NATIONAL INSTITUTE OF TECHNOLOGY RAIPUR

PROPOSED NEW SCHEME OF EXAMINATION FOR

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

SIXTH 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	1611	Architectural Design VI	2	0	0	0	50	100	150	2
2	1612	Building Construction and Technology VI	2	0	0	70	30	75	175	2
3	1613	Structural Design and Systems VI	3	2	0	70	30	20	120	4
4	1614	Building Services and Equipments II (Electrical & Mechanical)	3	1	0	70	30	20	120	4
5	1615	Estimation, Costing and Specifications	2	0	0	70	30	30	130	2
6	1616	Modern Architecture	2	1	0	70	30	50	150	3
7	1621	Architectural Design VI Studio	0	0	6	50	0	0	50	3
8	1622	Building Construction and Technology VI Studio	0	0	3	25	0	0	25	2
9	1627	Working Drawing II	0	0	6	30	0	30	60	3
10	1628	Discipline						20	20	1
TOTAL			**14**	**4**	**15**	**455**	**200**	**345**	**1000**	**26**

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

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		L	T	P	ESE	FE / SE	TA		
1611	**Architectural Design- VI**	2	0	0	0	50	100	150	2

This program gives special emphasis on role of technology in architecture. The design projects to be dealt in the studio should respond to the importance of structure, services and acoustical treatments.

Exercises related to public buildings i.e. commercial centre, hospital, auditorium, cinema, sports complex & educational buildings on sloping/flat sites. Study and incorporation of building byelaws should be complete in this Semester.

Simultaneously, stress should be given on the interior treatment of small and large spaces. Freedom in design is to be given with preliminary introduction of importance and role of byelaws in building design. Minimum one time problem is to be attempted in class, in addition to the major design problems.

Note:
Sessional will be in the form of drawings and models along with Technical 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 to buildings, dealt in studio problems, so as to document them with the help of photographs, slides, videocassettes etc.

References:

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

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		L	T	P	ESE	FE / SE	TA		
1612	**Building Construction and Technology VI**	2	0	0	70	30	75	175	2

UNIT 1	**Beams:** • Simply supported • Continuous • Cantilever • Inverted • L & T beams • Lintels & chhajjas • Details at odd junctions • Formwork of beams.
UNIT 2	**Slab:** • One way • Continuous • Two way slab • Flat slab • Waffle slab • Reinforced brick slab. • Formwork of slabs.
UNIT 3	**Foundation I:** • R.C.C. column footings, • Foundations for workshops and machines. • Formwork of foundation with column.
UNIT 4	**Foundation II:** • Various types of Pile foundations, • Raft foundations, • Grillage foundations. • Special Foundations, shallow foundations.
UNIT 5	**Staircases & Ramps:** • Types of staircases • Detail of R.C.C. • R.C.C. ramps. • Formwork of Staircases & Ramps.

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. M.S.Shetty, Concrete Technology, S.Chand & Co.ltd, New Delhi, 1986.
2. Dr. B.C.Punmia, A Text book of Building Construction, Laxmi Publications Pvt. Ltd., New Delhi, 2001.
3. T.D Ahuja & G.S. Birdie, Fundamentals of Building Construction, D RP Company Pvt. Ltd., New Delhi, 1996
4. S.P Arora and S.P Bindra, A Text Book of Building Construction - D RP Company Pvt. Ltd., New Delhi, 1990
5. Alan Blanc, Stairs, Steps and Ramps, Butterworth, Heinemann Ltd., 1999
6. Francis D.K Ching Building Construction illustrated, John Willey & Sons, 2000
7. W.B. McKay, "Building Construction" Vol, 1 to 4, Longmans, UK, 1981.
8. Barry, Construction of Buildings, Volume 1 to 5, Blackwell Publishing Ltd., Oxford, 2005
9. R. Chudley, Construction Technology, Richard Clay, Chanur Press, 1980

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		L	T	P	ESE	FE / SE	TA		
1613	**Structural Design and Systems VI**	3	2	0	70	30	20	120	4

STRUCTURE ANALYSIS

UNIT 1	Slope deflection method in simply supported and cantilever beams for point load and U.D.L.
UNIT 2	Moment distribution method (Beam only)
UNIT 3	Approximate method for an analysis of frames by portal and cantilever method.
UNIT 4	Kani's method (continuous beam only)
UNIT 5	Column analogy for beam with different moments of Inertia.

