Professional Training (Practicum)
AR 701

Practical : 30 **Year : IV**
Part : I

Course Objectives:

- To emphasize the application of principles, techniques and methods of designing, drafting, constructing etc, in practice, from the lessons learnt in previous semesters and consolidate their knowledge.
- To focus on problem based practical learning through experience in architectural/ engineering/ planning fields in the current market practice.

Instructions and Requirements:

- During this semester students will be required to register themselves as a trainee to assist architects/ engineers/ planners in an architectural firm/ Construction Company or other related offices of governmental/non-governmental organization approved by the department.
- The student will compulsorily identify their training places/offices/firms/companies before the close of 3rd yr/ II Part. The work must be done in design offices and site supervision alone will not be accepted as sufficient work.
- The area of work could be architectural design, urban design and planning, conservation of buildings and urban conservation and studies or mix of these areas etc. Estimating, costing and preparation of tender documents, specification, preparation of working drawings including structural and services drawing, site supervision, property valuation and other related works to the architectural discipline.
- Log books will have to be maintained by students and counter-signed by the principal of the firm/agency and 90 working days is mandatory to fulfill the course.
- The department will allocate departmental supervisors and the accepting firm/ company / office will appoint their supervisor from among its architects/ engineer/ planner etc to assist students in the learning process.

Supervision & Evaluation:

1. The modality of supervision during the course of practicum shall be as per the program fixed by the department.

2. **Evaluation and marks distribution:**

S. No.	Stage	Timing	Marks
1.	Preliminary evaluation	5th/6th Week	25
2.	Mid-term evaluation	11th/12th week	50
3.	Final evaluation by employing agency/firm	12th/13th week	100
4.	Final evaluation by department- Viva Voce	14th/15th week	75
5.	Final report		50
	Total		**300**

ARCHITECTURAL CONSERVATION
AR 751

Lecture : 4 **Year : IV**
Tutorial : 0 **Part : II**
Practical : 0

Course Objective:

- To highlight the theory and practice of conservation.
- To sensitize the students with the issues pertaining the conservation of cultural property
- To familiarize with their problems and the approaches in conservation.
- To focus on limitations of maintenance, repair and restoration.

1. Conservation **(12 hours)**

1.1. Definition
1.2. History
  1.2.1. Western-Conservation in ancient, medieval and modern periods
  1.2.2. Nepalese- Conservation in ancient, Lichhavi, Malla, Shah &Rana periods.

1.3. Philosophy
  1.3.1. Authenticity- Materials, Form, Structure
  1.3.2. Principles of conservation – Reversibility, Minimum intervention, Maximum retention

2. Cultural Property **(8 hours)**

2.1. Phenomenon of deterioration – Natural and human action.
2.2. Needs to repair, maintain and conserve values in conservation – Emotional , Historic, Archeological and Social values

3. Methodologies of Conservation **(12 hours)**

3.1. Inventory
3.2. Inspection
3.3. Documentation and Interventions- Degrees and Strategies
Prevention of deterioration, Preservation, Consolidation, Restoration, Rehabilitation, Reintegration, Anastylosis, Renovation, Conjectural restoration, with examples from national and international cases: Hanuman Dhoka Palace, Bhaktapur Development Project, Renovation of 55 windows palace.

4. Materials and Techniques (Traditional vs modern) **(8 hours)**

4.1. Traditional materials and techniques of conservation in Nepal eg; walls and facing, floors and joist replacements, roof structure and Jhingati, Dalans and column/beam sets, Doors & windows, mud and mud mortar, problems in wood works and brick works in traditional buildings.
4.2. Modern materials and techniques in use, roof tar, water proofing, damp proofing, problems in innovation and practice, examples Mayadevi temple at Lumbini, Keshav Narayan chowk at Patan, ChysilinMandap etc.

5. Historic Buildings **(8 hours)**

5.1. Rehabilitation
5.2. Adaptive Use

6. Design and Planning Control **(12 hours)**

6.1. Ancient Monuments Preservation act 1955 and revisions
6.2. World Heritage Site, criteria and procedure for nomination and inscriptions.
6.3. General Bye-laws and specific building control norms applied in monument Zones in Kathmandu Valley WHS, Problems and issues, conservation of urban cultural landscape, heritage spaces and cities, listing in WHS in danger .
6.4. Management plan and regulations of design/construction.

References:

1. Feilden, Bernard M, 1982, Conservation of Historic Buildings, London.
2. Fitch, James Marston, 1992, Historic Preservation, University of Virginia Press.
3. JokilethoJokka, A History of Architectural Conservation, University of York
4. Parajuli, Yogeshwor, 1986. Bhaktapur, Bhaktapur Development Project Board.
5. Sanday, John 1979. Building Conservation in Nepal, UNESCO, Paris.
6. Sanday, John 1979, Hanuman Dhoka, AARP, London.
7. Sanday, John 1979. Monuments of the Kathmandu Valley, UNESCO, Paris.

Evaluation Scheme:

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

Unit.	Chapters	Hours	Marks Distribution *
1	1	12	16
2	2, 4	8+4	16
3	3	12	16
4	5, 4	8+4	16
5	6	12	16
Total		60	80

* There may be minor deviation in marks distribution.

BUILDING SERVICES III
ME 760

Lecture : 2 **Year : IV**
Tutorial : 0 **Part : II**
Practical : 2

Course Objective:
To familiarize the students with basics of services requirements in building construction i.e.; HVAC Systems, Fire Protection System,Vertical Transportation and other mechanical equipment.

