MASTER IN ARCHITECTURE (M.Arch)

Course Structure

Year I, Part I (First Semester)

Teaching Schedule				Examination Scheme			Total	Remark
S. N.	Course Code	Course Title	Credit	Theory				
				Assessment Marks	Final			
					Duration hours	Marks		
1	MAr 521 AE	Core Architectural Theories, Contemporary Trend and Criticism	4	40	3	60	100	Core 1
2	MAr 522 AE	Ecologically Responsive Architecture	4	40	3	60	100	Core 2
3	MAr 523 AE	Research Methodology for Architectural Design	4	40	3	60	100	Core 3
4	MAr 524 AE	Design Studio-I	4	40	3	60	100	Core 4
		Total	**16**	**160**	**12**	**240**	**400**	

Year I, Part II (Second Semester)

Teaching Schedule				Examination Scheme			Total	Remark
S. N.	Course Code	Course Title	Credit	Theory				
				Assessment Marks	Final			
					Duration hours	Marks		
1	MAr 671 AE	Urban Design	4	40	3	60	100	Core 5
2	MAr 672 AE	Elective –A1	4	40	3	60	100	
3	MAr 673 AE	Elective –A2	4	40	3	60	100	
4	MAr 674 AE	Design Studio-II	4	40	3	60	100	Core 6
		Total	**16**	**160**	**12**	**240**	**400**	

Year II, Part I (Third Semester)

Teaching Schedule				Examination Scheme			Total	Remark
S. N.	Course Code	Course Title	Credit	Theory				
				Assessment Marks	Final			
					Duration hours	Marks		
1	MAr 525 AE	Elective-B1	4	40	3	60	100	
2	MAr 526 AE	Elective-C1 (Inter/intra Departmental)	4	40	3	60	100	
3	MAr 527 AE	Project Works	4	100	-	-		
		Total	**12**	**120**	**9**	**180**	**300**	

Year II, Part II (fourth semester)

Teaching Schedule				Examination Scheme			Total	Remark
S. N.	Course Code	Course Title	Credit	Theory				
				Assessment Marks	Final			
					Duration hours	Marks		
1	MAr 675 AE	Thesis	16	100	-	-	100	
		Total	**16**	**100**			**100**	

Core 1: **CORE ARCHITECTURAL THEORIES, CONTEMPORARY TRENDS AND CRITICISM**

Course Code: Mar 521 AE
Credits: 4
Total hrs: 60
Year I / Part I

A. Course Overview

The course focuses on expanding knowledge and intensifying students' understanding and ability in evaluating and discussing architectural theories, design thinking and tactics grounded in the history of disciplinary knowledge. The course covers architectural theories coming to the discipline from ancient civilizations to contemporary thinkers and practitioners considering both their words and design works in practice.

B. Course Objectives

The main objectives of the course are to enable students

- to draw connections between the variety of theories and design works,
- to read their impact on architectural design and practice in an increasingly urbanizing world, and
- to think and discover ways in which design can play a meditative/mediative role in the construction of a positive urban environment.

C. Course Outlines:

1. **Unit 1: History of Architectural theories.** (2+2)
   - Introduction to theories, discourses and criticism in Architecture
   - Ancient theories of architecture: Vaastusastra, Vastupurushamandala, Imaging the cosmos (Earth, Time and Space); Vitruvius's Firmitas, Utilitas, Venustas
   - Alberti's De re aedificatoria, Palladio's works.
   - Neo-classicism

2. Unit 2: Architectural Theories and Theorists – I (2+2)
   - Art Nouveau and Charles Rennie Mackintosh.
   - Functionalism, Slogan - Form follows Function.
   - Giedion's Three space Conceptions in Architecture; Space, time and architecture.

3. Unit 3: Architectural Theories and Theorists – II (6+6)
   - Modern architecture, modernism
   - Form, Function, Construction, Space and Power.

- The Masters –thoughts and works of Ludwig Mies van der Rohe, Walter Gropius, Frank Llyod Wright, and, Le Corbusier.
- Constructivism.

4. Unit 4: Architectural Theory and Theorists – III (6+6)

- Post Modern, Frampton's Critical Regionalism, Works and Words of Louis Kahn and Jorn Utzon.
- Form, Languages, Complexities – Words of Christopher Alexander, John Habraken and Nikos A. Salingaros
- Space, time and power; Meaning and Place in Architecture; Phenomenology in architecture, Kevin Lynch and Norberg-Schulz

5. Unit 5: Architectural Theories and Theorists – IV (8+8)

- Biophilia, Biomimetics, Deep Beauty (Nature and Culture)
- Architectural form and the city- Aureli
- Deconstructivism, Architectural responses to changing life style, cities and urbanism. Works and words of Rem Koolhass.
- Select Contemporary Discourses – Words of Star Architects.

6. Unit 6: Review and Criticism of post-50s Architecture in Nepal (6+6)

- Critical Study of select Architectural Works from post 1950 Nepal – the following list is tentative
- Foreign architects – CEDA building, Taragaun Museum (C Pruscha), Annapurna Hotel and Arcade (R Waise), Family Planning Building (L Kahn)
- Nepali architects – Saraswoti Sadan (BP Lohani), Foreign Ministry building, Royal Nepal Academy (SN Rimal), Kamal Kunj (LN Regmi) City Hall (GD Bhatta), SOS Children's Village (DM Sherchan) Dwarika Hotel (BM Singh)

D. Assessments, Assignments, Field works and Tests

Summary/Discussion papers on relevant topics and titles to be prepared and presented as seminar. Students will be assessed for written reports/Essay, presentations and interactions.

E. Evaluation Scheme – Assessments 40%, Examination 60%

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

Units	**Topics**	**Marks ***
Unit 1, Unit 2	As above	12
Unit 3	As above	12
Unit 4	As above	12
Unit 5	As above	12
Unit 6	As above	12
	Total:	**60**

* There may be minor deviation in marks distribution

Core 2: **ECOLOGICALLY RESPONSIVE ARCHITECTURE**

Course Code: MAr 522 AE
Credits: 4
Total hrs: 60 (30 lec.+ 30 Tut.)
Year I / Part I

A. Course Overview

The course focuses on the concepts of ecology and different types of ecosystems and acquaints the student with the relationship of architecture, building and urbanization with environment, ecology and earth/Nature. It seeks to impart the state of the art knowledge on designing and building for the health of both man and earth in sustainable, energy efficient and ecological ways. Case examples from global, vernacular and traditional architecture and towns are studied.

B. Course Objectives

The main objectives of the course are to enable students

- to draw connections between planning, design and construction of buildings and towns and the health of the earth, its material and energy resources, environment and ecosystems,
- to develop a practical and analytical approach towards sustainable, energy efficient and earth friendly design as they learn the application of ecological principles to various areas like ecological restoration, urban areas, climate change etc
- to identify and analyze environmental problems related to built-environment both in rural and urban areas and seek sustainable solutions.
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C. Course Outlines:

1. Unit 1: (2 Lecture+2 Tutorial)

Introduction, importance and relevance of ecologically responsible design; People, Planet, Energy and Resource intensive Life style, Building, Cities, Environment and ecology;

2. Unit 2: (6+6)

Sustainable Development, Sustainability in architecture, Environmental and Ecological sensitivities in design and building; Ecological footprint of Humankind, Global warming and Climate change; Responses of building design and built form, site planning to Climate and Climate Change.

3. Unit 3: (6+6)

Bio-climatic Architecture, Passive and active solar design, Energy efficiency and renewable energy, Energy aspect of Buildings, their materials and technology. Green Architecture and infrastructure; LEED, Griha, ERA (proposed by SONA) Rating Systems.

4. Unit 4: (6+6)
Natural ecosystems (*panchatatwa,* water, air, land and energy) and urban ecology (grey, dry, hot and waste piled); Design for the health of humanity and earth; Building with Nature; Alternative building materials and technologies; Waste and pollution.

5. Unit 5: (6+6+8 Field) Traditional wisdom and sustainable concepts, Historical and community perspectives of sustainable architecture. Vernacular architecture and its resuscitation/restoration. Learning from Nepali traditional architecture – its responsiveness to ecology, materials and climate – case of architecture of mud and wood, mud mortar, Dachi bricks and Jhingati tiles.

D. Assessments, Assignments, Field works and Tests

Internal assessments will be based on evaluation of reports, term papers or seminars. A field-work based report on traditional/vernacular architecture of Nepal is required.

E. Evaluation Scheme
Assessments 40% Examinations 60%

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

Units	Topics	Marks *
Unit 1	As above	12
Unit 2	As above	12
Unit 3	As above	12
Unit 4	As above	12
Unit 6	As above	12
	Total:	**60**

* There may be minor deviation in marks distribution

References

- C Kilbert, J Sendzimir and G Guy (eds.): Construction Ecology: nature as the basis for green buildings.
- Cities Alliance: Liveable Cities: The Benefits of Urban Environmental planning
- Leon Krier: Architecture: Choice or Fate
- MEA Board: Ecosystems and Human Well-being: Synthesis
- Otto Koenigsberger: Manual of Tropical Housing and Building
- PF Downton: Ecopolis: Architecture and Cities for a Changing Climate
- Richard Register: Eco-cities: Rebuilding Cities in Balance with Nature
- Sibyl Moholy-Nagy: Native Genius in Anonymous Architecture in North America
- S R Tiwari: Building the Green City of Future, The ISET Platform Lecture, 2014 September
- UNHABITAT: Leveraging Density- Urban Patterns for a Greener Economy
- UNHABITAT: Green Homes
- UNHABITAT: Sustainable Urban Energy
- WCED: Our Common Future

Core 3: **RESEARCH METHODOLOGY FOR ARCHITECTURAL DESIGN**

Course Code: MAr 523 AE
Credits: 4
Total hrs: 60 (38 lec.+ 22 Tut.)
Year I / Part I

A. Course Overview

Research methodology is an important and integral part of higher studies for it provides knowledge to carry out researches on problems both in social and natural science fields. This course will provide students to establish or further their understanding of research through critical exploration of research language, ethics, and approaches. The course first provides the philosophical foundation through language of research, second the research approaches and types and thirdly the data collection techniques. It provides a comprehensive understanding of quantitative, qualitative and mixed methods approaches. The purpose of this course is to prepare, students to make an appropriate methodological choice through the discussion of all available methodologies.

