DEPARTMENT OF ARCHITECTURE
NATIONAL INSTITUTE OF TECHNOLOGY RAIPUR

G. E. Road, Raipur, 492010 C. G

राष्ट्रीय प्रौद्योगिकी संस्थान रायपुर,

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B.Arch Syllabus

Semester-II

1.	Department proposing the course	Architecture
2.	Course Title	**Architectural Design-II**
3.	L-T-P Structure	3-3-1
4.	Credits/# of period	6/7
5.	Course number (Code)	**ARPC1211**
6.	Status (Core/Essential/Elective)	Professional Core (PC)
7.	Pre-requisites (course no./title)	ARPC1111-Architectural Design-I
8.	Frequency of offer	Annual
9.	Course Objectives (CO): 1. To implement concepts of architectural pricnciples. 2. To understand different Architectural Philosophies through the works done by eminent Architects. 3. To understand Architectural Contextualism.	
10.	Course Syllabus: All courses learnt in this semester and in previous semester are subservient to Architectural Design-II course. The course shall initiate with an Educational Tour accompanied by 1 teacher per 20 students (approx.) for understanding various Architectural Principles, Compositions and Contextualism. The lessons learnt from educational tour shall be submitted in form of Tour Report and learning shall be implemented in further design problems. Students shall be encouraged to be critical and to look for alternate descriptions and explanations of architecture. They shall critically evaluate user, Context and combination of user and context. and develop their own perceptions through discussions and writing. There shall be at least two design problems during this course to achieve the objectives stated hereabove. This may be done through designing small built-forms emphasizing on development of forms and interaction between Form and Space. The suggestive design topics may include 2 to 3 spaces *viz.* small house, night shelter, small office, kiosk, shop, bus stop, gate, clinic, saloon, pavilion, etc. Deliverable shall be in the form of Portfolio/Sheets/Models/Reports/Multimedia Presentation, etc.	
11.	References: i. Ching, F. D. (2014). Architecture: Form, space, and order. John Wiley & Sons. ii. De Chiara, J. (2001). Time-saver standards for building types. McGraw-Hill Professional Publishing. iii. Neufert, E., Neufert, P., & Kister, J. (2012). Architects' data. John Wiley & Sons.	

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B.Arch Syllabus

Semester-II

1.	Department proposing the course	Architecture
2.	Course Title	**Perspective and Sciography**
3.	L-TS-PS Structure	2-1-1
4.	Credits/# of period	4/4
5.	Course number (Code)	**ARPC1212**
6.	Status (Core/Essential/Elective)	Professional Core (PC)
7.	Pre-requisites (course no./title)	NIL
8.	Frequency of offer	Annual
9.	Course Objectives (CO): 1. To understand the geometry behind various viewing angles and dimensions. 2. To develop better skills of graphical representations.	
10.	Course Syllabus: **Unit-1: Perspective Drawings -I** a. Introduction to basic terms, principles, types and techniques of perspective drawings for expression of ideas. b. Two-point perspective of simple geometrical objects. c. One-point perspective of simple geometrical objects. **Unit-2: Perspective Drawings –II** a. Two-point perspective of complex geometrical objects and buildings b. One-point perspective of complex geometrical objects and building interiors/ exteriors. c. Multiple point perspectives. **Unit-3: Freehand Perspective Drawings** a. Freehand perspective drawings with various techniques **Unit-4: Sciography-I** a. Introduction to basic principles of Sciography and its application on two dimensional objects in plans and elevations. b. Sciography of three-dimensional objects in plan, elevations and views. **Unit-5: Sciography-II** a. Sciography of simple building elements. b. Various methods of Sciography in 3D form of simple geometrical objects. c. Sciography in Perspective view of complex objects.	
11.	References: i. Ching, F. (1943). Architectural graphics (6th ed.). New Jersey, John Wiley and Sons, Inc. ii. Dinsmore, G. (1968). Analytical graphics. Princeton, D. Van Nostrand Co. iii. Gill, R. (1991). Basic perspective. London, Thames and Hudson. iv. Gill, R. (2006). Perspective (1st ed.). London, Thames and Hudson. v. Graphic-Sha Staff. (1987). Interiors: Perspectives in Architectural Design/Included, An Actual CG Perspective. Tokyo, Japan: Books Nippan. vi. Holmes, J. (1954). Applied perspective. London, I. Pitman. vii. Lockard, W. (1994). Drawing as a means to architecture. Menlo Park, CA, Crisp Publications. viii. Martin, C. (1971). Architectural graphics (2nd ed.). Taipei, Tan Chiang Book Company. ix. Mulik, M. (2006). Perspective. India, Jyotsna Prakashan. x. Mulik, S. (1994). Textbook of Perspective and Sciography. India, Allied Publications Pvt. Ltd. xi. Norling, E. (1998). Perspective drawing. Tustin, CA, Walter Foster Pub.	

