

**SEMINAR & DIRECTED STUDIES
AR 801**

Lecture : 0
Tutorial : 0
Practical : 4

Year : V
Part : I

Course Objective:

To provide opportunities to pursue further studies in specific topic of student's interest and in new subjects not offered as core course and learn to communicate in both oral and written form.

The focus will be on research and appropriate presentation skills & methods, critical analysis on the topic and defense of one's view point.

Course Topics:

Course topics can be any relevant topics in architectural design, theory of architecture, architectural histories, contemporary design & trends, use of materials, construction & techniques, urban planning etc.

A. Directed Studies:

1. Introduction (2 hours)
2. Exploration and finalization of topic of choice (6 hours)
3. Studies, research and discussions. (30 hours)
4. Final report (6 hours)

B. Seminar:

1. Preparation of presentation A/V and reports (4 hours)
2. Seminar Presentation (2 presentations)
 - a. Seminar on any topic of choice related to architecture & planning. (6 hours)
 - b. Seminar on topic of directed studies. (6 hours)

Evaluation Scheme:

1. Final report on directed studies (40 marks)
Seminar presentations [60 marks]

PROFESSIONAL PRACTICE AR 805

Lecture : 4
Tutorial : 0
Practical : 0

Year : V
Part : I

Course Objective:

Familiarize students with the legal, economic and social issues related to professional practice. Focus will be on the role of the architect in a developing society and the emerging influence of economic liberalization. Emphasis will be on the ethical dimension governing professional conduct in serving the client/society.

The architect and his/her office, job organization, presentations, business management, sales promotion, human relations and personnel management, Design Audit procedures, Efficiency studies and performance appraisal, billing, accounting, business correspondence, information storage and retrieval are major focus areas.

- 1. Professional Ethics: (12 hours)**
 - 1.1. Definition of Ethics and the Professional
 - 1.2. Codes of Conduct – RIBA / AIA / IIA / SCAEF / SONA
 - 1.3. Practice Qualification
 - 1.4. Professional behavior and judgment
 - 1.5. Nepal Engineering council and proposed Council of Nepalese Architects
 - 1.6. Ethical Standard Interaction with other professional societies

- 2. Role of Architects: (8 hours)**
 - 2.1 Understanding who is professional and why architecture is considered a profession.
 - 2.2 Architect's role in the Society.
 - 2.3 Architect's role as a Team Leader.
 - 2.4 Relation with Client/Employer, Contractors and Fellow Professionals
 - 2.5 Responsibility of client/employer, contractor and consultant s.

- 3. Office Management: (4 hours)**
 - 3.1. Understanding the procedures for the establishment of an Architectural Practice
 - 3.2. Company Act and Registration including with professional societies

- 3.3. Architect's Administrative Role - financial, office accounts and billing.
- 3.4. Management Project Co-ordination- Clients, Consultant and Project Managers
- 3.5. Professional Development – Training
- 3.6. Office Automation Information Storage and Retrieval.

- 4. Hiring A/E Consultants: (8 hours)**
 - 4.1. Introduction to various selection procedures including CBS, QCBS, and QBS. Long list and pre-qualification
 - 4.2. National Practices – Procurement Act and the Consultancy Development Act.
 - 4.2.1. Technical and Financial Proposals
 - 4.2.2. Guidelines of the Government
 - 4.3. International practices of multi and bi-lateral donors
 - 4.4. Design Competitions etc.

- 5. Contracts and Agreements: (8 hours)**
 - 5.1. Understanding conditions of agreement- scope of work, comprehensive architectural services and conditions of engagement, remuneration and professional fees.
 - 5.2. The Terms of Reference and Scope of Works.
 - 5.3. Architectural Contract Agreements
 - 5.4. Professional Fees
 - 5.5. Professional Liabilities and Insurances /Securities

- 6. Business Promotion: (4 hours)**
 - 6.1. Understanding the techniques of business: commissions, marketing experts
 - 6.2. Preparing proposals and winning contracts
 - 6.3. Marketing and negotiation
 - 6.4. Business planning, time and project management, risk mitigation, and mediation and arbitration as well as an understanding of trends that affect practice, such as globalization, outsourcing, project delivery, expanding practice settings, diversity, and others.
 - 6.5. Design audit & efficiency studies, analysis for special efficiency of buildings.
 - 6.6. Best practice and quality assurance
 - 6.7. Proprietary rights

- 7. Regulatory Controls: (10 hours)**
 - 7.1. Regulations in planning and designing of projects in controlled areas

- 7.2. Land use and Zoning
- 7.3. Design standards and easements
- 7.4. National Building Codes
- 7.5. Housing & Apartment acts
- 7.6. IEE/EIA studies
- 7.7. Shelter policy
- 7.8. Municipal Drawings
- 7.9. Demolition

8. Valuation of Properties: (6 hours)

- 8.1. Introduction to property valuation/assessment
- 8.2. Property Assessment methods (Land, Building etc.)
- 8.3. Valuation assessment as per guidelines of the Nepal Rastra Bank

Evaluation Scheme:

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

Units	Hours	Marks Distribution
1, 2	20	18
3,6	8	10
4	8	12
5	8	16
7	10	14
8	6	12
Total	60	80

*There may be minor deviation in marks distribution.