1. **Energy:**Energy planning and auditing **(2 hours)**

2. **HVAC Systems** **(8hours)**
   2.1. Psychometric Chart,Thermal comfort, Ventilation standard
   2.2. HVAC design
   2.3. Components and Types of HVAC systems
   2.4. Installation of HVAC Systems
   2.5. Heating System (Solar/Boilers)

3. **Fire Protection Systems** **(6 hours)**
   3.1. Types of fire and safety codes
   3.2. Wet / dry pipe systems design
   3.3. Hydrant and sprinklers system design

4. **Vertical transportation systems and Construction equipment** **(8 hours)**
   4.1. Lifts and Escalators
   4.2. Transport Lifts and Construction Hoist
   4.3. Construction Equipment (Site preparation)

5. **Coordination of services with other discipline of construction** **(6 hours)**
   5.1. Air-conditioning system
   5.2. Fire protection System demonstration
   5.3. Solar PV and heating system
   5.4. Construction sites

Practical / Site Visit: **(30 hours)**

References:

1. Edward G. Pita , 2002 "Airconditioning Principles and System."
2. David V. Chadderton, 1995, "Building Services Engineering."
3. R.S.Khurmi / J.K.Gupta, 2011 "Refrigeration and Air-conditioning.

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

S. No.	Chapters	Hours	Marks Distribution*
1	(4hr2)	2+5	8
2	2	6	8
3	3	5	8
4	4,2	4+2	8
5	5,2	4+2	8
	Total	30	40

* There may be minor deviation in marks distribution.

COMMUNICATIONS (English & Nepali)
SH 754

Lecture : 2 **Year : IV**
Tutorial : 1 **Part : II**
Practical : 0

ENGLISH

Course Objective:
To make the students capable of producing professional writings such at technical proposals, reports and project works

Unit I: Reading

1. **Intensive Reading** **(5 hours)**
   - 1.1. Comprehension
   - 1.2. Note-taking
   - 1.3. Summary Writing
   - 1.4. Contextual questions based on facts and imagination
   - 1.5. Interpreting texts
2. **Extensive Reading** **(3 hours)**
   - 2.1. Title/Topic Speculation
   - 2.2. finding theme
   - 2.3. Sketching character
3. **Contextual Grammar** **(3 hours)**
   - 3.1. Sequence of tense
   - 3.2. Voice
   - 3.3. subject-Verb agreement
   - 3.4. Conditional Sentences
   - 3.5. Preposition

Unit II :

4. **Varieties of English** **(5 hours)**
   - 4.1. Formal/Informal English
   - 4.2. Familiar/Polite/More Polite English
   - 4.3. Personal/Impersonal English

Unit III

5. **Writing Technical Proposal** **(4 hours)**
   - 5.1. Introduction
   - 5.2. Parts of the proposal
     - 5.2.1. title page
     - 5.2.2. Abstract/Summary
     - 5.2.3. Statement of problem
     - 5.2.4. Rational
     - 5.2.5. Objectives
     - 5.2.6. Procedure/Methodology
     - 5.2.7. Cost estimate or Budget
     - 5.2.8. Time management/schedule
     - 5.2.9. Summary
     - 5.2.10. Conclusion
     - 5.2.11. References
     - 5.2.12. Annexes

Unit IV

6. **Writing formal Reports:** **(6 hours)**
   - 6.1. Formal Reports
     - 6.1.1. Introduction
     - 6.1.2. Parts and components of formal Report
       - 6.1.2.1. Preliminary Section
         - 6.1.2.1.1. Cover page
         - 6.1.2.1.2. Letter of transmittal/Preface
         - 6.1.2.1.3. Title page
         - 6.1.2.1.4. Acknowledgements
         - 6.1.2.1.5. Table of figures and tables
         - 6.1.2.1.6. Abstract/Executive summary
       - 6.1.2.2. Main section
         - 6.1.2.2.1. Introduction
         - 6.1.2.2.2. Discussion/Body
         - 6.1.2.2.3. Summary/Conclusion
         - 6.1.2.2.4. Recommendations
       - 6.1.2.3. Documentation
         - 6.1.2.3.1. Notes (contextual/Footnotes)
         - 6.1.2.3.2. Bibliography
         - 6.1.2.3.3. Appendix

Unit V

7. Writing Project Work: **(4 hours)**

7.1. Introduction

7.2. Parts

References:

??

Evaluation Scheme:

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

Unit	Chapters	Hours	Marks Distribution
1	1, 2	3	4
2	3, 4	3	4
3	5	3	4
4	6	3	4
5	1,5,6	3	4
	Total	15	20

* There may be minor deviation in marks distribution.

नेपाली खण्ड

१. पाठ्यांश परिचय:

विद्यार्थीहरुको वास्तूकला (आर्किटेक्चर) विषयलाई नेपालीभाषामा सम्प्रेषण–बोध र अभिव्यक्ति) गर्ने क्षमताको विकास हूने अपेक्षा राखिएको छ ।

२. पाठ्यांशको उद्देश्य:

यस पाठ्यांशको उद्देश्यबाट विद्यार्थीहरु निम्नलिखित कूरामा सक्षमहूनेछन् :

क) प्रयोजनपरक नेपालीको सामान्य सैद्धान्तिकपहिचानगर्न,

ख) वास्तूकलाप्रविधिको सम्प्रेषण नेपालीभाषाको प्रयोग गर्न,

ग) वास्तूकलाकाविविधविषयमामौखिक सम्प्रेषणकालागिगोलमेच छलफल, बैठक सञ्चालन, मौखिकप्रतिवेदन र प्रवचनगर्न,

घ) वास्तूकलाविषयक्षेत्रमा लेखिएकागद्यअभिव्यक्तिहरुको बोध गर्न,

ङ) वास्तूकलाकाविषयक्षेत्रमा लेख/निवन्ध, प्रस्ताव र प्रतिवेदन लेख्न र व्यावहारिक लेखनकाअन्यलिखितअभिव्यक्तिहरु प्रस्तूतगर्न ।

३. पाठ्यविषयको विवरण:

क) प्रयोजनपरक नेपालीको पहिचान (पाठघण्टा १)

- o सामान्य र प्रयोजनपरक नेपालीको भेद
- o वास्तूकला/इञ्जिनियरिङ क्षेत्रमाप्रयोजनपरक नेपालीको महत्व
- o वास्तूकला/इञ्जिनियरिङ विषयको सम्प्रेषणकालागि नेपालीभाषाको प्रयोगको वर्तमान स्थिति (प्रयास र सम्भावना)

