

# NATIONAL INSTITUTE OF TECHNOLOGY RAIPUR

## PROPOSED NEW SCHEME OF EXAMINATION FOR

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

### FIRST 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	1111	Architectural Design I (Basic Design & Visual Arts)	2	0	0	0	50	100	150	2
2	1112	Building Construction and Technology I	2	0	0	70	30	75	175	2
3	1113	Structural Design and Systems I	3	2	0	70	30	20	120	4
4	1114	Architectural Graphics Skills-I	3	0	0	70	30	75	175	3
5	1115	Building Materials and Science I	2	1	0	70	30	20	120	3
6	1116	Communication Skills (Humanities)	2	1	0	70	30	20	120	3
7	1121	Architectural Design I (Basic Design & Visual Arts) Studio	0	0	6	50	0	0	50	3
8	1122	Building Construction Technology I Studio	0	0	3	25	0	0	25	2
9	1124	Architectural Graphics Skills I- Studio	0	0	3	25	0	0	25	2
10	1127	Workshop practice and Site exposure I	0	0	3	0	0	40	40	2
<b>TOTAL</b>			<b>14</b>	<b>4</b>	<b>15</b>	<b>450</b>	<b>200</b>	<b>350</b>	<b>1000</b>	<b>26</b>

# NATIONAL INSTITUTE OF TECHNOLOGY RAIPUR.

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

### FIRST SEMESTER B. ARCH.

Subject Code	Subject	Periods per week			Scheme of Examination			Total Marks	Credit [L+{(T+P)/2}]
		L	T	P	ESE	FE / SE	TA		
1111	<b>Architectural Design I (Basic Design and Visual Arts)</b>	2	0	0	0	50	100	150	2

The aim of the subject is to introduce to the students the design fundamentals and design vocabulary and enable them to apply the same in compositions and designs.

- Points, Lines, Planes, Color theory and compositions. Introduction to modern Arts and various other techniques.
- Forms, Properties of forms, variations in forms with inter-relationship among planes, colours, tones, textures. Application of them in two and three-dimensional compositions, presented in form of scaled drawings, views, and freehand sketches to develop the skill and understanding of forms, proportions etc. in various media viz. pencil, pens, colors etc.
- Study through models of different materials viz. paper, clay, wax, soap, wires etc. The idea is mass and space handling with understanding the roles of form, colour and texture.
- Anthropometric study and ergonomics of human figure, dimensions of furniture and relationship with human anthropometrics (like in kitchens, toilets, bedrooms, staircases etc) with freehand drawing of human figures, vehicles, trees, buildings etc. to have a better understanding of proportion.
- Designing of basic building components (like kitchens, bedrooms, toilets etc.)

Note:

Sessionals shall be in the form of drawings and models along with report.

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

References:

1. Owen Cappleman & Michael Jack Jordon, Foundations in Architecture : An Annotated Anthology of Beginning Design Project, Van Nostrand Reinhold New York, 1993.
2. Charles Wallschlagger & Cynthia Busic-Snyder, Basic Visual Concepts and Principles for Artists, Architects and Designers, Mc Graw Hill, New York 1992.
3. V.S.Pramar, Design fundamentals in Architecture, Somaiya Publications Pvt. Ltd., New Delhi, 1973.
4. Francis D.K.Ching - Architecture - Form Space and Order Van Nostrand Reinhold Co., (Canaa), 1979.
5. John W.Mills - The Technique of Sculpture, B.T.Batsford Limited, New York - Reinhold Publishing Corporation, London, 1966.
6. Elda Fezei, Henny Moore, Hamlyn, London, New York, Sydney, Toronto, 1972.
7. C.Lawrence Bunchy - Acrylic for Sculpture and Design, 450, West 33rd Street, New York, N.Y.10001, 1972.