References:

1. AIA Manual of Professional Practice
2. IIA Standard for Establishing Fees
3. IIA Code of Ethics
4. Handbook for Users and Consultants ADB/Manila and other related documents related to procurement of services under ADB/Manila, World Bank/Washington and UN and other Bilateral Donor Agencies funded projects
5. GoN's Procurement Act and FAR (related to Consultant selection & procedures
6. Town Planning acts of Nepal 1962v with revisions
7. Building Standards (Nepal) with revisions
8. National Building Codes
9. National Building Code of India
10. Ancient Monument Preservation Act (Nepal) 2013 BS with revisions
11. Relevant ISI Standards
12. Company Act (Nepal) 2021 with revisions
13. Professional practice by Roshan Nanavati, Lakhani Book Depot, 1993.

LANDSCAPE DESIGN & SITE PLANNING

AR 803

- Geometric form
- Naturalistic form

Lecture : 2
Tutorial : 0
Practical : 2

Year : V
Part : I

Course Objective:

To familiarize the subject of Landscape design and site planning and make student capable of applying the knowledge of the subject in their project works.

- 1. Introduction to Landscape Architecture (6 hours)**
 - 1.1. Landscape Elements
 - 1.1.1 Hard Landscape Elements
 - 1.1.2 Soft Landscape elements
 - 1.2. Natural Landscape process
 - 1.2.1 Geological Process
 - 1.2.2 Biological Process
 - 1.2.3 Soil forming process
 - 1.3. Scope of works
- 2. Design Resources & Techniques (6 hours)**
 - 2.1. Land and Land Form
 - 2.2. Water
 - 1.3 Vegetation
 - 1.4 Surface Materials, Outdoor fittings, Construction materials and structures
- 3. Spatial Development & Site Planning (6 hours)**
 - 3.1. Site Analysis
 - 3.1.1. Site Factors
 - 3.1.2. Use Factors
 - 3.2. Concept
 - 3.2.1. General Philosophical concepts
 - 3.2.2. Specific functional concepts
 - 3.3. Design
 - 3.3.1. Form Development
 - Basic Elements of Design

3.3.2. Principles of organization

- Unity
- Harmony
- Interest
- Simplicity
- Emphasis-dominance
- Balance
- Scale & proportion
- Sequence

- 4. Landscape in History (6 hours)**
 - 4.1. Tradition of landscape design in East
 - 4.2. Tradition of landscape design in West
- 5. Miscellaneous (4 hours)**
 - 5.1. Roof Garden
 - 5.2. Atriums
 - 5.3. Roadside Plantations, Avenues
 - 5.4. Indoor Landscape
 - 5.5. Children's play area
- 6. Open Spaces and Parks (2 hours)**

PRACTICAL STUDIO WORKS:

1. Landscape Graphics (4 hours)
2. Identifications of Plants (4 hours)
3. Residential / Institutional Sites (10 hours)
4. Landscape Design for neighborhood open spaces. (12 hours)

References:

1. Motloch, John. L., Introduction to Landscape Design.
2. Reid, Grant W., From Concept to Form in Landscape Design.
3. Walker, Theodore D. and Davis, David A., Plan Graphics.

4. McHarg, Ian L., Design with Nature.
5. Ching, Francis D.K., Form, Space, and Order.
6. Acharya, Bal Krishna., Aurbed Jadi Buti Rahasya.

Evaluation Scheme:

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

Units	Hours	Marks Distribution*
1	6	8
2	6	8
3	6	8
4	6	8
5,6	6	8
Total	30	40

*There may be minor deviation in marks distribution.

**DESIGN STUDIO VIII
AR 802**

Lecture : 0
Tutorial : 0
Practical : 12

Year : V
Part : I

References:

1. Time Savers Standard
2. Neufert Architectural Design Data
3. All relevant references

Course Objective:

- Understanding urban spaces and process of improvement, renewal, redevelopment and urban metabolism, implementation of urban planning knowledge acquired in previous semester
- Understanding built form and its visual and environmental impact to surrounding areas.
- Urban Services, traffic management and urban features.
- Application of knowledge acquired in Architectural conservation in previous semester.

Exercise No./Hours	Suggested Project	Content	Marks Distribution
180 Hours	Project incorporating Planning, Urban Design and Conservation issues in traditional urban context.	Master Plan with landscape, Plans, Sections, Elevations, Perspective Drawings Block Model	300

Evaluation Schedule for each Exercise:

Week/Hrs	Stage	Marks	Remarks
4 48 Hrs	Literature & Case Studies	40	Inclusive of presentation of case study
4 48 Hrs	Conceptual Design	80	
7 84 Hrs	Final Design	180	Inclusive of final presentation
Total		300	

ELECTIVE II
AR 825

Lecture : 2
Tutorial : 0
Practical : 2

Year : V
Part : I

Course Objective:

To provide opportunities to pursue further studies in specific topic of student's interest and in new subjects not offered as core course and learn to communicate in both oral and written form. Pool of subjects will be offered. The focus will be on appropriate presentation skills & methods, critical analysis on the topic and defense of one's view point.

