

# **Outcome-based Curriculum of Master of Architecture**



**Architecture Discipline  
Khulna University**

**Date: September, 2022**

## 01. Title of the Academic Program

### Master of Architecture

| Program Overview                                                |                                             |
|-----------------------------------------------------------------|---------------------------------------------|
| Degree                                                          | Master of Architecture                      |
| Abbreviated form of the Degree                                  | M.Arch.                                     |
| Major (if applicable)                                           | N/A                                         |
| Discipline/Program Offering Entity (POE)                        | Architecture Discipline                     |
| School                                                          | Science, Engineering, and Technology School |
| Awarding Institution                                            | Khulna University                           |
| Location                                                        | Khulna, Bangladesh                          |
| Bangladesh National Qualifications Framework (BNQF) Level       | 9                                           |
| International Standard Classification of Education (ISCED) Code | 0731                                        |
| Mode of Study                                                   | Mixed-mode (Dissertation)                   |
| Language of Study                                               | English                                     |
| Applicable Session                                              | 2021-2022 and onwards                       |

## 02. Name of the University

Khulna University

## 03. Vision of the University

Creation of global leaders who will contribute to make knowledge-based just society through accelerating inclusive and transformative growth of Bangladesh and the world. The university aims to achieve this vision through scholarly enquiry and contribution to the global knowledge pool.

#### 04. Mission of the University

|            |                                                                                                                                                                                                                             |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>UM1</b> | Explore human potential to the fullest extent and produce self-motivated, aspiring leaders to work for the betterment of the humankind based on wisdom, freethinking, creativity and unhindered intellectual exercises.     |
| <b>UM2</b> | Ensure a transformative educational experience that enables creative learning, entrepreneurship and inquisitiveness among the students.                                                                                     |
| <b>UM3</b> | Create an inclusive research environment that enables graduates to make demonstrable economic and social impacts through translating knowledge and innovation into practice driven by moral values and professional ethics. |

**UM = University Mission**

#### 05. Name of the Discipline/Program Offering Entity (POE)

Architecture Discipline

#### 06. Vision of the Discipline/POE

ArchKU aspires to become a centre of academic excellence in producing graduates who would advocate moral values, context, inquiry and research, problem-solving, synthesis, leadership, and lifelong learning in creating a healthy built environment while addressing the emerging needs and challenges of societies.

#### 07. Mission of the Discipline/POE

|           |                                                                                                                                                                                                                                                                                                                                          |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>M1</b> | To enable a buoyant, adaptive and thought-provoking learning environment that supports inclusiveness, critical thinking, creativity, innovation and experiment, while problematizing the unique cultural landscape of Bangladesh.                                                                                                        |
| <b>M2</b> | To equip students with necessary knowledge, sensitivity, skills, and attitudes to design buildings and settlements that would warrant sustainability and wellbeing through rigorous and interdisciplinary exchange between emerging discourses and practices.                                                                            |
| <b>M3</b> | To produce skilled and committed professionals with a strong contextual foundation, who should become leaders in local and global premises, pioneer diversified career paths and yield novel design approaches/thinking/methodologies to tackle the socio-environmental needs and challenges posed by the contingent and changing world. |

**M = Mission of the Discipline/POE**

## 08. Objectives of the Discipline/POE

|           |                                                                                                                                                                                                                                                                                                                                              |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>O1</b> | To enable a thought-provoking learning environment that is founded on critical inquiry, innovation, and experimentation, while prioritizing the unique cultural landscape of Bangladesh.                                                                                                                                                     |
| <b>O2</b> | To educate students with contextual knowledge, responsiveness, professional skills, and attitudes in designing buildings and cities that would ensure health, safety and sustainability ascertained by rigorous interdisciplinary exchange between emerging discourses, practices and socio-environmental needs, aspirations and challenges. |
| <b>O3</b> | To produce skilled and committed professionals with a solid contextual foundation, who could act as leaders and team players, pioneer diversified career paths, and yield novel design approaches, thinking, and methodologies to tackle the challenges posed by the contingent and changing world.                                          |