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B.Arch Syllabus

Semester-II

1.	Department proposing the course	Architecture
2.	Course Title	**History of European Architecture**
3.	L-TS-PS Structure	3-0-0
4.	Credits/# of period	3/3
5.	Course number (Code)	**ARPC1213**
6.	Status (Core/Essential/Elective)	Professional Core (PC)
7.	Pre-requisites (course no./title)	NIL
8.	Frequency of offer	Annual
9.	Course Objectives (CO): 1. To understand the form-space relationships in early European architecture. 2. To learn impact of geographical, geological, climatic, historical, technological, social and religious factors influencing Architecture. 3. To understand the architectural characters.	
10.	Course Syllabus: **Unit-1: Greek Architecture (with special emphasis on religious architecture, public buildings, orders and visual corrections)** **Unit-2: Roman Architecture (with special emphasis on religious architecture, public buildings, and construction techniques)** **Unit-3: Christian Architecture (with special emphasis on religious architecture and construction techniques)** a. Early Christian b. Byzantine **Unit-4: Romanesque and Gothic (with special emphasis on religious architecture and construction techniques)** **Unit-5: Renaissance Architecture (with special emphasis on religious architecture)** a. Italian b. French	
11.	References: i. Burckhardt, J. (1987). The Architecture of the Italian Renaissance. Chicago, University of Chicago Press ii. Fletcher, B., & Cruickshank, D. (1996). Sir Banister Fletcher's a history of architecture. Oxford: Architectural Press. iii. Frankl, P. (2001). Gothic Architecture. Yale, The Yale University Press. iv. Kostof, S. (1985). A History of Architecture - Setting and Rituals. London, Oxford University Press. v. Robertson, D. S. (1969). Greek and Roman architecture. London, Cambridge University Press. vi. Roth, L. M. (2007). Understanding architecture: Its elements, history, and meaning. Boulder, Colo: Westview Press. vii. Yarwood, D. (1988). A Chronology of Western Architecture. Dover Publications Inc.	

