

NATIONAL INSTITUTE OF TECHNOLOGY RAIPUR

PROPOSED NEW SCHEME OF EXAMINATION FOR

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

FIFTH 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 | 1511 | Architectural Design V | 2 | 0 | 0 | 0 | 50 | 100 | 150 | 2 |
| 2 | 1512 | Building Construction and Technology V | 2 | 0 | 0 | 70 | 30 | 75 | 175 | 2 |
| 3 | 1513 | Structural Design and Systems V | 3 | 2 | 0 | 70 | 30 | 20 | 120 | 4 |
| 4 | 1514 | Building Services and Equipments I | 3 | 1 | 0 | 70 | 30 | 20 | 120 | 4 |
| 5 | 1515 | Building Bye-laws and Codes of Practices | 2 | 1 | 0 | 70 | 30 | 30 | 130 | 3 |
| 6 | 1516 | History of Architecture, Art and Culture III | 2 | 1 | 0 | 70 | 30 | 50 | 150 | 3 |
| 7 | 1521 | Architectural Design V Studio | 0 | 0 | 6 | 50 | 0 | 0 | 50 | 3 |
| 8 | 1522 | Building Construction Technology V Studio | 0 | 0 | 3 | 25 | 0 | 0 | 25 | 2 |
| 9 | 1527 | Working Drawing I | 0 | 0 | 5 | 30 | 0 | 50 | 80 | 3 |
| TOTAL | | | 14 | 5 | 14 | 455 | 200 | 345 | 1000 | 26 |

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR.

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

FIFTH SEMESTER B. ARCH.

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|--------------|-------------------------------|------------------|---|---|-----------------------|---------|-----|-------------|----------------------|
| | | L | T | P | ESE | FE / SE | TA | | |
| 1511 | Architectural Design-V | 2 | 0 | 0 | 0 | 50 | 100 | 150 | 2 |

The subject aims at developing creativity for designing imaginative built forms with application of principles and theory of architectural design and philosophies of contemporary architects. The attempt is towards developing one's own language and philosophy of architecture to guide towards exploring alternative building forms for different activities which help in understanding the relationship of structure and possibilities in building forms. Design problems shall include problems of simple and complex nature i.e. Religious buildings, residential complexes, gathering places, clubs, cafés, community halls, museums, art galleries, pavilions, sport complexes, hospitals, polyclinics, factories.

Emphasis shall be given more on three-dimensional studies to develop an understanding for man and space relationship and also relevant building byelaws.

There should be variety of problems in the studio work with changing focus for each problem from theory to construction techniques (local) and site layouts, including organization and detailing of open spaces with an aim to learn working with practical limitations.

Two time problems (as class tests) are to be conducted in class other than regular 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, 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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| Subject Code | Subject | Periods per week | | | Scheme of Examination | | | Total Marks | Credit [L+{(T+P)/2}] |
|--------------|---|------------------|---|---|-----------------------|---------|----|-------------|----------------------|
| | | L | T | P | ESE | FE / SE | TA | | |
| 1512 | Building Construction and Technology V | 2 | 0 | 0 | 70 | 30 | 75 | 175 | 2 |

| | |
|--------|--|
| UNIT 1 | Special openings-I <ul style="list-style-type: none"> • Design and Constructional details of sliding, • Sliding folding, • Side hung doors • Revolving doors, • Sliding windows in timber • Sliding windows in metal |
| UNIT 2 | Special openings-II <ul style="list-style-type: none"> • Fully glazed door, in metal. • Rolling shutter • Collapsible gates. |
| UNIT 3 | Curtain walls <ul style="list-style-type: none"> • Introduction to curtain wall construction, its advantages, shading, structural glazing, etc. • Metal and aluminium sectioned curtain wall. • R.C.C. curtain wall • Special purpose curtain wall with reflective glazing, insulation, etc. |
| UNIT 4 | Special entrances <ul style="list-style-type: none"> • Study of steel railing, jali, grills, and ladders. • Design and construction details of fixed glazing • Study of compound wall (including advance type) with security arrangement • Study of wicket gate and large entrance gates rolling on wheels. |
| UNIT 5 | Finishes and surface treatments <ul style="list-style-type: none"> • Study of expansion joints, waterproofing and roof light. • Study of details of various methods of common façade treatments. • Study of details of various methods of common interior finishes. |

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 to 4, 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. Francis D.K Ching Building Construction illustrated, John Willey & Sons, 2000
6. Wills H Wagner, Howard Bud, Modern Carpentry, Good Heart – Wilcox publishers, Portland, 2003
7. Barry, Construction of Buildings, Volume 1to 5, Blackwell Publishing Ltd., Oxford, 2005

