

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI

SCHEME OF TEACHING AND EXAMINATION OF I SEM B.ARCHITECTURE (CBCS SCHEME-2018)

S N	Subject Code	Subject Category	Title of the Subject	Teaching Scheme in Periods per Week (60 Mins)					Scheme of Examination						
				Lecture	Studio		Pract/ Tutorial/ Seminars	Total	Prog. /CIE Marks	Dur. of Exam [Hrs]	Theory Marks	Term work Marks	Viva Marks	Total	Credits
					Core	Applied									
1	18ARC11	PC	Architectural Design-I	-	3	5	-	8	150	-	-	-	150	300	9
2	18ARC12	BS&AE	Materials and Methods in Building Construction-I	1	2	2	-	5	75	-	-	-	75	150	5
3	18ARC13	PC	Architectural Graphics-I	1	-	3	-	4	75	-	-	75	-	150	4
4	18ARC14	PC	History of Architecture - I	3	-	-	-	3	50	3	100	-	-	150	3
5	18ENG15	BS&AE	Building Structures-I	1	-	-	2	3	50	3	100	-	-	150	2
6	18ART16	PC	Basic Design & Visual Arts	-	1	3	-	4	100	-	-	-	-	100	3
7	18ARC17	PC	Model Making workshop	-	-	-	3	3	50	-	-	-	-	50	2
8	18HUM18	SEC	Communication Skills	-	-	-	2	2	50	-	-	-	-	50	1
			Total	6	6	13	7	32	600	-	200	75	225	1100	29
ARC= Architectural Subjects ART= Art Subjects ENG = Engineering Subjects HUM = Humanities Subjects.															
No. of Subjects/Heads = 08 No. of Theory Examinations = 02															
Progressive Marks to be awarded by the subject teacher. Term work & Viva Voce examination shall be conducted jointly by one internal & one external examiner appointed by the University.															
Minimum Marks for passing: Progressive Marks 55%, Theory marks, Term work marks and Viva marks 40% in each															
Subject Categories: PC: Professional Core Courses BS&AE: Building Sciences & Applied Engineering Courses PE: Professional Elective Courses PAEC: Professional Ability Enhancement Courses SEC: Skill Enhancement Courses OE: Open Elective Courses															

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI

SCHEME OF TEACHING AND EXAMINATION OF II SEM B.ARCHITECTURE (CBCS SCHEME-2018)

S N	Subject Code	Subject Category	Title of the Subject	Teaching Scheme in Periods per Week (60 Mins)					SEE Marks						
				Lecture	Studio		Pract/ Tutorial/ Seminars	Total	Prog. /CIE Marks	Dur. of Exam [Hrs]	Theory Marks	Term work Marks	Viva Marks	Total	Credits
					Core	Applied									
1	18ARC21	PC	Architectural Design- II	-	3	5	-	8	150	-	-	-	150	300	9
2	18ARC22	BS&AE	Materials and Methods in Building Construction-II	1	2	2	-	5	50	4	100	-	-	150	5
3	18ARC23	PC	Architectural Graphics-II	1	-	3	-	4	75	-	-	75	-	150	4
4	18ARC24	PC	History of Architecture-II	3	-	-	-	3	50	3	100	-	-	150	3
5	18ENG25	BS&AE	Building Structures-II	1	-	-	2	3	50	3	100	-	-	150	2
6	18ART26	PC	Basic Design and Art Appreciation	1	-	3	-	4	100	-	-	-	-	100	3
7	18ENG27	BS&AE	Site Surveying and Analysis	1	-	-	2	3	50	3	100	-	-	150	2
8	18HUM28	SEC	Kannada Bhashe - Aadalitha Matthu Vyavahara	-	-	-	2	2	50	-	-	-	-	50	1
			Total	8	5	13	6	32	575	-	400	75	150	1200	29

ARC= Architectural Subjects ART= Art Subjects ENG = Engineering Subjects HUM = Humanities Subjects.

No. of Subjects/Heads = 08 No. of Theory Examinations = 04

Progressive Marks to be awarded by the subject teacher.

Term work & Viva Voce examination shall be conducted jointly by one internal & one external examiner appointed by the University.

Minimum Marks for passing: Progressive Marks 55%, Theory marks, Term work marks and Viva marks 40% in each

Subject Categories: PC: Professional Core Courses

PAEC: Professional Ability Enhancement Courses

BS&AE: Building Sciences & Applied Engineering Courses

SEC: Skill Enhancement Courses

PE: Professional Elective Courses

OE: Open Elective Courses

18ARC11 – ARCHITECTURAL DESIGN -I

CONTACT PERIODS : 8 (Studio) per week

PROGRESSIVE MARKS : 150

VIVA MARKS : 150

OBJECTIVES:

Beginning Design - To develop the ability to generate solutions to spatial constructs, which integrate principles of design with functional requirements.

PREAMBLE:

We inhabit and function in space, both the manmade and the natural i.e., “a life spent within an enclosure”. These enclosures have functional and cultural meanings, are symbols of abstract ideas of that period in time.

"Architecture is the art we all encounter most often, most intimately, yet precisely because it is functional and necessary to life, it's hard to be clear about where the "art" in a building begins." - Jonathan Jones

"Architecture is a discipline directly engaged with shaping enclosure, of erecting and toppling barriers or—more explicitly—of extending and limiting 'freedoms'." - E. Sean Bailey & Erandi de Silva

OUTLINE:

1. Introduction to Architecture:

- What architectural education entails?
- What being an architect involves?
- Understanding of Architecture's connection with other disciplines of knowledge: Science & Technology, Mathematics, Philosophy, Religion, Sociology, Psychology, etc.

Method of learning: Observation & Study

- Documentation of local stories on architecture, important local buildings and other favourite buildings or places.
- Observing and documenting the built environment around and experiencing enclosures (field trips) to learn basics of architectural representation.

2. Introduction to Principles of Design:

- Elements of form from abstract concepts like point, line, plane, mass and / or volume, 2D forms - circle, square and triangle, 3D forms – cube, sphere and pyramid, therefore , development of more complex forms by the method of addition and / or subtraction.
- Concepts of volume and scale, width to height ratio.
- Concepts of composition like rhythm, contrast, balance and symmetry.

Method of learning: Observation & Study

- Study models and sketches to explore the design principles.
- Drawings of study models - plans and sections (suitable scale).

3. Introduction to Anthropometry:

- Understanding the relationship between function and spatial requirements with respect to the human body and its postures.
- Minimum and optimum areas for mono functions.
- User's data, movement and circulation diagrams.

