 50 **MTE** 20 **ETE** 0 **PRE** 20

5. Credits: 5 6. Semester: **Autumn** 7. Subject Area: **DCC**

8. Pre-requisite: **AR-302**

9. Objective: To develop futuristic design ideas incorporating technological advancements using digital design process.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Digital Design process.	2
2.	State of Art building technologies.	3
3.	Futuristic architecture.	3
4.	Futuristic technology and forms.	3
5.	Building performance systems.	3
	Total	**14**

Suggested Design Exercises

1. Abstraction in forms and space
2. Research Stations/Laboratory buildings
3. High-Tech. Corporate Towers
4. Futuristic buildings – Museums, Stadium

- Seminar on State-of-the-art technologies for building services
- Study visits to sites and buildings

11. Suggested Books:

S. No.	Name of Authors/Books/Publisher	Year of Publication/Reprint
1.	Anthony, C.A., "Poetics of Architecture", John Wiley & Sons.	1992
2.	Kostas, T, "Algorithmic Architecture", Architectural Press.	2006
3.	Mike, J, Nicola, D, " Future Form and Design for Sustainable Cities", Architectural Press.	2005
4.	Philip, J., "New Form Architecture in the 1990s", Taschen.	1995
5.	Alan, J.B & Dominique, P, "Innovation in Architecture", Spon Press.	2004
6.	Szalapaj, P., "Contemporary Architecture and the Digital Design Process", Elservier.	2005

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./CENTRE: **Department of Architecture and Planning**

1. Subject Code: **CE-401** Course Title: **Construction Planning and Management**

2. Contact Hours: **L: 3** **T: 1** **P: 0**

3. Examination Duration (Hrs) **Theory** [3] **Practical** [0]

4. Relative Weightage: **CWS** [25] **PRS** [0] **MTE** [25] **ETE** [50] **PRE** [0]

5. Credits: [4] 6. Semester: **Autumn** 7. Subject Area: **DCC**

7. Pre-requisite: **Nil**

9. Objective: To impart knowledge of network techniques, construction planning practices, construction equipments and methods.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Network Techniques: Introduction to network techniques; Use of computer aided CPM and PERT for planning, scheduling and control of construction work, bar charts; Error in networks, Types of nodes and node numbering systems.	**12**
2.	Construction Planning: Planning for construction and site facilities using networks; Preparation of construction schedules for jobs, materials, equipment, labour and budgets using CPM.	**10**
3.	Construction Equipments and Methods: Equipment for earthworks; Concrete construction; Aggregate production; Concrete production, handling and placement; Mixers, vibrations and temperature control.	**12**
4.	Control of Construction: Construction quality control and inspection; Significance of variability and estimation of risks; Construction cost control; Crashing of networks.	**8**
	Total	**42**

11. Suggested Books:

S. No.	Name of Authors/Books/Publisher	Year of Publication/Reprint
1.	Ahuja, H.N., "Construction Performance Control by Networks", Wiley Interscience Publications.	1976
2.	Peurifoy, R.L., "Construction Planning, Equipments and Methods", McGraw Hill Book Co. Inc.	1996
3.	Srivastva, U.K., "Construction, Planning Management", Galgotia Publisher.	1999
4.	Srinath L.S., "PERT and CPM", Practice Hall of India.	2009
5.	Wiest J.M., Levy F.M., "A Management Guide to PERT/ CPM".	1993

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./CENTRE: **Department of Architecture and Planning**

1. Subject Code: **CE-491** Course Title: **Structural Design - II**

2. Contact Hours: **L: 3** **T: 1** **P: 0**

3. Examination Duration (Hrs) Theory [3] Practical [0]

4. Relative Weightage: **CWS** [25] **PRS** [0] **MTE** [25] **ETE** [50] **PRE** [0]

5. Credits: [4] 6. Semester: **Autumn** 7. Subject Area: **DCC**

8. Pre-requisite: **CE-392**

9. Objective: To impart knowledge in the area of the design of simple concrete structural elements and structures as well as the behavior of advanced concrete structures.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Properties of concrete and reinforcing steels.	3
2.	Design approaches.	4
3.	Limit State Design of reinforced concrete sections for bending and shear; Bond strength and development length; Serviceability; Limit states of deflection and cracking.	14
4.	Design of beams, one-way slabs, L and T beams, two-way slabs, columns and footing for isolated columns; Detailing of reinforcement.	10
5.	Introduction of framed buildings and prestressed concrete.	8
6.	Structural behavior of domes, grids, waffle slabs, shells and folded plates.	3
	Total	42