**O = Objective of the Discipline/POE**

## 09.Name of the Degree

Master of Architecture

## 10.Description of the Program

The Master of Architecture is a post-professional graduate program offered by Architecture Discipline, Khulna University. It promotes advanced level design research across several disciplinary specializations and adopts both “Learning by doing” and “Design by Research” approaches. In the context of global architectural practice, the course is committed to the development of international perspectives both in terms of the curriculum and research-based components, and in terms of the learning process itself. This course has been designed to assume an interactive learning process that encourages and enables the sharing of international and cultural experiences to deepen and enrich learners’ understanding, and equip them to respond appropriately to different design contexts. This program trains professionals, using a combination of cutting edge knowledge, advanced skills and critical inquiry toward the production of sensible but forward looking architecture. It is expected to make learners capable of thinking out of the box and produce architectural solutions for the current and imminent problems of the environment and society, while challenging the linear and homogeneous approach in design and building.

The program prepares students for an entrepreneurial approach to architectural thinking and practice. Students have the possibility to create their own practices in the field of architecture,

urban design, landscape design, and other relevant fields. Students who graduate successfully from this M. Arch course will have an opportunity to undertake a research degree, preferably a Doctor of Philosophy (PhD).

## 11. Graduate Attributes

| No. | Graduate Attributes                                | Multiple Domains                                      |
|-----|----------------------------------------------------|-------------------------------------------------------|
| GA1 | Deep Discipline Knowledge and Intellectual breadth | Fundamental domain + Thinking domain                  |
| GA2 | Digital Capabilities                               | Fundamental domain + Personal domain                  |
| GA3 | Team works and communication skills                | Social domain + Personal domain                       |
| GA4 | Cultural competency                                | Social domain +Personal domain+ Thinking domain       |
| GA5 | Creative and critical thinking and problem-solving | Fundamental domain + Personal domain+ Thinking domain |
| GA6 | Decision-making and Entrepreneurship               | Thinking domain + Personal domain                     |
| GA7 | Self-awareness and Ethical competency              | Personal domain +Social domain                        |
| GA8 | Professionalism and leadership readiness           | Personal domain +Social domain                        |

GA = Graduate Attributes

## 12. Program Educational Objectives (PEOs)

|      |                                                                                                                                                                                                               |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PEO1 | To instill an advanced knowledge of philosophy and principles of the multidimensional aspects of architecture, and the direct relationship between humans and the environment.                                |
| PEO2 | To frame methodological processes for designing and developing strategies to address complex built environment issues in order to meet the specific needs with the help of other multi-disciplinary concepts. |
| PEO3 | To educate the students to disseminate research findings with good communication skills and become successful entrepreneurs.                                                                                  |

|             |                                                                                                                                                                                  |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>PEO4</b> | To provide knowledge-based services to satisfy the needs of society and the industry by providing hands-on experience in various technologies in architecture and allied fields. |
| <b>PEO5</b> | To undertake progressively managerial, leading, and influential roles in their organizations and communities.                                                                    |

**PEO = Program Educational Objective**

### **13. Program Learning Outcomes (PLOs)**

After successful completion of the degree, the learner will be able to:

| <b>A. Fundamental Skills</b> |                                                                                                                                                                                                                                                               |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PLO1                         | Understand and apply the knowledge of philosophy, environment, technology, and society in various domains of built-environment, such as urban, heritage, conservation, disaster, etc. and excel in the construction industry.                                 |
| PLO2                         | Apply and seek appropriate spatial and digital tools, quantitative, qualitative, and mixed methods to investigate the dynamics of the built environment.                                                                                                      |
| <b>B. Social Skills</b>      |                                                                                                                                                                                                                                                               |
| PLO3                         | Be able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions to communicate effectively on complex activities with the professional community and with society at large. |
| PLO4                         | Collaborate, communicate and consult with the community together with professionals and stakeholders to improve the quality of life and well-being.                                                                                                           |
| PLO5                         | Apply reasoning to assess societal, health, safety, legal and cultural issues informed by the contextual knowledge and the consequent responsibilities relevant to the professional practice                                                                  |
| <b>C. Thinking Skills</b>    |                                                                                                                                                                                                                                                               |
| PLO6                         | Use evidence-based research and field studies for analysis, interpretation, and synthesis of the information to provide reliable conclusions by applying critical thinking.                                                                                   |
| PLO7                         | Establish, administer and run a start-up successfully being an innovator and bringing new ideas into the profession                                                                                                                                           |
| <b>D. Personal Skills</b>    |                                                                                                                                                                                                                                                               |
| PLO8                         | Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological, socio-cultural, and environmental change.                                                               |