Method of learning: Observation & Study

- Drawings of the human body in various postures with required measurements.
- Drawing exercise of artefacts, eg. - a table (object) with the human body - contextual.
- Measured drawing exercise of spaces – to get a grip of the functional and spatial aspects of the space, eg. - a classroom (mono functional) and a staircase (static/transitional), pavilions & open/ enclosed spaces (multi-functional).

4. Introduction to Design process –

- Understanding the relationship between idea, context, space (form & structure), and functional requirements.
- Introduction to the various methods of idea / concept generation - use of form, patterns in nature and in geometry, music, text, and other allied fields.
- Space planning based on activity, which will involve the entire body, and its movement in space.

Method of learning: Observation & Study

- Understanding the difference and similarity while design of a non-enclosed space, a semi-enclosed space, an enclosed space.
- Study of patterns and use the pattern, both physical and material patterns as well as patterns of transformation and Integration. Appreciation of the difference between architecture and the chosen pattern.
- Design of functional furniture layout with requisite circulation, lighting and ventilation for a specific function.
- Design of Spaces such as pavilion, gazebo, kiosk, bus stop, stage, living/dining, bedrooms, Architect's office, Doctor's clinic etc.
- Submission will include Idea generation, Study models, Sketches and drawings to achieve the desired results.

NOTE:

- Discussions, presentations, and case studies will cover all the topics.
- The portfolio covering all the assignments shall be presented for term work.

Learning outcome:

The student will get an introduction into the field of Architectural Design viz. a viz. the duality & the tension that exists between the form and function of a space.

REFERENCES:

1. Alain de Botton, " How Proust Can Change your life", Picador, 1997.
2. Alain de Botton, " The Architecture of Happiness", Sep. 2006, Vintage Books.
3. Alan Fletcher, " The art of looking sideways", Phaidon Press, 2001
and Partis", Van Nostrand Reinhold, 1985
4. Anthony Di Mari and Nora Yoo, " Operative Design: A Catalogue of Spatial Verbs", 2012, BIS Publishers.
5. Anthony Di Mari, " Conditional Design: An Introduction to Elemental Architecture", 2014, 1st Edition, Thames & Hudson.
6. Bruno Munari, "Design as Art", Penguin UK, 25-Sep-2008
7. Charles George Ramsey and Harold Sleeper, " Architectural Graphic Standards", 1992, Wiley
8. Christopher Alexander, "Notes on the Synthesis of Form", 1964, Harvard University Press.
9. Debkumar Chakrabarti, " Indian Anthropometric Dimensions For Ergonomic Design Practice", 1997,

10. François Blanciak, " Siteless: 1001 Building Forms", 2008, MIT Press
11. Frank Ching, James F. Eckler, "Introduction to Architecture", 2012, John Wiley & Sons, US
12. Frank D.K. Ching, " Architecture: Form, Space, and Order", 4th Edition, Sep. 2014, John Wiley & Sons
13. Herman Hertzberger, "Lessons for Students in Architecture", 2005, 010 Publishers
14. Italo Calvino, " Invisible Cities", Harcourt Brace Jovanovich (May 3, 1978)
15. John Berger, " Way of Seeing", 1972, Penguin, UK
16. John Hancock Callender, " Time-Saver Standards for Architectural Design Data", 1982, McGraw-Hill
17. Michael Pause and Roger H. Clark, " Precedents in Architecture: Analytic Diagrams, Formative Ideas, National Institute of Design.
18. Paul Jacques Grillo, " Form, Function and Design", 1975 , Dover Publications, New York
19. Paul Jacques Grillo, " What is Design ?", 1960, P. Theobald
20. Paul Lewis, Marc Tsurumaki, David J. Lewis, "Manual of Section", Princeton Architectural Press, 2016
21. Peter H. Reynolds, " The Dot", 2013, Candlewick Press
22. Philip Jodidio, "Tree houses. Fairy tale castles in the air", 2012, Taschen
23. Robert W. Gill, "Rendering with Pen and Ink", Van Nostrand Reinhold (1 June 1984)
24. Tom Alphin, "The LEGO Architect", 2015, No Starch Press

18ARC12: MATERIALS AND METHODS IN BUILDING CONSTRUCTION-I

CONTACT PERIODS: 5 (1 Lecture +4 Studio) per week

VIVA MARKS: 75

PROGRESSIVE MARKS :75

OBJECTIVE: *Introduction to building components, wall construction in masonry , foundations in masonry, wooden doors and windows, use of timber for construction.*

OUTLINE:

MODULE 1

1. Overview of simple masonry building, its various components and materials used for construction.
2. Various conventions used for drawing plan, section and elevation.
3. Brick: Types, properties, uses and manufacturing methods.
4. Brick Walls: Types of brick walls and bonds, mortar types, plasters, buttresses, arches and lintels.

MODULE 2

5. Stone: Types, properties, quarrying and finishing.
6. Stone Walls: Bonds, arches and lintels.

MODULE 3

7. CMU: Hollow and solid concrete Blocks: Manufacture, uses and properties, CMU Wall construction and detailing.
8. Alternative materials for Wall construction: Clay Blocks, Fly Ash Blocks, Aerated Concrete Blocks, Stabilized Mud Blocks and Glass Blocks: Manufacture, uses and properties, wall construction and detailing.

MODULE 4

9. Masonry Foundation: Simple load bearing foundations in brick and stone.
10. Wood: Natural, hard and soft wood; quality, properties; joints in wood. Timber: Quality of Timber used in buildings, defects, seasoning and preservation.

MODULE 5

11. Wooden doors: Types of wooden Doors - battened, ledged, braced, panelled, flush and glazed doors; details of joinery.
12. Wooden windows: Types of wooden glazed windows; details of joinery.

Note:

- **Minimum of one plate on each topic. Study of building materials may be compiled in the form of portfolio.**
- **Site visits to be arranged by studio teacher. Construction plates and portfolio of material shall be assessed for progressive marks.**

Learning Outcome: The students would be able to understand the use of brick, stone and timber in construction of basic components of buildings viz. walls, foundations, doors & windows.