11. Suggested Books:

S. No.	Name of Authors/Books/Publisher	Year of Publication/Reprint
1.	Dayaratnam, P., "Reinforced Concrete Structures", Oxford & IBH Publishing Co.	2002
2.	Jain, A.K., "Reinforced Concrete – Limit State Design", Nem Chand Bros.	2006
3.	Sinha, S.N., "Reinforced Concrete Design", Tata McGraw Hill.	2008

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./CENTRE: **Department of Architecture and Planning**

1. Subject Code: **EE-441** Course Title: **Building Technology (Electrical)- I**
2. Contact Hours: **L: 2** **T: 1** **P: 0**
3. Examination Duration (Hrs): **Theory** [2] **Practical** [0]
4. Relative Weightage: **CWS** [25] **PRS** [0] **MTE** [25] **ETE** [50] **PRE** [0]
5. Credits: [3] 6. Semester: **Autumn** 7. Subject Area: **DCC**
8. Pre-requisite: **Nil**
9. Objective: To expose the students of Architecture to the Technology of Electrical Installation and Illumination in Buildings.
10. Details of Course:

S. No.	Contents	Contact Hours
1.	Domestic Electrical Appliances: Brief description, principles of operation of the appliances commonly used in domestic installations - electric water heaters, radiators and air conditioners etc.	4
2.	Electrical Wiring Systems: Wiring in domestic and commercial buildings, control panels.	4
3.	Lightning Conductors and Earthing: Purpose, materials and fixing arrangements.	2
4.	General Principles of Illumination; Nature of light, definition, units of light, definitions of flux, solid angles, luminous intensity and brightness.	4
5.	Production of Light: Brief description, characteristics, incandescent lamp, sodium vapour lamp, mercury vapour lamp, flourscent lamp, neon lamp, LED, CFL,characteristics of reflectors.	5
6.	Laws of illumination; Inverse Square law, Lamber's Cosine law, lighting calculations using point by point method.	2
7.	Light Flux Method of calculation of number of lamps required; Outdoor lighting design.	5
8.	Reference to Indian Standards and Energy Auditing: Introduction to lighting design software Calenlux.	2
	Total	**28**

11. Suggested Books:

S. No.	Name of Authors/Books/Publisher	Year of Publication/Reprint
1.	Indian Standard (732)– Electrical Wiring Installation.	1963
2.	Indian Standard (3646)– Interior Illumination Part I, II, III.	1966
3.	Indian Standard (3043)– Earthing.	1966
4.	Taylor, E.O., "Utilisation of Electric Energy", Orient Blackswan.	1971
5.	Raina, K.B., Bhattacharya, S.K., "Electrical Design Estimation and Costing", New Age International (P) Ltd.	2002

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./CENTRE: **Department of Architecture and Planning**

1. Subject Code: **AR-403** Course Title: **Vastu Shastra and Vernacular Architecture**

2. Contact Hours: **L: 2** **T: 1** **P: 0**

3. Examination Duration (Hrs) **Theory** **2** **Practical** **0**

4. Relative Weightage **CWS** **25** **PRS** **0** **MTE** **25** **ETE** **50** **PRE** **0**

5. Credits: **3** 6 Semester: **Autumn** 7. Subject Area: **DEC**

8. Pre-requisite: **Nil**

9. Objective: To expose students to various theoretical and practical aspects of Vastu Shastra and Vernacular architecture.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Introduction to Vastu Shastra; Its purpose, nature and scope; Vastu principles and their effect; Art of building as per Vastu Shastra; Vastu principles and modern architecture.	2
2.	Application of Vastu Shastra; Role of various mandalas and Vastu Purusha Mandala; Site selection, Shapes of plots; Orientation aspects; Recommendations on site/plot, location layouts, configuration of various areas, inner and outer spaces within and outside the building.	5
3.	Case studies and Practical remedies for houses and commercial buildings as per Vastu Shastra.	5
4.	Introduction to Vernacular architecture - its nature, purpose and scope; Evolution of development of shelter form and identity; Natural and man-made determinants of form; Elements of visual identity.	4
5.	Rural and urban shelter and settlement patterns : Effect of place, time, folk, classical traditions, construction materials and techniques.	6
6.	Historical review of architectural forms, present day interpretation and role of vernacular architecture, process of design activity, space and form, influence of climate, land, material and technology, society and culture.	6
	Total	**28**