B. Course Objectives

By the end of the course, students will have learned to make appropriate methodological choice and the technique to carry out the research of their interest. The main objectives are;

- Understand the philosophical foundation of research to make a right methodological choice
- Acquaint with research approaches (quantitative and qualitative) and data collection techniques

C. Course Outlines:

1 UNIT 1: Philosophy of Research-I (Lect. 6 hrs. Tut. 2 hrs.)

- Introduction to Research and the Research Process
- Relationship between architectural design and research
- Design-studio based research studies
- Language of Research ((e.g Conceptualization, Theory, Hypotheses, Variable etc.)
- Philosophy of Research ; Basic Structure of Research, Paradigm, Logics and Quality in Research
- Building Blocks of Research (Ontology, Epistemology, Methodology, Methods, Data Sources)

Tutorial

2 UNIT 2: Philosophy of Research-II (Lect. 8 hrs. Tut. 4 hrs.)

Part A: Paradigms

- Paradigms in Social Research (Positivist, Post Positivist, Interpretevist/Constructivist, Transformative, Pragmatic and its building blocks)
- Use of Logics in Research (Inductive, Deductive Logic, Abductive and Retroductive logics)
- Quality in Research -Validity, Credibility, Reliability, Eroding Ignorance)

Tutorial

3 UNIT 3: Literature Review and Research Report Writing (Lect. 4 hrs. Tut. 4 hrs.)

- Theoretical and Empirical Research
- Research Proposal Writing
- Building Theory - Literature Survey.
- Referencing Formats, Standards.
- Ethics in Research

Tutorial

4 UNIT 4: Quantitative Methodologies and Techniques (Lect. 10 hrs. Tut. 6 hrs.)

- Descriptive and Inferential Statistics (average, standard deviation, normal distribution, sample, regression, statistical significance tests)
- Variables and their measurement techniques
- Causal Research - Experiments and Quasi-Experimental Research (Research Design, methods etc)
- Co-relational Research (philosophical assumptions, Questionnaire Survey, Sample Design, Distribution, Confidence Levels and range, Sampling Error etc)

Tutorial

5 UNIT 5: Qualitative Methodologies and Techniques (Lect. 10 hrs. Tut. 6 hrs.)

- Field Research; Grounded Theory (Assumptions, research process validity issues)
- Field Research; Ethnography (Assumption, research process, validity issues)
- Field Research; Phenomenology (Assumption, research process, validity issues)
- Interpretive Historical Research (Assumption, research process, validity issues)
- Case Studies (Definition, Design, Validity and reliability, Single and Multiple Designs, Data collection and CS Protocol)

Tutorial

D. Assignments

- (a) Research Proposal Development (10)
- (b) Reading Presentation (5)
- (c) Field based Mini Research (20)
- (d) Class Test (5)

E. Evaluation Scheme

Assessments 40% Examinations 60%

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

Units	Topics	Marks *
Unit 1	As above	8
Unit 2	As above	12
Unit 3	As above	8
Unit 4	As above	16
Unit 6	As above	16
	Total:	**60**

* There may be minor deviation in marks distribution

References

- Groat, L. & Wang, D. 2002, Architectural Research Methods, John Wiley & Sons, Inc. New York.
- Rossi, P.H., Wright, J.D. & Anderson, A.B. 1983, Handbook of Survey Research, Academic Press Inc., London.
- McQueen, R. & Knussen, C. 2002, Research Methods for Social Science, Prentice Hall.
- Jonker, J. & Pennik, B. 2002, The Essence of Research Methodology, Springer.
- Polonsky, M.J. & Waller, D.S. 2005, Designing and Managing a Research Project, SAGE
- Publications, Thousand Oaks.
- Hart, C. 2000, Doing a Literature Search, SAGE publications, London
- Yin, R.K. 1994, Case Study Research, SAGE Publications, Thousand Oaks.
- Trochim, W.M.K. 2006, Research Methods Knowledge Base, [online], Available: http://www.socialresearchmethods.net/kb, [2010, June 29]

Core 4: **DESIGN STUDIO – I**

Course Code: MAr 524 AE
Credits: 4
Total hrs: 60
Year I / Part I

Course Overview / Objectives

The course on Design Studio-I, provides students with an advanced training in the field of Architectural Design and develops Theoretical, Physical, Cultural, Aesthetics etc. The course focuses on the core Architectural Design experience at various scales, both in theory and in practice. The course aims to enable students to acquire a comprehensive base of knowledge required for the practice of architecture & develop awareness in physical, social, cultural, Aesthetical and environmental context about implications of limited sources in design decision making. The Course deals with project of a large magnitude.

In this Design Studio-I, students need to design one large scale project such as hotel Design/ hospital design/ Airport Design etc. comprising necessary aspects and subjects for the proper design. This Studio guides students into variety of directions, introducing critical tools, methods as well as content and context areas in the field. Students will develop knowledge of the relationships between the design of large scale buildings and their specific context, their function and they will be able to develop knowledge and design skills to understand and respond to physical, social, environmental, cultural, political, and ideological contexts through project-based design solutions, and the representational skills to communicate design solutions.

Students are required to follow different steps as given bellow.

1. Literature review on the given project.
2. Case studies of national and International of similar Projects
3. Site visit and explore the different aspects of the site
4. Site analysis (physical, social, cultural, economic, environmental, climatological etc. Access to infrastructure and services to the site etc.)
5. Preparation and Development of the site plan
6. Program Formulation and Concept Design
7. Design Development
8. Final Design

Course Outline

1. Literature Review (4hours)
2. Case Study (8hours)
3. Site Visit and Site Analysis (8hours)
4. Program Formulation and Concept Design (8hours)
5. Design Phase (16 hours)
6. Final Design (8hours)

Evaluation Scheme

This subject is field based so students have to visit field for the site selection and analysis. Students do not need to give written examination. They need to submit their final Design in the department and also need to present their work in front of Expert. The total marks (100) is distributed in different phases of evaluation such as:

S.N.	Stage	Marks *
1	Literature review	15
2	Case Study	15
3	Site Visit and Site Analysis	10
4	Concept design and Design Development	40
5	Final Design	20
	Total:	**100**

* There may be minor deviation in marks distribution

References:

- Time Saver Standard for Architectural Design Data, Michael J. Crosbie.
- Fundamentals of Building Construction Material and Methods by Edward Allen.
- Architecture Student's Hand Book of Professional Practice, Fourteen Edition, Published by American Institute of Architects.
- Site Planning and Design Hand Book, Second Edition, by Thomas Russ.
- Time Saver Standard for Architectural Design: Technical Data for Professional Practice, Eighth Edition, by Donald Watson, Michael J.Crosbie.
- Time Saver Standard for Building Types, by Joseph De Chiara.

Core 5: **URBAN DESIGN**

Course Code: MAr 671 AE
Credits: 4
Total hrs: 60
Year I / Part II

Course Overview / Objectives

This Urban Design course aims to enable practitioners and scholars to transform the field of urban design through critical thinking and creative practice.

The objective of the course is to impart knowledge on theories principles and process of Urban Design. This subject also guides students the design in practice of Urban Areas. The course introduces the basic elements principles and techniques of urban design so as to develop an understanding of the broader aspects and issues that bear upon the conception and design of built environment and public spaces at urban level.

Course Outline

Chapter One: Introduction to Urban Design (14 hours)

1,1 Introduction to Urban Design, Relationship between architecture, urban design. Theories of Urban Design, Understanding the historical development of cities, design principles and elements of urban design. .

1.2 City as a three-dimensional entity- Physical Volume-3D of cities, Social, Cultural and Physical Aspects of cities.

1.3 Study of open spaces at all levels (Hierarchy and order of open spaces)

1.4 Urban form as determined by inter-play of masses, voids, building typology, scale, harmony, symmetry, colour, texture, light and shade.

1.5 Urban Furniture: urban signage and graphics; Organization of spaces and their articulation in the form of squares, streets, vistas and focal points.

Chapter Two: Image of the City, Sense of Place, Morphology of places, Compact and Scattered Settlement. (12 hours)

2.1 Image of the city and its components such as edges, paths, landmarks, street features, sky-line, etc. urban transportation.

2.2. Morphology of places. Form, size and structure of cities. Elements of cities and their interrelationships;

2.3 Concept of sense of place. Concept of space and Place. Community and Public space.

2.4 Compact and Scattered settlement, Neighbourhood Design and Planning

2.5 Urban design and Climate: Street pattern and orientation; Bioclimatic design in planning and designing.

Chapter Three: Design guidelines of different cities. (8 hours)

3.1 European Cities, American Cities, Japanese Cities, Cities of Middle East, Cities of Asia, Cities of South East Asia (2hours)

3.2. Case studies of urban design characteristics of cities of Nepal and abroad.

Chapter Four: A Recent History of City Building and the Origin of Urban design: (12 hours)

4.1 Models of City Forms in History and the transformation of the City (Characteristics, factors, Techniques):

4.2 The Ancient, Medieval and the Renaissance City in Europe, and Asia.

4.3 Garden City: Ebenezer Howard, Modern Town Planning: Patrick Geddes.

4.4 The Colonial City: Roman, Spanish, French, British.

4.5 The Baroque City. Paris-Haussmann, Wren Plan for London. Barcelona Plan of Cerda.

4.6. Modern City. CIAM-Athens Charter, Le Corbusier Chandigarh, Constantine Doxiadis-Islamabad.

4.7. The Post-Modern City: Leon Krier, Neo-Urbanism, Vidyadharnagar (Doshi), New Bombay (Correa).

Chapter Five: Contemporary Urban Design, Greenfield Cities and cities in Kathmandu Valley (14 hour)

5.1 Theories of Contemporary Urban design**:** Lewis Mumford, John Habraken, Charles Correa, Jaime Learner.

5.2 Case Studies of Urban Design Projects in South Asia: Model Town Lahore, District Centers in New Delhi, Dacca Capital Complex, Bombay Fort Area,

5.3 Greenfield cities in South Asia, historical models of urban form in four centuries:
Shahjahanabad, Jaipur, New Delhi, Chandigarh, Dhaka Capital Complex, Islamabad, Amaravati, Lumbini and Kwok's Peace city.