REFERENCES:

- 1) Francis K Ching 'Building construction', Wiley; 5 edition (February 17, 2014)
- 2) R. Barry, "Construction of Buildings" Vol 1., 1999 by Wiley-Blackwell
- 3) Roy Chudley, "Construction Technology", 3rd Edition, Longman, 1999
- 4) W.B. McKay, "Building Construction", Donhead, 2005

18ARC13: ARCHITECTURAL GRAPHICS-I

CONTACT PERIODS: 4 (1 Lecture + 3 Studio) per week

TERM WORK MARKS: 75

PROGRESSIVE MARKS : 75

OBJECTIVE: *To introduce students to the various concepts and techniques of architectural and graphic presentations. Train the students to work on drawing methods both in freehand and with instruments.*

OUTLINE:

1. **Introduction to Graphic Representations:** Basic principles and methods of drawing, methods of using instruments, and sign conventions.
 - Exercises in line - weightage and its application
 - Exercises in free-hand drawing.
2. **Exercises of Practice in Lettering:** Lettering used in architectural drawings, including different fonts.
3. **Introduction to Euclidian Geometry:** Exercises in lines and angles. Basic geometrical constructions, construction of triangles, quadrilaterals and regular polygons. Introduction to the development of simple surfaces of basic geometrical shapes and their applications.
4. **Arches:** Typical arch shapes and their construction methods.
5. Introduction to plane curves such as ellipse, parabola, hyperbola and ovals and their construction methods.
6. Introduction to reduced scales and its application to architectural drawings.
7. **Introduction to orthographic projection (First - angle projection):** Principles of orthographic projection, projections of points, lines and planes in different positions.
8. Orthographic Projection of Solids, architectural elements and built forms.
9. **3D Projections-I:** Isometric and Axonometric views of solids and architectural elements.
10. **3D Projections-II:** Isometric and Axonometric views of built forms.

Note: A consolidated portfolio containing exercises related to each of the above topics are to be submitted for term work examination.

Learning outcome: At the end of the semester, the students will be equipped with graphical skills which shall be useful in translating the graphical ideas into technically appropriate drawing presentations.

REFERENCES:

- 1) Francis D.K.Ching, "Architectural Graphics", Van Nostrand Reinhold Co., 1985
- 2) I.H.Morris, " Geometrical Drawing for Art Students", Longmans (1902)
- 3) Shankar Malik, " Perspective & Sciography", 1994, Allied Publisher

18ARC14: HISTORY OF ARCHITECTURE - I

CONTACT PERIODS: 3 (Lecture) per week

THEORY MARKS: 100

PROGRESSIVE MARKS : 50

DURATION OF EXAM : 3 HRS

OBJECTIVE: *To appreciate the culture and architecture of first societies and early civilizations. (The scope limited from Prehistory, Stone Age to civilizations across continents, early Iron Age); to develop critical reading, discussion and representation skills for architectural history.*

MODULE 1

1. **Introduction** meaning, methods and significance of History and Architecture's connection with History.
2. **Introduction to Pre-Historic Civilization (early cultures):** Primitive man - shelters, settlements, ritual centers (religious and burial systems) E.g.: Oval hut, Nice; settlement at Çatalhöyük; Megalithic architecture (Dolmen tomb, gallery grave, passage grave); Henge Monuments, Stonehenge.

MODULE 2

3. **Introduction to river valley cultures:** generic forces shaping settlements and habitats.
4. **Introduction to Desert and Mountainous Cultures:** Forces shaping settlements and habitats (environmental and cultural influences)
E.g.: include First civilization of Americas, Andes, Mayans, early societies/ cultures in the Sahara, Thar, North America.
5. **Introduction to Tribal Cultures:** Forces shaping settlements and habitats
E.g.:include Indigenous Peoples across the globe (environmental, cultural influences on settlements).

MODULE 3

6. **Indus Valley Civilization (Indus and Ghaggar Hakra):** Forces shaping settlements and habitats, E.g.: Mehrgarh, Layout of Mohenjo-Daro, dwellings and monumental architecture (House plan, Community well, Great Bath, Granary)
7. **Mesopotamia (Tigris and Euphrates):** Forces shaping settlements and habitats
E.g.: Ziggurats at Warka, Ur and Tchoga Zanbil, Palace of Sargon.
8. **Egyptian Civilization (Nile):** Forces shaping settlements and habitats (funerary and sacred spaces), E.g.: Mastabas, Pyramid complex, Temple of Khons, Karnak.

MODULE 4

9. **Chinese Civilization (Yellow and Yangtze):** Forces shaping settlements and habitats.
E.g.: Niheliang Ritual Center and dwellings at Banpo, Shang dynasty (Layout of Zhengzhou, Palace and Tomb at Yin), Zhou dynasty (ritual complex and Wangcheng Plan).
10. **Japanese Civilization:** Forces shaping settlements and habitats.
E.g.: Jōmon and Yayoi Period (dwellings), Kofun Period (burial mounds/ tumulus)

MODULE 5

11. **Introduction to Pre-Classical Civilization:** Mycenaean, Etruscan, Persian (Achaemenid)
E.g.: Lion Gate and Treasury of Atreus, Mycenae; Palace of Tiryns (megaron), Etruscan Temples (Juno Sospita, Lanuvium), Tomb of Cyrus, Pasargadae, Palace of Persepolis.
12. **Introduction to Pre-Classical Architecture (Indian sub-continent):** Aryan and early Mauryan
E.g.: Vedic village, Vedic Town and city planning principles (mandalas), Palace at Pataliputra.

NOTE: Progressive marks to include Submission of a portfolio of sketches, Assignments and study models

Learning Outcome: At the end of the course the students will be able to appreciate geographical, geological, social, cultural and political factors that influenced the early society and its architecture. They will also understand the use of materials and structural/construction systems explored during that era.

REFERENCES:

1. Francis D K Ching, Mark M. Jarzombek, Vikramaditya Prakash, "A Global History of Architecture" by Wiley and Sons, 2011.
2. Percy Brown, "Indian Architecture Buddhist and Hindu", Read Books, 2010.
3. Sir Banister Fletcher; edited by Dan Cruickshank, "History of Architecture", CBS Publishers and Distributors, 2003
4. Satish Grover, "Buddhist and Hindu Architecture in India", CBS Publishers and Distributors, 2003

18ENG15: BUILDING STRUCTURES-I

CONTACT PERIODS: 3 (1 Lecture + 2 Pract./Tutorial/Seminars) per week

THEORY MARKS: 100

PROGRESSIVE MARKS : 50

DURATION OF EXAM : 3 HRS

OBJECTIVE: *Introduction to principles of mechanics, structural material & different force system & on structural properties.*

OUTLINE:

MODULE 1

1. Different construction materials with emphasis on structural properties viz. steel , concrete, wood, glass, aluminium. Different types of loads, the structure is being subjected to as per IS 875 Part I & II.

