NATIONAL INSTITUTE OF TECHNOLOGY RAIPUR

PROPOSED NEW SCHEME OF EXAMINATION FOR

TEN SEMESTER INTEGRATED COURSE OF B. ARCH.(APPLICABLE FROM 2010-11)

THIRD SEMESTER

S.No.	Subject Code	Subject	Periods per week			Scheme of Examination			Total Marks	Credit [L+{(T+P)/2}]
			L	**T**	**P**	**ESE**	**FE/ SE**	**TA**		
1	1311	Architectural Design III	2	0	0	0	50	100	150	2
2	1312	Building Construction and Technology III	2	0	0	70	30	75	175	2
3	1313	Structural Design and Systems III	3	2	0	70	30	20	120	4
4	1314	Climatology	3	1	0	70	30	30	130	4
5	1315	Building Materials and Science III	2	0	0	70	30	20	120	2
6	1316	History of Architecture, Art and Culture I	3	1	0	70	30	50	150	4
7	1321	Architectural Design III Studio	0	0	6	50	0	0	50	3
8	1322	Building Construction Technology III Studio	0	0	3	25	0	0	25	2
9	1327	Disaster Management	0	0	2	0	0	25	25	1
10	1328	Computer Applications in Architecture	0	0	3	25	0	30	55	2
TOTAL			**15**	**4**	**14**	**450**	**200**	**350**	**1000**	**26**

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SYLLABUS FOR FIVE YEARS B.ARCH. DEGREE COURSE
(A Ten semester integrated course)

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Subject Code	Subject	Periods per week			Scheme of Examination			Total Marks	Credit [L+{(T+P)/2}]
		L	T	P	ESE	FE / SE	TA		
1311	**Architectural Design-III**	2	0	0	0	50	100	150	2

The aim of the course is to emphasis and evolves the methodology for architectural design with reference to the previous knowledge of function and aesthetics. The design should highlight clear approach to the design with concept, Analysis, Synthesis and clarity of details (like barrier free design considerations), along with architectural expression with use of appropriate graphic presentation techniques.

1. The design should be done with **sensitivity towards surroundings** i.e. traditional and vernacular architecture, construction techniques and environment.

2. The assignments shall be design of small buildings like nursery schools, restaurants, small nursing homes, small offices, exhibition pavilions, dispensaries, residences, canteens, shops etc.

Two time problems (as class tests) are to be conducted in class other than regular design problems.

Notes:

Sessional will be in the form of drawings and models along with project report for the design dealt. The evaluation shall be done in intermediate reviews consisting of internal and external experts. There should be regular site visits / case studies of buildings, so as to document them with the help of photographs, slides, etc.

References:

1. Joseph De Chiara, Michael J Crosbie, Time Saver Standards for Building Types, McGraw Hill Professional 2001. Julius Panero, Martin Zelnik, Human Dimension and Interior Space, Whitney Library of Design, 1975
2. Joseph De Chiara, Julius Panero, Martin Zelnik, Time Saver Standards for Interior Design and Space Planning, McGraw Hill 2001.
3. Ernst Neuferts Architects Data, Blackwell 2002
4. Ramsey et al, Architectural Graphic Standards, Wiley 2000
5. Richard P. Dober, Campus Planning
6. Kanvinde, Campus Planning in India
7. Kevin Lynch, Site planning, MIT Press, Cambridge, 1967
8. Sam F. Miller, Design Process: A Primer for Architectural and Interior Design, Van Nostrand Reinhold, 1995

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Subject Code	Subject	Periods per week			Scheme of Examination			Total Marks	Credit [L+{(T+P)/2}]
		L	T	P	ESE	FE / SE	TA		
1312	**Building Construction and Technology III**	2	0	0	70	30	75	175	2

UNIT 1	**Timber floor:** • Single • Double • Triple • Various joints between joists, lengthening of wall plates, etc. • Herring bone and solid strutting.
UNIT 2	**Timber roofs:** • Lean to type • Couple • Close couple • Collar.
UNIT 3	**Timber trussed roofs:** • King post • Queen post • Built up roof truss.
UNIT 4	**Industrial roofing:** • North Light roof trusses in steel • Monitor type steel trusses.
UNIT 5	**Industrial roofing:** • Tubular trusses • Built- in trusses in steel • Industrial roofing in R.C.C. • Industrial glazing in roofing. • Industrial cladding in roofing.

Note:
1. There shall be regular site visits to buildings, under construction or Constructed, to explain the above topics. Use of audio-visuals should be stressed.
2. Sessional work shall be done as scaled drawings on drawing sheets and freehand drawings along with occasional visits to construction sites.
3. In theory examination there will be a separate question from each unit with choice within the unit/question. All units/questions will be compulsory.