11. Suggested Books:

S . No.	Name of Authors/Books/Publisher	Year of Publication/Reprint
1.	Cooper, G. and Dawson, B. "Traditional Building of India", Thames & Hudson.	1998
2.	Oliver, P, "Encyclopedia of Vernacular Architecture of the World", Cambridge University Press.	1997
3.	Rudofoky, B., "Architecture Without Architects", University of New Mesvilo Press.	1964
4.	Jonathan D., "An Introduction to Vastu", D & S Books.	2002
5.	Glassie H. H., "Vernacular Architecture" Indiana University Press.	2000
6.	Mayamuni, Degens B., "Mayamata: An Indian Treatise on Housing, Architecture and Iconography", Sitraram Bhartia Institute of Scientific Research.	1985
7.	Chakrabarti V., "Indian Architectural Theory: Contemporary Uses of Vastu Vidya", Routledge.	1998

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./CENTRE: **Department of Architecture and Planning**

1. Subject Code: **AR-405** Course Title: **Resource Conserving Architecture**

2. Contact Hours: **L: 2** **T: 1** **P: 2**

3. Examination Duration (Hrs): **Theory** [2] **Practical** [0]

4. Relative Weightage: **CWS** [15] **PRS** [15] **MTE** [30] **ETE** [40] **PRE** [0]

5. Credits [4] 6. Semester: **Autumn** 7. Subject Area: **DEC**

8 Pre-requisite: **Nil**

9 Objective: To acquaint students with principles, techniques and relevant guidelines for planning and design of resource conserving architecture.

10. Details of Course:

S.No	Contents	Contact Hours
1.	Introduction: Broad understanding of the environment and its resources; Classification and characteristics of resources, brief review of use / exploitation of resources for development in human history; Resource use in architecture; Resource shortage and constraints; Concepts and need for conservation; Renewable and non renewable resources.	3
2.	Energy conserving architecture: Basic concepts, parameters and principles of energy conservation; Pattern and efficiency of energy use in architecture; Technologies / methods of energy conservation; Socio -cultural, economic, technological and environmental implications.	6
3.	Conservation of other resources : Conserving building materials, water, land in architecture; Technologies/methods of conservation and their implications.	5
4.	Design of resource conserving Architecture: Fundamentals of planning and design of resource conserving architecture; Elements and principles of design; Study of design problems; Application of relevant principles for design solutions; Innovative and appropriate construction technologies; Construction details.	8
5.	Case Studies : Discussions of case studies from India and abroad.	6
	Total	**28**

11. Suggested Books:

S. No.	Name of Authors /Books/Publisher	Year of Publication/Reprint
1.	Davies and Schubert, "Alternative Natural Energy Sources in Building Design", Van Nostrand Reinhold.	1977
2.	McHarg, I., "Design with Nature", Wiley.	1969
3.	McHale, J.," The Ecological Context", Littlehampton Book Services Ltd.	1970
4.	Clapham, W.B.," Human Ecosystems" MacMillan Publishing Co.	1981
5.	Schumacher, E F, "Small is Beautiful" Harper Perennial.	1973
6.	Peter F.S., "Our Dying Planet", University of California Press.	2011

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./CENTRE: **Department of Architecture and Planning**

1. Subject Code: **AR-407** Course Title: **Hi-Tech Buildings**
2. Contact Hours: **L: 2** **T: 1** **P: 0**
3. Examination Duration (Hrs) **Theory** [2] **Practical** [0]
4. Relative Weightage: **CWS** [25] **PRS** [0] **MTE** [25] **ETE** [50] **PRE** [0]
5. Credits: [3] 6. Semester: **Autumn** 7. Subject Area: **DEC**
8. Pre-requisite: **Nil**
9. Objective:

To impart knowledge of the design and development of Hi-Tech buildings.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Beginning of Hi-Tech buildings in the early 20th century; Basic principles and elements of Hi-Tech architecture.	2
2.	Structural expressionism and Hi-Tech aesthetic; Integrated design approach; Application of cutting edge technology for traditional buildings.	3
3.	Study of Hi-Tech buildings through the works of contemporary architects such as Norman Foster, Richard Rogers, Renzo Piano, Santiago Calatrava, Rem Koolhaas, Herzog and de Meuron, Nicholas Grimshaw, Ben Van Berkel, Toyo Ito.	5
4.	Emerging concepts – single envelope designs, double skin facades, parametric design, biomimicry, programme generated architecture.	4
5.	New materials and construction techniques; Smart building systems; High technology structural systems and building services; Modular assemblies such as kit-of-part and clip-on-construction.	5
6.	Advanced seismic techniques in buildings; Application in buildings with specific architectural objectives.	3

7.	Energy efficient built environments with emphasis on Zero Energy, Zero Carbon and Energy Plus buildings; Hi-Tech green buildings.	3
8.	Simulation modeling and allied digital technologies; Virtual environments; Introduction to Rapid Prototyping and CNC techniques for building elements.	3
	Total	**28**

