HOUSING

ENAR 365

Lecture	**: 3**	**Year : III**
Tutorial	**: 0**	**Part : II**
Practical	**: 0**	

Course Objectives:

The objective of this course is to provide students with a comprehensive understanding of housing planning, design and economics. It enables students to develop functional, efficient and context-responsive housing solutions using appropriate strategies.

1 Introduction (4 hours)

1.1 General definition
1.2 Housing as a process and product
1.3 Housing as a socio-economic and political process
1.4 Housing needs, demands and shortage
1.5 Formal and informal housing
1.6 Rental housing and tenure types

2 Housing Typology (7 hours)

2.1 Detached, semi-detached, row, apartments (Duplex, multilayered variants)
2.2 Low-rise and high-density, walk-up housing, high rise
2.3 Incremental housing (Habraken's Support and Infill theory)
2.4 Group housing
2.5 Site and services/ land pooling

3 Standards, Norms and Regulations (4 hours)

3.1 Building by-laws (Setbacks, FAR, ground coverage)
3.2 Space standards and codes
3.3 Light and ventilation standards
3.4 Basic services provisions

4 Housing Design Parameters (14 hours)

4.1 Basic site selection considerations
4.2 Unit Design: Efficiency, flexibility and privacy
4.3 Cluster design (Circulation, open space, street network, community facilities)
4.4 Neighborhood design (Services, mobility and amenities)
4.5 Climate response and energy-efficient housing
4.6 Built form and architectural expression (Facades, massing)
4.7 Shared space design (Staircase, corridors, lobby)

4.8 Site planning, landscape elements and livability
4.9 Incremental and participatory housing approaches

5 Housing Service Design (4 hours)

5.1 Sanitary and waste design
5.2 Electrical design
5.3 Circulation
5.4 Basic mechanical systems

6 Housing Economics (4 hours)

6.1 Cost estimation and projections
6.2 Cost efficiency (Material, space, construction and services)
6.3 Basic pricing, break-even and payback
6.4 Housing finance and market mechanism

7 Contemporary Housing Issues (8 hours)

7.1 Affordable housing
7.2 Social and public housing
7.3 Slum upgrading and rehabilitation
7.4 Sustainable housing (Energy, water and waste)
7.5 Housing and social equity
7.6 Housing policies and governance framework

Assignment

1. Presentation and report on housing scenario in Nepal using census data
2. Study on housing demand, supply and land development mechanisms
3. Case-based assignment: Comparative study of two housing projects (Formal/informal or different income groups) focusing on typology, design, economics and livability

Final Exam

The questions will cover all the chapters in the syllabus. The evaluation scheme will be as indicated in the table below:

Chapter	Hours	Mark distribution*
1	4	6
2	7	10
3	4	6
4	14	16
5	4	6
6	4	6
7	8	10
Total	**45**	**60**

* There may be minor deviation in marks distribution.

References

1. Abrams, C. (1964). Housing in the modern world: Man's struggle for shelter in an urbanizing world (Latest Edition). MIT Press.
2. Turner, J. F. C. (1976). Housing by people: Towards autonomy in building environments (Latest Edition). Pantheon Books.
3. Hamdi, N. (1991). Housing without houses: Participation, flexibility, enablement (Latest Edition). Intermediate Technology Publications.
4. Gallion, A. B., Eisner, S. (1963). The urban pattern: City planning and design (Latest Edition). D. Van Nostrand Company.
5. Lynch, K., Hack, G. (1984). Site planning (Latest Edition). MIT Press.
6. De Chiara, J., Panero, J., Zelnik, M. (1995). Time-saver standards for housing and residential development (Latest Edition). McGraw-Hill.

LANDSCAPE ARCHITECTURE

ENAR 366

Lecture	**: 3**	**Year : III**
Tutorial	**: 0**	**Part : II**
Practical	**: 0**	

Course Objectives:

The objective of this course is to introduce the principles of landscape architecture and develops the ability to integrate site planning and landscape design in architectural projects, with emphasis on ecological and contextual response.