Course Topics:

Course topics can be any relevant topics in architectural design, theory of architecture, architectural

Evaluation Scheme:

100 Marks
Assessment 10 Marks
Final Exam 40 Marks
Practical 50 Marks

Evaluation Scheme may vary according to the subject offered.

THESIS PROPOSAL AND RESEARCH AR 806

Lecture : 1
Tutorial : 2
Practical : 0

Year : V
Part : I

Course Objective:

To enable the student to prepare a proposal for design thesis and to plan, undertake and report on necessary research needed to undertake the design thesis proposed. This course is prerequisite to course AR 851 listed in Year V Part II. This course objective needs to be read in conjunction with the following requirements of Thesis -

A thesis in architecture is expected be a solution of a creative design problem (of a building complex, a building or elements of a building) that may have differing focus as seen from the perspective of different support courses such as environment, ecology, energy, climatology, design theory, planning, materials and technology of construction, services and the like. The thesis aims to demonstrate the students' ability and development to pursue analytical investigations related to the design of a building and/or its cultural, social, economic, material, climatic, technological, etc. dimensions. It should balance research and design application components. It should respond to contemporary issues in architecture and design.

The following component of works leading to the thesis has to be completed in this semester

1. Thesis topic, project justification and requirement assessment: The topic of thesis and its scope shall be finalized in consultation with the assigned thesis supervisor and the thesis supervision faculty. Requirement assessment shall include space, services, environment, ecology, energy and other design requirement of the proposed project. [6 hours]
2. Thesis proposal: The thesis proposal must be submitted in proper form for department records and must include introduction to the proposed thesis, the need and importance (justification), requirements, fundamental research

themes and case studies, client and site information, expected output of research as well as the thesis. The submission will be marked. [hours]

3. Basic Research: This component of the course will require students to take up fundamental research and literature review (including architectural standards) on the functional and philosophical nature of the proposed thesis topic. Research on technological, environmental, ecological issues may be encouraged. The presentation shall be marked by a review team. [15 hours]
4. Case study: Students should take up cases of similar exemplary design projects or components of project for detailed study. The cases may be analyzed from the perspective of form, function and technique. Studies may be made for all or some major determinants of design such as climate/sun/wind/rain, materials/their use and behavior, socio-cultural factors, functional reflections, etc. The presentation shall be marked by a review team. [15 hours]

Reference:

All references as identified for supporting courses.

Evaluation Scheme:

S. No.	Title	Hour	Total Marks
1.	Thesis Topic and Thesis Proposal – Submitted Hard and Soft copies.	15	50
2.	Fundamental Research and Findings. Presentations on Drawing Paper.	15	75
3.	Case Study Research and Findings. Presentations on Drawing Paper.	15	75

ELECTIVE -II

HOUSING AR 825 01

Lecture : 2
Tutorial : 0
Practical : 2

Year : V
Part : I

Course objective:

- To provide the students with the basic theoretical knowledge of housing .
- To make them acquainted with the current practice of housing in Nepal.
- To make them able to deal with housing schemes.

- 1. General and definition of housing (2 hours)**
 - 1.1. General introduction
 - 1.2. Definition
- 2. Theory of housing (4 hours)**
 - 2.1. Structuralism
 - 2.2. Functionalism
 - 2.3. Formalism
 - 2.4. Economy theory
- 3. Components of housing (4 hours)**
 - 3.1. Physical components
 - 3.2. Administrative and regulatory components
 - 3.3. Management (construction) components
 - 3.4. Financial /Capital components
 - 3.5. Socio-economic components
 - 3.6. Cultural components
- 4. Housing Standard (2 hours)**
 - 4.1. Physical indicator
 - 4.2. Social indicator
 - 4.3. Space standard
 - 4.4. Changes of housing stock of various standards
- 5. Socio -economic benefits of housing (4 hours)**
 - 5.1. Status
 - 5.2. Infrastructure
 - 5.3. Security and satisfaction
 - 5.4. Economic Benefits
- 6. Shelter policy of Nepal (4 hours)**

- 6.1. Increasing the production of dwelling units and repair and maintenance of the existing stock.
- 6.2. Promote effective mobilization and allocation of financial resources.
- 6.3. Organizational improvement.

- 7. Approaches of Housing delivery (4 hours)**
 - 7.1. Government approach
 - 7.2. Popular/owner built housing approach
 - 7.3. Private sector developer housing approach
 - 7.4. Cooperative approaches
 - 7.5. Community housing approach
- 8. Parameters (2 hours)**
 - 8.1. Physical parameters
 - 8.2. Economics parameters
 - 8.3. Social parameters
 - 8.4. Institutional parameters
- 9. Apartment Act (4 hours)**

References:

1. Abrams, C., *Housing in the Modern World: Man's Struggle for Shelter in an Urbanizing World*, MIT Press, Massachusetts
2. Hamdi, N., *Housing Without Houses: Participation, Flexibility, Enablement*, London, Intermediate Technology Publications
3. Hasan, A., *Urban Housing Policies and Approaches in a Changing Asian Context*, Karachi, City Press
4. Joshi, J., *Housing and Urban Development in Nepal: Analysis and Design of a Participatory Process*, Kathmandu, Lajmina Joshi
5. Sharma, K., *Housing Finance in India*, N. Delhi, Centre for Urban Studies, Indian Institute for Public Administration
6. Turner, J.F.C, *Housing by the People*, N. York, Pantheon Books

Practical Assignment

S.No	Time	Stage	Marks
1	6 hrs	Discussion & Consultation	10
2	16 hrs	Housing scheme preparation	10
3	4 hrs	Seminar/Viva	20
4	4 hrs	Report Preparation	10
Total	30		50

Evaluation Scheme

The question shall cover all the chapter of syllabus. The evaluation scheme will be as indicated in the table below.