11. Suggested Books:

S. No.	Name of Authors/Books/Publisher	Year of Publication/Reprint
1.	Davies, C., "High Tech Architecture", Rizzoli.	**1988**
2.	McKean, J., "Pioneering British High Tech", Phaidon Press.	**1999**
3.	Pawley, M., "Norman Foster: A Global Architecture", Universe Publishing.	**1999**
4.	Ballard B. and Rank, V.P., "Materials for Architectural Design", Laurance King.	**2006**
5.	Philip, J., "Green: Architecture Now!", Taschen.	**2009**

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./CENTRE: **Department of Architecture and Planning**

1. Subject Code: **AR-409** Course Title: **Modern Indian Architecture**

2. Contact Hours: **L: 2** **T: 1** **P: 0**

3. Examination Duration (Hrs): **Theory** 2 **Practical** 0

4. Relative Weightage: **CWS** 25 **PRS** 0 **MTE** 25 **ETE** 50 **PRE** 0

5. Credits 3 6. Semester: **Autumn** 7. Subject Area: **DEC**

8. Pre-requisite: **Nil**

9. Objective: To impart knowledge about the development of modern architecture in India.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Indo-Sarcenic to post Independent architecture.	4
2.	Review of modern architecture in India; Contributions of Edwin Lutgens, Herbert Baker, Claude Batley, Le Corbusier and Louis Kahn; Early works of Charles Correa, A.P. Kanvinde, U.C. Jain, B.V. Doshi, J.A. Stein, Laurie Baker and other architects.	3
3.	Regional vernacular styles and cultural identity; Neo-vernacular and Regionalism.	5
4.	Study of the works of contemporary Indian architects through various building typologies.	6
5.	Trends in building materials and construction techniques in modern Indian Architecture.	5
6.	Critical review of on going modern trends and its future prospects in Indian architecture.	5
	TOTAL	**28**

11. Suggested Books:

S. No.	Name of Authors/Books/Publisher	Year of Publication/Reprint
1.	Bhatt and Scriver, P., 'Contemporary Indian Architecture : After the Masters', University of Washington Press.	1990
2.	Gast, K.P., 'Modern Traditions: Contemporary Architecture in India', Springer.	2007
3.	Kalia, R., 'Gandhinagar: Building National Identity in Postcolonial India', University of South Carolina Press.	2004
4.	Shah, J., 'Contemporary Indian Architecture', Roli Books.	2010

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./CENTRE: **Department of Architecture and Planning**

1. Subject Code: **AR-402** Course Title: **Architectural Design-VII**

2. Contact Hours: **L: 1** **T: 2/2** **P: 6**

3. Examination Duration (Hrs): **Theory** [0] **Practical** [7]

4. Relative Weightage: **CWS** [10] **PRS** [50] **MTE** [20] **ETE** [0] **PRE** [20]

5. Credits: [5] 6. Semester: **Spring** 7. Subject Area: **DCC**

8. Pre-requisite: **AR-401**

9. Objective: To develop students' ability to evolve urban design solutions.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Introduction to urban design projects.	2
2.	Urban Design Process.	2
3.	Methods of urban design analysis.	2
4.	Case studies of varied urban design projects – Central Business District, Urban Regeneration/renewal, conservation, water front development.	8
	Total	**14**

Suggested Design Exercises

1. Central Building District, Town Centers
2. Urban Design projects such as water front development, urban conservation, urban renewal, sustainable neighborhoods
3. Public domain, streetscape

- Seminar on topics related to thesis project or any research oriented study.
- Study visits to sites and buildings

11. Suggested Books:

S. No.	Name of Authors/Books/Publisher	Year of Publication/Reprint
1.	Cuthbert A. R, "Understanding Cities : Method in Urban Design" Routledge.	2011
2.	Darren, R, "Computer Modeling for Sustainable Urban Design : Physical Principles, Methods and Application" Earthscan.	2011
3.	Carmona, M, "Public Places- Urban Spaces: The Dimensions of Urban Design", Elsevier.	2010
4.	Chiara, J.D., Panero, J., Zelnik, M., "Time Saver Standards for Housing and Residential Development", 2nd Ed., McGraw-Hill.	1995
5.	Colquhoun, I, "Urban Regeneration : An International Perspective", London: BT Batsford.	1995
6.	Watson, D.(Editor), "Time-saver Standards for Urban Design", McGraw-Hill.	2003

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./CENTRE: **Department of Architecture and Planning**