MODULE 2

2. Mechanics - Classification of mechanics, force, characteristics of force, classification of force system, Resultant of force, Composition of force, Axioms in mechanics, Principles of transmissibility, Moment of force, Resultant of coplanar concurrent force system, and Free body diagrams.

MODULE 3

3. Resultant of coplanar noncurrent force system, couple & characteristics of couple, different types of loads, different types of beams, statically determinate & statically indeterminate, different types of supports, problems on support reactions, Equilibrium of Co-planar Concurrent and Non-Concurrent forces.

Note: In the numerical pertaining to support reactions, loading on the beam shall be restricted to only **point load & uniformly distributed load**].

MODULE 4

4. Center of gravity, centroid, to locate the centroid of composite section from the 1st principles. Moment of inertia, radius of gyration, parallel axis theorem, perpendicular axis theorem. Numericals on determination of moment of inertia of composite section about any defined axis.

Note: In the question paper restrict the question to the numericals **and not on the derivation of the formula.**

MODULE 5

5. Truss - Triangulation concept, different types of trusses, assumption made in the analysis of truss. Analysis of the truss by the **"Method of Joints" (Simple problems)** to calculate the dead weight of the truss from given data.

Learning outcome: At the end of the course the students will have the ability to understand the mechanics of forces acting on rigid bodies and the structural properties.

REFERENCES:

- 1) R.K.Bansal, " A Textbook of Engineering Mechanics", Laxmi Publications, 2008
- 2) S.S. Bhavikatti, " Engineering Mechanics", New Age International, 1994.
- 3) S. Ramamrutham, " Engineering Mechanics ", Dhanpat Rai Publishing, New Delhi, 2016.

18ART16: BASIC DESIGN & VISUAL ARTS

CONTACT PERIODS: 4 (Studio) per week
PROGRESSIVE MARKS : 100

OBJECTIVE: *To encourage a critical orientation to design thinking and action.*

- 1) **Composition** : Elements of Design & Principles of Design.
- 2) **Observation & Study 1:** Selection of two outdoor objects/systems and observation of their natural occurrence, relationships with context, form & structure, colors & textures, and function
Sketching & visual representation in various media.
- 3) **Observation & Study 2:** Selection of two indoor objects/systems and observation of their situation, relationships with context, form & structure, colors & textures, and functions.
Sketching & visual representation in various media.
3 dimensional modeling in appropriate medium
(Clay/paper/wire/plaster/wax etc.).
- 4) **Additive and Subtractive of Forms**
- 5) **Material Study-1:** Selection of two materials used in everyday life (textiles, Earthenware, terracotta, metals, stone, plastic, glass etc.) Study of properties, Strength, examples of use.
- 6) **Freehand sketching:** Objects and surroundings.
- 7) Exercises of freehand pencil drawings, sketches of objects, solids, furniture, architectural elements and built forms.
- 8) Exercises of rendering techniques using pencil and pen of objects, built forms showing light, shade, shadow and textures.
- 9) **Material Study-2:** Sketching & visual representation of material in various media, like Paper, clay, plaster, wood, wire, wax, photography.
- 10) **Material Study-3:** Hands-on making of object/joint/structure of own choice with one of the materials studied.

Learning Outcome: At the end of the course the students would have understanding of various principles of design. They would be able to appreciate the scope and limitations of using different materials for creating different forms and shapes.

REFERENCES:

- 1) Donald Norman , 'Design of Everyday Things" , Basic Books; 2 edition (5 November 2013)
- 2) John Berger , 'Ways of Seeing' 1972, Penguin, UK
- 3) Maitland Graves , 'The Art of Color and Design' , McGraw-Hill, 1951
- 4) Robert Gill, "Rendering with Pen and Ink" , Thames & Hudson; Revised, Enlarged edition (2 April 1984)

18ARC17: MODEL MAKING WORKSHOP

CONTACT PERIODS: 3 (Pract./Tutorial/Seminars) per week
PROGRESSIVE MARKS : 50

OBJECTIVE: *To train the students to experiment and manipulate materials leading to creative exploration of forms.*

OUTLINE:

1. Generation of basic forms-cube, cone, dome and arch.
2. Generating of organic and geometrical forms/objects.
3. Generation of forms &Material exploration: hands on skill by using wood, bamboo, metal wire, thread, balsa wood, clothe, paper board etc.
4. Composite forms: Experimental form generation by combining various materials and shapes. (rods, pipes, slabs,etc.)
5. Free Forms: Tensile structures, Funicular Shells using wood, fabric, plastic etc.
6. Architectural forms: making of windows, wall doors, roofs, trees, shrubs, roads, vehicles etc.
7. Introduction to digital modeling like 3D printing and laser cutting.

Note: Student may be encouraged to use environment friendly materials.

Learning Outcome: At the end of the course the students would be able to use variety of materials to construct architectural models and different geometrical forms.

REFERENCES:

1. Arjan Karssen & Bernard Otte, "Model Making: Conceive, Create and Convince", Frame Publishers (November 11, 2014)
2. David Neat , "Model-Making: Materials and Methods", CroWood Press, 2008
3. Jocqui Atkin, "250 tips, techniques, and trade secrets for potters", Barron's Educational Series, 2009
4. Matt Driscoll, "Model Making for Architects", The Crowood Press Ltd, 2013
5. Megan Werner," Model making", Princeton Archit.Press,2010
6. Nick Dunn, "Architectural Model Making", Laurence King Publishing, 2014
7. Roark T. Congdon, "Architectural Model Building", Fairchild Books; 1 edition, 2010

18HUM18: COMMUNICATION SKILLS

CONTACT PERIODS: 2 (Pract./Tutorial/Seminars) per week

PROGRESSIVE MARKS : 50

OBJECTIVE: *To develop skills in effective communication – both written and verbal and to explore the potential of media technology and the Internet to enhance communication.*

OUTLINE:

1. **Introduction:** Introduction to course objective and framework of assignments and assessment. Discussion on exploratory topics.
2. **Reading and listening comprehension:** Reading of a passage from famous books (e.g. Samskara). Students to draw an image on A4 paper based on the read passage.
3. **Listening Comprehension:** Comprehension of lectures and speeches to locate key points.
4. **Verbal presentations:** Understanding the differences among seminars, conferences, convention, congress, debates, extempore speeches, panel discussions etc. Students to make brief oral and visual presentations on selected topics. Importance of gesture , posture and expressions in verbal presentations.
5. **Analytical / Technical Writing:** To develop the ability to write concisely and correctly and present ideas in a logical manner.
6. **Introduction and discussion on exploratory topic for a survey questionnaire:** Need to document infrastructure (or lack of) on college campus and students to prepare a fifteen point questionnaire with info- graphics and conduct survey.
7. **Interpretation of materials:** such as questionnaires, application forms, analysis of materials such as texts, reports, technical literature.
8. **Notes taking:** From spoken and written English.
9. **Formal / Informal Communication:** Understanding the difference between formal and informal letters etc. Students to Write /draw a letter to fellow architects, clients, public authorities, contractors, enquiries to industries, dealers.
10. **Article writing:** on a Design or a Building, Introduction to Design Basis Report.
11. **Writing a term paper and book review:** An article or paper on a chosen topic. Writing of a review on a chosen book on art or architecture.
12. **Using the Internet to enhance communication**

Learning outcome: The course would enable the students to communicate effectively using verbal, visual and electronic modes and media.