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B.Arch Syllabus

Semester-II

1.	Department proposing the course	Architecture
2.	Course Title	**Building Materials and Construction Techniques-II**
3.	L-TS-PS Structure	2-1-1
4.	Credits/# of period	4/4
5.	Course number (Code)	**AREP1211**
6.	Status (Core/Essential/Elective)	Essential Program Requirement (EPR)
7.	Pre-requisites (course no./title)	AREP1111-Building Materials and Construction Techniques-I
8.	Frequency of offer	Annual
9.	Course Objectives (CO): 1. To introduce wood as a building material. 2. To create an understanding of timber joineries in various wooden components of buildings. 3. To introduce all types of wooden doors, windows, flooring, paneling, roofing, trusses, etc.	
10.	Course Syllabus: The course focuses on wood as a building material. Other associated building materials, with fixing details, required to explain the topics should be incorporated for comprehensive understanding. Emphasis should be given to on-site construction practices. **Unit 1: Introduction to Wood as building material** a. Wood – Types, Seasoning, Defects, Testing, etc. b. Components made up of wood and wood composites. **Unit 2: Wooden Doors and Windows** a. Doors – Types, Shutters, Frames and Components, Joinery details, Fitting and Fixtures, etc. b. Window – Types, Shutters, Frames and Components, Joinery details, Fittings and Fixtures, etc. c. Louvers, Ventilators, Fan-light, etc. **Unit 3: Wooden Flooring and Paneling** a. Flooring – Types, Uses, Construction Techniques and Finishes, etc. b. Wall Paneling – Types, Uses, Frame and Fixing Details, Laminates, etc. c. Jamb, Lintel, Sill Casings, etc. **Unit 4: Wooden Staircase, Railings and Posts** a. Staircase – Types, Risers, Treads, Nosing, Stringer, etc. b. Railings – Types, Newel Post, Baluster, Handrail, etc. c. Posts – Types, Uses, Components, Joinery details, Fixing details, etc. **Unit 5: Wooden Trusses and Roofs** a. Roofs – Types, Uses, Joinery details, Fixing and Finishes, Water Proofing, etc. b. Truss – Types, Uses, Joinery details, etc. c. Purlins, Gutters, Rafters, Ridge, Eve, Covering Materials (like Sheets, Tiles, Slates), etc. *Note: Deliverable shall be in form of portfolio/sheets/models/reports/multi-media presentations, etc.*	
11.	References: i. Barry, R. (1999). The Construction of Buildings Series. 5th Ed. New Delhi: East-West Press. ii. Ching, F.D.K. (2014). Building Construction Illustrated. 5th Ed. New Jersey, John Wiley and Sons. iii. Chudley, R. (2008). Building Construction Handbook. 7th Ed. London, Butterworth-Heinemann. iv. Duggal, S. K. (2017). Building materials. Routledge. v. Foster, J. and Mitchell, S. (1963). Building Construction: Elementary and Advanced, 17th Ed. London: B.T. Batsford Ltd. vi. Kumar, S. (2003). Building Construction. 19th Ed. Delhi, Standard Publishers. vii. McKay, W. B. (2005). Building Construction Metric Series, I-V. 4th Ed. Mumbai: Orient Longman. viii. Moxley, R. (1961). Mitchell's Elementary Building Construction. London, B. T. Batsford. ix. Punmia, B.C. and Jain, A. K. (2016). Building Construction. 11th Ed. New Delhi, Laxmi Publications. x. Rangwala, S. C. (2017). Engineering Materials: Material Science. 43rd Ed. Anand, Charotar Publishing House Ltd. xi. Rangwala, S. C. (2019). Building Construction 33rd Ed. Anand, Charotar Publishing House Pvt. Ltd.	

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B.Arch Syllabus

Semester-II

1.	Department proposing the course	Architecture
2.	Course Title	**Mechanics of Solids**
3.	L-TS-PS Structure	3-0-0
4.	Credits/# of period	3/3
5.	Course number (Code)	**AREP1212**
6.	Status (Core/Essential/Elective)	Essential Program Requirement (EPR)
7.	Pre-requisites (course no./title)	NIL
8.	Frequency of offer	Annual
9.	Course Objectives (CO): 1. To understand various principles of strength of materials. 2. To introduce a design process to provide a combination of component with different variety of factors. 3. To outline the relationship between the bending to the material property and geometry.	
10.	Course Syllabus: **Unit-: Introduction to Beam and its properties** a. Elasticity, Stress and Strain, Deformation of beam, Centroid and Center of Gravity, Moment of Inertia, Theorems of M.I. of Parallel and Perpendicular axes, b. Force- Causes and Effects, Force through vector, Coplanar, Concurrent, Non-concurrent forces, Triangle of forces, Parallelogram of forces and Conditions of Equilibrium, Moments, Moment of forces, Moment of couples and Static equilibrium of rigid bodies. **Unit-2: Shear Force and Bending Moment** a. Beams and support conditions - Types, Shear force and Bending moment diagram, Cantilevers, and Overhanging beams with concentrated, uniformly distributed and uniformly varying loads. b. Bending and Shearing Stresses**,** Theory of Bending, Distribution of stress in beams. **Unit-3: Deflection of Beams** a. Differential equation of the elastic curve, Double integration method, Area moment theorems. b. Applications to simply supported, cantilever and overhanging beams. c. Strain energy for axial load and bending, Castigliano's theorems and applications. **Unit-4: Trusses** a. Statically determinate plane trusses, Perfect and Imperfect frames, Deficient and Redundant frames. b. Analytical methods for finding out the forces, Method of joints and Method of sections, Deflection of Truss joints. **Unit-5: Introduction to Statically Indeterminate structures** a. Statically Indeterminate structures, Redundancy, Degree of Indeterminacy of Beams, Frames and Truss. b. Method of Consistent Deformation, Three Moment Method, Slope Deflection Method and Moment Distribution Method, Fixed end moments of beams with concentrated, uniformly distributed loads and moments.	
11.	References: i. Beer, F. P., & Johnson Jr, E. R. (1997). Vector Mechanics for Engineers, Vol. 1 Statics and Vol. 2 Dynamics.Merium and Kraig; 'Engineering Mechanic' ii. Neal, B. G. The plastic methods of structural analysis 1963. iii. Prasad, P. and King, A. I. (1974). An experimentally validated dynamic model of the spine. Journal of Applied Mechanics, 41(3), 546-550. iv. Punmia, B. C. (2004). *SMTS-II Theory of Structures*. Firewall Media. v. Rajasekaran, S. (2009). Engineering Mechanics: Statics and Dynamics. Vikas Publishing House. vi. Rajput, R. K. (2008). Strength of materials. S. Chand. vii. Ramamrutham, S., & Narayanan, R. (1999). Elements of Strength of Materials. Dhanpat Rai Publishing Company (P) Ltd. viii. Shames, I. H. (1966). Engineering mechanics: dynamics (Vol. 2). Prentice-Hall. ix. Tayal, A. K. (2009). Engineering Mechanics. Umesh Publications. x. Timoshenko, S. P. and Young, D. H.; 'Elements of Strength of Materials'; 5th edition, East West Press, 1993 Timoshenko, S.; 'Strength of Material'; Tata McGraw Hill, New Delhi. xi. Wang, C. K. and Saunders, H. (1986). Intermediate structural analysis.	