1. Subject Code: **AR-404** Course Title: **Finishes, Materials and Specifications**

2. Contact Hours: **L: 2** **T: 1** **P: 0**

3. Examination Duration (Hrs) **Theory** [2] **Practical** [0]

4. Relative Weightage: **CWS** [25] **PRS** [0] **MTE** [25] **ETE** [50] **PRE** [0]

5. Credits: [3] 6. Semester: **Spring** 7. Subject Area: **DCC**

8. Pre-requisite: **Nil**

9. Objective: To impart knowledge on various types of building finishes, materials and their specifications.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Special finishes like aluminium, anti-corrosive and water bound paints.	3
2.	Distempers, snowcem, lacquers, polishes and staining varnishes, water proofing compounds and proprietary materials.	3
3.	Aluminium, plastic, glass and different alloys and their applications in the building industry.	3
4.	Recent developments in timber and concrete building materials.	3
5.	Different paving and facing materials.	3
6.	Acoustical and fibre boards.	4
7.	Influence of materials and methods of construction on modern architectural design.	2
8.	Specifications of common building materials and construction, as separate documents or annotated on the working drawings.	3
9.	Specifications for special finishes, advanced materials and different construction elements.	4
	Total	**28**

11. Suggested Books:

S. No.	Name of Authors/Books/Publisher	Year of Publication/Reprint
1.	Dutta, B.N., "Estimating and Costing in Civil Engineering", 24th Ed., UBS.	1998
2.	CPWD Delhi Schedule of Rates Civil Works.	2007
3.	Construction Specifications for Govt. Contractors based on CPWD Specification Civil Works.	2002
4.	CPWD Schedule of Rates Electrical Works.	2007
5.	CPWD Specifications Electrical Works.	2007
6.	BIS, National Building Code.	2005

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./CENTRE: **Department of Architecture and Planning**

1. Subject Code: **AR-406** Course Title: **Landscape Architecture**

2. Contact Hours: **L: 2** **T: 0** **P: 3**

3. Examination Duration (Hrs): **Theory** 0 **Practical** 3

4. Relative Weightage: **CWS** 0 **PRS** 50 **MTE** 20 **ETE** 0 **PRE** 30

5. Credits 3 6. Semester: **Spring** 7. Subject Area: **DCC**

8. Pre-requisite: **Nil**

9. Objective: To familiarize students with the linkage between architecture and nature through the planning and design of landscape elements.

10. Details of Course:

S.No	Contents	Contact Hours
1	Introduction: Definition, scope, objectives, design process and profession of landscape architecture in relation to architecture, elements of landscape architecture, linkages with nature and built environment; Graphics in landscape architecture.	4
2	Historical review: History of the art of garden design of India, China, Persia, Japan, Italy, France and England; Garden design of the modern world.	4
3	Horticulture: Plant classification and nomenclature, plant identification, propagation and care of plants, planting preparation and methods.	4
4	Characteristics and use of plants: Characteristics of various types of plants and their suitability of landscaping, plant selection criteria, landscape design elements and principles.	6
5	Landscape design: Landscape design for various building types, landscaping parks and roads, rock gardens, interior and terrace gardens, formal and informal design, use of water and man-made elements in landscape, garden furniture and embellishments, landscape construction, preparation of landscape schemes, ecological and environmental aspects of landscape design.	10
	Total	28

Suggested Design Exercises:

- Design of a small park, Tot Lot.
- Landscape of Housing Complex.
- Use of various Landscape Elements.
- Landscaping of a Monument for Conservation.
- Study of Plants and Plant Materials.

11. Suggested Books:

S. No.	Name of Authors/Books/Publisher	Year of Publication/Reprint
1.	Bose, T.K. and Chowdhury, B., 'Tropical Garden Plants in Colour', Allied Publishers.	**1991**
2.	Black & Decker, 'Landscape Design & Construction', Creative Publishing International.	**1993**
3.	Thompson, W. and Sorvig, K., 'Sustainable Landscape Construction: A Guide to Green', Island Press.	**2007**
4.	Haeris C., Dines N., 'Time Saver Standard for landscape Architecture', Mcgraw–Hill Publication.	**1997**
5.	Simonds. J.O., Staike B.W., 'Landscape Architecture : A Manual of Land Planning and Design', MCgraw Hill.	**2006**

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./CENTRE: **Department of Architecture and Planning**