REFERENCES:

- 1) A K Jain, A M Sheikh & Pravin S R Bhatia, " Professional Communication Skills", S. Chand Publishing, 2001
- 2) Jones Leo , "Working in English: Teachers Book", Cambridge University Press, 2001.
- 3) Marsha J. Ludden, "Effective Communication Skills", Jist Works; 2 edition, 2001
- 4) Mudambadithaya G.S , "Communicative English for Professional Courses", Sapna Book House, 2002.
- 5) Taylor, Grant , "English Conversation Practice", McGraw Hill Education; 1 edition, 2001.

18ARC21 – ARCHITECTURAL DESIGN -II

CONTACT PERIODS : 8 (Studio) per week

PROGRESSIVE MARKS : 150

VIVA MARKS : 150

OBJECTIVE: *Beginning Design contd. - To develop the ability to generate solutions to spatial constructs, i.e., space and form which integrate principles of design with functional requirements by emphasising the study of variables like light, movement, transformation, scale, structure & skin., physical constraints and cultural context, either urban or rural.*

PREAMBLE:

We inhabit and function in space, both the manmade and the natural i.e., “a life spent within an enclosure”. These enclosures have functional and cultural meanings, are symbols of abstract ideas of that period in time.

“Architecture is about giving form to the places where people live. It is not more complicated than that but also not simpler than that.” - Alejandro Aravena

“Architecture is both an art and a practical pursuit, and the profession has always been divided between those who emphasize the art, that is pure design, and those who give priority to the practical.” - Paul Goldberger

“Architecture is used by political leaders to seduce, to impress, and to intimidate.” - Deyan Sudjic

OUTLINE:

1. To relearn the “principles of Design” and anthropometric requirements of space planning,

Method of learning: Observation & Study

- Study of the relationship between human body and the built environment understanding usage and comfort

2. Introduction to “Nature of Space”:

- Understanding the notions of PLACE: A “boundary”, a “center” and a “spirit”, PATH: A “way” and a “goal”, DOMAIN: A conglomeration of paths and goals that forms a “whole” with its own “identity”,
- Understanding the notions of “Enclosure, Ambiguity, and Transparency”, “Spatial Context - open, closed, transition spaces”, “cultural context – inclusion, exclusion, spatial segregation”,

Method of learning: Observation & Study

- Mapping of one’s journey from home to studio/of the campus/of a Neighbourhood. Explore issues of movement, navigation, circulation, direction and discovery. Explore issues of representation, scale, starting point, orientation, landmarks, and imagery.
- Culture & Design: Understanding social attitudes to Built-form: extroverted/introverted, formal/informal, typical/individual, simple/labyrinthine, contiguous/isolated etc.

3. Introduction to “Poetics of Space” :

- light, movement, transformation, scale, structure and skin,

- key tools for learning : text / language as a tool; emotion, cultural, climatic, eg.- contemplative / severe / dramatic / minimalist / natural / organic / contemporary / traditional / etc.,

Method of learning: Observation & Study

- Presentation of case studies based on literature survey & field visit.
- Study models, Sketches and Drawings of study models - plans and sections (suitable scale) using a mono functional space.

4. Understanding the role of Physical Context - terrain, materials, structure, etc.,

Method of learning: Observation & Study

- Hands-on Design exercise – creation of a simple design in which form is distinct from structure and creation of a simple design in which form is integral with structure.
- Presentation of case studies based on literature survey & field visit.
- Study models, Sketches and Drawings of study models - plans and sections (suitable scale) using a mono functional space.

5. Design process to test the learning of the semester using a multifunctional program to incorporate “nature of space”, “poetics of space” and “physical constraints”,

- Generation of a design brief for a multifunctional program, generation of areas based on human activity and anthropometric data,
- Selection a of suitable site,
- Idea generation, design development, & design drawings,
- Eg. - A House for self, Guest House, Farm house, Villa, Container house, Courtyard house, Tree house, etc.

Method of learning: Observation & Study

- Presentation of *case studies based on literature survey & field visit*,
- Submission will include Idea generation, Study models, Sketches to achieve the desired result, development drawings and a set of plans, sections and elevations & model to suitable scale.

NOTE:

- Discussions, presentations, and case studies will cover all the topics.
- The portfolio covering all the assignments shall be presented for term work.

Learning outcome:

The student will be equipped to understand the requirements of a multifunctional programs with respect to aspects of locating the design program on site viz a vie light, movement, etc.. The student will also be equipped to understand how to start a settlement study.

REFERENCES:

1. Alain de Botton, " How Proust Can Change your life", Picador, 1997.
2. Alain de Botton, " The Architecture of Happiness", Sep. 2006, Vintage Books.
3. Alan Fletcher, " The art of looking sideways", Phaidon Press, 2001
4. Anthony Di Mari and Nora Yoo, " Operative Design: A Catalogue of Spatial Verbs", 2012, BIS Publishers.
5. Anthony Di Mari, " Conditional Design: An Introduction to Elemental Architecture", 2014, 1st Edition, Thames & Hudson.
6. Bruno Munari, "Design as Art", Penguin UK, 25-Sep-2008