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. R.K. Bansal, A Text Book on Strength of Materials – Laxmi Publications, New Delhi, 1994.
2. B.C. Punmia, SMTS-I, Strength of Materials – Laxmi Publications, New Delhi, 1994.
3. M.M. Ratwani & V.N. Vazirani, Analysis of Structures, Vol. 1, Khanna Publishers – Delhi, 1987.
4. Timoshenko, S.P.and D.H. Young, Elements of Strength of Materials,5th edition, East West Press, 1993.
5. A.R. Jain and B.K.Jain, Theory and analysis of structures, Vol. 1, Nemchand and Bros, Roorkee, 1987.
6. R.K. Rajput "Strength of Materials", S.Chand & Company Ltd., New Delhi 1996.

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		L	T	P	ESE	FE / SE	TA		
1614	**Building Services and Equipments-II (Electrical &Mechanical)**	3	1	0	70	30	20	120	4

The subject aims at developing the understanding and knowledge of fundamentals of all types of services required in a building. To learn various equipments and fittings available in the market and to prepare basic design layout of various services and its details.

SECTION-A (ELECTRICAL)

UNIT 1	**Basic Electrical Services:** • Fundamentals of electricity. • Principles of wiring. • Study of various fixtures, fittings, accessories and equipments used in installation of electrical services in small, large and multistoried buildings of various types viz. residential, commercial, public, industrial etc.
UNIT 2	**Planning and design of electrical services in various types of buildings:** • Calculation of electric load and its phasing. • Schematic diagram of electric installations with use of symbols. • Study of special fixtures like lightning conductors, earthing, waterproof and spark proof installations, stabilizers, circuit breakers etc. and installation thereof. • Study and application of relevant rules and regulations of Electricity boards.
UNIT 3	**Illumination:** • Principles of lighting including calculations for desired illumination on different working planes for various activities like reading, writing, drawing, domestic works, industrial jobs etc. • Designing of lighting for various types of buildings like residential, educational, offices etc. • Lighting for special purposes viz. Exhibitions, Theaters, Stadiums, Swimming pools, Cinemas, Assembly halls, Restaurants, Religious buildings etc along with study of Direct, Indirect, Flood, Concealed, Focus light etc. • Over illumination controlling measures.

SECTION-B (MECHANICAL)

UNIT 4	• The fundamental principles of Psychometrics and heat transfer. • Methods of Air conditioning, Fittings, fixtures, accessories and equipment used in various types of air-conditioning along with their construction details and basic load calculations. • A.C. duct design and layout with constructional details. (Including calculations.)
UNIT 5	• Lifts and movable walkways, escalators including study of their operation, function, layouts and design details. • Appliances, equipments and systems for fire safety of buildings, (particularly high rise) including study of their function, operation and construction details.

Note:

1. The sessional shall be in form of notes, home assignments, schematic layout/drawing for layout of installation of various electrical and mechanical services in given building.
2. There will be separate question papers from Electrical services and Mechanical services having 3 questions (of 14 marks each; total of 42 marks) from Electrical services and 2 questions (of 14 marks each; total of 28 marks) from Mechanical services.
3. The passing marks will be the sum of both sections, (i.e., Electrical services + Mechanical services).

References:

1. E.P.Ambrose, Electric Heating, John Weley & Sons Inc., New York, 1968
2. Philips Lighting in Architectural Design, McGraw Hill. New York, 1964
3. R.G.Hopkenson & J.D.Kay, The lighting of Buildings, Faber & Faber, London, 1969 Conveying systems
4. Elevators, Escalators , Moving Walkways – Manufactures catalogues
5. Handbook of building Engineers in metric systems, New Delhi 1968
6. National Building Code

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		L	T	P	ESE	FE / SE	TA		
1615	**Estimation, Costing and Specifications**	2	0	0	70	30	30	130	2

UNIT 1	**Specifications-I:** • Importance and methods of drafting specification in buildings • Use of Indian standard specification and PWD/ CPWD handbook, specifications affecting cost. • Method of specification writing (trade wise practice, item of completed works) • Standard clauses/ instructions for various items of work for the contractor, owner, Architect, sub- contractor. • Explanation of extra items, their necessity and other items created for change of specifications.
UNIT 2	**Specifications-II:** • Specification for a structure from excavation up to finishing in superstructure. • Material specification (timber and its products, metals, water proofing materials, materials used in roofing and roof covering, etc.) • Exercise on specification writing of load bearing structure, R. C. C. frame structure and steel frame structure.
UNIT 3	**Introduction to Estimation:** • Types of estimates. • Methods of preparing estimates. • Data required for making an estimate. • Introduction to Quantity Survey.
UNIT 4	**Methods of estimation and rate analysis:** • Mensuration, Standard Mode of measurements, Schedule of rates, Commercial abbreviations, Methods and procedure of taking off abstractions, Working up and Billing, Examples and exercises for above from excavations to finishing. • Rate analysis, Cost of materials and labour for various works, Measurement of work for interim and final certificates for payment to contractors.
UNIT 5	**General terms:** • Administrative approval, Technical sanction, Competent authority, Deposit work, Issue rates, Payment on accounts, Suspense account, Imprest, Indent of Stores, Muster roll, Measurement book, Materials site account, Establishment charges etc. • Methods and Contents of technical report and proposals for obtaining administrative/technical/financial approval/sanctions.