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B.Arch Syllabus

Semester-II

1.	Department proposing the course	Architecture
2.	Course Title	**Surveying and Leveling**
3.	L-TS-PS Structure	3-0-0
4.	Credits/# of period	3/3
5.	Course number (Code)	**AREP1213**
6.	Status (Core/Essential/Elective)	Essential Program Requirement (EPR)
7.	Pre-requisites (course no./title)	NIL
8.	Frequency of offer	Annual
9.	Course Objectives (CO): 1. To interpret the booking for field notes. 2. To apply the fundamental of chain and compass surveying for field survey. 3. To work out the contour surveying with the help of levelling instrument. 4. To determine the triangulation with the help of Theodolite. 5. To define and classify the various types of modern survey.	
10.	Course Syllabus: **Unit-1: Chain Surveying** a. Principles of Survey, equipment required, selection of station, methods of taking off sets. Booking the field notes, obstacles in chaining, errors in chaining, chaining on sloping ground and reciprocal ranging. b. Compass Surveying- The prismatic compass; its construction and uses. Other types of compasses. Reduced and whole circle bearing, magnetic declination, effects local attraction. Compass traverse and balancing the closing error. **Unit-2: Levelling** a. Different types of levels, their temporary and permanent adjustment levelling staff. Book of the readings and reduction of levels, errors in levelling. b. Curvature and refraction reciprocal levelling profile, levelling cross sections. c. Theodolite Surveying - Theodolite its temporary and permanent adjustment measuring of magnetic bearings, horizontal and vertical angles. Theodolite traverse and balancing the closing error. **Unit-3: Plane table Survey and Contouring** a. Equipment and methods of plane table survey. Two points and three points problems. b. Characteristics of contour lines, direct and indirect methods of contouring, interpolation of contours. **Unit-4: Introduction to modern surveying equipment** a. Total Station, GPS, Use of Distomat and Theomat, Aerial Photography, b. Digital Levels and Auto-Levels. (Preliminary information and use). c. Minor Instruments –Hand level, Abney level, Tangent Clinometer, Sextant and Pantograph. **Unit-5: Construction Surveying** a. Introduction, Equipment for setting out, Horizontal and vertical control, b. Setting out a pipe line, Setting out a building and structure (complete layout).	
11.	References: i. De Chiara, J., & Koppelman, L. (1969). Planning Design Criteria. Van Nostrand Reinhold Company. ii. Development Control Rules – CMDA. iii. Lynch, K., Lynch, K. R., & Hack, G. (1984). Site planning. MIT press. iv. Punmia, B. C., Jain, A. K., & Jain, A. K. (2005). Surveying Vol. I & II. v. Shahani, P. B., & Shahani, P. B. (1969). Advanced Surveying. Oxford and IBH. vi. Strom, S., Nathan, K., & Woland, J. (2013). Site engineering for landscape architects. John Wiley & Sons.	