References:

1. Don A. Watson, “Construction Materials and Processes”, McGraw Hill, 1972.
2. W.B. McKay, “Building Construction” Vol, 1 and 2, Longmans, UK, 1981.
3. S.C Rangwala “Building Construction” Charotar Publishing House, India, 2000
4. S.K.Sharma, “A Text book of Building Construction”, S.Chand & Co Ltd., New Delhi, 1998
5. American Institute of Timber Construction (AITC), Timber Construction Manual, Wiley Publishers, 2004
6. Francis D.K Ching Building Construction illustrated, John Willey & Sons, 2000
7. Wills H Wagner, Howard Bud, Modern Carpentry, Good Heart – Wilcox publishers, Portland, 2003
8. Barry, Construction of Buildings, Volume 1&2, Blackwell Publishing Ltd., Oxford, 2005

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		L	T	P	ESE	FE / SE	TA		
1313	**Structural Design and systems III**	3	2	0	70	30	20	120	4

THEORY OF STRUCTURE

UNIT 1	• Arches, • Three hinged arches • Two hinged arches (parabolic and semi circular), • Temperature effect on arches
UNIT 2	• Euler's theory of long column, • Assumption and limitation of Euler formula, • Statically Indeterminate structure, • Difference between statically indeterminate and determinate Structure.
UNIT 3	• Theory and analysis of singly and doubly reinforced beam (no design) • Neutral axis of Beam section, • Lever arm, • Moment of resistance, • Balanced, unbalanced under reinforced and over reinforced section, • Introduction to R.C.C (W.S.M and L.S.M)
UNIT 4	• Introduction of prestressed concrete, • Basic concept, • Classification and • Types of prestressing system, • End anchorage, • Advantages and disadvantages of prestressed concrete • Advantages of prestressed concrete over reinforced concrete construction.
UNIT 5	• Bearing capacity of soil, • Types of soil (characteristic of black cotton soil). • Types of Structure (load bearing and framed), • Types of foundation, • Method of stabilization of soil.

Note:

1. Sessionals work shall include assignments/tests on the above topics.
2. In theory examination there will be a separate question from each unit with choice within the unit/question. All units/questions will be compulsory.

References:

1. L.S. Negi, Design of Streel Structures – Tata McGraw Hill Publishing Company Ltd., New Delhi, 1997.
2. S. Ramachandra, Design of Steel Structures - Standard Book House, Delhi, 1984.
3. A.S.Arya, Structural Design in Steel, Masonry and Timber, Nemchand and Bros, Roorkee, 1971.
4. National Building Code of India, 1983, Part VI, Structural Design.
5. Gurucharan Singh, Design of Steel Structures, Standard Publishers, New Delhi, 1982.
6. Dayaratnam.P, Design of Steel Structures, Oxford and IBH Publishing Co.
7. IS 800/1984 – Code of Practice for use of Structural Steel in General Building Construction.

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		L	T	P	ESE	FE / SE	TA		
1314	**Climatology**	3	1	0	70	30	30	130	4

UNIT 1	**Elements of climate**: • Constituents of climate, definition. • Measurement and Data collection with use of meteorological data, solar charts etc. • Classification of climate on global level and national level • Study of Microclimate and Macroclimate. • Effect of climate on man, shelter and environment
UNIT 2	**Principles of thermal comfort:** • Physiological impact of climate. • Comfort indices. Human comfort conditions – Comfort chart, Comfort Zone, Effective temperature, etc. • Natural and artificial methods of achieving thermal comfort — landscaping, building materials (U-values) etc.
UNIT 3	**Parameters of comfort conditions:** • Ventilation and air movement — spatial organization in buildings, layout and orientation of buildings in housing. • Natural Illumination and day lighting. • Artificial illumination and night lighting.
UNIT 4	**Climate conscious design-I**: • Introduction to traditional design measures / Vernacular architecture in various climates at Global level. • Architectural design considerations in various climatic zones in India —hot dry, warm humid, cold dry, cold humid, temperate, composite etc.
UNIT 5	**Climate conscious design-II**: • Use of different design aids at various climatic conditions • Study of materials and construction techniques for climate conscious design. • Case studies of climate conscious designs. • Application of wind and solar oriented architecture, introduction to climate oriented software and other analytical techniques.

Note:

1. Course would be run through lectures, Audiovisuals and site visits to various laboratories and buildings.
2. Sessional shall be in the form of reports, seminars, and design solutions on different units. The works of various building science laboratories be referred and discussed.
3. In theory examination there will be a separate question from each unit with choice within the unit/question. All units/questions will be compulsory.