1. Subject Code: **MI-429** Course Title: **Building Technology (Mechanical) -II**

2. Contact Hours: **L: 2** **T: 1** **P: 0**

3. Examination Duration (Hrs.): **Theory** [2] **Practical** [0]

4. Relative Weightage: **CWS** [25] **PRS** [0] **MTE** [25] **ETE** [50] **PRE** [0]

5. Credits: [3] 6. Semester: **Spring** 7. Subject Area: **DCC**

8. Pre-requisite: **Nil**

9. Objective: This course aims to impart knowledge in the areas of air conditioning, ventilation, and horizontal and vertical transportation in buildings.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Introduction: The role of engineering services for well designed buildings and colonies, trends in modern buildings for thermal comfort, pollution free environment and indoor traffic management.	6
2.	Requirement of Air Conditioning: Concepts of thermal comfort, physiological principles, reactions of the human body to the thermal environment, comfort requirements and comfort indices.	4
3.	Psychrometrics: Psychrometric properties, psychrometric chart, simple and computerized psychrometrics, psychrometric processes; Appreciation of indoor and outdoor conditions for a space in summer and winter.	6
4.	Cooling Systems: Evaporative cooling systems for dry and arid climates in India.	3
5.	Air Conditioning Processes: Summer and winter air-conditioning processes; Sources of thermal load in summer and winter using Load Estimation Chart; Sensible Heat Factor (SHF).	5
6.	Vertical Transportation: Role and uses of elevators and escatators in Multistory buildings; Safety features, alerts and alarms.	4
	Total	**28**

11. Suggested Books:

S. No.	Name of Authors /Books /Publisher	Year of Publication/Reprint
1.	Prasad, M., "Refrigeration and Air Conditioning", 2nd Ed., New Age International.	**2002**
2.	Howell, R.H., Saucer, H.J., and Coad, W.J., "Principles of Heating, Ventilation and Air Conditioning", ASHRAE.	**2005**
3.	Arora, C.P., "Refrigeration and Air Conditioning", Tata McGraw-Hill.	**2000**
4.	ASHRAE Hand Book (Fundamentals), ASHRAE.	**2005**

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./CENTRE: **Department of Architecture and Planning**

1. Subject Code: **AR-410** Course Title: **New Structural Systems**

2. Contact Hours: **L: 2** **T: 1** **P: 0**

3. Examination Duration (Hrs): **Theory:** 2 **Practical:** 0

4. Relative Weightage: **CWS** 25 **PRS** 0 **MTE** 25 **ETE** 50 **PRE** 0

5. Credits 3 6. Semester: **Spring** 7. Subject Area: **DEC**

8. Pre-requisite: Nil

9. Objective: To create awareness of development of new structures and their integration in architectural design.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Philosophy and concept of structures in terms of conventional and important new trends and techniques in applications of structural principles.	4
2.	History of the development of structures using various materials, starting from a very early age to the present day.	4
3.	Effect of various foundation settlements on the behavior of super structures.	6
4.	Concept of structural forms and their stability to various structures.	6
5.	Shells, vaults, domes, light structures in timber, RCC, space frames and steel space structures, geodesic domes, suspended and cable roofs etc.	8
	Total	**28**

11. Suggested Books:

S.No.	Name of Authors/Books/Publisher	Year of Publication/Reprint
1.	Nervi, P L," Structures" F.W.Dodge Co.	1956
2.	Salvadori, M, "Why Buildings Stand up: The Strength of Architecture", W.W. Norton & Co.	2002
3.	Salvadori, M, & Heller, R.A, "Structure in Architecture: The Buildings of Binding", (2nd Ed) Practice Hall.	1981
4.	Andrew, C, "Structure of Architecture; A Source for Architects & Structural Engineers", Elsevier& Architectural Press.	2005
5.	Mainstone R., "Development in Structural Form", Architectural Press.	2001

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPARTMENT/CENTRE: **Department of Architecture and Planning**

1. Subject Code: **AR-412** Course Title: **Multi-storied Building**

2. Contact Hours: **L: 2** **T: 1** **P: 0**

3. Examination Duration (Hrs) Theory: 2 Practical: 0

4. Relative Weightage: **CWS** 25 **PRS** 0 **MTE** 25 **ETE** 50 **PRE** 0

5. Credits: 3 6. Semester: **Spring** 7. Subject Area: **DEC**

8. Pre-requisite: Nil

9. Objective: To impart knowledge on different aspects of multi-storied buildings.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Introduction- various aspects of multi-storied (MS) building design in urban context.	2
2.	Architectural design considerations like functional efficiency, privacy, safe access, aesthetic; Space planning and design standards, Building byelaws and codes.	6
3.	Advanced structural systems for MS building and design load considerations.	4
4.	Service core in MS buildings; Parking, building services- vertical transportation, water supply and sanitation, HVAC, electrical, firefighting and security; Building automation system; Codal provisions for building services.	6
5.	Materials for construction and cladding; Construction techniques and management.	3
6.	Environmental and physical planning considerations; Sustainable resource management concept in MS building such as bioclimatic, Zero Energy building.	4
7.	National and International case studies of MS buildings.	3
	TOTAL	**28**