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|--------------|--|------------------|---|---|-----------------------|---------|----|-------------|----------------------|
| | | L | T | P | ESE | FE / SE | TA | | |
| 1513 | Structural Design and Systems V | 3 | 2 | 0 | 70 | 30 | 20 | 120 | 4 |

STRUCTURE DESIGN-II (STEEL STRUCTURE)

| | |
|--------|--|
| UNIT 1 | Steel joint and connection |
| UNIT 2 | Design of compression member |
| UNIT 3 | Design of tension member |
| UNIT 4 | Design of steel beam (simple and built up beam) |
| UNIT 5 | Industrial building: <ul style="list-style-type: none">• Introduction,• Planning,• Types,• Roof and side covering,• Element of Industrial building (no design),• Only design steps, for industrial building (no detail design) |

Note:

1. Steel table & I.S. code 800 is permitted in examination.
2. Sessionals work shall include assignments/tests on the above topics.
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. L.S. Negi, Design of Steel 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 | | |
| 1514 | Building Services and Equipments-I | 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.

| | |
|--------|--|
| UNIT 1 | Sanitation-I <ul style="list-style-type: none"> • Basic principles of sanitation • Introduction to modern plumbing system. • Study of Indian standards and plumbing byelaws (NBC). • General introduction to various sanitary fitting & fixtures, their placement, functions and constructional details. • Study of internal & external drainage system including study of duct for various buildings including small residences, apartments, block of houses, public buildings etc. |
| UNIT 2 | Sanitation-II <ul style="list-style-type: none"> • Study of various types of sanitary pipes, construction of joints and laying of pipes. • Study of Traps, Inspection chambers, Manholes, Septic tanks, Soak pits, and Public sewage line. • Study of Disposal systems for domestic effluent from fitting to sewer line. • Study of low cost sanitary systems (SULABH COMPLEXES) and other CBRI details. • Study of storm water disposal at site and settlement level. |
| UNIT 3 | Sanitation-III <ul style="list-style-type: none"> • Importance of sanitary services in the economics of buildings. • Study of refuse chutes and service floors in multistoried buildings. • Planning & design for disposal of urban /rural effluent. • Various methods of collection, treatment, disposal, and recycle of urban /rural effluent including wastewater and city solid wastes. |
| UNIT 4 | Water Supply-I <ul style="list-style-type: none"> • Sources of water, types of water. • Water treatment for domestic purpose. • Quality of potable water. • Rain water harvesting system. • Recycling of water. |
| UNIT 5 | Water Supply-II <ul style="list-style-type: none"> • Study of water storage and supply network. • Calculation of water supply requirements based on Indian standards (BIS and NBC). • Architectural approach to plan the domestic water storage facilities and water distribution system in a building and settlement, along with study of fixtures, fittings, accessories, equipments and construction details thereof. |

Note:

1. Sessional will be prepared in the form of sanitation schemes, water supply schemes and design of toilets of the given building or buildings.
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. Manual of water supply & treatment, 2nd edition, CPHEEO, Ministry of works and housing, New Delhi 1977
2. AFE Wise, JA Swaffied Water, Sanitary & Waste Services in buildings – Mitchell Publishing Co. Ltd. – 2002, V Ed.
3. G.M. Fair, J.C.Geyer & D.Okin, Water and Waste water engineering Vol II, John Wiley & Sons, Inc. N Y, 1968
4. Manual on sewerage and sewerage treatment, CPHEEO – Ministry of works and housing, New Delhi, 1980
5. S.C.Rangwala, Water supply and sanitary engineering, Chartar publishing house, Anand, 1989, Lecture notes compiled by Chaman.L.Gupta
6. Renewable energy, basics and technology, supplement volume on integrated energy systems) Solar Agni systems, Sri Aurobindo Ashram, Pondicherry 605002 India

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|--------------|---|------------------|---|---|-----------------------|---------|----|-------------|----------------------|
| | | L | T | P | ESE | FE / SE | TA | | |
| 1515 | Building Bye-Laws and Codes of Practices | 2 | 1 | 0 | 70 | 30 | 30 | 130 | 3 |