5.4 Cities in the Kathmandu Valley: Urban Fabric, architecture language, Urban Space (Durbar Squares), Traditional Models of city Form during Licchavi and Malla Periods

5.5 Contemporary Urban Design attempts in Kathmandu: New Road axis, Durbar Marg axis, Louis Kahn Proposal.

Seminar Presentation

This subject is based on theory as well as field study. Students have to visit different cities and neighborhoods. Students must give written examination and also have to take part in seminar for presentation.

For Assignment

- Analysis of open spaces (National and International) and how many cases will be decided by the course coordinator.
- Study on neighborhoods of different cities.

Evaluation Scheme:

Assessment Marks 40 out of 100
Final Exam 60 out of 100 marks.

The question will cover the chapters of the syllabus. The evaluation scheme for final exam is indicated in the table.

S.N.	Chapter	Topics	Marks *
1	1	Introduction to Urban Design	14
2	2	Image of the City, Sense of Place, Morphology of places, Compact and Scattered Settlement.	12
3	3	Design guidelines of different cities.	8
4	4	A Recent History of City Building and the Origin of Urban design:	12
5	5	Contemporary Urban Design, Greenfield Cities and cities in Kathmandu Valley.	14
		Total:	**60**

* There may be minor deviation in marks distribution

References

- Spiro Kostof , The City Assembled , Thames and Hudson.
- Spiro Kostof , The City Shaped, Thames and Hudson.
- Jon Lang , Urban Design Typology and procedures, Architectural Press
- Kevin Lynch , Good City Form, MIT Press.
- Kelvin Lynch, The Image of a City,
- Edmund Bacon, Design of Cities.
- Geoffrey Broadbent, Emerging Concepts of urban Design.
- A.E.J. Morris , History of Urban Form, Longman Scientific and Technical.
- Donald Watson, Alan Plattus and Robert Shibley, Time Saver Stardard for Urban Design.

Core 6: **DESIGN STUDIO – II**

Course Code: MAr 674 AE
Credits: 4
Total hrs: 60
Year II / Part I

A. Course Overview

The second semester focuses on ***Integrative*** Design Studio-II leading to the development of multi-scale architectural design projects of diverse types, sufficiently large scale (viz. housing complexes, institutional, educational, recreational, community, cultural, urban infrastructure projects etc.) and programmatically complex (viz. building systems and constructability) and realistic to the necessities perceived in Metropolitan Kathmandu and other emerging centers in Nepal. The projects undertaken in this ***Field-based Studio*** will be realistic to the current pattern of development and will explore possibilities of opportunities/exploitation of practical restrictions while seeking to address future possibilities. It is expected that design solutions shall be deeply rooted in the "Place", extend the possibilities of urban space, enhance community development and today's socio-cultural life, seek innovative spatial and technical solutions and fresh possibilities in aesthetics to provide original/harmonious experiences to discourage indifferent imitations.

The studio focuses on Kathmandu Valley which is the setting of one of the most advanced urban civilizations in South Asia, developed in over two millennia. Yet its population has also increased almost tenfold in the past three decades, resulting in a visually and spatially unsettling yet exuberant cosmopolitan city. The past is very palpable everywhere, albeit in fragments. The modern and the ancient cultures cohabit the same space, within visible fault lines. Design solutions should creatively address and express this phenomenon latent in the context. Universal goals and demands of architectural design like environmental and social sustainability, ecological balance, optimizing energy consumption, climate change issues, optimal space usage and construction are some of the key design drivers that solutions should focus on.

B. Course Objectives

By the end of the course, students will have learned to appropriately respond to urbanistic concerns/issues facing the cities today, while also advancing civic possibilities, as well as diverse functions and socio-cultural infrastructure of the City, through innovative yet rooted architectural design solutions. It also aims at developing new creative architectural solutions based on the critical understanding of social, economic, political and cultural transformations Nepali cities/towns are undergoing.

C. Course Outlines:

The studio shall follow the following sequence in the design development process which includes applied research on characteristics of the building type, the site and context, design issues to be addressed.

UNIT 1: Project Programming (8 hrs.)

Identifying the range of specific functions and spaces, size requirements, circulation, services, structural possibilities, inter-relationships, performance criteria etc.

UNIT 2: Theory and Design method (10 hrs.)
Based on building type, design issues, limitations, constructability, aspirations and Goals.

UNIT 3: Developing Design Narratives (10 hrs.)
facilitates communication of design process and methods and participation.

UNIT 4: Resolutions of the architectural idea and Development of Architectural Details (16 hrs)
Resolution of architectural idea in terms of Context, spatial organization, system articulations, spaces, form, structural principles, materiality, Aesthetic principles.

Develop strong proficiency in thinking about principal architectural elements, façade characteristics, specific characteristics of space, decorative features in proper details to establish the completeness of the architectural resolution. These therefore need to be drawn both manually and digitally with proper accuracy and aesthetic merit.

UNIT 5: Representation (16 hrs)
A combination of Manual and Digital drawing methods shall be used to produce the representation of the architectural solutions, in the form of drawings of various scale, Details, models. Manually produced physical models as well as hand drawn details of principal architectural elements, and sections are mandatory. It shall be expected that high quality drawings and models with accurate details shall be presented finally. Representation has three objectives: as a critical tool in design thinking, as the medium of communicating the design idea, and as individual artistic expression.

D. Assignments

- Reports
- Drawings (digital/manual)/physical model
- Presentations

E. Evaluation Scheme
The evaluation scheme indicated in the table below:

Units	Topics	Marks
Unit 1	All	8
Unit 2	All	16
Unit 3	All	16
Unit 4	All	30
Unit 5	All	30
	Total:	**100**

* There may be minor deviation in marks distribution

VERNACULAR ARCHITECTURAL DESIGN

Course Code: AR854-E21 (Elective-A1)

Credits: 4 **Year : I**
Total hrs.: 60 **Part: II**

A. Course Overview

The course focuses on the role of vernacular architecture with special emphasis to its contribution to identity and environment. It also centers on the possibility of using it for modern usage. In this context, the contribution of the architects in this arena also has been also taken into consideration. The vernacular style of the different countries in general and that of Nepal in particular has been in the forefront of this course. The study will take place after making site visits of the place exhibiting vernacular architecture.

B. Course Objectives

The general objective is to impart the students the knowledge of the vernacular architecture. The specific objectives are

- to have an understanding of the evolution of Vernacular architecture of Nepal and the other countries of the world.
- to develop a practical and analytical approach towards sustainable, energy efficient and earth friendly design through the study of Vernacular architecture etc.
- to appreciate the contribution made by architects in the vernacular architecture of their countries.
- to resolve complex architectural problem with due consideration of vernacular concepts and principles in present interfaces of i) people to people, and ii) people to space. (This was assumed that vernacular architecture evolved in prevailing interfaces of i) people to people; and ii) people to space. Evolution thus illustrates to concepts and principles of vernacular architecture. In changed context, the interfaces is also changed. In complex architectural problem, the student are to understand changed interfaces in order to apply in proposed architectural solution.)

C. Course Outlines:

1. Chapter 1: (12 hrs.)

Introduction

- Definition and Classification of Vernacular Architecture.
- Vernacular architecture as a process – Survey and Methods of study of vernacular architecture.
- Cultural and contextual responsiveness of vernacular architecture: an overview.
- Different approaches and concepts to the study of vernacular architecture: an over view – Aesthetic, Architectural and Anthropological studies.

Importance and relevance of Vernacular Architecture

- Importance and relevance of the study
- Importance in material context and social learning of dwelling
- Relevance in spatial and morphological context of settlement

2. Chapter 2: (12 hrs.)

Sustainable Development, Sustainability in architecture, Sustainability of Vernacular architecture

- Basic theory of sustainable development – its requirement and international commitment
- Evolution and development of different approaches through movement of Sustainable development
- Millennium Development Goal (MDG 2000-2015) and Sustainable Development Goal (SDB 2015-2030) as global commitment
- Sustainability in architecture
- Practices in architecture in the context of sustainability
- Sustainability of vernacular architecture and its contextual evolution

3. Chapter 3: (12 hrs.)

Physical Aspects of Vernacular Architecture: Foundation, Superstructure and Roof and their use of natural materials and the indigenous technology

- Physical aspects of vernacular architecture
- The evolution and practice of - a) Foundation; b) Superstructure; c) Roof; and d) other building elements - in different practices
- The use of local material in different contextual practice of dwelling and use of color, art, symbolism
- Indigenous technology in evolution of vernacular architecture
- Building and Settlements – Forms and morphology (spatial planning)

4. Chapter 4: (12 hrs.)

Social Aspects of Vernacular Architecture: Different sizes of Buildings catering to different social hierarchy. Use of different materials according to the social status

- The evolution and practice of transitional space: in building typology; such as Dalan, verandahs, courtyards etc, and in settlement morphology such as pati, pauwa, dhungedhara, bar-pipal chautara, temples, rest houses, squares, Dabu etc
- Use of social element in different building elements in terms hierarchy and status
- The Recent social change in context and Change in building typology
- Social concern in present urban dynamics – new form of planning and settlement morphology
- Social aspect and change in technology including adaptation

5. Chapter 5: (12 hrs.)

Cultural Aspects of Vernacular Architecture:

- Rituals employed before and after the construction of the buildings.
- Traditional designing theories like Vastushastra used in the design of such buildings and the site lay out showing the position of the buildings and different other livelihood activities such as animal husbandry, agriculture and the likes
- The evolution and practice of cultural elements in building and settlement, Impact of cultural element in interface of building permit and construction technology and method

The Practice

- The practice and influences of the context for evolution of vernacular architecture in Himal, Pahad, Terai and prosperous region such as Kathmandu Valley, Mithila, and other settlements in and around market center.
- Proponents of Vernacular Architecture: Hassan Fathy of Egypt, Geofrrey Bawa of Sri Lanka, Raj Rewal of India, Julia Morgan and Sibyl Moholy-Nagy of the United States, Jean Nouvel of France, Deepak Man Serchan of Nepal

The Analysis

- Analysis of a complex architectural problem and application of vernacular concepts and principles in present social context.

D. Assessments, Assignments, Field works and Tests

Internal assessments will be based on evaluation of reports, term papers or seminars. A field-work based report on traditional / vernacular architecture of Nepal is required.