11. Suggested Books:

S. No.	Name of Authors/Books/Publisher	Year of Publication/Reprint
1.	Armstrong P, CTUBH, "Architecture of Tall Buildings", Mc Graw Hill.	1995
2.	Lin Chew Fit, "Construction Technology for Tall Buildings", Singapore University Press.	2001
3.	International Code Council, International Building Code 2003, USA.	2003
4.	Craighead G., "High Rise Security & Fire Life Safety", Butterworth-Heinemann.	2009
5.	Jain V K, "Handbook of Designing and Installation of Services in Building Complex- High Rise Buildings, JBA Pub.	2010
6.	Reddy K. N., "Urban Redevelopment: A Study of High-Rise Building", Concept Publishing Company.	1996

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./CENTRE: **Department of Architecture and Planning**

1. Subject Code: **AR-414** Course Title: **Futuristic Architecture**

2. Contact Hours: **L: 2** **T: 1** **P: 0**

3. Examination Duration (Hrs): **Theory** [2] **Practical** [0]

4. Relative Weightage: **CWS** [25] **PRS** [0] **MTE** [25] **ETE** [50] **PRE** [0]

5. Credits [3] 6. Semester: **Spring** 7. Subject Area: **DEC**

8. Pre-requisite: **Nil**

9. Objective: To impart knowledge on futuristic architectural concepts, building materials and building technologies.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Future concepts envisioned by earlier theorists and architects like Antonio Saint Elia and F.L. Wright.	2
2.	Emerging architectural paradigms such as programme generated architecture, dynamic architectural systems, virtuality, transarchitecture, data driven structures and 'glocal' approach through the study of relevant projects.	8
3.	Evolution of contemporary architectural concepts - historical revival, biomimcry, adaptive reuse and low cost buildings; Futuristic building materials: Building tectonics and systems.	8
4.	Study of specific building types - houses, office spaces, public buildings, skyscrapers and transportation hubs through various projects.	6
5.	Sustainable buildings including energy efficiency, Zero Energy and Energy Plus buildings and resource conservation.	4
	Total	28

11. Suggested Books:

S. No.	Name of Authors/Books/Publisher	Year of Publication/ Reprint
1.	Bell, J., "21st Century House", Laurence King Publishing.	2006
2.	Bell, V. B., "Materials for Architectural Design", Laurence King Publishing.	2006
3.	Jodidio, P., "Building a New Milleneum", Vol.1, Taschen.	2003
4.	Jodidio, P., "Architecture Now", Vol. 2, Taschen.	2004

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./CENTRE: **Department of Architecture and Planning**

1. Subject Code: **AR-507** Course Title: **Housing**

2. Contact Hours: **L: 2** **T: 1** **P: 0**

3. Examination Duration (Hrs): **Theory:** 2 **Practical:** 0

4. Relative Weightage: **CWS** 25 **PRS** 0 **MTE** 25 **ETE** 50 **PRE** 0

5. Credits 3 6. Semester: **Autumn** 7. Subject Area: **DEC**

8. Pre-requisite: Nil

9. Objective: To acquaint students with various aspects, issues and considerations that bear upon housing design.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Introduction : Definition of housing; Overview of various aspects, problems and issues of housing; Role of architect in creating a good living environment.	3
2.	Built form, socio-psychological and aesthetic implications, and suitability of different types of dwellings.	5
3.	Criteria for site selection; Housing layout considerations.	5
4.	Energy efficient housing; Cost effective housing.	8
5.	Special considerations for housing in hill areas, disaster prone areas; rural areas; Slums; Prefabricated housing; High rise housing.	7
	Total	**28**

11. Suggested Books:

S.No.	Name of Authors/Book/Publisher	Year of Publication/Reprint
1.	Greater London Council, "An Introduction to Housing Layout", Architectural Press.	1983
2.	Macsai, J., "Housing", John Wiley & Sons.	1982
3.	Chiara, J.D., Panero, J., Zelnik, M., "Time Saver Standards for Housing and Residential Development", 2nd Ed., McGraw-Hill.	1995
4.	Schmitz, A, "Residential Development Handbook", 3rd Edition, Urban Land Institute.	2004
5.	Crolland, A., "Housing Development: Theory, Process and Practice", Routledge.	2003
6.	David, L, "Housing Design Book : A Guide to Good Practice", Routledge Taylor & Francis Group.	2010

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./CENTRE: **Department of Architecture and Planning**