Note:
1. In theory examination there will be a separate question from each unit with choice within the unit/question. All units/questions will be compulsory.
2. Sessionals shall be in form of exemplary assignments to be submitted as notes, and collection of cases regarding professional practice in the field.

References:

1. Estimating, Costing and Valuation (Professional practice) By Rangwala – S.C CHAROTAR PUBLISHING HOUSE, INDIA.
2. Estimating & Costing – By B.W. Dutta (Revised by S. Dutta) UBS Publishers Distribution P.Ltd. India.
3. Estimating Costing and Specification. – By M. Chakraborti 21.B – Bhabananda Road, Calcutta – 700 026.
4. Estimating Costing and Valuation – By Gurcharan singh & Jagdish singh. Standard Publishers Distributors, 1705 – B, Nai sark post box no.1066. Delhi – 110 006.
5. T.N. Building practice, Vol:1 Civil Govt Publication.
6. PWD Standard Specifications. Govt Publication.

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		L	T	P	ESE	FE / SE	TA		
1616	**Modern Architecture**	2	1	0	70	30	50	150	3

UNIT 1	**Introduction of Modern Architecture** • Effect of industrialization and development of modern architecture. • Review of the development of Architecture on global level related to all influencing factors regarding evolution of styles. • Movement of Modernism including various Architectural and aesthetical philosophies and concepts.
UNIT 2	**Determinants of Physical forms:** • Understanding the determinants of physical form viz: Space, Structure, Organization, Symbolism, Order, Datum, Axis, Surface, Mass, Void, Scale, Proportion, Harmony, Contrast, Rhythm, Balance, Accentuation etc. based on the comparison between the past development and modern movement.
UNIT 3	**Works of Architects:** • Study of Modern Architecture based on works and concepts of exemplary Indian and Non-Indian modern architects in 20^{th} and 21^{st} century like Louis Sullivan, F. L. Wright, Louis Kahn, Le Corbusier, Philip Johnson, Charles Correa, Michael Graves, etc. • Study of environmental design and technology with reference to trend setting works of contemporary architects, designers. Ecologists, engineers etc.
UNIT 4	**Design Parameters of Modern Architecture** • Communication and Interpretations of Modern and Contemporary Architecture based on study of literature and existing buildings to understand design parameters principles process, methods, and programme-formulation for design.
UNIT 5	**Trends of Modern Architecture:** • Relationship of modern architecture with social-cultural developments. • Relationship of modern architecture with modern Arts. • Introduction to Non-conventional architectural trends — bio mimicry, intelligent buildings, nano architecture, deconstruction etc. • Futuristic trends —utopian architecture.

Note:

1. Course would be run through lectures, Audiovisuals and site visits to various buildings.
2. Sessional shall be in the form of 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 and culture.
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. Kenneth Frampton , Modern Architecture: A Critical History , Thames & Hudson, London, 1994
2. Manfredo Tafuri., Modern Architecture, Harry N. Abrams Inc.
3. Leonardo Benevolo, History of Modern Architecture, 2 Vols.,Routledge & Keganpaul, London, 1971
4. Miki Desai et. al., Architecture and independence, Oxford University Press, 2000
5. Thomas Metcalf, An imperial Vision, Faber & Faber/ Electa, 1980.
6. Christian Norburg Schulz., Meaning in Western Architecture, Studio Vista
7. William J. Curtis – Modern Architecture since 1900.

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		L	T	P	ESE	FE / SE	TA		
1621	**Architectural Design VI 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-VI (1611) 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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Subject Code	Subject	Periods per week			Scheme of Examination			Total Marks	Credit [L+{(T+P)/2}]
		L	T	P	ESE	FE / SE	TA		
1622	**Building Construction and Technology-VI 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-VI **(**1612**)** 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		
1627	**Working Drawing - II**	0	0	6	30	0	30	60	3

The subject is a continuation of the subject (1527). The preliminaries, methodologies etc have been already taught.

1. One set of complete working drawing of a framed structure with emphasis of building services.

Note:

Submission of the sessional shall be in the form of full set of working drawing and design details of given building. The sessional marks will be based upon the portfolio submitted and internal viva.

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		L	T	P	ESE	FE / SE	TA		
1628	**Discipline**	–	–	–	–	–	20	20	1

The marks of this subject are based on the yearly performance, behaviour, conduct, active participation, discipline and attendance of the students.