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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		
1112	<b>Building Construction and Technology-I</b>	2	0	0	70	30	75	175	2

UNIT 1	<b>Brick:</b> <ul style="list-style-type: none"> <li>• Types of bricks.</li> <li>• Bonds in brick masonry for various thicknesses of walls and various situations like ends, junctions, etc.</li> <li>• Attached and detached pier.</li> <li>• Jointing and pointing.</li> <li>• Cavity walls.</li> </ul>
UNIT 2	<b>Stone:</b> <ul style="list-style-type: none"> <li>• Stone dressing of different types.</li> <li>• Stone masonry of different types for various thicknesses of walls.</li> <li>• Jointing and pointing.</li> </ul>
UNIT 3	<b>Foundation:</b> <ul style="list-style-type: none"> <li>• Types of simple foundations.</li> <li>• In Bricks</li> <li>• In Stones,</li> <li>• Timbering to excavation.</li> </ul>
UNIT 4	<b>Arches and Lintels:</b> <ul style="list-style-type: none"> <li>• Brick Arches.</li> <li>• Stones Arches.</li> <li>• Brick Lintels.</li> <li>• Stone lintels,</li> <li>• Centering materials and methods.</li> </ul>
UNIT 5	<b>Construction systems and Elements of Buildings</b> <ul style="list-style-type: none"> <li>• Overview of method of construction of a simple two storied building.</li> <li>• Plinth - filling – processes and techniques.</li> <li>• Thresholds – various types</li> <li>• Plinth protection, D.P.C.</li> <li>• Coping</li> <li>• Chhajja</li> </ul>

Note:

1. Sessionals shall be in form of drawing sheets having scaled drawings and proportionate freehand sketches, along with occasional visits to construction sites.
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. S.P Arora and S.P. Bindra, Text book of Building Construction, ganpat Rai publications (P) Ltd New Delhi, 2005.
2. Klans Dukeeberg, Bambus – Bamboo, Karl Kramer verlag Stuttgart Germany, 2000.
3. Don A. Watson Construction Materials and Processes Megraw Hill 1972, WB Mckey Building construction vol 1,2, Longman UK 1981.
4. Barry, the construction of buildings Affiliated East West press put Ltd New Delhi 1999.
5. Francisa D.K. Ching Building Construction illustrated John Wiley & Sons 2000.

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		L	T	P	ESE	FE / SE	TA		
1113	<b>Structural Design and Systems - I</b>	3	2	0	70	30	20	120	4

**APPLIED MECHANICS**

UNIT 1	<ul style="list-style-type: none"><li>• Concurrent, non-concurrent and co-planer forces,</li><li>• Composition and resolution of forces,</li><li>• Laws of forces,</li><li>• Moments and couples,</li><li>• Conditions of equilibrium.</li></ul>
UNIT 2	<ul style="list-style-type: none"><li>• Center of gravity and moment of inertia of composite and cutout section,</li><li>• Parallel and perpendicular axes theorem.</li></ul>
UNIT 3	<ul style="list-style-type: none"><li>• Types of loads,</li><li>• Support and support reaction,</li><li>• Stresses in frames and trusses by analytical and graphical method.</li><li>• Maxwell's diagram.</li></ul>
UNIT 4	<ul style="list-style-type: none"><li>• Stress and strain,</li><li>• Hook's law,</li><li>• Lateral strain,</li><li>• Poisson Ratio,</li><li>• Young's Modulus,</li><li>• Modulus of Rigidity,</li><li>• Bulk Modulus and their relation.</li></ul>
UNIT 5	<ul style="list-style-type: none"><li>• Stresses in composite sections.</li><li>• Thermal stress.</li></ul>

**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 textbook on Engineering Mechanics. Lakshmi Publications. Delhi 1992.
2. R.K.Bansal – A textbook on Strength of Materials Lakshmi Publications. Delhi 1998.
3. P.C.Punmia, Strength of Materials and Theory of Structures; Vol. I, Lakmi Publications, Delhi 1994.
4. S. Ramamrutham, Strength of Materials – Dhanpatrai & Sons, Delhi, 1990.
5. W.A.Nash, Strength of Materials – Schaums Series – McGraw Hill Book Company, 1989.
6. R.K. Rajput – Strength of Materials, S. Chand & Company Ltd. New Delhi 1996.
7. A.P.Dongre – Structural Engineering for Architecture, Scitech Publications Ltd.