1. Subject Code: **AR-511** Course Title: **Urban Design**

2. Contact Hours: **L: 2** **T: 1** **P: 0**

3. Examination Duration (Hrs): **Theory:** 2 **Practical:** 0

4. Relative Weightage: **CWS** 25 **PRS** 0 **MTE** 25 **ETE** 50 **PRE** 0

5. Credits 3 6. Semester: **Autumn** 7. Subject Area: **DEC**

8. Pre-requisite: **Nil**

9. Objective: To introduce the basic elements, principles and techniques of urban design.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Definitions, scope of urban design and its relationship with architecture and planning.	4
2.	Brief review of heritage of urban design and approaches to urban design.	4
3.	Basic elements of urban design; Urban spaces and activities.	5
4.	Salient urban design principles and techniques.	6
5.	Study and analysis of urban design projects, building complexes, town centres etc.	9
	Total	**28**

11. Suggested Books:

S.No.	Name of Authors/Books/Publisher	Year of Publication/Reprint
1.	Broadbent, G., "Emerging Concepts in Urban Space Design", Von Nostrand Reinhold.	1995
2.	Lynch, K., "The Image of the City", MIT Press, Cambridge.	1960
3.	Speriregen, Paul D., "Urban design : The Architecture of Towns and Cities", Krieger.	1980
4.	Chiara, J D and Kopplman, L, "Urban Planning and Design Criteria", Von Nostrand Reinhold.	1975
5.	Lang, J., "Urban Design: The American Experience", John Wiley and Sons.	1994
6.	Cowan, R., "Urban Design Guidance: Urban Design Frameworks, Development Briefs and Master Plans", Thomas Telford.	2002
7.	Carmona, M., " Public Places- Urban Spaces: A Guide to Urban Design", Architectural Press.	2003

APPENDIX 'B'
Item No.Senate/39.3

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./ CENTRE: **Department of Mathematics**

1. Subject code: **MA-624** Course Title: **Operations Research**

2. Contact Hours: **L: 2** **T: 1** **P: 0**

3. Examination Duration (Hrs): **Theory** 2 **Practical** 0

4. Relative Weightage:**CWS:** 25 **PRS** 0 **MTE:** 25 **ETE:** 50 **PRE:** 0

5. Credits 3 6. Semester: **Both** 7. Subject Area: **DEC**

8. Pre-requisite: **Nil.**

9. **Objective:** To acquaint the students with some topics of Operations Research.

10. Detail of course:

S.No.	Contents	Contact Hours
1.	**Replacement and Depreciation Models.**	4
2.	**Sequencing and Scheduling.**	2
3.	**CPM/ PERT.**	4
4.	**Search Techniques:** Direct Search and Gradient Methods, Unimodal Functions, Fibonacci Method, Golden Section Method, Method of Steepest Descent, Newton Raphson Method, Hookes and Jeeves Method, Conjugate Gradient Methods.	8
5.	**Inventory Models**	5
6.	**Queuing Models:** Analysis of Simple Queues with Poisson Arrival and Exponential Service Time Distributions.	5
	Total	28

11. Suggested Books:

S.No.	Name of Book/Author/Publisher	Year of Publication
1.	Taha H.A., "Operations Research : An Introduction", 7th Edition, MacMillan Pub Co.	2003
2.	Ravindran, A., Phillips D. T., Solberg J. J., "Operations Research: Principles and Practice", 2nd Edition, John Wiley and Sons.	2001
3.	Pant J. C., "Introduction to Optimization/ Operations Research", Jain Brothers.	2005
4.	Mittal K.V., Mohan C., "Optimization Methods in System Analysis and Operations Research", New Age India Pvt. Ltd.	1996
5.	Mohan C., Deep Kusum. "Optimization Technique", New Age India Pvt. Ltd.	2009

बैठक अनुभाग
MEETING SECTION
भारतीय प्रौद्योगिकी संस्थान रूड़की
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
रूड़की–247667/**ROORKEE-247 667**

No. IITR/MS/39th Senate/7037 Dated: 27th September 2011

ADDENDUM

Reference this Office letter No. IITR/MS/39th Senate/6939 dated 1st September 2011 enclosing therewith the minutes of the emergent meeting (39th meeting) of the Senate held on 22nd July 2011.

The following be added in the said minutes under "Any other items':

UNDER ANY OTHER ITEMS:

Item No. 39.4: Issue related to delay in the declaration of Spring Semester results for several classes.

Prof. S.N.Sinha, Head, Department of Electronics & Computer Engineering had raised the matter of delay in the declaration of Spring Semester results for several classes. Senate expresses its concern on the delay in declaration of results and requests the Dean, Academic Studies to look into the reasons for this delay. The reasons be reported in the next meeting of the Senate.

This has the approval of the Chairman, Senate.

(Prashant Garg)
Offtg. Registrar

Copy to All Members of the Senate.