ख) मौखिक सम्प्रेषण (पाठघण्टा २±८, अङ्क १०)

- o वास्तूकला क्षेत्रका समस्यामुलकविषयमागोलमेच छलफलको अभ्यास
- o कूनै भवन, परियोजनामुलककार्य आदिको प्रगतिविवरण, डिजाइन, समस्यानिवारण जस्ता समसामयिकविषयमागरिने बैठक संचालनको अभ्यास
- o कूनै स्थल, भवनआदिको निरीक्षण वालिखित प्रस्तावबाप्रतिवेदनको सारांशमौखिक रुपमा प्रस्तूतगर्ने अभ्यास
- o आफुले पढेकाकूनै खास विषयमा छोटो प्रवचनगर्ने अभ्यास

ग) प्रयोजनपरक बोध (पाठघण्टा २±८, अंक १०)

- सामान्य र प्रयोजनपरक नेपालीको भेद
- वास्तूकलाप्रतिविको विषयकागद्यअभिव्यक्तिहरुको बोध अभ्यास
- उक्तगद्यअभिव्यक्तिहरुबाट विशिष्ट र प्राविधिकशब्दतथापदावलीको अर्थज्ञान र प्रयोग गर्ने अभ्यास
- उक्तगद्यअभिव्यक्तिका पद–पदावली र वाक्यका संरचनागतविशिष्टततहरुको पहिचानगर्ने अभ्यास

घ) लेख/निवबन्ध लेखन (पाठघण्टा १±८, अंक १०)

- वास्तूकलासंग सम्वन्धितविविधविषयशीर्षकहरुमाआधारित भई लेख/निबन्ध लेखनको अध्यास

ङ) प्रस्ताव र प्रतिवेदन लेखन(पाठघण्टा २±८, अंक ५±१०)

- अनूसन्धान र परियोजना संचालनकालागिविविधविषयहरुमा संक्षिप्त प्रस्ताव लेखनको अभ्यास
- प्रयोगशाला परीक्षण, प्रगतिविवरण, स्थलगतनिरीक्षण वाअवलोकन, सर्वेक्षण, सम्भाव्यताअध्ययनको संक्षिप्तप्रतिवेदन लेखनको अभ्यास

च) व्यवहारिक लेखन (पाठघण्टा १±५, अंक ५)

- निवेदन, कार्यालयीयपत्र, सुचना, टिप्पणी (कार्यालयीय) र विज्ञापन लेखनको अभ्यास

४. वास्तूकला सम्प्रेषणकालागि नेपाली (कोर्स म्यानूयल): लेखन तथा सम्पादन:प्रा. लालानाथ सूवेदी

५. मुल्यांन:

क) मौखिक सम्प्रेषणबाट आन्तरिक मुल्यांनगरिनेछ । यसलाई अर्धवार्षिक परीक्षामा समावेश गरिने छैन ।

ख) अर्भवार्षिक परीक्षाबाट गरिने मुल्यांनकालागिविशिष्टीकरण तालिका (स्पेसिफिकेशनचार्ट) र त्यस अनूसारको नमूनाप्रश्नपत्र पछि तयार गरिनेछ ।

द्रष्टब्य:

क) पाठघण्टाको अगाडिको आंबाट सिद्धान्त र पछाडिको आंबाट अभ्यास बू‰नूपर्नेछ ।

ख) यस पाठ्यांक्रमअनूसार शिक्षण गर्न हालको कोर्स म्यानूयलमामौखिक सम्प्रेषणसम्बन्धी सामग्रीथपगर्नूपर्नेछ ।

पाठ्यपुस्तक

- वास्तूकला सम्प्रेषणकालागि नेपाली (कोर्स म्यानूयल): लेखन तथा सम्पादन:प्रा. लालानाथ सूवेदी

Evaluation Scheme:

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

Unit	Chapter	Hours	Marks Distribution*
1	1,2	3	4
2	3	3	4
3	4	3	4
4	5	3	4
5	3, 6	3	4
	Total	15	20

* There may be minor deviation in marks distribution.

CONSTRUCTION MANAGEMENT
AR 753

Lecture : 4 **Year :IV**
Tutorial : 0 **Part : II**
Practical : 0

Course Objective:
The lessons in this course will address the pertinent issues and approaches to be considered during construction. At the same time the Architect is expected to realize his/her responsibility in undertaking and in the implementation of a construction project.

1. **Introduction to Construction Management** **(2 hours)**
   - 1.1. Management: need and necessity
   - 1.2. Role of Architects in Construction Management
2. **Contract Administration** **(10 hours)**
   - 2.1. Understanding Contract Administration and the Architects role
   - 2.2. Procurement Guidelines and selection and criteria
   - 2.3. Terms of Reference and Contract Agreements
   - 2.4. Bid and Contract Documents
   - 2.5. Progress report & billing
3. **Planning & Scheduling** **(10 hours)**
   - 3.1. Introduction to planned approaches in construction
   - 3.2. Planning importance and techniques
   - 3.3. Bar or Gantt Charts
   - 3.4. Networking and it's features: critical path diagrams
   - 3.5. S-curve
4. **Personnel Management** **(6 hours)**
   - 4.1. Understanding the importance of human resources as a valuable sector
   - 4.2. Human Resource as a valuable sector
   - 4.3. Institution: objectives and goals
   - 4.4. Organizationapproaches
5. **Material Management** **(6 hours)**
   - 5.1. Understanding effective purchasing techniques, material handling and inventory control
   - 5.2. Economic Order Quantity: ascertaining savings
   - 5.3. Best Practice and Quality Assurance
   - **5.4.** Proprietary rights
6. **Quality in Construction** **(4 hours)**
   - 6.1. Importance of quality construction in design and construction works
   - 6.2. Best Practice and Quality Assurance
   - **6.3.** Principles of Inspection
7. **Maintenance management and Site Equipment** **(4 hours)**
   - 7.1. Significance of managing site and construction equipment
   - 7.2. Repair and Maintenance
   - 7.3. Maintenance Types
8. **Safety** **(6 hours)**
   - 8.1. Understanding the need to create safe working environment
   - 8.2. Effects of physical, physiological and psychological impacts
   - 8.3. Benefits and Losses
   - 8.4. Standard Practices
   - 8.5. Demolition Works
9. **Cost Control** **(4 hours)**
   - 9.1. Understanding the need for cost control
   - 9.2. Necessity and strategies
10. **Financial Management and Accounts** **(8 hours)**
    - 10.1. Introduction to financial planning and information
    - 10.2. Accounting Policy and Cash Flow
    - 10.3. Assets and Liabilities
    - 10.4. Financial Statements: Balance Sheet and income statements
    - 10.5. Auditing and Taxation