1 Introduction (2 hours)

1.1 Importance of landscape in architecture
1.2 Role of landscape in architectural design
1.3 Elements of landscape design: Hardscape and softscape elements
1.4 Multidisciplinary nature: Relationship with built form, ecology and environment

2 History of Landscape Design (4 hours)

2.1 Nepalese landscape traditions (Social and cultural aspects)
2.2 Traditional landscapes: Durbar squares, chowks, courtyard design, dhungedhara and ponds, aagan of residences, rest spaces and chautara, ghats, gaucharan
2.3 Western traditions- Italian, French formal, English landscape gardens
2.4 Eastern traditions: Islamic, Chinese, Japanese gardens

3 Design Resources and Techniques (8 hours)

3.1 Land, landform and topography: Grading and modification
3.2 Water as a design element
3.3 Vegetation: Role and selection criteria (Functional, structural, visual and other sensory, aesthetic characteristics of plants - texture, form, size and colour)

4 Sustainable Landscape Design (6 hours)

4.1 Nature-based design: Use of site features, water efficiency, biodiversity, wildlife
4.2 Stormwater management: Bioswales, infiltration, drainage
4.3 Resilient landscape design

5 Design Concepts and Principles (9 hours)

5.1 Concept development: Functional, aesthetic, experiential
5.2 Form development: Geometric and naturalistic
5.3 Organization principles of outdoor spaces: Unity, harmony, balance, proportion, rhythm, emphasis, users' and designers' interests

6 Site Analysis (6 hours)

6.1 Site Inventory: Topography, soil types, vegetation, drainage,
6.2 Site analysis: Site factors (Topography and landform), climate, hydrology and drainage, geology and soil, existing vegetation and ecology
6.3 Contextual factors: regulatory aspects (Zoning, setbacks), cultural, visual, infrastructure, historical
6.4 McHarg's layered cake method (Design with nature)

7 Case Studies and Applications (10 hours)

7.1 Open spaces: Parks, children's playground, plaza
7.2 Streetscape: Pedestrian movement and planting
7.3 Roof and vertical garden
7.4 Indoor landscape

Assignments (30 hours)

1. Plant identification and documentation
2. Case study of projects integrating landscape design
3. Landscape design for a neighbourhood-scale site

Final Exam

The questions will cover all the chapters in the syllabus. The evaluation scheme will be as indicated in the table below:

Chapter	Hours	Mark distribution*
1	2	3
2	4	6
3	8	9
4	6	9
5	9	12
6	6	9
7	10	12
Total	**45**	**60**

* There may be minor deviation in marks distribution.

References

1. Booth, N. K. (2011). Foundations of landscape architecture: Integrating form and space using the language of site design. John Wiley & Sons.
2. McHarg, I. L. (1969). Design with nature (Latest Edition). American Museum of Natural History.
3. Russ, T. H. (2002). Site planning and design handbook. McGraw-Hill.
4. Reid, G. W. (2007). From concept to form in landscape design. John Wiley & Sons.
5. Harris, C. W., Dines, N. T. (1988). Time-saver standards for landscape architecture design and construction data (Latest Edition).
6. Reid, G. (2012). Landscape graphics: Plan, section, and perspective drawing of landscape spaces. Watson-Guptill.
7. Ching, F. D. K. (2023). Architecture: Form, space, and order. John Wiley & Sons.
8. Simonds, J. O. (1983). Landscape architecture: A manual of site planning and design (Latest Edition).

ADVANCED COMPUTER APPLICATION

ENAR 367

Lecture	**: 3**	**Year : III**
Tutorial	**: 0**	**Part : II**
Practical	**: 0**	

Course Objectives:

The objective of this course is to develop skills in the use of advanced computer technologies for architectural design. It introduces digital tools for modelling, visualization and graphic communication and supports exploration of design alternatives. The course also familiarizes students with tools and workflows commonly used in architectural and engineering practice.