For Term Paper, students are to take an example of building, or group of buildings, or a complex, or a settlement in order to understand interfaces – people to people; and people to space- of that time. A thorough comparison of such interface with present day interface is expected to illustrate. Then, students are to sketch proposed architectural solution of some function desired to that context – in the physical, social and cultural context

E. Evaluation Scheme

Assessments 40%, Examinations 60%

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

Units	Topics	Marks *
Unit 1	Chapter 1	12
Unit 2	Chapter 2	12
Unit 3	Chapter 3	12
Unit 4	Chapter 4	12
Unit 5	Chapter 5	12
	Total:	**60**

** There may be minor deviation in marks distribution*

References

1. A. Foruzanmehr and M. Vellinga, "Vernacular architecture: questions of comfort and practicability," *Building Research & Information,* vol. 39, no. 3, pp. 274-285, 2011/06/01 2011.

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8. J. Yun, "Rethinking vernacular architecture: the case of Hanoks in South Korea," *The Journal of Architecture,* vol. 19, no. 1, pp. 108-127, 2014/01/02 2014.
9. S. Moholy-Nagy, *Sibyl Moholy-Nagy: Native Genius in Anonymous Architecture in North America*. Schocken Books, 1976.

ADVANCED INTERIOR DESIGN IN ARCHITECTURE
Course Code: AR854-E21 (Elective-A1)

Lecture: 3 hrs. per week **Year: I**
Practical: 1 hrs. per week **Part: II**

Course Objectives:

The Advance Interior Design in Architecture Course aims to enable practitioners and scholars to transform the knowledge of Interior Design through creative works in the real field. The objective of the course is to impart knowledge on theories principles and process of Interior Design. The course introduces the basic elements, principles and techniques of Interior Design so as to develop an understanding of the broader aspects and issues that bear upon the conception and design of spaces on exterior and interiors of the building as well as the landscape elements. The course provides the student with a comprehensive view of the space development process, including basic skills in sketch techniques and understanding the importance of design.

After studying Advanced Interior Design Course, students will be the makers, the sketchers, the inventors, the experimenters, the idea generators, the thinkers and finally students will be the Interior designers for better space planning. Students will be flexible design thinkers who can explore social, economic and environmental contexts and opportunities to design original, useful and thought-provoking interior spaces in Architecture.

Course Contents:

1. Introduction to Interior Design [8 Hrs.]

1.1 Introduction to Interior Design
1.2 Elements and Principles of design, Visual Design, all aspects of design, including: aesthetics and Product Language, material and technology, ergonomics, usability, sustainability etc.
1.3 History of Interior Design, Develop critical understanding of the discipline of Interior Design in theory and Practice.
1.5 Human dimension and Anthropometry
1.4 Identity, Art and Architecture
1.6 Emotion and Expression in Art and Space.

2. Construction Technology & Material [6 Hrs.]

2.1 The physical and structural of material used in architecture and interior of a buildings.
2.2 The design and detail for the materials proposed in any interior design problem
2.3 Develop a vocabulary of a wide variety of materials available locally and internationally
2.4 Develop sensibility to propose suitable interior finishes customized to different design spaces.

3. Interior Product Design [8 Hrs.]

3.1 Furniture Design. Concept development and selection, Creativity skills, Human-centered design, co-design and innovative design processes,
3.2 Light source and Fixture

3.3 Colour: Explore multiple solutions using critical thinking to propose appropriate tones in an interior setup. Develop professional color palette to be used in interior design and color presentation in actual application
3.4 Graphic Design: Design in Context. Design in Practice: Drawings of top-down- and all sides of the object.
3.4 Perspective drawing, model making (Sketching & Computer drawing) in a suitable colour scheme.

4. Special population, ADA and Vaastu science **[10 hrs]**

4.1 ADA and Universal design
4.2 Definition of Special Population and various types
4.3 Elements of Vaastu and scientific application
4.4 Vaastu mandala
4.5 Arrangement of space and layout according to Vaastu principle
4.6 Practical Vaastu Tips for internal environment

5. Space planning and furniture history **[10 hrs]**

5.1 Space planning, arrangement and traffic pattern
5.2 Prosimics and Ergonomix
5.3 Living with less and more space
5.4 Furniture as symbol of history
5.5 Design principles in furniture
5.4 Gender and space
5.5 Perception of space in the 21st century.

6. Building services and HVAC System **[8 Hrs.]**

6.1 External and Internal Electrical Distribution system
6.2 Various types of lighting system, Fire alam System,
6.3 Various types of Air- conditioning system and piping work
6.4 Sanitation system {general}
6.5 Plumbing system {general}

7. Architectural Details and Report Writing **[10 hrs]**

7.1 Architectural Details in Interiors
7.2 Wall, Ceiling, Doors and Windows, Fireplace and finishes
7.3 Environmental consideration and Report writing
7.4 Specification writing, Budgeting, estimation
7.5 Tender documentation

Practical Assignments, Field works

Interior Space Design: to develop independent thinking, analysis and decision making in reference of design project which will help in building critical thinking in the design process for a structured and systematic approach through research.
Interior Project- Commercial / Residential / Educational Project.

Process, Specification, drawings: plan, elevations sections, perspective view, 3D and animation, mechanical Movement etc. Students have to visit different industries, furniture factories and shopping malls.
Certain hour of each Chapter will be given to the Practical exercises and Field works.
Students shall submit reports, term papers and present in seminars. Field work is necessary. Field Visit in different Industries and visit different markets of the product shall be done.

Evaluation Schemes
a. Internal Examination

Type	Weightage
Minor tests	70%
Assignments	30%

b. Final Examination
The questions will cover all the chapters in syllabus. The evaluation scheme for final exam will be as indicated in the table below:

Units	Chapters	Marks
1	1, 2	12
2	2, 3	12
3	4, 5	12
4	5, 6	12
5	6, 7	12
	Total	**60**

References

1. S. Schleuning, M. Lamonaca, and J. Aynsley, Moderne. Ist ed. New York: Princeton Architectural Press, 2008
2. P. Sparke, P., Desinging the modern Interior, Is ted. Oxford: Berg, 2009
3. J. De Chaiara, , J. Paneor and M. Zelnik, Time-Saver standard for Interior Design and Space Planning. 1st ed. New York: Mc Graw-Hill, 2001.
4. M. Kuhlo, Architectural Rendering with 3ds Max and V-Ray. Is ted Hoboken: Taylor and Francis, 2013
5. F. Birren. Color Psychology and Color Theraphy; A Factual Study of the Influence of Color on Human Life. 1st ed. San Francisco: Hauraki Publishing, 2016.
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7. T. Magar, Architecture Re-performed. 1st ed. London: Roudtledge, 2016.
8. J. Nielson and A. D. Taylor, "INTERIORS an Introduction," Brown &Benchmark, Pub. Iowa, ISBN, D-b97-12543-2, USA.
9. D. K. Chang, Interior Design.
10. B. B. Puri, Vastu Science for 21 st cent to enjoy the gift of nature, ISBN 81-7822107, New Age Books pub India.

Design with Digital Media
Course Code: AR854-E21 (Elective-A1)

Lecture	**: 3 hr. per week**	**Year: I**
Practical	**: 1 hr. per week**	**Part: II**

Course Objectives:

This course is aimed in the use of digital media for architectural design by the use of different computer aided tools and techniques. Computational capabilities have revolutionized the design industry in terms of quality of design: meticulous design iteration is now taken care by the computers rather than manual process; quantity of design: computational speed is assisting design in producing designs in faster rate. In the 20th century, computation assisted in drawings but through 21st century it has also revolutionized management of construction through computation. Due to its revolutionary assistance in design, the design domain has transformed its state. From this course, the students will be able to explore the new paradigm led by computational capabilities. Students will lead traditional design process with assistance and challenges to come up with better design outcomes.

This course provides the theoretical knowledge and skills on digital media and its application in architecture using parametric design process for architectural design solutions. It also introduces basic concepts of Geographic Information System to be applied in the field of architecture.

Course Contents

1. Digital Media **[3 hrs.]**

1.1 Introduction to Digital Media
1.2 Digital Media and Architecture
1.3 History and Application of Computation in Architecture
1.4 Importance of Computation in Architecture
- Paradigm Shift of Computational Design
- Computerized and Computational Infographic
- Complexity of Computation design

2. Parametric Design **[5 hrs.]**

2.1 Introduction to Parametric Design
2.2 Comparative Analysis: Traditional vs Parametric Design Frameworks and Differences
2.3 Parametric Architecture theoretical frameworks and Workflow
2.4 History of Parametric Design
2.5 Tools and Techniques of Parametric Design

3. Parametric Modeling **[15 hrs.]**

3.1 3D modeling: Introduction to Rhino
3.2 Architectural Drafting in 2D
- 3.2.1 Create 2 D lines, Polylines, and NURBS curves
- 3.2.2 Precision Modeling
- 3.2.3 2D Shapes: Rectangle, Circles, Arch, Ellipse, Polygons, Helix
- 3.2.4 Curves, Display and Editing: Pan, zoon, OpenGL, fillet and chamfer
- 3.2.5 NURBS: Free form curves, control point editing of curves

3.2.6 Advance Modeling: Rebuild curves, split, blend

3.3 Architectural Modeling in 3D

3.3.1 Solids and surfaces

3.3.2 Precision Modeling

3.3.3 Lofting and Editing: Loft, Extrude, Array, Boolean Operation, Offset, Extend

3.3.4 Advance Modeling: Split, Blend, Lighting and rendering

3.3.5 Advance Editing: Extrude, Loft, Revolve, Sweep, Network

3.4 Advance Tools in Rhino and its Plugins

3.4.1 Paneling Tool

3.4.2 Visual ARQ

3.4.3 Grasshopper 3D

4. Algorithmic Design [25 hrs.]

4.1 3D modeling Tool Grasshopper

4.1.1 How does grasshopper work?

4.1.2 Interface overview

4.2 Basic Generation Tool

4.2.1 Create a point, point projections and lines

4.2.2 Sine wave, Travelling sine wave, Helix

4.2.3 Plane, domain, Curve Division, Spline

4.3 Data Organization

4.3.1 Data Trees

4.3.2 Attractor point and curve

4.3.3 Surface, Brep and Mesh

4.3.4 Catenaries, Vertical Cables, Diagonal Cables

4.3.5 Subdivide Surface, Offset, Move, Fillet, Loft

4.4 Advanced Tools

4.4.1 Voronoi Introduction

4.4.2 Point Population

4.4.3 Metaball

4.5 Advanced Techniques with plugins:

4.5.1 Lunchbox

4.5.2 Environmental Analysis Tool: Ladybug+ Honeybee

4.5.3 Weaverbird

4.5.4 Paneling Tool

4.5.5 Physics Engine: Kangaroo and Karamba 3D

4.5.6 Galapagos

5. Geographic Information System [12 hrs.]

5.1 Introduction to Geographic Information System

5.2 Spatial Coordinate System – WGS, UTM

5.3 Spatial Data Types – Raster and Vector

5.4 Map Visualization

5.5 Application of GIS for Architects

Practical Exercises

Practical exercises will be done for the topics covered in the lectures. Certain hour of each Chapter will be given to the Practical exercises. Different software for parametric design will be used for the exercise such as Rhino 3d (Base 3d modeling software), Grasshopper (Algorithmic modeling software), and various other software and plugins. For GIS exercise, QGIS/ArcGIS software or other GIS software will be used.