References:

1. Construction Planning, Equipments and Methods: R.L. Peurifoy
2. Construction Planning, Equipments and Application: M Verma
3. Construction Planning and Management through System Techniques
4. Management by Network Analysis: A. Bhattacharya and S. Sorkhel
5. Construction Management and Accounts: V.N. Vaziram& S.P. Chandola
6. PERT & CPM: Punhira&Khandelwall

Evaluation Scheme:

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

Units	Chapters	Hours	Marks Distribution*
1	2, 1	10+2	16
2	3, 10	10+2	16
3	4, 9, 10	6+4+2	16
4	5, 6, 10	6+4+2	16
5	7, 8, 10	4+6+2	16
Total		60	80

* There may be minor deviation in marks distribution.

DESIGN STUDIO VII
AR 752

Lecture : 0 **Year : IV**
Tutorial : 0 **Part : II**
Practical : 12

Course Objective:

- Understanding urban spaces and process of improvement, renewal, redevelopment and 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.

Exercise No./Hours	Suggested Project	Content	Marks Distribution
180 Hours	Projects Incorporating Design of: -Public Building of national significance -Redevelopment of historical sites - Re-development and/or urban renewal project.	Master Plan with landscape, Plans, Sections, Elevations, Perspective Drawings Block Model	300

Evaluation Schedule for Project work:

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	

References:

1. Time Savers Standard
2. Neufert Architectural Design Data

STRUCTURES IV
CE 761

Lecture : 3 **Year : IV**
Tutorial : 1 **Part : II**
Practical : 0

Course Objectives:
To understand various structural systems for buildings and their structural performance.

1. **Lateral Load Resisting Systems** **(14 hours)**
   - 1.1. Lateral loads due to earthquake, wind, water and earth pressure.
   - 1.2. Rigid floor diaphragm
   - 1.3. Center of mass and center of rigidity
   - 1.4. Torsionally uncoupled and coupled systems.
   - 1.5. Moment resisting frames, braced frames
   - 1.6. Shear wall system,combination with moment resisting frames
   - 1.7. Structural systems for high rise buildings.
2. **Configuration of Buildings, and its Effect on Structural Performance(6 hours)**
   - 2.1. Structural arrangement plan
   - 2.2. Mass and stiffness distribution
   - 2.3. Plan irregularity
   - 2.4. Elevation irregularity
   - 2.5. Soft storey and weak storey effects
   - 2.6. Code provisions on configurations of buildings
   - 2.7. Effect of irregularity in configuration
3. **Introduction to Shells, Plates and other Structures** **(7 hours)**
   - 3.1. Structural behavior of different types of shells –
   - 3.2. Domes, vaults and folded plates.
   - 3.3. Structural behavior of waffle slabs, ribbed and grid slabs.
   - 3.4. Introduction to prestressed concrete and its use.
   - 3.5. Structural behavior of large span roofs.
   - 3.6. Selection of type of structural components and material of construction
4. **Approximate Analysis and Design of Building Structures** **(8 hours)**
   - 4.1. Analysis and design for gravity loading
   - 4.2. Substitute frame method of analysis
   - 4.3. Portal and cantilever method of frame analysis
   - 4.4. Analysis and design of buildings for wind load
   - 4.5. Codal provisions for wind loading
   - 4.6. Calculation of wind pressure on walls and roofs of buildings
   - 4.7. Load cases and load combinations for design
5. **Earthquake Resistant Design of Buildings** **(10 hours)**
   - 5.1. Principles of earthquake resistant design
   - 5.2. Seismic coefficient method
   - 5.3. Seismic weight
   - 5.4. Seismic coefficient method
   - 5.5. Introduction to response spectrum
   - 5.6. Base shear calculation
   - 5.7. Vertical distribution of base shear
   - 5.8. Displacement and drift requirements
   - 5.9. Torsion
   - 5.10. Joint between adjacent buildings
   - 5.11. Ductility and ductile detailing

References:

1. Dayaratnam, P., "Reinforced Concrete Structures", Oxford & IBH Publishing Co.
2. Jain, A.K., "Reinforced Concrete – Limit State Design", Nem Chand Bros.
3. BIS, IS 1893: 2002 (Part 1) Criteria for earthquake resistant design
4. DUDBC, NBC-105:1994 Seismic design of buildings
5. BIS, IS 13920: 1993 Ductile detailing of reinforced concrete

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

Units.	Chapters	Hours	Marks Distribution
1	1	10	16
2	1, 2	8	16
3	1, 3	9	16
4	4	8	16
5	5	10	16
Total		45	80

* There may be minor deviation in marks distribution.

ELECTIVE I
AR 765

Lecture : 2 **Year : IV**
Tutorial : 1 **Part : II**
Practical : 1.5

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.

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 etc. Pool of topics available for studies will be offered.

Evaluation Schemes:

Assessment	10
Final Exam	40
Practical	50
Total	100

Evaluation Schemes may vary according to the subject offered.