1 Basic Modelling (10 hours)

- 1.1 Introduction to Rhino 3D
  - 1.1.1 Interface overview, tools, commands, units, grids, snap settings
  - 1.1.2 Understanding curve properties, curve and surface modeling
  - 1.1.3 Drafting and annotations
  - 1.1.4 NURBS and its application: Creating and editing NURBS objects
  - 1.1.5 Rendering basics: Materials and textures mapping
  - 1.1.6 Basic introduction to sub 3D modeling
  - 1.1.7 Modeling a unit of architecture using Rhino 3D
- 1.2 Introduction to Grasshopper 3D
  - 1.2.1 Interface and components
  - 1.2.2 Components performing math, sets and vectors
  - 1.2.3 Components of curve, surface, mesh, transformations and intersection
  - 1.2.4 Data organization techniques
  - 1.2.5 Plugins in Grasshopper
  - 1.2.6 Modeling a unit of architecture using Grasshopper 3D
- 1.3 Designing an architectural unit using Rhino 3D and Grasshopper 3D

2 Building Information Modelling (BIM) (20 hours)

- 2.1 Introduction to BIM
- 2.2 Revit architecture basics
  - 2.2.1 Lesson on user interface
  - 2.2.2 Lesson on Revit elements and families
  - 2.2.3 Lesson on working with templates
- 2.3 Commencing a design: Lesson on levels and grids

2.4 Building a model
  2.4.1 Lesson on creating a floor plan
  2.4.2 Lesson on adding walls, lessons on doors and windows
  2.4.3 Lesson on editing tools
2.5 Working with component families
2.6 Viewing the model
  2.6.1 Managing views and controlling the visibility
  2.6.2 Working with sections and elevation views
2.7 Working with annotate, massing and site
2.8 Developing building model: Working, creating and modifying floors, ceiling and roof
2.9 Presentation of the building model

3 Graphics (9 hours)

3.1 Photoshop workspace basics: Introductions to tools, rulers, grids, guides, plugins and preferences.
3.2 Color and tonal adjustments: Understanding color adjustments with adjusting, matching, replacing and mixing
3.3 Retouching and transformation
  3.3.1 Adjusting crop, rotation and retouching images
  3.3.2 Transforming objects
3.4 Working with layers and filters
3.5 Photographic special effects
  3.5.1 Blurring, sharpening, vignetting
  3.5.2 Using color for emphasis
  3.5.3 Replacing layers
  3.5.4 Replications of photographic filters
  3.5.5 Layer masking for collage
  3.5.6 Adding depth of field
  3.5.7 Stitching panoramas together
  3.5.8 Sharpening techniques

4 Visual Communication Techniques (6 hours)

4.1 Adobe InDesign workspace basics for presentations and publication
  4.1.1 User interface, customizing the workspace
  4.1.2 Setting up documents, text, colour and swatches
  4.1.3 Advanced layout techniques: Creating interactive documents
4.2 SketchUp layout basics for presentations
  4.2.1 User interface, customizing the workspace
  4.2.2 Working with text, dimension, colour, clipping mask and the default tray
  4.2.3 Importing and managing SketchUp models

Assignments

1. Basic modeling, parametric modeling
2. Basic modeling of small-scale residences and presentation sheets
3. Graphical presentation panel
4. Presentation and publication sheets in SketchUp layout and InDesign

Final Exam

The questions will cover all the chapters in the syllabus. The evaluation scheme will be as indicated in the table below:

Chapter	Hours	Mark distribution*
1	10	12
2	20	30
3	9	12
4	6	6
Total	**45**	**60**

* There may be minor deviation in marks distribution.

References

1. Aiello, C. (2014). Digital and parametric architecture. eVolo Press.
2. Eastman, C. M. (2008). BIM handbook. Wiley.
3. Duell, R., T. H. (2013). Autodesk Revit architecture 2014 essentials. Wiley.
4. Kelby, S. (2013). The Adobe Photoshop book for digital photographers. Pearson Education.
5. Burke, P. S. (2012). E-publishing with InDesign CS6. Wiley.
6. Donley, M. (2015). SketchUp to LayOut. Bizfound, LLC.