Units	Chapters	Hours	Marks Distributions*
1	1,2	6	8
2	3,4	6	8
3	5,6	6	8
4	7,8	6	8
5	8,9	6	8
	Total	30	40

*There may be minor deviation in mark distribution.

VERNACULAR ARCHITECTURE
AR 825 02

Lecture : 2
Tutorial : 0
Practical : 2

Year : V
Part : I

Course Objectives:

- To familiarize the students with fundamental of Vernacular architecture.
- To understand the underlying concepts, ordering principles and explore the rapidly disappearing vernacular architectural entities.
- To impart the knowledge of conversing and preserving the vernacular architectural building.

- 1. Introduction (1 hour)**
 - 1.1. Introduction to vernacular architecture
 - 1.1.1. Society
 - 1.1.2. Culture
 - 1.1.3. Religion
 - 1.1.4. Architecture
- 2. Evolution of Architecture (4 hours)**
 - 2.1. Evolution and continuity
 - 2.2. Approaches and concepts
 - 2.2.1. Aesthetic aspects and Architectural aspects.
 - 2.2.2. Anthropological aspects and ethnographical aspects.
 - 2.2.3. Developmental and conservationist aspects.
 - 2.2.4. Historical and Folkloristic Aspects.
- 3. Various Influencing factors (6 hours)**
 - 3.1. Physical factors and their influence on local architecture.
 - 3.2. Climate and ecological environment.
 - 3.2.1. Tropical, sub-tropical, monsoon, desert, maritime, montane, continental, arctic and sub-arctic and Mediterranean.
 - 3.3. Geography
 - 3.3.1. Location and sites (below ground, costal, slope, valley, plain or flat grass land etc.)
 - 3.3.2. Topography (Plain, slope & terrain etc.)
 - 3.4. Population and settlement pattern
 - 3.4.1. Growth
 - 3.4.2. Distribution and density (Sparse or Scattered & Dense)
 - 3.4.3. Migration and urbanization.

- 3.4.4. Availability of building materials (Materials and building resource).
 - 3.4.5. Use of rocks and stones
 - 3.4.6. Use of earth and clays
 - 3.4.7. Use of trees, grasses, palms, timber and thatch
 - 3.4.8. Use of animal products
 - 3.4.9. Use of manufactured products.
 - 3.5. Other miscellaneous materials and building recourses: Fibers, Cement, Glass, Tires Sheet, Metal etc.

- 4. Social and Cultural attributes (2 hours)**
 - 4.1. Social Organization, Cultural attributes and architecture
 - 4.2. Daily Practices.
 - 4.3. Family Occupation and economy
 - 4.4. Behavior Patterns of occupations.
 - 4.5. Social structures
 - 4.5.1. individual & interdependence
 - 4.5.2. various economic social stratifications & organization
 - 4.5.3. Leaders and authority
- 5. Symbolism in Architecture (6 hours)**
 - 5.1. Symbolism and Architectural Manifestation
 - 5.2. **Decorated elements:** Doorways, Facades, Columns, Walls, Floors, Openings and Other elements.
 - 5.3. **Inscriptions:** Carpenters' assembly marks, Date stones, Eng raved text, Masons marks, Sign writing, tile impression and other elements.
 - 5.4. **Motifs:** Swastika, Square(Mandala), Spiral geometry, Solar(sun), Star, Lunar, Cross, Crest, Suva lava , etc
 - 5.5. **Rules, Systems and Rituals:** Vastu Vidya, Feng Shui, Divination & Sacrifice (Lela) (Bali), Vastu Purusha Mandala etc. Proportion, symmetry, Golden Selection etc
 - 5.6. **Symbolic Spaces etc:** Cosmic, Fertility, Mythic domain, sacred boundary, etc.
- 6. Building Technology and Production (2 hours)**
 - 6.1. Building processes technology and architecture productions.
 - 6.2. Designing to Dimensions, traditional crafts skills and building problems and solutions.
 - 6.3. Framing and infilling
 - 6.3.1. Structure and supports.
 - 6.3.2. Walls, Screen & fenesters etc.

6.3.3. Flooring, roofing etc.

6.4. Services

6.4.1. Circulations (Verandah, Balcony, Corridor, Hall, Gallery, Porch, Chowk, Lobby, Stair, Ladder, Lisno, Steps, Ramp, Footways, Bridge, etc)

6.4.2. Cooking and Heating (Chulo, Bake, Oven, Againo, etc)

6.4.3. Sanitation & Hygiene (Latrine ,Bath, Bathing Ghat, sauna, Stone, Spout & Pond etc.

6.4.4. Ventilation cooling and Lighting (courtyard, louvers, Water cooling, Aankhi jhyal, ventilation shaft, wind tower, Water channel etc.