ELECTIVE-I

LOW COST HOUSING
AR765 01

Lecture : 2 **Year : IV**
Practical : 2 **Part : II**
Tutorial : 0

Course Objectives

- To sensitize student with the issue pertaining to low cost housing for the urban and rural low income group.
- To deal with the specific local materials in design and construction of low cost housing.
- To impart the knowledge of low cost construction technology from the perspective of efficient uses of building construction materials.

1. Introduction (2 hours)
- 1.1. Introduction /Background & Definition.
- 1.2. Present housing condition in Nepal
- 1.3. Resource limitation
- 1.4. Role of low cost housing
- 1.5. Low cost housing in SAARC Countries and abroad.

2. Land development (2 hours)
- 2.1. Land for housing
- 2.2. Supply of land
- 2.3. The role of land planning
- 2.4. Supply of housing units through land development works
  - 2.4.1. GLD (Guided Land Development)
  - 2.4.2. Land Pooling
  - 2.4.3. Site and Services
    - 2.4.3.1. site selection
    - 2.4.3.2. site planning and services
    - 2.4.3.3. core housing scheme

3. Infrastructures (2 hours)
- 3.1. Infrastructures & Types
- 3.2. Role of infrastructure planning

4. Low cost housing in urban areas (12 hours)
- 4.1. Design of an individual building (house)
  - 4.1.1. Building plan
  - 4.1.2. Staircase and circulation space
  - 4.1.3. Storey height
  - 4.1.4. Area of Openings
  - 4.1.5. Standardization
- 4.2. Building materials and construction technology
  - 4.2.1. Various types of building materials
  - 4.2.2. Building elements (Element of Building Structure)
  - 4.2.3. Vertical Elements
    - 4.2.3.1. Load bearing structure system & framed structure system
    - 4.2.3.2. Brick masonry
    - 4.2.3.3. Stone masonry
    - 4.2.3.4. Stone block masonry
    - 4.2.3.5. Hollow cement block masonry
    - 4.2.3.6. Timber Framed structure
    - 4.2.3.7. Metal Framed Structure
    - 4.2.3.8. RCC Framed Structure
    - 4.2.3.9. Comparison between conventional RCC pillar system and load bearing wall structure system (brick masonry & hollow cement block masonry)
  - 4.2.4. Horizontal Elements
    - 4.2.4.1. Floor Slab /Roof Slab
    - 4.2.4.2. Cast in situ RCC Slab
    - 4.2.4.3. Precast RCC slab
    - 4.2.4.4. Partial Precast RCC slab
    - 4.2.4.5. waffle slab
    - 4.2.4.6. Comparison between various types of horizontal elements.
  - 4.2.5. Other Elements
    - 4.2.5.1. Pennings
    - 4.2.5.2. Doors, windows & ventilators
    - 4.2.5.3. Size of doors, window & ventilator
    - 4.2.5.4. Materials for door, window & ventilator
    - 4.2.5.5. Timber door and window
    - 4.2.5.6. RCC frame for door and window
    - 4.2.5.7. Frameless door and window
    - 4.2.5.8. Ferro cement door and window
    - 4.2.5.9. Masonry projection door & window
    - 4.2.5.10. Comparison between various types of door & window
    - 4.2.5.11. Staircase –Cast in situ & Precast

5. Low cost housing in rural areas (8 hours)

- 5.1. Introduction and Background
- 5.2. Problems in present housing condition & their solutions
- 5.3. Building materials and construction technology
- 5.4. Elements of building structure (Building Elements)
  - 5.4.1. Vertical elements
    - 5.4.1.1. Load bearing wall structure/Timber & Bamboo framed structure.
    - 5.4.1.2. Stone masonry
    - 5.4.1.3. Brick masonry
    - 5.4.1.4. Rammed mud wall
    - 5.4.1.5. Wattle dub wall
    - 5.4.1.6. Stud(timber/ bamboo)wall
    - 5.4.1.7. Sun dried mud brick wall
    - 5.4.1.8. Compacted soil block wall
    - 5.4.1.9. Stabilized soil block wall
    - 5.4.1.10. Improvement in the compressed soil block
    - 5.4.1.11. Strengthening(retrofitting)the masonry wall
    - 5.4.1.12. Foundation for vertical post (timber /bamboo)
    - 5.4.1.13. Damp proof course in vertical elements
  - 5.4.2. Horizontal elements
    - 5.4.2.1. Floor/Roof
    - 5.4.2.2. Solid floor for ground floor (treatment on ground floor)
    - 5.4.2.3. Roof and roofing techniques
    - 5.4.2.4. Use of thatch, clay tiles stone slab slate, cement tiles and Stabilized soil roof
  - 5.4.3. Other Elements:
    - 5.4.3.1. Openings
    - 5.4.3.2. Door
    - 5.4.3.3. Windows
    - 5.4.3.4. Ventilators

6. Miscellaneous (6hours)

- 6.1. Pavements on ground
  - 6.1.1. Brick pavement for pedestrian traffic
  - 6.1.2. Composite of brick & concrete pavement for pedestrian traffic
  - 6.1.3. Composite of brick & concrete pavement for vehicular traffic
  - 6.1.4. Cost comparison of 6.1.2. & 6.1.3
- 6.2. Pavements of telia bricks over roof /terrace
- 6.3. Advantages of telia brick and cement finish roof /terrace
- 6.4. Low cost latrines
  - 6.4.1. The latrine house (block)
  - 6.4.2. Volume of leaching pit
  - 6.4.3. Cost of low cost latrine

References

1. Low cost housing for practicing engineers and architects text book (by BL. shrestha)
2. Hand book for low cost house A.K. lal
3. Low cost housing in developing countries by G.C Mathur
4. Low cost housing technology by good man Rp. Pama& others