INCLUSIVE DESIGN IN ARCHITECTURE

ENAR 368

Lecture	**: 3**	**Year : III**
Tutorial	**: 0**	**Part : II**
Practical	**: 0**	

Course Objectives:

The objective of the course is to develop a comprehensive understanding of accessibility, inclusivity, and universal design in the built environment, along with relevant professional competencies. It introduces key principles and national and international standards, and emphasizes methods such as accessibility audits and user-centred design. The course supports the evaluation of existing environments and the development of inclusive design strategies from conceptual to detailed stages.

1 Introduction (6 hours)

1.1 Concepts of inclusion and diversity; Disability degree and built environment and spatial justice; Ethics
1.2 Disability models: Charity, medical and psycho-social model
1.3 Accessibility, universal design, inclusive design and personalised design
1.4 Human diversity, intersectionality
1.5 Basic principles of universal design, including reasonable accommodation

2 Ergonomics and Anthropometrics (6 hours)

2.1 Concepts and definitions
2.2 Anthropometric data and human dimensions
2.3 International frameworks, guidelines and standards
2.4 National frameworks, guidelines and standards
2.5 Assistive technology consideration in design and development

3 Accessibility Audit (12 hours)

3.1 Concept and purpose
3.2 Audit frameworks (Reach, enter, circulate, use)
3.3 Types of barriers (Physical, sensory, cognitive)
3.4 Documentation methods (User journey mapping- reconnaissance survey, site inspection with measurements, user experience evaluation)
3.5 Prioritisation frameworks (Critical versus desirable)

4 User-Centred Design Approach (15 hours)

4.1 Concept: Designer-led versus user-led
4.2 User diversity and mapping (Mobility, sensory, neuro diverse)

4.3 Key methods for Users' spatial experience: User personas, empathy mapping (Role playing- blindfolding, wheelchair using and other approaches)
4.4 Barrier-free planning and spatial strategies: Mobility, multi-sensory, cognitive
4.5 Prototyping, testing, reflection and collaboration

5 Inclusive Design: Applications and Discussion (6 hours)

5.1 Product design: Building-related products (Sanitary, electrical and other service products)
5.2 Public spaces: Streets, pedestrian movements, public transport, parks and open spaces
5.3 Heritage and cultural contexts
5.4 Service design: Public access, healthcare, communication
5.5 Resilience and sustainability

Assignments

1. Group exercise on furniture design - students will observe and understand the difficulties faced by Persons with Disabilities (PwDs) while using furniture and interacting with spaces in daily life. Based on their findings, they will design furniture solutions using principles of ergonomics, anthropometry and universal design
2. Students will work in groups to first conduct an accessibility audit of a selected built environment - such as public toilets, bus stops, ATMs, academic institutions, banks or public service centers - and based on a user-centered design approach, they will propose practical design solutions aimed at improving accessibility and achieving barrier-free environments for the selected project

Note: Reports and produced outcomes should be in an accessible format (Maintaining proper font size, line spacing, colour and contrast, an alternative caption, and appropriate subtitles) for animated presentations.

Final Exam

The questions will cover all the chapters in the syllabus. The evaluation scheme will be as indicated in the table below:

Chapter	Hours	Mark distribution*
1	6	9
2	6	9
3	12	15
4	15	18
5	6	9
Total	**45**	**60**

* There may be minor deviation in marks distribution.

References

1. Burton, E., Mitchell, L. (2006). Inclusive urban design: Streets for life. Routledge.
2. Imrie, R., Hall, P. (2003). Inclusive design: Designing and developing accessible environments. Taylor & Francis.
3. Lidwell, W. (2015). The pocket universal principles of design: 150 essential tools for architects, artists, designers, developers, engineers, inventors, and makers. Rockport Publishers.
4. Neufert, E. (2019). Architects' data. John Wiley & Sons.
5. Null, R. (Ed.). (2013). Universal design: Principles and models. CRC Press.
6. Steinfeld, E., Maisel, J. (2012). Universal design: Creating inclusive environments. John Wiley & Sons.