Assessments

Students will be given explorative research on parametric plugin. Students will be divided into number of groups and each group shall select one of the above-mentioned plugins. Students will explore the plugin, and present report and seminar.

Besides, design studio will be conducted. A real case architectural problem based on fieldwork and research shall be devised, which the students will tackle with the help of digital media.

Evaluation Schemes

a. Internal Examination

Type	Weightage
Minor tests	70%
Assignments	30%

b. Final Examination

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

Units	Chapters	Marks
1	1 & 2	12
2	3	12
3	3 & 4	12
4	4	12
5	5	12
	Total	**60**

References

1. A. Tedeschi, . Algorithms Aided Design. Le Penseur, 2014
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3. R. F. Woodbury, Elements of Parametric Design. Routledge, 2010
4. A. Madl, Parametric Design for Landscape Architects.Routledge, 2022
5. P. Schumacher, The Autopoiesis of Architecture: A New Framework for Architecture. Wiley, 2012
6. A. Menges, and S. Ahlquist, Computational Design Thinking. AD Reader.
7. B. Gross, H. Bohnacker, J. Laub, and C. Lazzeroni, Generative Design, 2018

8. B. Santos *et al.*, “GIS in Architectural Teaching and Research: Planning and Heritage,” *Education Sciences*, vol. 11, no. 6, p. 307, Jun. 2021, doi: 10.3390/educsci11060307
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BUILDING TECHNOLOGY: MATERIALS AND METHODS

Course Code: AR854-E21 (Elective-A1)

Credits: 4 **Year : I**
Total hrs.: 60 **Part: II**

A. Course Overview

This course focusses on the role of material in the formation of architecture and the physical, logistical, and environmental constraints as well as demands that shape the processes of construction and its technology. It will also address the life safety, building service systems, materials, sustainability, and life-cycle analysis; accessibility; technical documentation and outline specifications. It will be taught spontaneously with the integrative design studio. This course will include field trips to construction sites, recently completed buildings, and/or fabrication shops/labs. It is to ensure that the students understand and design the integration of elements in both contemporary and emerging construction and fabrication. Students will be guided through the different components, constraints and systems of a work of architecture.

It seeks to impart the state of the art knowledge on building climate responsive and environmentally friendly constructions. Sustainability forms the important aspect of this course.

B. Course Objectives

The course guides building construction systems, building materials, building elements, detailing of construction systems etc. The course also guides both as an introduction to the physical processes lying behind the design of a building's envelope, interior and equipment, and as an initiation for a proper integration of technology in architecture.

- To analyze various approaches to construction in relation to their historical and cultural context.
- To explain the materials and their uses, in terms of sustainability
- To understand environmental issues relating to the building practice
- To be able to select the proper design and materials for a given building configuration.

C. Course Outlines:

1. Chapter 1: (10 hrs.)

Introduction, importance of building technology that is environmentally friendly and climate responsive. An understanding of traditional project phases including pre-design, design, design development, construction documents, preconstruction, construction ; Understand building construction types; along with the building loads and how they influence the design requirements for a building; Basic structural properties and behaviors of materials; Building Components consisting of Foundation Systems - Footing, Slabs, Wall Systems - Masonry, Steel, Curtain Wall, Rain Screen, Roof Systems - Various membranes, Flat Roof, Sloped Roofs, Trusses, Fenestration Systems - Glazing, Veneers.

2. Chapter 2: (14 hrs.)

Concept of sustainability as applied to the Sustainability of the technology and the materials in building construction. Importance of life safety in construction projects and ways and means by which it is attained. Overview of Materials and Building/Structural Types (Historic, Current), Factors Affecting Choice of Materials and Structural Form, Properties- Mechanical Properties (strength, structural performance) and Non-Mechanical Properties (physical properties, durability); Individual Building Materials (Manufacturing, Properties, Comparative Behavior, Applications in Construction)

3. Chapter 3: (14 hrs.)

Building automation system, or BAS, monitors an entire building's functionality including heating, ventilation, air conditioning (HVAC), fire and life safety; Operation and maintenance; Energy supply and efficiency; Smart technology; Waste water and water management.; Collaborative practices; Research, development and innovation.

4. Chapter 4: (12 hrs.)

Concepts and procedures for design, manufacturing, and construction in steel, concrete, masonry, timber, and new materials supplemented by examples and case studies.

5. Chapter 5: (10 hrs.)

Construction site location as per the bye laws, Construction in the night time in the urban areas to ensure no disturbance to the movement of the people, visit to the site and its report writing.

D. Assessments, Assignments, Field works and Tests

Internal assessments will be based on evaluation of reports, term papers or seminars. A field-work based report on the visit of the relevant construction works is required.

E. Evaluation Scheme

Assessments 40% Examinations 60%

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

Units	Chapters	Marks *
Unit 1	Chapter 1	12
Unit 2	Chapter 2	12
Unit 3	Chapter 3	12
Unit 4	Chapter 4	12
Unit 5	Chapter 5	12
	Total:	**60**

***** *There may be minor deviation in marks distribution*

References

1. A. Deplazes, *Constructing Architecture: Materials, Processes, Structures : a Handbook*, 2nd ed. Birkhäuser Architecture, 2009.
2. A. Deplazes, *Constructing Architecture: Materials, Processes, Structures : A Handbook*. Birkhäuser Architecture, 2009.
3. E. Allen, *How Buildings Work: The Natural Order of Architecture*, 3rd ed. Oxford University Press, 2005.
4. E. Allen, *Fundamentals of Building Construction: Materials and Methods*, 6th ed. Wiley, 2013.
5. E. Allen and J. Iano, *Fundamentals of Building Construction: Materials and Methods*, 5th ed. Example Product Manufacturer, 2008.
6. F. D. K. Ching and C. Adams, *Building Construction Illustrated*. 3rd, ed. Wiley, 2000.
7. M. DeKay and G. Brown, *Sun, Wind & Light: Architectural Design Strategies, 3rd edition*. 2014.
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9. N. Lechner, *Heating, Cooling, Lighting: Sustainable Design Methods for Architects*. 3rd, ed. Wiley, 2008.
10. S. V. Szokolay, *Introduction to Architectural Science, Second Edition: The Basis of Sustainable Design*, 2nd ed. Architectural Press, 2008.

Architecture and Urban Design Policies and Regulations

Course Code: AR854-E22 (Elective A2)

Credits: 4 **Year : II**
Total hrs.: 60 **Part: I**

A. Course Overview

Architecture and urban design have major roles in the processes involved in the production of the livable built environment. In this process mostly design essentials and processes are involved which more often than not tend to shadow the policy contexts of such production. The policy contexts are important realities that need to be interpreted and understood for the holistic comprehension of the role of architecture. In this context, the course focuses on expanding knowledge and intensifying students' understanding and ability in interpreting the architectural and urban design policies in terms of its purpose, policy formulation process, policy tools based on existing theory and practice.

B. Course Objectives

The main objectives of the course are to enable students

- to acquaint students about policies related to better-built environment design,
- to provide theoretical and practical knowledge of design governance of the built environment
- to introduce important architectural and urban design policies and tools
- to develop a critical outlook on architectural and urban design policy discourse

C. Course Outlines:

1. **Chapter 1: Architecture and Built environment design** (8 hrs.)
   - Architecture and Urban Design: Conceptual distinctions
   - Defining Architecture: Meaning and debates
   - Urban design: as an interdisciplinary field

2. Chapter 2: Built Environment and Design Governance (8 hrs.)
   - Development models
   - Actors and their roles in the development process
   - Design quality development.
   - Design Governance and public participation

3. Chapter 3: Architectural as public policy process (16 hrs.)

- Concept of public policy, policy cycle
- Public policy analysis: the epistemology
- Policy tools: Regulatory tools, restrictive tools, and facilitating tools
- Policy tools: Building bylaws, Zoning, Planning Regulations, Conduct

4. Chapter 4: Architectural and Urban Design Policies Discourse (16 hrs.)

- Definitions, policy aim, and policy scope
- Basis of architectural and urban design policies
- Problems and challenges of design policies
- Policy dimensions: target areas and objectives

5. Chapter 5: Evaluation of Policies and Policy Tools: **Nepali Context**(12 hrs.)

- Review of existing policies
- Policy analysis: Policy objectives, outputs, and effects
- Purpose, need identification, problems, and challenges

D. Assessments, Assignments, Fieldworks and Tests

Summary/Discussion papers on relevant topics and titles to be prepared and presented at a seminar. Students will be assessed for written reports/Essays, presentations, and interactions.