Evaluation Schedule for Practical Works

S.No	Time	Description	Marks	Remarks
1.	10 hrs.	Literature Study Case Study /Inventory of existing low cost housing (Urban/Rural)	10	Discussion & Site (Field Visit)
2.	4 hrs.	Conceptual Design (Urban /Rural) Site Planning & Building Design)	10	Presentation
3.	4 hrs.	Preliminary Deign Work	10	Desk Presentation
4.	12 hrs.	Final Design Work Report & Drawing Preparation	20	Submission/Presentation /VIVA or Oral Examination
Total	30 hr		50	

Evaluation Scheme

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

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

*There may be minor deviation in mark distribution

DISASTER RISK MANAGEMENT IN TRADITIONAL SETTLEMENT
AR 765 02

Lecture : 2 **Year : IV**
Tutorial : 0 **Part : II**
Practical : 2

Course objective

- To familiarize the student with the fundamentals of disaster risk management and develop perspective in the area of risk management of cultural heritage
- To sensitize students with the issues pertaining to the conservation of cultural properties, and seeing it from the lens of risk management
- To support the Design Studio VIII by introducing structural and non-structural interventions in order to reduce the risks to historic properties.

1. **Introduction** **(2hours)**
   1.1. Introduction to disaster in World
   1.2. Scenario of disaster in Asia
   1.3. Disaster in context of Nepal
2. **Terminology and interrelation** **(4hours)**
3. **Disaster risk management** **(6 hours)**
   3.1. Before disaster
   3.2. During disaster
   3.3. After disaster
4. **Characteristics of Traditional settlements in Nepal** **(2 hours)**
5. **Risk assessment, Vulnerability analysis, Risk Map for historic monuments and Cultural heritage** **(4 hours)**
6. **Historic monuments, cultural heritage and different natural as well as man-made risk** **(6 hours)**
7. **Government regulation and Institutional Framework for disaster management and protection of cultural heritage** **(2 hours)**
8. **Indigenous knowledge in disaster risk reduction** **(2 hours)**
9. **Community based risk management technique** **(2 hours)**

Hazard, Disaster, Risk, Vulnerability, Prevention, Mitigation, Response, Recovery

References:

1. Abarquez, I. &Murshed, Z., 2004. Commnuity Based Disaster Risk Reduction, Field Practitioners' Handbook, ADPC
2. Ben Wisner, Piers Blaikie, Terry Cannon and Ian Davis, 2004. At Risk: Natural Hazards, People's Vulnerability and Disasters by, Routledge (2nd Edition)
3. Dill, M., et al. Natural Disaster Hotspots A Global Risk Analysis, The World Bank Publication
4. Gandhi, P. J., 2007. Disaster Mitigation and Management: Post Tsunami Perspectives, Deep & Deep Publications (P) Ltd.
5. Gaur, R., 2002. Disaster Management, Gnosis Publishers, Delhi, India
6. Jana, B.K., 2008. Unprecedented Earthqauke and Dreadful Tsunami, Mohit Publication
7. N. P. Bhandary, J. K. Subedi (Editors), 2010. Disasters and Development: Investing in Sustainable Development of Nepal by Bajra Publications, Kathmandu, Nepal.
8. Pelling, Mark, 1967- The vulnerability of cities : natural disasters and social resilience
9. Rits-DMUCH a, 2009. Disaster Risk Management of Cultural Heritage, International Training Course on Disaster Risk Management of Cultural Heritage 2009, Rits-DMUCH
10. Rits-DMUCH b, 2009. Protecting World Cultural Heritage sites and their Historic Urban Environment from Earthquakes (Doccument), Kathmandu Symposium, 16th to 19th February, 2009,
11. Smith, K., 2004. Environmental Hazards Assessing Risk and Reducing Disaster, Fourth Edition, Routledge, London.
12. Stovel, H., 1998. Risk preparedness: A management manual for world cultural heritage. Rome: ICCROM
13. Thakral, K.K., Disaster Management: Relevant Issues and Challenges, Cybertech Publications
14. Tiwari, S. R., 2002. The Brick and The Bull, HimalPublicatio, Kathmandu, Nepal
15. Tiwari, S. R., 2009. Temples of the Nepal Valley, ISBN 978 9937 8144 3 0 HimalPublicatio, Kathmandu, Nepal

Practical Assignment **(30 hours)**

S. No.	Time	Description	Marks
1	10 hrs.	Presentation on Case study of Disaster (National or International)	15
2	12hrs.	Presentation on Case study of traditional settlement and its disaster risk management in Nepal	20
3	8hrs.	Report on the study of cultural heritage and disaster risk management in Nepal	15
Total	30 hrs.		50

Evaluation Scheme:

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

Units	Chapters	Hours	Marks Distribution*
1	1 + 2	2 + 4 = 6	8
2	3	6	8
3	4+5	2+4 = 6	8
4	6	6	8
5	7 + 8+9	2 + 2 + 2 = 6	8
Total		30	40

PASSIVE SOLAR ARCHITECTURE
AR 765 03

Lecture : 2 **Year : IV**
Tutorial : 0 **Part : II**
Practical: 2

Course Objective:

- To introduce the concept of Passive Solar Architecture in relation to architectural design
- To deal with the use of the specific Passive Solar Architecture in design and construction to produce comfortable, energy efficient and environment friendly buildings.