6.4.5. Water supply (Dhunge dhaaro, Opi, Padhero, Canal Chanel, cistern jharu, irrigation.etc)

7. Architectural Types (6 hours)

7.1. Uses and functions of vernacular architecture (4 hrs)

7.2. Domestic architecture
Residential building, Hut Villa and Bungalow, etc.

7.3. Sanctuaries and Temples
Hindu temple, Buddhist Stupa, Church, Chapel, Cult House, Madrasa, Monastery, Mosque, Synagouge, Temple (haveli),Chorten, etc.

7.4. Shrine & Funerary
Cemetery, Grave shed , Grave Shelter, House deity (Vastu Purusha), Memorial, Tomb, Yard Shine, House Shrine, etc.

7.5. Authority & status
Citadel, Dzong, Guest House, Palace etc.

7.6. Economic and social
7.6.1. Economic: Bazaar, Shop, Counter, Store, Grain elevator, Granary (rice) Pottery kiln etc.

7.6.2. Social: Drum tower (Menstruation/birth/Chaaupadi) Bride House, Dacha, Meeting hall, Dharma Sanstha, Tea house, Theater building etc.

7.7. Out building (House) , Barn Cowshed (Goth), Corn culling, Granary, Pigeon Tower Storage Silo Thrashing, House, Watch Tower etc.

8. Roles of Architecture in Community (3 hours)

8.1. survival and continuity of vernacular architecture

8.2. Collaboration of mordan techniques and vernacular techniques

8.3. Roles of architects and mordan techniques

8.4. Role of community

References:

- Encyclopedia of vernacular architecture of the world by Paul Oliver vol 1&2
- The traditional architecture of Kathmandu valley by Wolfgang korn
- The brick &bull by Dr.Prof.S.R.Tiwari
- Temples of Nepal by Joel M.Boch Insacson
- Nepal Ka Kalatmak Jhyalharu by Dr. C. B. Joshi

Practical Assignments:

1. Inventory of existing vernacular architecture (10 hours)
 - Domestic architecture (dwellings)
 - Religious & culture building
 - Scancharies & temples
 - Shrine & funerary architecture
 - Economic social & out building
2. Project work (design work) (15 hours)
 - Conservation & regeneration
 - Renewable and retrofitting
 - Design of new vernacular architects on selected topics
3. Site visit/discussion (5 hours)
 - Report preparation & presentation

Evaluation Scheme:

The question shall cover all the chapters of syllabus. The evaluation scheme will be as indicate in the table below:

Unit	Chapters	Hours	Marks Distribution*
1	1, 4, 6	6	8
2	2, 8	6	8
3	3	6	8
4	5	6	8
5	7	6	8
Total		30	40

*There may be minor deviation in mark distribution.

GREEN BUILDING DESIGN
AR 825 03

Lecture : 2
Tutorial : 0
Practical : 2

Year : V
Part : I

Course Objective:

- To introduce the basic concepts of Green building in relation to architectural design
- To deal with the use of the Green concept in design and construction to produce healthy, economical, comfortable, energy efficient and environment friendly green buildings.

- 1. Concept of Green Building (4 hours)**
 - 1.1. Introduction and Objectives
 - 1.2. History of Green Building
 - 1.3. Importance of Green Building
 - 1.4. Concept of Green Building
- 2. Green Building Rating System (2 hours)**
 - 2.1. Building Rating System
 - 2.2. LEED, BREEAM, CASBEE, GRIHA etc.
- 3. Green Building Design (4 hours)**
 - 3.1. Site efficiency
 - 3.2. Green material and resources
 - 3.3. Green technology
 - 3.4. Energy efficiency
 - 3.5. Water efficiency
 - 3.6. Indoor air quality
 - 3.7. Waste management
 - 3.8. Innovative design
- 4. Site Efficiency (2 hours)**
 - 4.1. Site – Orientation, landscape, open space
 - 4.2. Site – Transportation, community service
- 5. Green Building Material and Resources (3 hours)**
 - 5.1. Embodied energy of material

- 5.2. Reuse & recycle material
- 5.3. Healthy environment friendly material – CSEB, Green concrete, VSBK brick etc.