| | |
|--------|--|
| UNIT 1 | <p>Introduction:</p> <ul style="list-style-type: none"> • Building bye-laws – their need and importance, advantages. • Study of building bye-laws - means of access, open spaces, parts of buildings (as per NBC). |
| UNIT 2 | <p>Building Bye-Laws-I</p> <ul style="list-style-type: none"> • Building bye-laws with respect to various plot sizes, building types and height restrictions, air funnel. • Lighting, sound and HVAC (as per NBC). • Fire fighting regulations • Parking regulations |
| UNIT 3 | <p>Building Bye-Laws-II</p> <ul style="list-style-type: none"> • Building bye-laws for special zones viz., airport, hospitals, residential, commercial, Cinema theatres, SEZ etc. • Development control and aesthetic control bye-laws, sky plane, front and rear angles. • Other building standards including state and municipal byelaws |
| UNIT 4 | <p>Development controls at settlements level.</p> <ul style="list-style-type: none"> • Eminent domain, police powers, zoning controls, etc. • Sub-division regulations. • Land development standards and municipal byelaws in various states. |
| UNIT 5 | <p>Special regulation:</p> <ul style="list-style-type: none"> • Codal provision for disaster mitigation (earthquake, urban floods, landslides etc.) • Coastal area regulations. |

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. Sessional shall be in form of exemplary assignments to be submitted as notes, and collection of cases regarding professional practice in the field.

References:

1. Architects Act 1972.
2. Publications of Handbook on Professional practice by IIA.
3. Publications of Council of Architecture-Architects (Professional conduct) Regulations 1989, Architectural Competition guidelines
4. Roshan Namavati, Professional practice, Lakhani Book Depot, Mumbai 1984.
5. J.J.Scott, Architect's Practice, Butterworth, London 1985.
6. Ar. V.S. Apte, Architectural Practice and Procedure, Padmaja Bhide, Pune, 2008.
7. Development Regulations of Second Master Plan for Chennai Metropolitan Area – 2026.
8. Chennai City Corporation Building Rules 1972.
9. Persons with Disabilities Act.
10. T.N.D.M. Buildings rules, 1972.

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| | | L | T | P | ESE | FE / SE | TA | | |
| 1516 | History of Architecture, Art and Culture- III | 2 | 1 | 0 | 70 | 30 | 50 | 150 | 3 |

| | |
|--------|--|
| UNIT 1 | Renaissance Architecture: <ul style="list-style-type: none"> • Italian • French • English • German |
| UNIT 2 | Early Islamic Architecture <ul style="list-style-type: none"> • Development of ancient Islamic Architecture (global) • Development of Islamic Architecture (Indian) pre-Mughal rule (Delhi Sultanate) |
| UNIT 3 | Indian Islamic Provincial Architecture — <ul style="list-style-type: none"> • Central India • East India • West India • South India |
| UNIT 4 | Indian Islamic Architecture during Mughal Rule <ul style="list-style-type: none"> • Pre Akbar period • Akbar –Jahangir period • Reign of Shajahan • Aurangzeb and after |
| UNIT 5 | Colonial Architecture <ul style="list-style-type: none"> • Introduction • Regional influence • Indo-saracenic style • Influence of early industrialization |

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.
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, 1986.
2. Spiro Kostof - A History of Architecture - Setting and Rituals, Oxford University Press, London, 1985.
3. Pier Luigi Nervi, General Editor - History of World Architecture - Series, Harry N.Abrams, Inc.Pub., New York, 1972.
4. S.Lloyd and H.W.Muller, History of World Architecture - Series, Faber and Faber Ltd., London, 1986.
5. Vincent Scully: Architecture; Architecture – The Natural and the Man Made: Harper Collins Pub: 1991.
6. Leland M Roth; Understanding Architecture: Its elements, history and meaning; Craftsman House; 1994

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| | | L | T | P | ESE | FE / SE | TA | | |
| 1521 | Architectural Design-V 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-V (1511) 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 | | |
| 1522 | Building Construction and Technology-V 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-V (1512) 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 | | |
| 1527 | Working Drawing - I | 0 | 0 | 5 | 30 | 0 | 50 | 80 | 3 |

The aim of this subject is to train the students to enable them to make the detailed and accurate drawings so as to be executed in construction on site.

1. Introduction to various building components and precise purpose of set of working drawings. Study of each drawing with reference to specification & schedules of various building materials.
2. Preparations of check list as guide for list of working drawings. Study of building byelaws for various construction details. Method of representing various contents & specific information in working drawings.
3. Preparation of municipal drawings and importance of working drawing as a legal document and tender document.
4. One set of working drawing of any load bearing structure along with large-scale details of any specifically designed situations.
5. List of drawings:
 - Corporation drawing
 - Center line plan
 - Excavation plan
 - Footing layout plan, footing detail
 - Beam (ground beam and plinth beam), beam detail
 - Sill level plan, schedule of openings
 - Lintel level plan
 - Slab level ,slab beam detail
 - Frame detail

Note:

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.