7. Charles George Ramsey and Harold Sleeper, " Architectural Graphic Standards", 1992, Wiley
8. Christopher Alexander, "Notes on the Synthesis of Form", 1964, Harvard University Press.
9. Debkumar Chakrabarti, " Indian Anthropometric Dimensions For Ergonomic Design Practice", 1997, National Institute of Design.
10. François Blanciak, " Siteless: 1001 Building Forms", 2008, MIT Press
11. Frank Ching, James F. Eckler, "Introduction to Architecture", 2012, John Wiley & Sons, US
12. Frank D.K. Ching, " Architecture: Form, Space, and Order", 4th Edition, Sep. 2014, John Wiley & Sons
13. Herman Hertzberger, "Lessons for Students in Architecture", 2005, 010 Publishers
14. Italo Calvino, " Invisible Cities", Harcourt Brace Jovanovich (May 3, 1978)
15. John Berger, " Way of Seeing", 1972, Penguin, UK
16. John Hancock Callender, " Time-Saver Standards for Architectural Design Data", 1982, McGraw-Hill
17. Michael Pause and Roger H. Clark, " Precedents in Architecture: Analytic Diagrams, Formative Ideas, and Partis", Van Nostrand Reinhold, 1985
18. Paul Jacques Grillo, " Form, Function and Design", 1975 , Dover Publications, New York
19. Paul Jacques Grillo, " What is Design ?", 1960, P. Theobald
20. Paul Lewis, Marc Tsurumaki, David J. Lewis, "Manual of Section", Princeton Architectural Press, 2016
21. Peter H. Reynolds, " The Dot", 2013, Candlewick Press
22. Philip Jodidio, "Tree houses. Fairy tale castles in the air", 2012, Taschen
23. Robert W. Gill, "Rendering with Pen and Ink", Van Nostrand Reinhold (1 June 1984)
24. Tom Alphin, "The LEGO Architect", 2015, No Starch Press

18ARC22: MATERIALS AND METHODS IN BUILDING CONSTRUCTION-II

CONTACT PERIODS: 5 (1 Lecture +4 Studio) per week

THEORY MARKS: 100

PROGRESSIVE MARKS : 50

DURATION OF EXAM : 4 HRS

OBJECTIVE: *To understand Roofing systems using Timber, Steel Truss and Concrete. Cement, Steel and Reinforced Concrete.*

OUTLINE:

MODULE 1

- 1) Timber Roof – Lean to roof, Collared Roof, King post roof, Queen Post Roof; details of joinery.
- 2) Steel Roof – Types of Steel Truss Roofs and method of construction.

MODULE 2

- 3) Cement: Types, applications, Tests - laboratory and field.
- 4) Steel: Properties and uses of reinforced steel.
- 5) Concrete: Ingredients, grades, admixtures, properties, production, mix, proportioning

MODULE 3

- 6) Reinforced Cement Concrete: Form work, placing, and compaction, curing of concrete, sampling and testing of concrete. Construction joints, expansion joints, finish in concrete, chemical admixtures.
- 7) RCC Foundations (Isolated footing) and Columns (Square and Round). Raft foundations, Grillage foundations and combined footing.

MODULE 4

- 8) Staircase: Anthropometry of stairs, types of Staircases.
- 9) Timber Stairs: Single and Double Stringer stairs: construction methods and joinery.
- 10) RCC Stairs: Waist slab, folded plate, stringer beam stairs, precast stairs: construction methods and joinery.

MODULE 5

- 11) Steel Stairs: Stringer stairs, Folded Type, Spiral stairs, Fire escape stairs: construction methods and joinery.
- 12) Composite Stairs: Brick/stone, Steel/Timber, Concrete/wood, steel/ glass: construction methods and joinery.

Note:

- **Minimum of one plate on each topic. Study of building materials may be compiled in the form of portfolio.**
- **Site visits to be arranged by studio teacher. Construction plates and portfolio of material shall be assessed for progressive marks.**

Learning outcome: At the end of the course, the students would be able to appreciate the procedure involved and various materials that can be used in construction of roofs, foundations and staircases with greater understanding of details involved in joinery.

REFERENCE:

- 1) Francis K Ching 'Building construction', Wiley; 5 edition (February 17, 2014)
- 2) R. Barry, "Construction of Buildings" Vol 1., 1999 by Wiley-Blackwell
- 3) Roy Chudley, "Construction Technology", 3rd Edition, Longman, 1999
- 4) W.B. McKay, "Building Construction", Donhead, 2005

18ARC23: ARCHITECTURAL GRAPHICS-II

CONTACT PERIODS: 4 (1 Lecture + 3 Studio) per week

TERM WORK MARKS: 75

PROGRESSIVE MARKS : 75

OBJECTIVE: *To develop visual communication and representation skills and methods of presentation of spatial design through 3D drawing techniques.*

OUTLINE:

1. 3D-Projections: exercises in 3D representation of exploded isometric and axonometric views of objects, furniture and built forms.
2. Development of surfaces for architectural roof forms, built enclosures and envelopes such as tents, upholstery and exercises of application to develop the paper and cardboard models.
3. Section of geometrical solids and construction of true shapes.
4. Interpenetration of geometric solids, combination of different forms in architectural compositions.
Ex: Projecting towers of vertical circulation on building facades, chimney over sloping roofs and projecting canopies and balconies on facades and dormer windows.
5. Introduction to perspective drawing: Its importance in architectural drawings, principles of perspective drawing, visual perceptions and its limitations. Exercises of observation, recording and representing the visual effects of depth, diminution and vanishing of built forms and understanding the methods of perspective projection.
6. Studies in perspective drawing: Understanding the importance and purpose of picture plane, station point, vanishing point, ground level, eye level, cone of vision and central line of vision - their variations and resultant effects.
7. One - point perspective drawings: Exercises of perspective drawings of simple built forms, interior views of a room with furniture. Exercise of perspective by changing the variables, their positions of PP, CV, SP and eye level etc.
8. Two-point perspective drawings: exercises of perspective drawings of simple built forms, architectural elements. Interior views of a room with furniture. Exercises of perspective by changing the variables, their positions of PP, CV, SP and eye-level etc.
9. Free-hand perspective drawings of architectural elements, built forms. Exercises of rendering techniques showing light, shade and shadow on built forms. Rendering of plants, trees, water, landscape, human figures, vehicles, furniture and buildings with suitable elements of foreground and background.
10. Introduction to Sciography: Principles of shade and shadow constructions for geometrical solids, architectural elements and built forms. Construction of shadows on floor plans, elevations, sectional elevations and roof-top views.

Learning outcome: At the end of the course, the students will be equipped with a skills to use 3D techniques in architectural presentations. They would also attain skills to make architectural presentation using rendering and sciographic techniques.