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		L	T	P	ESE	FE / SE	TA		
1114	<b>Architectural Graphics Skills-I</b>	3	0	0	70	30	75	175	3

UNIT 1	<b>Graphical Codes, Symbols and Scales</b> <ul style="list-style-type: none"> <li>• Architectural letterings</li> <li>• Types of lines</li> <li>• Symbolic representations of building materials</li> <li>• Symbolic Representations of Building parts.</li> <li>• Plane Scales</li> <li>• Diagonal Scales</li> </ul>
UNIT 2	<b>Geometric views and Projections</b> <ul style="list-style-type: none"> <li>• Isometric views</li> <li>• Axonometric views</li> <li>• Oblique views</li> <li>• Isometric projections</li> <li>• Axonometric Projections</li> <li>• Oblique Projections</li> </ul>
UNIT 3	<b>Orthographic projections (One and two Dimensions)</b> <ul style="list-style-type: none"> <li>• Points</li> <li>• Lines</li> <li>• Lamina</li> </ul> (Parallel, Perpendicular and inclined projections of above)
UNIT 4	<b>Orthographic projections (Three Dimensions)</b> <ul style="list-style-type: none"> <li>• Various solid and hollow geometrical objects — Parallel, Perpendicular and inclined projections.</li> </ul>
UNIT 5	<b>Sections, Interpenetrations and Development of Surfaces</b> <ul style="list-style-type: none"> <li>• Sections of various solid and hollow geometrical objects — Parallel, Perpendicular and inclined.</li> <li>• Interpenetration of various solid geometrical object</li> <li>• Development of surfaces with or without sections.</li> </ul>

Note:

1. Sessionals is to be done in the form of drawings on drawing sheets and proportionate sketches on 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. I.H. Morris, Geometrical Drawing for Art Students - Orient Longman, Madras, 2004.
2. Francis Ching, Architectural Graphics, Van Nostrand Rein Hold Company, New York, 1964.
3. George K.Stegman, Harry J.Stegman, Architectural Drafting Printed in USA by American Technical Society, 1966.
4. C.Leslie Martin, Architectural Graphics, The Macmillan Company, New York, 1964.
5. Bhatt N.D., Engineering Drawing, India, 2011.

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		L	T	P	ESE	FE / SE	TA		
1115	<b>Building Materials and Science - I</b>	2	1	0	70	30	20	120	3

The subject aims at developing the understanding and knowledge of BASIC building materials regarding their availability, constitution, properties, classification, uses and applications, effects of sun, rain, wind and other climatic and environmental conditions on them.

UNIT 1	<p><b>Clay and clay products and stones.</b></p> <ul style="list-style-type: none"> <li>• Bricks — Various types of bricks, properties of good brick, use of bricks, classification of various grades of bricks.</li> <li>• Compressed mud blocks, hollow blocks</li> <li>• Stones — Buildings stones, types, properties of good stone, natural bed, aggregates for concrete work, use of stones.</li> </ul>
UNIT 2	<p><b>Cementing materials:</b> Cement, lime, sand, aggregate, mortar and concrete.</p> <ul style="list-style-type: none"> <li>• Lime—quick lime, hydraulic lime, lime mortar mix and preparation, neeroo, efflorescence, peeling and flaking.</li> <li>• Cement — Composition, properties of cement, initial setting time, slow setting, quick setting and rapid hardening cement.</li> <li>• Sand— Pit, river and sea sand, uses in mortar and concrete, properties of good sand, impurities of sand and their removal.</li> <li>• Mortar — Various types of mortar, their mix and properties, application methods.</li> <li>• Concrete — Various types of concrete, their mix and properties, application methods.</li> </ul>
UNIT 3	<p><b>Timber and bamboo:</b></p> <ul style="list-style-type: none"> <li>• Timber of various types of quality and properties,</li> <li>• Defects in timbers</li> <li>• Methods of seasoning, sawing and planning,</li> <li>• Preservation of timber</li> <li>• Bamboo as a building material</li> <li>• Preservation of bamboo</li> <li>• Use of timber and bamboo in buildings.</li> </ul>
UNIT 4	<p><b>Metals:</b></p> <ul style="list-style-type: none"> <li>• Various types of Ferrous Metals- Wrought Iron, Cast Iron, Steel, their properties and uses in Architecture.</li> <li>• Various types of Non-Ferrous Metals- Aluminium, Copper, Tin, Brass, etc. their properties and uses in Architecture.</li> </ul>
UNIT 5	<p><b>Glass:</b></p> <ul style="list-style-type: none"> <li>• Various types of glasses and their properties.</li> <li>• Use of glass in architecture,</li> <li>• Working on glass such as etching, beveling, and stained glass work.</li> </ul>