1. Concept of Passive Solar Architecture [4 hours]
- 1.1. Introduction, Objectives &Importance
- 1.2. History of passive solar architecture
- 1.3. Concept of low energy passive building

2. Concept of Solar Radiation [2 hours]
- 2.1. Solar Energy & its type – Direct, Diffuse & Reflected
- 2.2. Solar Radiation – Absorption & Reflection on Earth
- 2.3. Geometry of Solar movement
- 2.4. Solar Chart & its uses in passive design

3. Concept of Climatology [2 hours]
- 3.1. Climate, weather& season
- 3.2. Micro & Macro, Micro Climatic factors
- 3.3. Site & Urban climate
- 3.4. 3.4 Climatic data & interpretation

4. Passive Building Design Concept [2 hours]
- 4.1. Passive heating system
- 4.2. Passive cooling system
- 4.3. Passive ventilation system

5. Passive Solar Heating System [5 hours]
- 5.1. Passive Solar gain – site planning, orientation, colour, texture, material & technology
- 5.2. Solar gain - Direct gain, Indirect gain & Isolated gain
- 5.3. Direct solar gain – through window, glass wall
- 5.4. Indirect solar gain – through thermal storage wall, floor & roof
- 5.5. Thermal storage wall –Trombe wall, water wall, traditional brick wall
- 5.6. Thermal storage roof –Solar chimney, Rooftrap, Roofpond
- 5.7. Thermal storage floor–traditional composite mud flooring
- 5.8. Isolated solar gain – Green house, Solarium, sunspace, etc

6. Passive Solar Cooling system [5 hours]
- 6.1. Control of Solar radiation – site planning, orientation, material & technology
- 6.2. Solar radiation control techniques - Natural & Artificial
- 6.3. Natural – using colour, texture, vegetation & water body
- 6.4. Artificial - shading by various External & Internal devices
- 6.5. External devices – vertical, horizontal, geometric overhang, chhajjaetc
- 6.6. Internal devices – curtain, venetian blind, special glass etc.
- 6.7. Shading by texture – wall & roof
- 6.8. Roof shading – green roof, inverted pots, vegetation, water spray etc

7. Passive heating and cooling by ventilation system [2 hours]
- 7.1. Stack effect, Air vent
- 7.2. Courtyard effect
- 7.3. Wind tower & EAT system

8. Traditional passive buildings & settlement of Nepal [2 hours]
- 8.1. Traditional residential buildings of Kathmandu
- 8.2. Clusters & Courtyard type building & settlement
- 8.3. Traditional Earth shelters

9. Active Solar Heating & Cooling [2 hours]
- 9.1. Solar water heater, floor heating system
- 9.2. Hybrid system - Natural convective loop, water & air loop

10. Project work with the application of passive solar system [4 hours]
- 10.1. Design of a Residence in one of the climatic zones of Nepal-Terai, Hilly, Kathmandu valley & Mountain
- 10.2. Climatic data- Solar radiation, Temperature, wind pattern, Humidity, Precipitation
- 10.3. Micro-climatic data- local wind flow, Solar access to the site, vegetation, water body
- 10.4. Objective – Design response with comfort & energy efficiency
- 10.5. Site analysis- Topography, orientation, Solar envelope

10.6. Analysis of orientation, site & space planning & building configuration
10.7. Application of passive system for heating & cooling
10.8. Selection of materials & construction technology with low K value, U value
10.9. Construction of Openings, walls, roofs, floors etc.
10.10. Thermal performance of building envelope- wall, roof, opening
10.11. Analysis - Heat gain & loss by external, internal & ventilation load
10.12. Conclusion

Practical Assignment:
Evaluation Schedule for Practical Works

S.No	Duration	Stage	Marks
1	10 hrs	Case Studies / Assignments on: • Observation of different Passive building – Traditional & Modern • Observation of climate, microclimate, site, material, technology and Solar energy for Passive Solar system • Presentation	15
2	15 hrs	Assignments on: • Design or renovation of a building with Passive Solar system • Presentation	15
3	5 hrs	Report Submission /Attendance	20
Total	**30 hrs**		**50**

References:

1. N.K.Bansal&K.Rijal "Passive Solar Building in the Mountains" - ICIMOD
2. K.Rijal "Energy use in Mountain areas"- ICIMOD Nepal
3. V.Gupta 1984 "Energy & Habitat" – Wiley Eastern Ltd, New Delhi, India
4. Er. B Pahari,2002"Passive Building-Concept & Design" KEC, Lalitpur, Nepal
5. S. Nienhuys, 2003, "Insulation for Houses in high altitudes" Renewable Energy Documents-2003, SNV Nepal
6. Koenigsberger, Ingersoll, 1975 "Manual of Tropical Housing and Building" – Orient Longman, Chennai, India,
7. S V Szokolay, A krishan, 2001 "Climate Responsive Architecture" – Tata McGraw- Hill, New Delhi, India
8. S. Prakash, 1991" Solar architecture and Earth construction in the Northwest Himalaya" – Har-Anand Publication, New Delhi, India
9. "Climatological Records of Nepal" –Department of Meteorology, Government of Nepal
10. www.passive solar architecture.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.	3,4,7	6	8
3.	5,6	6	8
4.	6,8	6	8
5.	9,10	6	8
Total		**30**	**40**

* There may be minor deviation in marks distribution

Advance Computer Aided Architectural Graphics
AR 765 04

Lecture : 2 Year : IV
Tutorial : 0 Part : II
Practical : 2

Course objective

- To introduce the course in the study of Computer Aided Drafting (CAD) with regard to Architecture.
- Helps people to believe in the possibility of the design.
- To acquaint the student with the range of graphic tools which are available for conveying architectural notions.
- To prepare students for the professional life with tools that is used in AEC industry.

1. Basic Modelling (6 hours)

A basic class in the study of three-dimensional (3-D) computer aided design for Architecture. The course will use modelling technology where sketch up will be used as the primary software to teach how to model, surface, light and animate the design of a building and its surrounding environmental context.

1.1. Modelling room for visualization
1.2. Composing scene and saving the camera view
1.3. Introduction to texture, materials and components for photo real rendering
1.4. Starting introduction to photo images and rendering
1.5. Walkthrough and flyover
1.6. Presentation in Layouts

2. Building Information Modelling (BIM) (12 hours)

A basic class in the study of Building Information Modelling with Autodesk Revit Architecture as tool. The course will enable student to grasp the idea BIM learn modelling and information handling with Revit architecture

2.1. Introduction to Building Information Modelling (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
  2.4.3. Lessons on doors and windows
  2.4.4. 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 section and elevation vies
2.7. Working with dimensions its constraints
2.8. Developing building Model: Working on creating and modifying floors ceiling and roof
2.9. Presentation of the building model

3. Graphics (8 Hours)

Application of the techniques architectural illustrators uses to render architectural presentation drawings. This course focuses on the organization and preparation of a portfolio showcasing a student's creative work in preparation for employment in the field. Computer photo editing and printing, paper and digital portfolio preparation, and the implications of using a portfolio in the interview process for employment are emphasized. The course will use Adobe Photoshop / Autodesk Impression as the primary software.