References:

1. O.H. Koenigsberger and others (1993), Manual of Tropical Housing and Building – Part I - Climate design, Orient Longman, Madras, India.
2. Bureau of Indian Standards IS 3792 (1987), Hand book on Functional requirements of buildings other than industrial buildings, (Part I – IV), Manakbhavan, 9, Bahadur Shah Zafar Marg, New Delhi – 110002
3. Martin Evans (1980), Housing Climate and Comfort – Architectural Press, London
4. B. Givoni (1981), Man, Climate and Architecture, Architectural Sciences Series - Applied Science Publishers Ltd., London
5. B. Givoni (1994) Passive and Low Energy Cooling of building,Van Nortrand Reinhold New York, USA..
6. Galloe, Salam and Sayigh A.M.M. (1998) "Architecture, Comfort and Energy", Elsivier Science Ltd. , Oxford, U.K.

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Subject Code	Subject	Periods per week			Scheme of Examination			Total Marks	Credit [L+{(T+P)/2}]
		L	T	P	ESE	FE / SE	TA		
1315	**Building Materials and Science-III**	2	0	0	70	30	20	120	2

The subject aims at developing the understanding and knowledge of PROPRIETORY building materials regarding their availability, composition, properties, classification, uses and applications. Study of environmental conditions on various building materials and the science of design for creating effective human comfort conditions.

UNIT 1	**Synthetic Materials and Eco friendly Materials:** • Wallpapers • Polymers • Plastics • Laminated boards • Eco Boards • Soft Boards • Medium / High density fibre boards.
UNIT 2	**Materials For Specific Uses-I:** • Thermal insulation material, • Waterproofing materials, • Fire resistant materials. • Materials used in termite control.
UNIT 3	**Materials for specific uses-II:** • Materials used in electrical fittings, • Materials used in sanitation, • Materials used in water supply. • Acoustical materials.
UNIT 4	**Materials used for furniture construction:** • Timber, Bamboo, Cane, • Metals, • Foams, • Drapery, Upholstery, • Floor Coverings • Resins. • Plastic
UNIT 5	**By-product materials:** • Materials from industrial, agricultural and mineral wastes e.g. fly ash, furnace slag, lime kiln rejects, red mud, rice husk ash, saw dust, wooden chips, fibres, wood wool, etc,.

Note:

1. Sessional shall be in the form of reports, seminars and notes on above mentioned topics. The works of CBRI, NBO, HUDCO and other institutions be referred and discussed.
2. In theory examination there will be a separate question from each unit with choice within the unit/question. All units/questions will be compulsory.

References:

1. M.S.Shetty, Concrete Technology, S.Chand & Co.ltd,New Delhi,1986.
2. S.C.Rangwala, Engineering Materials, Charotar Publishing House, India, 1997.
3. S.K Duggal, Building Materials, Oxford and IBM Publishing Co, Pvt Ltd.,
4. Arthur Lyons - Materials for Architects and Builders - An introduction Arnold, London, 1997.
5. Don A.Watson, Construction Materials and Process, McGraw Hill Co., 1972.
6. S.N Sinha, Reinforced Concrete Design, Tata-McGraw Hill, New Delhi, 2002
7. Howard Kent Preston, Prestressed concrete for Architects and Engineers, McGraw Hill, New York, 1964.

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Subject Code	Subject	Periods per week			Scheme of Examination			Total Marks	Credit [L+{(T+P)/2}]
		L	T	P	ESE	FE / SE	TA		
1316	**History of Architecture, Art and Culture- I**	3	1	0	70	30	50	150	4

UNIT 1	**History of Arts and Culture -I:** • Development of civilizations — different periods like Neolithic, prehistoric, Paleolithic etc. • Cultural developments of different periods at global level. • Introduction to Development of Arts up to medieval period at global level, • Six limbs of Art as per Indian tradition.
UNIT 2	**Early History of Architecture** • Global preview of prehistoric architecture • Indian architecture during Vedic period, Indus-Saraswati civilization • Cretan, Mayan, Mexican architecture
UNIT 3	**Egyptian Architecture** • Mastaba and tombs • Pyramids • Temples
UNIT 4	**West Asiatic Architecture** • Sumerian • Assyrian • Babylonian
UNIT 5	**Buddhist Architecture.** • Development at Asian level (China, Japan, SE Asia, Afghanistan etc.) • Indian examples and influences.

Note:
1. Course would be run through lectures, Audiovisuals and site visits to various buildings.
2. Sessional shall be in the form of small reports, seminars, Sketches on above-mentioned topics.
3. The discussions should be based on selected examples highlighting the aesthetical values, architectural features, construction techniques, materials used and philosophy of construction.
4. In theory examination there will be a separate question from each unit with choice within the unit/question. All units/questions will be compulsory.