REFERENCES:

- 1) Francis D.K.Ching, "Architectural Graphics", Van Nostrand Reinhold Co., 1985
- 2) I.H.Morris, " Geometrical Drawing for Art Students", Longmans (1902)
- 3) Robert.W.Gill, "Rendering with pen and ink".
- 4) Shankar Malik, " Perspective & Sciography", 1994, Allied Publisher

18ARC24: HISTORY OF ARCHITECTURE - II

CONTACT PERIODS: 3 (Lecture) per week

THEORY MARKS: 100

PROGRESSIVE MARKS : 50

DURATION OF EXAM : 3 HRS

OBJECTIVE: *To study the evaluation of greek, roman, byzantine, medieval and gothic architecture through critical analysis of appropriate examples.*

OUTLINE:

MODULE 1

1. Classical Greek Architecture 1: Critical appreciation of works and synoptic study of architectural characteristic features from the Greek early periods.

2. Classical Greek Architecture 2: Critical appreciation of works and synoptic study of architectural characteristic features from the Greek later periods, Doric, ionic and Corinthian orders and optical correction.

3. Greek architecture Typologies: Study of principles of design of Greek buildings through study of three kinds of Architecture: a) Monumental (Built to impress and Last) ex. Parthenon, Theatre at Epidauros. b) Domestic (Built to inhabit): House of Colline, House of Masks, etc. and c) Civic space: The Agora and Acropolis.

MODULE 2

4. Introduction to Roman Architecture: Critical appreciation of works and synoptic study of architectural characteristic features from the Roman periods. Study of Tuscan and composite orders.

5. Roman architecture Typologies 1: Study of principles of design of Roman buildings through study of proportion, composition, visual effects etc. in Monumental (Built to impress and last) Pantheon, Colosseum, Thermae of Caracalla, Pont du Gard, Nimes, Basilica of Trajan.

MODULE 3

6. Roman architecture Typologies 2: Study of principles of design of Roman buildings through study of Domestic (Built to inhabit)-House, villa and apartments.

7. Roman architecture Typologies 3: Study of principles of design of Roman buildings through study of Civic space with elements like triumphal arch, Column of Trajan(Septimius Severus), Roman Forum.

8. Early Christian: Evolution of architecture parallel to the evolution of religious practices. Study of principles of design of buildings through study of three kinds of Architecture: a) Monumental b) Domestic (Built to inhabit) and c) Civic space.

MODULE 4

9. Byzantine: Study of principles of design of buildings through study of its Architecture: a) Monumental; Hagia Sophia b) Domestic (Built to inhabit) and c) Civic space-St.Marks Venice.

10. Medieval: Study of principles of design of buildings through study of its Architecture: a) Monumental; Pisa Cathedral, the Campanile and Baptistery, Angouleme Cathedral b) Domestic (Built to inhabit) and c) Civic space; Pisa.

MODULE 5

11. Gothic: Study of principles of design of buildings through study of its Architecture:

a) Monumental; Notre Dame, Paris. b) Domestic (Built to inhabit) and c) Civic space;

12. Gothic: Study of Gothic Architecture, typical characteristics including the pointed arch, the ribbed vault and the flying buttress, aesthetic elements with examples like Chartres Cathedral: French High Gothic style

NOTE: Progressive marks to include Submission of sketch book, study models relating to structure, aesthetics and building typology resulting from different functions.

Learning outcome: The students would develop appropriate skills of reading, writing and understanding the physical and aesthetic experience of buildings.

REFERENCES:

1. Bannister Fletcher , "History of Architecture", CBS Publishers, 1992
2. Henri Stierlin, "Architecture of the world - Greece", Herron Books 1994
3. Henri Stierlin, "Architecture of the world - The Roman Empire", Taschen Pub., 1997 .
4. Henri Stierlin , "Architecture of the world - Romanesque", Taschen Pub., 2008.
5. James Stevens Curl, " Classical Architecture", W. W. Norton & Company; Reissue edition, 2003.
6. Robert Adam, " Classical Architecture", Harry N. Abrams; 1st edition, 1991

18ENG25: BUILDING STRUCTURES-II

CONTACT PERIODS: 3 (1 Lecture + 2 Pract./Tutorial/Seminars) per week

THEORY MARKS: 100

PROGRESSIVE MARKS : 50

DURATION OF EXAM : 3 HRS

OBJECTIVE: *Introduction to Mechanics & Materials.*

OUTLINE:

MODULE 1

1. **Simple Stresses & Strains:** Types of stresses and strains, Hookes law, factor of safety, stress-strain curve for, mild steel, high strength steel, brittle materials. Elongation of bars of varying cross section, uniformly varying bars, bars of varying width **(no derivation)**. Poisson's ratio, relationship between elastic constants **(no derivation)**. Concept of temperature stresses **(no numericals)**, analysis of composite bars.

MODULE 2

2. **Bending Moment Diagram & Shear Force Diagram:** Concept of bending moment & shear force, sign convention. To draw bending moment & shear force diagrams of cantilever, simply supported & over hang beams only. Subjected to **point load & uniformly distributed load** & its combination. Relationship between rate of loading, shear force and bending moment.

MODULE 3

3. **Stresses in Beams:** Theory of simple bending, assumption made in bending theory, bending equation **(no derivation)**, section modulus, numericals to determine bending stresses across the cross section **(restricted to rectangular section T & I sections only)**. Shear stresses in beams, shear stress equation **(no derivation)**, numericals to determine the shear stress variation across the cross section **(restricted to rectangular section. T & I sections only)**

MODULE 4

4. **Elastic Stability of Columns:** Introduction - Actual length of column, Effective length of column, expression for Effective length of columns for various end conditions (fixed, hinged, free) - **No derivations**. Classification of columns based on slenderness ratio criteria, and on criteria based on least lateral dimension, and based on failure of columns, Euler's theory of long columns. Assumption and limitations of Euler's theory for critical load on long column **(no derivations)**. Numericals based on the above concepts.

MODULE 5

5. **Deflection of Beams:** Moment curvature equation **(no derivation)**, assumptions made in the deflection theory. To determine deflection and slope for cantilever beam, simply supported and overhang beam, subjected to **point load & uniformly distributed load** by Double Integration Method & Macaulays method.

Learning outcome: At the end of the course the students will have the ability to understand the effect of forces on deformable bodies.

REFERENCES:

- 1) B.S.Basavarajaih & P. Mahadevappa, "Strength of Materials", Universities Press, 3rd editn. 2010.
- 2) Dr. S. Ramamrutham & R. Narayan "Strength of Materials", Dhanpat Rai Publ., 8th edi. 2014.
- 3) William A. Nash, "Strength of Materials", McGraw-Hill Education; 6th edition, 2013.
- 4) R.K.Bansal, "Strength of Materials", Laxmi Publications; 6th edition (2017).
- 5) R.S.Khurmi & N. Khurmi, " Strength of Materials", S Chand Pub., revised edition 2006.