- 6. Green Building Technology (3 hours)**
 - 6.1. Traditional technique – wall, floor, roof, Rammed earth
 - 6.2. Modern Green technique - Rat-trap bond, cavity structure, Inco-panel, UPVC door, windows, CSEB roof etc.
- 7. Energy Efficiency (5 hours)**
 - 7.1. Energy efficient Lighting – Day lighting, artificial lighting
 - 7.2. Day lighting – Atrium, Sky light
 - 7.3. Artificial lighting – CFL, LED lighting,
 - 7.4. Passive Solar Design
Passive solar heating, Passive solar cooling, Passive solar heating & cooling
 - 7.5. Passive solar heating - Direct, Indirect, Isolated gain, color, texture
 - 7.6. Passive solar cooling – Shading, ventilation, color, texture Courtyard effect, Air cooling, Earth cooling, EAT, Evaporation cooling
 - 7.7. Combined Passive heating and cooling
 - 7.8. Trombe wall, Roof ponds, Solar chimney, Wind tower, etc.
 - 7.9. Active system- Solar PV panel, Solar water heater
- 8. Water Efficiency, Solid Waste Management & Indoor Air Quality (1 hour)**
 - 8.1. Water-efficient toilet, Sensor taps
 - 8.2. Rainwater harvesting, Waste water treatment
 - 8.3. Biomass - Biogas, bio-digester
- 9. Case Study of Green Buildings in Nepal (2 hours)**
 - 9.1. Zero Energy Building (CES)
 - 9.2. Green School Buildings
 - 9.3. LEED rated Buildings
- 10. Project Work with the Application Green Building Design (4 hours)**
 - 10.1. Design of a Green building in Nepal
 - 10.2. Climatic data- Solar radiation, Temperature, Wind pattern, Humidity, Precipitation
 - 10.3. 10.3 Micro-climatic data- local wind flow, Solar access to the site, vegetation, water body
 - 10.4. Objective – Design response with green, energy efficiency & environment friendly

- 10.5. Site selection - with transportation, community service, environment friendly
- 10.6. Application of energy-efficient design
- 10.7. Selection of Green materials & construction technology
- 10.8. Integration of Renewable Energy systems
- 10.9. Lighting & HVAC system
- 10.10. Water efficiency & Solid waste management
- 10.11. Conclusion

References:

1. Er. B Pahari, 2002 "Passive Building-Concept & Design" KEC, Lalitpur, Nepal
2. N. K. Bansal & K. Rijal "Passive Solar Building in the Mountains" – ICIMOD, Nepal
3. K. Rijal "Energy use in Mountain areas"- ICIMOD, Nepal
4. M Majumdar, 2002 "Energy- efficient buildings in India"- teri, New Delhi, India
5. "Sustainable Building Design Manual"- 2004 ERI, New Delhi, India
6. V. Gupta 1984 "Energy & Habitat" – Wiley Eastern Ltd, New Delhi, India
7. S. Nienhuys, 2003, "Insulation for Houses in high altitudes" Renewable Energy Documents-2003, SNV Nepal
8. Koenigsberger, Ingersoll, 1975 "Manual of Tropical Housing and Building" – Orient Longman, Chennai, India,
9. S V Szokolay, A krishan, 2001 "Climate Responsive Architecture" – Tata McGraw- Hill, New Delhi, India
10. S. Prakash, 1991" Solar architecture and Earth construction in the Northwest Himalaya" – Har-Anand Publication, New Delhi, India
11. "Climatological Records of Nepal" -Department of Meteorology, Government of Nepal
12. www.Green building.com

Practical Assignment:

Evaluation Schedule for Practical Works

S.No	Time	Stage	Marks
1	10 hrs	Case Studies / Assignments on: <ul style="list-style-type: none"> • Different GREEN buildings • Observation of different GREEN building rating system LEED, GRIHA, CASBEE, etc. • Observation of climate, site, material, technology and energy for GREEN building • Presentation 	15
2	15 hrs	Assignments on: <ul style="list-style-type: none"> • Design or renovation of a building with GREEN concept • Presentation 	15
3	5 hrs	Report Submission / Attendance	20
Total	30 hrs		50

Evaluation Scheme:

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

Unit	Chapter	Hours	Total Marks
1.	1,2	6	8
2.	3, 4	6	8
3.	5,6	6	8
4.	7,8	6	8
5.	9,10	6	8
	Total:	30	40

* There may be minor deviation in marks distribution.

GEOGRAPHIC INFORMATION SYSTEM

AR 825 04

Lecture : 2

Tutorial : 0

Practical : 2

Year : V

Part : I

Course Objective:

On Completion, a student will be able to

- Understand the principle and the use of GIS vocabulary
- Carryout basic GIS Operation
- Use the knowledge of GIS for settlement study & planning/ urban diversity and infrastructure planning & inventory assessments
- Understand fundamentals of Remote Sensing, Global Positioning System (GPS)

1. Overview of GIS (6 hours)

- 1.1. Introduction and background of GIS
- 1.2. GIS sub-systems
 - 1.2.1. Data input
 - 1.2.2. Data Storage and retrieval
 - 1.2.3. Data manipulation and analysis
 - 1.2.4. Data output
- 1.3. Components of GIS – Hardware, software, Data, People, Methods
- 1.4. GIS Applications
 - 1.4.1. Different application fields
 - 1.4.2. Key features of GIS
- 1.5. Perspectives on GIS and Sustainability Management
- 1.6. Introduction to Remote Sensing

2. Map Projection Systems (2 hours)

- 2.1. Map scale
- 2.2. Map projections and its classification
 - 2.2.1. According to geometric surface - azimuthal, cylindrical & conical
 - 2.2.2. According to the property - equivalent, equidistant & conformal
- 2.3 Spatial coordinate system
 - 2.2.3. Geographic coordinate system
 - 2.2.4. Plane coordinate system
- 2.4 Global Positioning System