References:

1. Sir Banister Fletcher, A History of Architecture, University of London, The Antholone Press, 1996.
2. Spiro Kostof - A History of Architecture - Setting and Rituals, Oxford University Press, London, 1985.
3. Leland M Roth; Understanding Architecture: Its elements, history and meaning; Craftsman House; 1994
4. Percy Brown, Indian Architecture (Buddhist and Hindu Period), Taraporevala and Sons, Bombay, 1983.
5. Satish Grover, The Architecture of India (Buddhist and Hindu Period), Vikas Publishing Housing Pvt. Ltd., New Delhi, 2003.
6. Christoper Tadgell, The History of Architecture in India from the Dawn of civilization to the End of the Raj, Longmon Group U.K.Ltd., London, 1990.

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		L	T	P	ESE	FE / SE	TA		
1321	**Architectural Design-III Studio**	0	0	6	50	0	0	50	3

The subject is a lab (studio) oriented subject and hence, the syllabus as specified in Architectural Design-III (1311) will be the same. The works done as sessionals will be evaluated by internal and external examiners at the end semester examination. For conduction of the practical (viva-voce) examination one external and one internal examiner may be appointed for a group of 15-20 students.

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		L	T	P	ESE	FE / SE	TA		
1322	**Building Construction and Technology-III Studio**	0	0	3	25	0	0	25	2

The subject is a lab (studio) oriented subject and hence, the syllabus as specified in Building Construction and Technology-III **(**1312**)** will be the same. The works done as sessionals will be evaluated by internal and external examiners at the end semester examination. For conduction of the practical (viva-voce) examination one external and one internal examiner may be appointed for a group of 15-20 students.

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		L	T	P	ESE	FE / SE	TA		
1327	**Disaster Management**	0	0	2	0	0	25	25	1

UNIT 1	**Introduction:** • Types of disaster, meanings and related definitions. • Principles of Disaster Management, Hazards, Risks and Vulnerabilities. • Assessment of Disaster Vulnerability of a location and vulnerable groups. • Causes and effects of natural hazards. • Disaster profile of India.
UNIT 2	**Disaster preparedness and response and rehabilitation:** • Preparedness and Mitigation measures for various Disasters • Preparation of Disaster Management Plans • School Awareness & Safety Programme. • Issues in Environmental Health, Water & Sanitation. Earthquake Mitigation, Floods, Fire, Landslides and other natural calamities.
UNIT 3	**Post Disaster Relief & Logistics Management:** • Emergency Support Functions and their coordination mechanism. • Resource & Material Management. • Management of Relief Camp. • Information systems & decision making tools.
UNIT 4	**Roles and responsibilities of different agencies:** • Voluntary Agencies & Community Participation at various stages of disaster management. • Integration of Rural Development Programmes with disaster reduction and mitigation activities. • Role of Remote Sensing, Science & Technology. • Rehabilitation Programmes. • New Initiative.
UNIT 5	**Case Studies of different Project Works like Bhuj, etc.**

Note:

Sessionals shall be evaluated in the form of small exercises / practical projects.

References:

1. Guidelines for earthquake resistant non-engineered construction, National Information centre of earthquake engineering (NICEE, IIT Kanpur, India)
2. C.V.R Murthy, Andrew Charlson. “Earthquake design concepts”, NICEE, IIT Kanpur India.
3. Ian Davis (1987) Safe shelter within unsafe cities” Disaster vulnerability and rapid urbanization, Open House International, UK
4. Socio-economic developmental record- Vol.12, No.1, Jan-Feb 2005
5. Learning from Practice- A review of Architectural design and construction experience after recent earthquakes- Joint USA-Italy workshop, Oct.18-23, 1992, Orvieto, Italy.

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		L	T	P	ESE	FE / SE	TA		
1328	**Computer Application in Architecture**	0	0	3	25	0	30	55	2

1. Introduction and basic applications of operating software: like Windows, and Word processing software: MS Office (word, excel, access, power point etc. – formatting and putting formula in excel, data handling with access, etc.), PageMaker, Open Office etc.

2. Introduction to basic understanding of Architectural application software, such as Auto cad 2D and 3D modeling (creating shades and shadows, attaching materials and rendering),

3. Introduction to basic understanding of other software like Architectural Desktop, Corel draw, photoshop, Revit, Sketchup, Archicad etc.

4. Advanced professional application of software in rendering techniques, walkthrough, animations like Maya, 3D studiomax, etc.

5. Basic understanding of other applicable software for energy auditing, building simulation, introduction to GIS like Arcview, Mapinfo, and design build etc.

Note:

Sessionals shall be evaluated in the form of small exercises / practical projects.

References:

1. Photoshop 7 Bible Professional Edition, Wiley John & Son INC, New York, DekeMcClelland, 2000.
2. AutoCAD architectural user guide – Autodesk Inc., 1998.
3. A Watt, Fundamentals of Three-Dimensional Computer Graphics, Addis Wesley, Massachusetts, 1989.
4. The Illustrated AutoCAD 2002 Quick Reference, Ralph Grabowski,
5. Autocad 2000: A Problem-Solving Approach, Sham tikoo. Pub: Thomson Learning,1999