E. Evaluation Scheme – Assessments 40%, Examination 60%

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

Units	**Topics**	**Marks ***
Unit 1	Chapter 1, 2	12
Unit 2	Chapter 3	12
Unit 3	Chapter 3, 4	12
Unit 4	Chapter 4	12
Unit 5	Chapter 5	12
	Total:	**60**

* There may be minor deviation in marks distribution

References

1. J. E. Anderson, *Public policymaking: An introduction*. Houghton Mifflin Company, 2003.
2. T. A. Birkland, 3rd, Ed. *An Introduction to the Policy Process: Theories, Concepts, and Models of Public Policy Making*. M.E. Sharpe, 2005.
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7. Netherlands, *A Culture of Design. Vision of architecture and Spatial Design*. Den Haag: Ministry of Education, Culture and Science, 2008.
8. Norway, *Architecture Now. Norwegian Architectural Policy*. Oslo: The Ministry of Culture and Church Affairs, 2009.
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URBAN LANDUSE AND TRANSPORT PLANNING

Course Code: AR854-E22 (Elective-A2)

Credits: 4 **Year: I**
Total hrs.: 60 **Part: II**

A. Course Overview

This course is designed to provide the students with an overview of Urban Planning with focus on land use and transportation planning. This course provides an opportunity for students to learn urban planning methods and practices with emphasis on linkage between land use and transportation systems. The course aims to develop an understanding of relevant theories and analytical techniques, through the exploration of various cases drawn from different parts of the world.

B. Course Objectives

The main objectives of the course are

- To impart knowledge on core concepts of urban planning
- To develop an understanding on important aspects urban landuse and urban transport planning
- To understand the role of integrated landuse and transport planning for sustainable urban development

C. Course Outlines:

1. Chapter 1: Introduction to Urban Planning (10 hrs.)

- Introduction to Urban Planning
- History of Urban Planning, Urbanization in Nepal
- Layout/ Structure of Human Settlement
- Concepts of Urban Morphology
- Planning and Management Tools

2. Chapter 2: Urban Landuse (20 hrs.)

- Urban Landuse, Urban Form and Structure
- Urban Landuse Classification: Commercial and Employment Centers, Residential Areas, Integrating Community Facilities with Land Use
- Urban Landuse Acts and Policies
- Urban Land Management and Administration
- Attributes of land (Location, Registration, Size, Land use, Land Rights/ Tenure and Land Value

- Land Tools for improving Land Management and Administration: Access to land and tenure security, Land Administration and Information, Land-Based Financing, Land Management and Planning, Land Policy and Legislation, Cross Cutting Issues
- Land Development Process

3. Chapter 4: Urban Transportation (20 hrs.)

- Introduction to Transport Planning
- Urban Roads, Design and Street Layouts
- Transit Oriented Development
- Traffic planning and forecasting- trip generation and methods of predicting trip generation, Models of traffic assignments.
- Urban form in relation to traffic and transportation patterns; Sustainable transport systems
- Traffic Calming, Transport Safety and Issues, Transportation and Environmental Issues
- Urban Transport Acts and Policies

4. Chapter 4: Integration of Urban Landuse and Transport Planning (10 hrs.)

- Issues on Integration of Landuse and Transport Planning
- Urban Sprawl, Accessibility, Job/Housing Balance, Compact Settlement, Radburn Concept

D. Assessments, Assignments, Field works and Tests

Summary/ discussion papers on relevant topics and titles to be prepared and presented as seminar. Students will be assessed for written reports/essay, presentations and interactions.

E. Evaluation Scheme – Internal Assessments 40%, Examination 60%
The questions will cover all the chapters in syllabus. The evaluation scheme for final exam will be as indicated in the table below:

Units	Topics	Marks *
Unit 1	Chapter 1	12
Unit 2	Chapter 2	12
Unit 3	Chapter 2, 3	12
Unit 4	Chapter 3	12
Unit 5	Chapter 4	12
	Total:	**60**

** There may be minor deviation in marks distribution*

References:

1. A. Bertaud and S. Malpezzi, "The Spatial Distribution of Population in 48 World Cities: Implications for Economies in Transition," The Center for Urban Land Economics Research, University of Wisconsin 2003.
2. A. Bertaud, *Metropolis: A Measure of the Spatial Organization of 7 Large Cities*. 2001.
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7. J. Friedmann, *Planning in the Public Domain*. Princeton University Press, 1987.
8. J. P. Rodrigue, *The Geography of Transport Systems*, Fifth ed. New York, Routledge, 2020.
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Sustainable Landscape Architecture
Course Code: AR854-E22 (Elective A2)

Lecture	**: 3 hr. per week**	**Year: I**
Practical	**: 1 hr. per week**	**Part: II**

Course Objectives:
The Sustainable Landscape Architecture Design course aims to enable practitioners and scholars to transform the field of landscape design through critical thinking and creative practice.

The objective of the course is to impart knowledge on theories principles and process of Sustainable Landscape Design.This subject also guide students the designing practice of landscape Design in different parks, places of cities. The course introduces the basic elements principles and techniques of landscape Design so as to develop an understanding of the broader aspects and issues that bear upon the conception and design of sustainable landscape design of different parks, open spaces of cities and villages etc.

Course Contents:

1. **Introduction to Landscape Architecture** **[12 hrs.]**
   - 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. Hydrology and geomorphological Process
     - 1.2.4. Soil forming Process
   - 1.3.Principle of Landscape Design
     - 1.3.1. Unity
     - 1.3.2. Harmony
     - 1.3.3. Balance
     - 1.3.4. Texture
     - 1.3.5. Scale and Proportion
     - 1.3.6. Sequence etc.
   - 1.4.Different types of plants and its species
     - 1.4.1. Indigenous Plant
     - 1.4.2. Imported Plants
     - 1.4.3. Religious Plants etc.

   - 1.5.Landscape elements (Modern)

1.5.1 Water bodies,
1.5.2. Vegetation,
1.5.3. Man Made Elements and its different materials etc.

2. History of Landscape Design [12hrs.]

2.1.History of Landscape Design
- 2.1.1. History of Landscape Design in East (Asia, South East Asia, South Asia)
- 2.1.2. Mughal Garden, Japanese Garden, Chinese Garden.

2.2.History of Landscape Design in West.
- 2.2.1. Garden of Egypt
- 2.2.2. Garden of Greece
- 2.2.3. Roman Garden.
- 2.2.4. .Features of Garden of France
- 2.2.5. Features of Garden of Spain

2.3.History of Landscape Design in Nepal.
- 2.3.1 Garden in Malla Period.
- 2.3.2. Garden in Rana Period.
- 2.3.3. Garden in Shah Period.

3. Sustainable Landscape Architecture [12 hrs.]

3.1. Sustainable Development
3.2. Different Aspects of Sustainable Development
3.3. Benefits of sustainable Landscape Design
3.4. Different Aspects of Sustainable Landscape.
3.5. Principles of Sustainable Landscape Design.
3.6. Sustainable landscape Elements.
3.7. Concept of Green and food, Fruit Green Cities-Parks, Gardens and open spaces with sustainable Aspects.

4. Sustainable Landscape design components of different cities [8 hrs.]

4.1. Landscape design of Streetscape
4.2. Landscape elements/Street Furniture
4.3. Landscape design of Neighborhood
4.3. Elements of Neighborhood Landscape Design.

5. Sustainable Landscape and allied Subjects. [8 hrs.]

5.1.Landscape and Environment
5.2.Landscape Economics and Management,
5.3.Heritage Landscape and conservation.

5.4.Landscape and legal Aspect
5.5.Landscape and drainage
5.6.Landscape and lighting

6. Sustainable Landscape element of Traditional towns of Nepal [8 hrs.]

6.1.Landscape elements of Newari Traditional Town of Kathmandu Valley
6.2.Landscape elements of Terai Towns
6.3.Landscape Elements of Hilly towns
6.4.Landscape elements of Mountain Towns

Practical Assignments and Field work

This subject is based on theory as well as field study. Students have to visit different gardens, parks, recreation areas, open spaces and neighborhoods of cities and rural areas. Students must give written examination and also have to take part in seminar for presentation. The project work is to be done related to the following topics.

- Case Study of National and International parks, gardens, landscape design of different areas, such as neighborhood parks, etc.
- Design Sustainable landscape of different parks and open spaces of cities.
- Students have to submit Field Visit Report related to Sustainable Landscape Design. At least one day visit of different Gardens and Parks is required.

Evaluation Schemes
a. Internal Examination

Type	Weightage
Minor tests	70%
Assignments	30%

b. Final Examination

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

Unit	Chapters	Marks *
1	Chapter 1	12
2	Chapter 2	12
3	Chapter 3	12
4	Chapter 4, 5	12
5	Chapter 5, 6	12
	Total:	**60**

*There may be minor deviation in marks distribution

References

1. J. Zeumert, Landscape Architecture and Environmental Sustainability, Apple Books, 2017.
2. R. Jonathan, R. Daniel and A. Anderson, Innovation in Landscape Architecture, Apple Books, 2016.
3. J. Kraue, Creative Landscape Design, 2018.
4. M. L. John, Introduction to Landscape Design, 2nd ed., Wiley, 2000.
5. F. ZambraMela, 1000 Details in Landscape Architecture, Firefly Book Ltd, 2012.
6. DK, Encyclopedia of Landscape Design: Planning, Building, and Planting Your Perfect Outdoor Space, DK; Illustrated edition, 2017.
7. E. B. Rogers, Landscape Design: A Cultural and Architectural History, 1st ed., Harry N. Abrams, 2001.
8. T. Richardson, Futurescapes: Designers for Tomorrow's Outdoor Spaces, Thames & Hudson, London, 2011.
9. T. Balsley, Thomas Balsley: Uncommon Ground, ORO Editions, 2015.
10. Charles W., Harris Nicolas T. Dines, Time-saver Standards for landscape Architecture, Mac Graw Hill, 1997.

PROJECT WORK

Course Code: **MAr 527 AE**
Credits: 4
Total hrs: 60

A. Course Overview

Project work is important module to culminate the knowledge gained in three semesters to develop specialized field of interest. Done preferably in groups of three to five students, it focuses on multi-scale design projects of student's choice that is expected to provide opportunity to develop thesis projects according to student's special area of interest. The design project undertaken will provide opportunity to EXPAND the responses to the issues and problems of contemporary urbanism in Nepal. In the contemporary world where the architectural realities are networked, the project work focuses on the application of on-site design research and speculation to situate design project within larger socio-cultural, political, environmental and global systems. It aims at understanding the role of other actors in shaping the built environment to make an opportunistic intervention that may help to provide a frame for future possibilities of architectural solution. The purpose of this course is to prepare students to make field-based understanding of their research interest and crystalize pertinent issues and problems for a detailed investigation in the thesis projects. The project work is run as directed studies with one supervisor for each group.