3. Data Source and Data Model (4 hours)

- 3.1. Data types
 - 3.1.1. Spatial data
 - 3.1.2. Vector data - Point, Line and Polygon
 - 3.1.3. Raster data – eg. DEM
- 3.2. Comparison between vector and raster data types
- 3.3. Other data types
 - 3.3.1. Image data
 - 3.3.2. Triangular Irregular Network (TIN)
- 3.4. Data sources and geo-referencing of spatial data

4. Data Analysis (6 hours)

- 4.1. Introduction to Data analysis
- 4.2. Analysis types
 - 4.2.1. Database Query.
 - 4.2.2. Spatial Query
 - 4.2.3. Overlay Operations
 - 4.2.4. Network analysis.
 - 4.2.5. Buffer Operations

5. Data Presentation (4 hours)

- 5.1. Common Map Elements
- 5.2. Map Classification
 - 5.2.1. Cadastral Maps
 - 5.2.2. Topographic Maps
 - 5.2.3. Thematic Maps
- 5.3. Bertin's visual variables
- 5.4. Data type classification
 - 5.4.1. Qualitative data – Nominal
 - 5.4.2. Quantitative data – Ordinal, Interval, Ratio
- 5.5. Map visualization & map presentation techniques
 - 5.5.1. Qualitative data
 - 5.5.2. Quantitative data – Absolute and Relative

6. GIS Application for Architects and Planners (8 hours)

- 6.1. Urban Land use Planning
 - 6.1.1. Objectives of Landuse Planning – Activities, Location, Implementation
 - 6.1.2. Effective use of GIS for land use planning
- 6.2. Urban Infrastructure Management

- 6.2.1 Infrastructure types
- 6.2.2 Principles of GIS in Infrastructure management
- 6.3. Urban Transport
 - 6.3.1 Definition of Urban transport
 - 6.3.2 Aggregate and disaggregate models
 - 6.3.3 Application of GIS in transport planning
- 6.4. Disaster Management
 - 6.4.1 Urban disaster management
 - 6.4.2 Key definitions – Hazard, Risk, Vulnerability,
 - 6.4.3 GIS application in disaster management

- 3. Nyerges, T.I., Jankowski, P. (2010), “Regional and Urban GIS, A Decision Support Approach”, ISBN 978-1-60623-336-8, THE GUILFORD PRESS, New York.
- 4. Sutton, T., Dassau, O., Sutton, M. (2009), “A Gentle Introduction to GIS”, Spatial Planning & Information, Department of Land Affairs, Eastern Cape.

Practical:

S.No	Duration	Stage	Marks
1	10 hrs	Preliminary exercises: <ul style="list-style-type: none"> • Usage of GIS software package – Arc-Catalog & ArcMap. • Various Exercises for understanding GIS Concepts 	10
2	20 hrs	Case Studies / Assignments on: <ul style="list-style-type: none"> • Problem Identification • Data collection • Data analysis • Cartography & map presentation • Presentation on findings Possible Topics: Settlement Planning, Infrastructure, Transport, Disaster related etc.	40
3		Report Submission	
Total	30		50

References:

- 1. Albrecht, J. (2007), “Key Concepts & Techniques in GIS”, SAGE Publication.
- 2. Masser, I., Hofstee, P., Brussel, M. (2006) “GIS for Urban Planning in the Developing World”, ITC Publication.

Evaluation Scheme:

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

Unit	Chapter	Hours	Marks Distribution *
1.	1	6	8
2.	2, 3	2+4 = 6	8
3.	4	6	8
4.	5, 6	4+2 = 6	8
5.	6	6	8
Total		30	40

* There may be minor deviation in marks distribution

- 11.1. Water-efficient toilet, Sensor taps
- 11.2. Rainwater harvesting, Waste water treatment
- 11.3. Biogas/bio-digester

12. Case study of Energy Efficient Buildings - Zero Energy Building & other Buildings (2 hours)

13. Project Work with the Application of Energy Efficient Building Design (4 hours)

- 13.1. Design of a building in one of the climatic zones of Nepal
- 13.2. Climatic data- Solar radiation, Temperature, Wind pattern, Humidity, Precipitation
- 13.3. Micro-climatic data- local wind flow, Solar access to the site, vegetation, water body
- 13.4. Objective – Design response with energy efficiency & environment friendly
- 13.5. Site analysis- site efficiency with topography, orientation, Solar envelope
- 13.6. Application of energy-efficient design
- 13.7. Selection of materials & construction technology
- 13.8. Integration of Renewable Energy systems
- 13.9. Lighting & HVAC system
- 13.10. Water efficiency & Solid waste management
- 13.11. Conclusion

Practical Assignment:

Evaluation Schedule for Practical Works

S.No	Duration	Stage	Marks
1	10 hours	Case Studies / Assignments on: <ul style="list-style-type: none"> • Different energy-efficient buildings • Observation of different energy efficient building rating system LEED, GRIHA, etc. • Observation of climate, site, material, technology and energy for energy-efficient system • Presentation 	15
2	15 hours	Assignments on: <ul style="list-style-type: none"> • Design or renovation of a building with energy-efficiency • Presentation 	15
3	5 hours	Report Submission / Attendance	20
Total	30 hours		50

References:

1. Er. B Pahari, 2002 "Passive Building-Concept & Design" KEC, Lalitpur, Nepal
2. N.K.Bansal & K.Rijal "Passive Solar Building in the Mountains" – ICIMOD, Nepal
3. K.Rijal "Energy use in Mountain areas"- ICIMOD, Nepal
4. M Majumdar, 2002 "Energy- efficient buildings in India"- teri, New Delhi, India
5. "Sustainable Building Design Manual"- 2004 ERI, New Delhi, India
6. V.Gupta 1984 "Energy & Habitat" – Wiley Eastern Ltd, New Delhi, India
7. S. Nienhuys, 2003, "Insulation for Houses in high altitudes" Renewable Energy Documents-2003, SNV Nepal
8. Koenigsberger, Ingersoll, 1975 "Manual of Tropical Housing and Building" – Orient Longman, Chennai, India,
9. S V Szokolay, A krishan, 2001 "Climate Responsive Architecture" – Tata McGraw- Hill, New Delhi, India
10. S. Prakash, 1991" Solar architecture and Earth construction in the Northwest Himalaya" – Har-Anand Publication, New Delhi, India
11. "Climatological Records of Nepal" –Department of Meteorology, Government of Nepal
12. www.energyefficientbuilding.com

Evaluation Scheme:

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

Unit	Chapter	Hours	Total Marks
1	1,2	6	8
2	3, 4,5	6	8
3	6,7,8	6	8
4	9,10,11	6	8
5	12,13	6	8
	Total:	30	40

* There may be minor deviation in marks distribution.

THESIS DESIGN AR 851

Tutorial : 7 (Contact hours)
Practical : 23 (Studio working hours)

Year : V
Part : II

Course Objective:

A thesis in architecture is expected to be a solution of a creative design problem (of a building complex, a building or elements of a building) that may have differing focus as seen from the perspective of different support courses such as environment, ecology, energy, design theory, climatology, planning, materials and technology of construction, services and the like. The thesis aims to demonstrate the students' ability and development to pursue analytical investigations related to the design of a building and/or its cultural, social, economic, material, climatic, technological, etc. dimensions. It should balance research and design application components. It should respond to contemporary issues in architecture and design.

The thesis design will be as per the proposal approved in the earlier semester and will be approached on the basis of research outcomes thereof. The students will undertake any additional research and study as needed. It will lead to the following final output:

- (i) **Design/Drawing component:** Drawings to fully explain conceptualization, development and design of the approved project. The output will be in form of presentation drawings. The drawings shall at least pertain to site and layouts, plans as required, four elevations and at least two sections, two perspectives, 3D drawings and model as necessary to fully explain the concept and design. Students shall seek prior approval for use of different sizes of drawings.
- (ii) **Explanatory Component:** The thesis shall also contain a written explanatory section describing the concept/ design and this section will be illustrated with A4 size schematic drawings of the proposal. Thesis report shall include the proposal, fundamental research process and findings, case study analysis and findings as separate chapters.

[Size A4 for written, illustrative and explanatory components: Black on white. Sketches and limited number of BW Photographs]

- (iii) Submission for Department records and study completion: Final of Thesis Report with an appendix of photographic reproductions of all drawings and Models.

Multimedia presentations supplements may be allowed with permission but this shall not replace the drawings and models.

The studio works will be reviewed in following stages of design exercise:

- 1. Conceptual Design (28 hours)**
The first stage of submissions and presentations will be expressions of ideas and concepts in design and planning for the approved thesis project based on guidelines and conclusions (points of departures and cautions) from the research and case studies done in the previous semester or additional studies done afterwards to meet the demands of comments made during the case study presentations (ii) make analysis of site for design purpose (iii) think-up some basic ideas and (iv) apply these together to formulate planning and design concepts and (v) draw and present the concepts in the form of basic/explanatory sketches/drawing. Concepts will be produced as 'presentation drawings and sketches'.
- 2. Preliminary Design (28 hours)**
At this stage the concepts will be detailed into designs and a presentation of major aspects of the design shall be made in the preliminary form with, say, single line drawings in orthographic plans/elevations/sections or perspectives and/or with simple models in paper, wood etc. – they should explain the translation of the idea/concept into the design. Review team shall include at least one internal faculty.
- 3. Design Development (28 hours)**
Further development of designs shall be made along with sufficient consideration of form, style, energy, services, structure, construction,

safety and security, etc. and output presented in form of presentation drawings. The drawings shall at least pertain to site and layouts, plans as required, four elevations and at least two sections, two perspectives or model and as necessary to fully explain the concept and design. Review team shall include at least one faculty from other colleges.

4. THESIS FINAL SUBMISSION (21 hours)

For Jury Review including a Draft Thesis report

Assessments Marks Distribution:

S. No.	Title	Hour	Total Marks
1.	Conceptual Design. Review of presentations on Drawing Paper	28 hours	100
2.	Preliminary Design. Review of presentations on Drawing Paper.	28 hours	100
3.	Design Development. Review of presentations on Drawing Paper.	28 hours	100

Examination Marks:

S. No.	Title	Hour	Total Marks
1.	Jury Examination	-	300

Reference:

All references as identified for supporting courses.