18ART26: BASIC DESIGN & ART APPRECIATION

CONTACT PERIODS : 4 (1 Lecture + 3 Studio) per week

PROGRESSIVE MARKS : 100

OBJECTIVE: *To explore the relationship between materiality & space, between building, the environment and culture and to initiate an understanding of abstraction and analysis of space and form. Study of Arts and crafts and its aesthetics and application.*

OUTLINE:

1. Patterns-1: Study of pattern –making in nature, (such as trees, leaves, crystals, shells etc.) Observation & representation of 2 dimensional patterns in various visual media. Eg. Charcoal/ pencil/crayons/oils etc.
2. Patterns-2: Study of pattern-making in technology. (Such as geodesics, nanotech, fractals etc.) Observation & representation of 2 & 3 dimensional patterns in various media. eg. Wire/soap bubble/photographs/digital models etc.
3. Patterns-3: Use of patterns to synthesize and create form. Use of both physical and material patterns as well as patterns of transformation and Integration. Appreciation of the difference between architecture and pattern.
4. Structure-1. Understanding gravity, and the different ways we resist it. Study of Material & structure in nature, and how design brings them together. Sketch analysis of structure and form in an example taken from Patterns-1.
5. Structure-2. Hands-on Design exercise- creation of a simple design in which form is distinct from structure. Eg. Portal frames, tensile structures.
6. Structure -3: Hands –on Design exercise- creation of simple design in which form is integral with structure. Eg. Shells, massive forms, pneumatics.
7. Study of shades & shadows.
8. Study of Art Forms & Crafts of India and Asia. Difference between art and craft.
9. Art Styles of India- folk, popular and modern art, Art trends, periods and Isms.
10. Appreciation of oriental and western performing arts.

Learning outcome: The students will be able to appreciate the concept of abstraction by experimenting with different patterns and materials. They will also develop an ability to appreciate various art forms.

REFERENCES:

- 1) Abid Husain, "National culture of India", National Book Trust, India, 1994
- 2) Antony Mason, John T. Spike, "A History of Western Art: from prehistory to the 21st Century", McRae Books, 2007.
- 3) Arthur Llewellyn Basham, "The Wonder That Was India", Picador; Indian ed edition, 2004
- 4) Christopher Alexander, "The Timeless way of Building", Oxford University Press (1979)
- 5) Francis D.K. Ching, "Architecture: form, space & order", John Wiley & Sons, 2010
- 6) Fred S. Kleiner, "Art through the Ages", Cengage Learning; 14 edition, 2012
- 7) IDEO, "Human Centered Design Toolkit", 2009.
- 8) Ilay Cooper, John Gillow, "Arts and Crafts of India", Thames and Hudson, 1996
- 9) Jasleen Dhamija, "Indian Folk arts and Crafts", 2002
- 10) Michael Braungart, William Mc Donough, "Cradle to Cradle: remaking the way we make things", North Point Press; 1 edition, 2002
- 11) Paul Johnson, "Art : A New History", Weidenfeld & Nicolson, 2003
- 12) Peggy Holroyde, "An ABC of Indian Culture", MapinLit, 2007
- 13) Yashodhara Dalmia, "Contemporary Indian Art", Marg Publications, 2002

18ENG27: SITE SURVEYING & ANALYSIS

CONTACT PERIODS: 3 (1 Lecture + 2 Pract./Tutorial/Seminars) per week

THEORY MARKS : 100

PROGRESSIVE MARKS : 50

DURATION OF EXAM : 3HRS

OBJECTIVE: To develop the knowledge and skills related to surveying and levelling principles and practice and carrying out surveys of land of medium complexity and preparation of survey plans.

OUTLINE:

MODULE 1

- 1) **Introduction to Surveying** – Definition, classification, principles of surveying, character of work, shrunk scale.
- 2) **Introduction to Chain Surveying Instruments** – Chain and its types, Ranging Rod, Tapes, pegs.

MODULE 2

- 3) **Chain Surveying 1** – Ranging and Types of Ranging.
- 4) **Chain Surveying 2** – Setting out angles, erecting perpendicular, Obstacles in chain surveying, calculation of area by offsets.

Plane Table Surveying – Accessories used, advantages and disadvantages, Methods of plane table surveying (radiation and intersection).

MODULE 3

- 5) **Levelling** – Definition, Classification, booking and reduction of levels (HI Method, Rise and Fall Method).
- 6) **Levelling** – Profile levelling – Calculation of depth of cutting and filling

MODULE 4

- 7) **Contouring:** Characteristics of contours, direct and indirect methods of contours, interpolation and uses of contours.
- 8) **Introduction to Contemporary Survey Instruments** – Theodolite, Total Station, GPS
Theodolite – Basic Concepts, Measuring horizontal and vertical angles
Total Station – Accessories used, uses of total station and applications, Introduction to GPS

MODULE 5

- 9) **Observation and Analysis of a Site** – Survey without instruments using geometry and anthropometric measures. To learn a terrain on site factors like topography, hydrology, soils, landforms, vegetation, climate and micro climate and influence of water bodies.
- 10) **Studying Survey Drawing** – Learning to read a land survey drawing, types of land survey drawing, scale and north, legends and symbols.

Field work – Setting out works such as center lines of a building instruments used in center line marking.

Learning outcome: At the end of the course the students will have ability to understand, measure and analyze the topographical characteristics of a given site for its effective use in site planning.

REFERENCES:

- 1) B C Punmia, " Surveying Volume I", Firewall Media, 2005
- 2) K R Arora, "Surveying " Standard Book House, 7th edition.
- 3) R. Subramanian, " Fundamentals of Surveying and Levelling", Oxford Uni. Press., 2014.
- 4) S K Duggal, " Surveying", Vol 1, 14th Edition, McGraw Hill Education, 2013.
- 5) TP Kanetkar, SV Kulkarni, "Surveying and Levelling(Part-1)", PuneVidyarthi Griha Prakashan, 2014.

18HUM28: KANNADA BHASHE - Aadalitha Matthu Vyavahara

CONTACT PERIODS: 2 (Pract./Tutorial/Seminars) per week

PROGRESSIVE MARKS : 50

[Syllabus shall be announced after receiving the approved draft from the BoS [Humanities], VTU]