B. Course Objectives

By the end of the course, students will have learned the field-based understanding of their area of research interest and be able to crystalize pertinent issues and problems for a detailed investigation during the thesis works. The main objectives are;

- Identification of areas of specialization in one of the following specialized studies; (a)Urban Design (b) Sustainable Design (c) Heritage Conservation (d) History, Theory & Criticism (e) Architectural Graphics & Visualization (f) Architectural Project Management (g) Architectural Technology (h) other special areas

- Systematic development of project to understand the elements of diversity of human, spatial, environmental, economic and social resources and to detail out/expand at least one these elements to provide viable opportunistic intervention.

C. Course Outlines:

UNIT 1: Project Work/Study Proposal and Development (Sp. Lect. 2 hrs. Tut. 6 hrs.)

- Identifying the project topic/areas of study within the elements of diversity of human, spatial, environmental, economic and social cultural resources related to architecture
- Identifying the major issues and problems related to the topic/areas of study that needs to be addressed
- Description of the problem and the specific study areas/fields

UNIT 2: Critical Review (Tut. 8 hrs.)

- Chronological summary of the existing knowledge/theoretical development in the field
- Methodological Review of the solutions to similar problems
- Critical review of the problem and status quo
- Development of framework for the project study

UNIT 3: Field Study/Work (20 hrs.)

- Architectural studies/data collection related to specific functions, performance, circulation (both internal and immediate external), structural possibilities
- Existing fabric and integration possibilities
- Socio-cultural, economic and the environmental contexts study
- Ethnographic study of social behavior of identifiable groups of users

UNIT 4: Development of Design/Study Narratives (Lect. 2 hrs. Tut. 22 hrs.)

- Compare theoretical rationale and its relationship with design
- Understand and expand the interlinking of various architectural domain
- Assessment of potential opportunistic interventions (design outcome) to bring positive changes in status quo
- Evaluate the design outcome along with self-evaluation process within design development/study field
- Develop design solution/ narrative that contributes to context, spatial organization, system articulation, form, aesthetics and structural capability
- Crystalizing and identifying areas that need extended and elaborated research

D. Assignments

- Reports
- Drawings (digital/manual)/physical model
- Presentations

E. Evaluation Scheme

The evaluation scheme indicated in the table below:

Units	**Topics**	**Marks**
Unit 1	All	10
Unit 2	All	20
Unit 3	All	20
Unit 4	All	50
	Total:	**100**

PRODUCT DESIGN

Course Code: AR904-E31 (Elective – B1)

Credits: 4 **Year: II**
Total hrs.: 60 **Part: I**

A. Course Overview and Objectives

The Product Design Course aims to enable practitioners and scholars to transform the knowledge on product design through creative works in the real field. The objective of the course is to impart knowledge on theories principles and process of Product Design. The course introduces the basic elements principles and techniques of Product Design so as to develop an understanding of the broader aspects and issues that bear upon the conception and design of product related to building, exterior and interiors of the building as well as the landscape elements etc.

B. Course Outcome

The course provides the student with a comprehensive view of the product development process, including basic skills in sketch techniques and understanding the importance of design as well as deeper skills in working with computer aided design.

After studying Product design course, students will be the makers, the sketchers, the inventors, the experimenters, the idea generators, the thinkers and finally students will be the product designers. Students will be flexible design thinkers who can explore social, economic and environmental contexts and opportunities to design original, useful and thought-provoking products.

C. Course Outline:

1. Chapter 1: **Introduction to Product Design (8 hrs.)**

- Introduction to Product Design,
- History of Product design, Design Theory, Design Principle
- Elements of design, Visual Design, all aspects of design, is including: aesthetics and Product Language, material and technology, ergonomics, usability, sustainability etc.

2. Chapter 2: **Industrial Design (14 hrs.)**

- Industrial product development.
- The process of product development.
- Product planning. Managing customer and technical specifications. Physics for designing, Technology use in product design, Printmaking techniques.

3. **Chapter 3**: **Product Sketching (10 hrs.)**

- Sketching techniques: freehand sketching of different objects.
- Sketching of the different products

4. Chapter 4: Product Architecture (16 hrs.)

- Product architecture. Concept development and selection, Creativity skills, Human-centered design, co-design and innovative design processes,
- Graphic Design, Design in Context. Design in Practice: Drawings of top-down- and all sides of the object.
- The isometric projections, perspective drawing, model making.

5. Chapter 5: **Digital Technique (12 hrs.)**

- Basics of Digital Design, digital illustration techniques,
- Autocad-2D and 3 D of the project, animation, simulation of mechanical movement,
- Photo rendering

D. Assessments, Assignments, Field works

Design Product - Process, Specification, drawings: plan, elevations sections, perspective view, orthographic projection (Engineering drawing) model making, 3D and animation, mechanical Movement etc. The subject is based on theory as well as Practical. Students have to visit different industries. Students must give written examination and also need to present in the seminar schedule by the Master in Architecture program.

Internal assessments will be based on evaluation of reports, term papers or seminars. Field work is necessary. Field Visit in different Industries, visit different markets of the product.

E. Evaluation Scheme

Assessments 40% Examinations 60%

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

Units	**Chapters**	**Marks ***
Unit 1	Chapter 1, 2	12
Unit 2	Chapter 2	12
Unit 3	Chapter 3, 4	12
Unit 4	Chapter 4	12
Unit 5	Chapter 5	12
Total:		**60**

* *There may be minor deviation in marks distribution*

References

1. T. Franco and B. Costa, *Product Design Process: The manual for Digital Product Design and Product Management*. Imaginary Cloud Limited; Illustrated edition, 2019.
2. D. Norman, *The Design of Everyday Things: Revised and Expanded Edition*. Basic Books; Revised edition 2013.
3. A. Milton and P. Rodgers, *Product Design*. Laurence King Publishing; Illustrated edition, 2011.
4. T. Kelley and D. Kelley, *Creative Confidence: Unleashing the Creative Potential within Us All Hardcover*. 2003.
5. W. Joenson, *Iconic Product Design" An Illustrated History of the World's Most Innovative Devices*. 2013.

COMPUTER ANALYSIS TOOLS FOR ADVANCE RESEARCH

Course Code: AR904-E31 (Elective-B1)

Credits: 4 **Year : II**
Total hrs.: 60 **Part: I**

A. Course Objective:

The main objective of the course is to provide students the knowledge on application of computer analysis tools for advance. The following learning objectives have been prepared to assist student's in the preparation for the master's comprehensive examination in the area of quantitative and qualitative research tools for advance research. A review of content related to these learning objectives should provide you with the foundation required for a successful mastery of the content.

- To provide the basic statistical concepts, and statistics application and computer for advance research work.
- To acquaint students the basic qualitative research methods and apply different text transcribing computer tools for advance research work

B. Course Outlines:

Quantitative Analysis Tools

1. Chapter 1: Question Design, Data Collection, Data Management (10 hrs.)

- Introduction to Survey Design, Measurement Scales
- Questionnaire Design, Sampling design and sample size calculation.
- Web base Data collection using KOBO Toolbox (digital question design, field survey, and data handling)
- Introduction of SPSS environment, Coding in SPSS, Data export and import
- Analysis technique with SPSS (cross tabulation), Representations thorough graphs (Pie, Bar diagram, Histogram, Boxplot, scatter plot etc.)

2. Chapter 2: Data Analysis Technique, Graph and Numerical Measures (12 hrs.)

- Data interpretation using numerical measures (viz. mean, standard deviation, scatter plots)
- Introduction of Bivariate Pearson's Correlation coefficient and significance
- Introduction to regression analysis, least square method, multivariate regression

3. Chapter 3: Inferential Statistics (8) hrs.

- Introduction of hypothesis testing
- One sample t-test
- Independent t –test
- Pair- t test

- One-way ANOVA
- Test of proportions

Qualitative Analysis Tools

Chapter 4: Introduction to Qualitative Research and Analysis Software (12 hrs.)

- Introduction to Qualitative research,
  - Techniques of data Collection-Interviews, Long Interviews, In-depth interviews
  - Focus Group Discussion, Social discourses Design of questionnaire guides
  - Non-probability sampling, sampling size determination
  - Open codes, central codes and theoretical codes

Chapter 5: Introduction to Microsoft word transcription function for mini research (6 Hrs.)

- Creating codes from qualitative dataset
- Transporting to Excel sheet
- Analysis, interpretation, and presentation

Chapter 6: Computer Assisted Data Analysis Tools (12 hrs.)

- Software for transcription analysis, coding and text analysis, discourse analysis, Grounded Theory Research
  - Any one open source or commercial software (e.g. like CAQDAS, QDA Miner Lite, Atlas.ti)
  - Content searching
  - Sorting and Coding
  - Data linking
  - Data mapping
  - Data visualization and Reporting

C. Assessments, Assignments, Field works and Tests

Internal assessments Field based Mini Research Report, Term papers

D. Evaluation Scheme

Assessments 40%, Examinations 60%

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

Units	**Topics**	**Marks ***
Unit 1	Chapter 1,3	12
Unit 2	Chapter 2	12
Unit 3	Chapter 3, 5	12
Unit 4	Chapter 4	12
Unit 5	Chapter 6	12
	Total:	**60**

** There may be minor deviation in marks distribution*

References

1. A. Field, *Discovering Statistics Using SPSS*, 2nd ed. SAGE Publication 2019.
2. N. A. Weiss, *Elementary Statistics*, 9th ed. Pearson, 2021.
3. R. E. Walpole, R. H. Myers, S. L. Myers, and K. E. Ye, *Probability & Statistics for Engineers & Scientists,* 9th ed. Pearson, 2012.
4. C. R. Kothari, *Research Methodology: Methods and Techniques*, 2nd ed. New Delhi: New Age International Publishers, 2004.,
5. M. Walter, *Research interview Transcript A*, Australia; Oxford University Press, 2009
6. J. Davies & K. Smith, *Practical Research and Evaluation: A Start-to-Finish Guide for Practitioners*, Sage Pulbication, 2010.
7. Y. K. Robert, *Case Study Research Design and Methods*, 5th ed. Thousand Oaks, CA: Sage, 2014

Energy Efficient Building Design Modeling

Course Code: AR904-E32 (Elective C1)

Credits: 4 **Year: II**
Total hrs.: 60 **Part: I**

A. Course Overview

Energy Efficiency Building Modeling (EEBM) is a tool that helps architects solve many of the complex problems they face during the design process. This course acquaints students to the fundamental concept of the energy performance of buildings, its prerequisites and explores the relationship between passive and active energy sources to make a building energy efficient. In this context, the course focuses on giving hands-on experience in building simulation tools to evaluate the energy performance of a building.