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B.Arch Syllabus

Semester-II

1.	Department proposing the course	Architecture
2.	Course Title	**Model Making Workshop**
3.	L-TS-PS Structure	0-2-0
4.	Credits/# of period	1/2
5.	Course number (Code)	**AREP1221**
6.	Status (Core/Essential/Elective)	Essential Program Requirement (EPR)
7.	Pre-requisites (course no./title)	NIL
8.	Frequency of offer	Annual
9.	Course Objectives (CO): 1. To learn model making by using tools and techniques necessary to demonstrate ideas and designs in 3-Dimensional form.	
10.	Course Syllabus: Creation of a model inculcate problem solving, experimentation, innovation and implementation ability fostering individual skills, processes, techniques and creative power. The course activities focus on both exquisite craft, and rapid modeling. It facilitates tools and environment for model making techniques of varying resolution, and the appropriateness of each to mark their presence in professional practice. Assignments shall vary in focus from skill and execution to iteration and experimentation. The deliverable shall be in form of 3D-models as an output of model making exercises of the assignments given to students in other courses during the semester, like History of Architecture. The exercises shall incorporate use of different tools, techniques and materials to prepare 3D models.	
11.	References: i. Beech, R. (1995). Discover Origami: 40 original projects to build your paper crafting skills. Hamlyn. ii. Kato, D. (2006). The Art of Polymer Clay: Designs and Techniques for Creating Jewelry, Pottery, and Decorative Artwork. Clarkson Potter. iii. McCreight, T., & Bsullak, N. (2001). Color on Metal: 50 Artists Share Insights and Techniques. Guild. iv. Stanyer, P. (2003). The Complete Book of Drawing Techniques: A Professional Guide for the Artist. Arcturus.	

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B.Arch Syllabus

Semester-II

1.	Department proposing the course	Architecture
2.	Course Title	**Vernacular Architecture**
3.	L-TS-PS Structure	0-2-0
4.	Credits/# of period	1/2
5.	Course number (Code)	**AREP1222**
6.	Status (Core/Essential/Elective)	Essential Program Requirement (EPR)
7.	Pre-requisites (course no./title)	NIL
8.	Frequency of offer	Annual
9.	Course Objectives (CO): 1. To know all dimensions of architectural practice to build judiciously and be able to practice in a more cost effective, ecologically sensible and culturally relevant way. 2. To identify and learn the different materials and techniques of construction in Vernacular Practices	
10.	Course Syllabus: The objective may be achieved through measure drawings and documentations of various case studies. **Unit-1: Introduction of Vernacular Architecture** a. Definition and characteristics of Vernacular Architecture. b. Differentiating Vernacular Architecture from Traditional Architecture. c. Scope of Vernacular Architecture. d. Evolution of Vernacular Architecture Theories. **Unit-2: Factors Influencing Vernacular Architecture** a. Need, benefits and importance b. Vernacular and Environment c. Physical, social, climatic, etc. factors influencing, **Unit-3: International case studies** a. Settlement Pattern, Built form and Symbolism b. Typical features, materials and techniques c. Impacts of social, physical, technological and environmental factors. **Unit-4: Indian case studies** a. Settlement Pattern, Built form and Symbolism b. Typical features, materials and techniques c. Impacts of social, physical, technological and environmental factors. **Unit-5: Implementation of Vernacular Architecture** a. Vernacular Architecture in contemporary practices. b. Works of various architects, etc.	
11.	References: i. Brunskill, R. W. (2000). Vernacular Architecture: An Illustrated Handbook. London, Faber. ii. Koenigshberger, O. H., Ingersoll, T., Mayhew, A., & Szokolay, S. V. (2010). Manual of tropical housing and building: Climatic design. Hyderabad, India: Universities Press. iii. Oliver, P. (1998). Encyclopedia of Vernacular Architecture of the World. Cambridge, Cambridge Univ. Press. iv. Rudofsky, B. (1987). Architecture without architects: a short introduction to non-pedigreed architecture. UNM Press. v. Thapar, B. (2012). Introduction to Indian Architecture. Tuttle Publishing. vi. Tipnis, A. (2012). Vernacular traditions: Contemporary architecture. The Energy and Resources Institute (TERI).	