Note:

1. Sessionals shall be in the form of small reports, seminars and notes on above mentioned topics. The works of CBRI, CFRI, BMTPC, HUDCO, TIFAC, and other institutions to 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. P.C. Varghese, Building Materials, Prentice Hall of India put Ltd New Delhi, 2005.
2. S. C. Rangwala, Engineering Materials, Character Publishing house, Anand, India, 2002.
3. Dunkelberg (K), Bambus – Bamboo, Bamboo as a Building Material, Karl Kramer Verlag Stuttgart, 2000.
4. UNO, Use of Bamboo and reeds in construction – UNO publications
5. S.K. Duggal, Building materials, Oxford and IBH publishing Co, put, Ltd, New Delhi 110001, 1997.
6. Rural Construction NBO – New Delhi

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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		
1116	<b>Communication Skills (Humanities)</b>	2	1	0	70	30	20	120	3

UNIT 1	<b>Aids to Correct Writing</b> <ul style="list-style-type: none"> <li>• Tenses</li> <li>• Models</li> <li>• Conditionals</li> <li>• Infinitives, gerunds and participles</li> <li>• Active and passive voice narration</li> <li>• Subject verb agreement</li> <li>• Common errors</li> <li>• Punctuations, capital letters.</li> </ul>
UNIT 2	<b>Composition-I</b> <ul style="list-style-type: none"> <li>• Précis</li> <li>• Essay</li> <li>• Paragraph</li> <li>• Copy Writing for advertisements — characteristics of a good advertisement, aids to make advertisement attractive and effective.</li> </ul>
UNIT 3	<b>Composition-II</b> <ul style="list-style-type: none"> <li>• Technical reports and letter writing</li> <li>• Speeches, profile of speaker, characteristics of speech.</li> <li>• Aesthetic and critical writing, kinesics.</li> <li>• Appreciation of scene, figures and images.</li> </ul>
UNIT 4	<b>Enriching vocabulary:</b> <ul style="list-style-type: none"> <li>• Nuances, jargon, foreign word and phrases sometimes used in correspondence.</li> <li>• Roots and origin of words</li> <li>• Words often confused</li> <li>• Synonyms</li> <li>• Antonyms</li> <li>• Homophone</li> <li>• Homonym</li> <li>• Words followed by preposition</li> <li>• Prefixes and suffixes</li> <li>• Words followed by appropriate prepositions</li> <li>• Idioms</li> <li>• Phrases</li> </ul>
UNIT 5	<b>Presentation Skills:</b> Communication skills in architecture through write up and graphic, graphs, sketches audio presentation, supplemented by drawings, transparencies, photographs, epidiastope, slides, video presentation, script writing dubbing, cue sheet, ending vision, mixing.

Note:

1. Sessional 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.

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		L	T	P	ESE	FE / SE	TA		
1121	<b>Architectural Design I (Basic Design and Visual Arts) Studio</b>	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 I (Basic Design and Visual Arts) (1111) 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		
1122	<b>Building Construction and Technology-I Studio</b>	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-I (1112) 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		
1124	<b>Architectural Graphics Skills-I Studio</b>	0	0	3	25	0	0	25	2

The subject is a lab (studio) oriented subject and hence, the syllabus as specified in Architectural Graphics Skills-I (1114) 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		
1127	<b>Workshop Practice and Site Exposure-I</b>	0	0	3	0	0	40	40	2

The aim of the subject is to introduce to the students to the various tools used in carpentry, metal work, masonry, painting etc. and get a reasonable skill in handling the materials and tools there off.

**Plastic materials:** Use of clay, plaster of Paris, wax, soap etc.

**Paper Craft:** Introduction to modeling with paper, board, plastic sheets etc.

**Carpentry:** Handling different carpentry tools, carpentry processes, carpentry joints and wood working machines.

**Masonry:** Handling the bricks, mixing the mortar, bond work of bricks, stones and masonry tools.

Note:

1. Site visits relating to the various works may be carried out for better exposure to the students.
2. Submission of the sessionals will be in the form of different jobs /projects in each trade and models prepared by students and the same will be subjected to internal examination.