3.1. Photoshop workspace basics:Introduction to tools, rulers, grids, guides, plug-ins 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, vigenetting
  3.5.2. using color for emphasis
  3.5.3. replacing skys
  3.5.4. Replication photographic filters
  3.5.5. layer masking for collage
  3.5.6. Adding depth of field
  3.5.7. Stitching paranomas together
  3.5.8. Sharpening techniques
3.6. Showing to the client

4. Presentations **(4 hours)**

Various graphic conventions and techniques will be presented and the rationale behind their use explained. Students will explore visual composition and organization, document assembly methods and various reproduction and image management techniques. Applications for impressive presentation. The course will use Adobe Indesign, skecthup layout as the primary software.

4.1. Adobe Indesign workspace basics for presentations
4.2. Sketchup layout basics for presentations

Practical Evaluation Scheme:

S. No.	Stages	Hours to perform	Mark distribution
1	Literature studies (report submission)	12	5
2	Conceptual design (presentation)	10	5
3	Final design (report and presentation)	8	40
	Total	30	50

There can be deviations in hours and mark distribution with negotiations.

References

1. Learning Autodesk revit Architecture 2010 volume 1 & 2
2. Sketcup 7.1 & 8.1 for architectural visualization
3. Using Adobe Photoshop CS4 @ CS5
4. The Photoshop book for digital photographers
5. Using Adobe indesign CS4 @ CS5

Evaluation Scheme

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

Units	Chapter	Hours	Mark distribution
1	2	6	8
2	2	6	8
3	1	6	8
4	3	6	8
5	3 and 4	2+4	8
Total		30	40

INTERIOR DESIGN
AR 765 05

Lecture : 2 **Year: IV**
Tutorial : 0 **Part : II**
Practical: 2

Course Objective:

- To provide the students the theoretical knowledge of interior design
- To make them acquainted with the curre.. practice of interior design in different buildings
- To make them able to deal with various interior design & declination problems

1. Introduction **(2 hours)**
- 1.1. Interior spaces
- 1.2. Interior design
- 1.3. Interior Display
- 1.4. Importance of architecture in Interiors
- 1.5. The process of ID
- 1.6. Design principles & elements

2. Special Population **(4 hours)**
- 2.1. Design for special population
- 2.2. The ADA and Universal population
- 2.3. Types of special population

3. Colour **(2 hours)**
- 3.1. Historical Evolution of colour
- 3.2. The standard colour wheel theory and scheme
- 3.3. Colour harmony and Properties of colours
- 3.4. The colour trend market

4. Light **(4 hours)**
- 4.1. Liht in interiors
- 4.2. Categories of Artificial Lighting
- 4.3. Light controls and effect
- 4.4. Metamerism

5. Space Planning And The Design Process **(4 hours)**
- 5.1. Plan arrangement
- 5.2. Traffic patterns
- 5.3. Floor plan symbols

6. Furniture Layout/Details And Human Factors **(4 hours)**
- 6.1. Furniture as symbol and History
- 6.2. Furniture arrangement and layout
- 6.3. Design principles in furnitures
- 6.4. Human factors

7. Architectural Details **(4 hours)**
- 7.1. Architectural details in interiors
- 7.2. Wall ceiling Doors and windows
- 7.3. Treatment and finishes
- 7.4. Other details

8. Vastu In Interiors **(4 hours)**
- 8.1. Introduction to Vaastu
  - 8.1.1. Vastu Purusha (Vedic Vastu)
  - 8.1.2. Vastu Mandala
  - 8.1.3. Five Elements and Scientific Application
- 8.2. Planning
  - 8.2.1. Orientation (Space)
  - 8.2.2. Layout (Furniture / Fixtures)
  - 8.2.3. Practical vastu tips for internal environments
- 8.3. Energy and Materials
  - 8.3.1. Energy from colour and light
  - 8.3.2. Vastu remedies in interiors

9. Environmental Considerations **(2 hours)**
- 9.1. Environmental considerations of different material used
- 9.2. The affecting factors in interiors

References:

1. Karla J. Nielson &David A. Taylor, (1990-1994) *"INTERIORS an Introduction*", second Ed., Brown & Benchmark, Publication,Iowa,ISBN,D-b97-12543-2, USA.
2. Chang, D.K.,(1992),*"Interior Design*".
3. Professor B.B.Puri, (2004), *"A Practical Guide to AGE LESS MIND"* ISBN-81-90064-3-7, India.
4. Professor B.B.Puri (2003), *"Vastu Science for 21 st century to Enjoy the gift of Nature"* ISBN 81-7822107-1, New Age Books Publication, India.
5. Halse, Albert O., (1972), "*Architectural Rendering*", Second Ed.
6. MadhuraKarki (1996),*"Arts and Graphics*", IOE, Nepal.
7. MadhuraKarki, (1993) *"Graphics and Presentations"*, IOE,Nepal.

8. Doyle, Michael E. (1993)," *Colour Drawing*".
9. Gardens and Hannferd (1993)"*Lighting Design*".
10. Lim and Rao(1970)"*Environmental Factors in the Design of Building".*
11. Galvin P, J.,(1981),*Kitchen Planning and Designing*

Practical Assignments

S. N.	Hours	Stages	Mark Distribution	Remarks
1	8	Literature Review and Case studies	10	Projects Residential/Non residential
2	16	Design (Concept) Development	15	Work in Theme
3	6	Final Project work (Report Preparation, Presentation)	25	Presentations and working Drawings Compilations of Reports and class works
Total	**30**		**50**	

Evaluation Schemes

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

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

*There may be minor deviation in marks distribution.