B. Course Objectives

The main objectives of the course are to enable students

- Familiarize basic concepts of Energy Efficiency in Buildings
- Introduce the pre-requisites for the energy efficiency building modeling
- Introduce and acquaint simulation programs of buildings to perform energy calculations, evaluate the relationship between energy use, indoor comfort, and users,
- Enable the student to evaluate and recommend energy efficiency strategies

C. Course Outlines:

1. **Chapter 1: Basic Concepts of Energy Efficiency in Buildings** (10 hrs.)
   - Basic concepts: terminologies and definitions
   - Objectives of Energy Efficiency in Buildings
   - Energy use in the building structure

2. Chapter 2: Passive Design Concepts (12 hrs.)
   - Energy, climate, and design
   - Thermal comfort and heat transfer in a Building
   - Psychrometric for comfort
   - Thermal Characteristics of Building Envelope
   - Solar energy, Solar shading, Solar Charts, and calculations

3. Chapter 3: Introduction to Active Energy in Buildings (10 hrs.)
   - Concept of HVAC
   - Use of HVAC in buildings
   - Types of HVAC systems & how each contributes to energy use

- Influencing factors on building energy use and HVAC performance (weather/weather data, occup ants, internal loads, building envelope, infiltration, ventilation, HVAC performance)

4. Chapter 4: Method of Data Collection for Building Energy Modelling (12 hrs.)

- Energy Consumption Pattern Survey (Lighting, Room Heating, Cooking, Cooling, etc)
- Site Study
- Climate Study
- Study of existing building bylaws

5. Chapter 5: Introduction to Energy Simulation (16 hrs.)

- The basic concept of Simulation
- Commonly used building energy modeling software & tools; advantages/disadvantages
- Introduction to simulation tools (e.g. Ecotect/Energy Plus etc)
- Basic input requirements; modifying input data to change output data
- Analysis of output of energy modeling software: monthly and sub monthly/hourly

D. Assessments, Assignments, Fieldworks and Tests

Written project report// constructive critique of EE in buildings, poster presentation/seminar presentation, term paper, lab experimentation/tests

E. Evaluation Scheme – Assessments 40%, Examination 60%

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

Units	Topics	Marks *
Unit 1	Chapter 1,5	12
Unit 2	Chapter 2	12
Unit 3	Chapter 3,5	12
Unit 4	Chapter 4	12
Unit 5	Chapter 5	12
	Total:	**60**

* There may be a minor deviation in marks distribution

References

1. R. Emmanuel, *An Urban Approach To Climate Sensitive Design*, 1st ed. London: Taylor & Francis, 2005.
2. B. Givoni, *Climate and Architecture*, 2nd ed. London: Applied Science Publishers, 1976.
3. C. E. Hagentoft, *Introduction to Building Physics* Lund Sweden: Studentlitteratur AB, 2003.
4. O. H. Koenigsberger, T. G. Ingersoll, M. A., and S. V. Szokolay, *Manual of Tropical Housing and Building, Part 1 – Climatic Design*. Chennai: Orient Longman Pvt. Ltd., 2004.

5. A. Krishan and N. Baker, S. Yannas and S. V. Szokolay, Eds. *Climate responsive architecture: A design handbook for energy efficient buildings*, 1st ed. Tata McGraw-Hill Pub. Co, 2017.
6. A. Rapaport, *House form and Culture*. NJ: Prentice-Hall: Englewood Cliffs, 1969.
7. ASHRAE 90.1, *User Manual*. 2007.
8. J. P. Waltz, *Computerized Building Energy Simulation Handbook*. Fairmont Pr, 1997.

CLIMATOLOGY AND BUILDING PHYSICS

Course Code: AR904 - E32 (Elective C1)

Credits: 4 **Year: II**
Total hrs.: 60 **Part: I**

A. Course Overview

The course focuses on the concepts of Climatology and Building Physics with the relationship of architecture. It seeks to impart the state-of-the-art knowledge on designing and building with respect to climate, climatic elements and physical environment of wind, light, humidity, precipitation, heat and acoustics.

B. Course Objectives

The main objectives of the course are to enable students

- to draw connections between design, planning and construction of buildings with the climate and climatic elements and physical environment like Sun, wind, light, acoustics and thermal environment and ecosystems,
- to develop a practical and analytical approach towards building design and its physical surrounding

C. Course Outlines:

1. Introduction of Climatology 20 Hrs

1.1 Climatology - Climate, Weather, Micro, Macro Climate
1.2 Climatic design due to human activities (Urban climate)
1.3 Climates in Nepal and world - Climatic zones and their Characteristics
1.4 Climatic Factors - Primary factors (Temperature, Solar Radiation, Humidity, Precipitation, Wind) and Secondary factors (Earthquake, Thunderstorm, Storm, Lightening, etc.)
1.5 The Bioclimatic approach - Tools for analyzing climatic data for building design
1.6 Geometry of Solar movement, Solar Chart

2. Climate Responsive Building 12 Hrs

2.1 Climate responsive Building in different climatic zones of Nepal –Terai, Hilly, Mountain
2.2 Climate responsive Building in different climatic zones of World – Warm humid, hot arid, Composite, Cold (Cool temperate, Alpine, Tundra), etc.

2.3 Building design - Active design, Passive design, Hybrid design, Zero energy building, energy efficient building, eco-friendly building, net-zero building, etc.

3. Architecture Lighting **8 Hrs**

3.1 Day lighting and building design

3.2 Artificial lighting and interior design

4. Architectural Acoustics **8 Hrs**

4.1 Room Acoustics

4.2 Noise control in and around building

5. Building Physics **12 Hrs**

5.1 Building design with respect to wind

5.2 Thermal control and Thermal balance in a human body and in a building

5.3 Internal comfort

5.4 Adaptive Thermal comfort

D. Assessments, Assignments, Field works and Tests

Internal assessments will be based on evaluation of reports, term papers or seminars. A field-work based report on traditional/vernacular architecture of Nepal is required.

E. Evaluation Scheme

Assessments - 40%, Examinations - 60%

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

Units	Chapters	Marks *
Unit 1	Chapter 1, 5	12
Unit 2	Chapter 2	12
Unit 3	Chapter 3	12
Unit 4	Chapter 4	12
Unit 5	Chapter 5	12
	Total:	**60**

** There may be minor deviation in marks distribution*

References:

1. A. K. Upadhyay, H. Yoshida, and H. B. Rijal, "Climate Responsive Building Design in the Kathmandu Valley," *Journal of Asian Architecture and Building Engineering,* vol. 5, no. 1, pp. 169-176, 2006/05/01 2006.
2. A. Krishan, N. Baker, and S. Yannas, *Climate Responsive Architecture: A Design Handbook for Energy Efficient Buildings*, 1st ed. Tata McGraw-Hill Pub. Co, 2017.
3. B. Givoni, *Man, Climate, and Architecture* (Elsevier architectural science series.). Amsterdam; London; New York: Elsevier Publishing Company Limited, 1969.
4. B. Pahari, *Passive Building - Concept & Design*. Lalitpur, Nepal: KEC, 2002.
5. G. K. Tuladhar, "Developing strategies for sustainable residential building design: Kathmandu Metropolitan City, Nepal," Master of Architecture, Iowa State University, 2011.
6. H. B. Rijal and H. Yoshida, "Winter Thermal Comfort of Residents in the Himalaya Region of Nepal," presented at the Ninth International IBPSA Conference., 2005.
7. L. Bittencourt, "Ventilation as a cooling resource for Warm-humid Climates: An investigation on perforated block wall geometry to improve ventilation inside Low-rise Buildings.," 1993.
8. O. H. Koenigsberger, T. G. Ingersoll, A. Mayhew, and S. V. Szokolay, *Manual of Tropical Housing and Building, Climatic Design*. Universities Press (India) Private Limited, 1975.
9. S. B. Bajracharya, "The Thermal Performance of Traditional Residential Buildings in Kathmandu Valley," *Journal of the Institute of Engineering,* vol. 10, 2014.
10. S. B. Bajracharya, *Thermal experiment of different building materials and technologies in a laboratory, Reflections on Built Environment and Associated Practices* Lalitpur, Nepal: Department of Architecture, Institute of Engineering, T.U., 2014.
11. S. Bodach, "Developing Bioclimatic Zones and Passive Solar Design Strategies for Nepal," in *30th International Plea Conference*, 2014.
12. S. V. Szokolay, *Introduction to Architectural Science, The Basis of Sustainable Design*. Architectural Press, 2008.
13. T. Bajracharya, R. Shree, S. Shakya, and S. Bajracharya, "Energy Efficient Building in Kathmandu Valley - A Case Study of Passive and Contemporary Residential Building," in *IOE Graduate Conference*, Kathmandu, Nepal, 2020.
14. W. Rattanongphisat and W. Rordprapat, "Strategy for Energy Efficient Buildings in Tropical Climate," *Energy Procedia,* vol. 52, pp. 10-17, 2014/01/01/ 2014.

THESIS

Course Code: **MAr 675 AE**
Credits: 16
Total hrs: 60
Year II / Part II

Course Overview / Objectives

Taking forward from the preparatory research development in the second and third semesters, the M. Arch thesis strives to formulate a well-conceived proposition for the thesis design project. In this, students formulate a cohesive thesis argument and critical project using supportive research and case studies through a variety of representational media, critical traditions, and architectural/artistic conventions.

The thesis project includes

a. The 'qualitative/quantitative research in architectural theme/subject to challenge the existing theoretical notions' or
b. Design by research with building design output or
c. Research by design involving the building research laboratory.

A thesis supervisor is assigned to supervise and direct the student's research work. In addition, practicing architects with substantial design credentials will be assigned as an advisor with intermittent involvement. Seminars and conferences both inside (e.g. IOE Graduate conference) and outside the classroom are organized from time to provide thesis students opportunities for presenting their works and peer review. In addition to this, students are encouraged to participate in various national and international conferences.