|       |                                                                                                                              |
|-------|------------------------------------------------------------------------------------------------------------------------------|
| PLO9  | Apply ethical principles and commit to professional ethics and responsibilities and norms of the professional practice.      |
| PLO10 | Function effectively as an individual, and as a member or leader in diverse teams, as well as in multidisciplinary settings. |

**PLO = Program Learning Outcome**

#### **14 (A). Mapping Mission of the University with PEOs**

| <b>PEOs \ Missions</b> | <b>UM1</b> | <b>UM2</b> | <b>UM3</b> |
|------------------------|------------|------------|------------|
| PEO1                   | 3          | 2          | 1          |
| PEO2                   | 1          | 1          | 3          |
| PEO3                   | 2          | 2          | 3          |
| PEO4                   | 1          | 3          | 1          |
| PEO5                   | 2          | 1          | 3          |

**Level of Correlation: 3=High, 2=Medium, 1=Low**

#### **14(B). Mapping Mission of the Discipline with PEOs**

| <b>PEOs \ Missions</b> | <b>M1</b> | <b>M2</b> | <b>M3</b> |
|------------------------|-----------|-----------|-----------|
| PEO1                   | 3         | 2         | 1         |
| PEO2                   | 1         | 1         | 3         |
| PEO3                   | 2         | 2         | 3         |
| PEO4                   | 1         | 3         | 1         |
| PEO5                   | 2         | 1         | 3         |

**Level of Correlation: 3=High, 2=Medium, 1=Low**

## 15. Mapping PLOs with PEOs

| Program Learning Outcomes (PLOs) |       | Program Educational Objectives (PEOs) |      |      |      |      |
|----------------------------------|-------|---------------------------------------|------|------|------|------|
|                                  |       | PEO1                                  | PEO2 | PEO3 | PEO4 | PEO5 |
| A. Fundamental Domain            | PLO1  | •                                     |      |      | •    |      |
|                                  | PLO2  |                                       | •    | •    |      |      |
| B. Social Domain                 | PLO3  |                                       |      | •    | •    | •    |
|                                  | PLO4  |                                       | •    | •    | •    | •    |
|                                  | PLO5  | •                                     | •    | •    | •    |      |
| C. Thinking Domain               | PLO6  | •                                     | •    |      |      |      |
|                                  | PLO7  |                                       |      | •    | •    | •    |
| D. Personal Domain               | PLO8  | •                                     |      |      |      | •    |
|                                  | PLO9  |                                       |      |      | •    | •    |
|                                  | PLO10 |                                       |      | •    | •    | •    |

## 16. Mapping Courses with PLOs

| Course Code and Course Title                                         | PLOs               |      |               |      |      |                 |      |                 |      |       |
|----------------------------------------------------------------------|--------------------|------|---------------|------|------|-----------------|------|-----------------|------|-------|
|                                                                      | Fundamental Domain |      | Social Domain |      |      | Thinking Domain |      | Personal Domain |      |       |
|                                                                      | PLO1               | PLO2 | PLO3          | PLO4 | PLO5 | PLO6            | PLO7 | PLO8            | PLO9 | PLO10 |
| First Year First Term                                                |                    |      |               |      |      |                 |      |                 |      |       |
| 0731 01 Arch 6101<br>Architectural History, Theory and Criticism     | •                  | •    | •             |      | •    | •               |      |                 |      |       |
| 0731 01 Arch 6102 Design Communication                               |                    | •    | •             |      |      | •               | •    | •               |      | •     |
| 0319 01 Soc 6153<br>Research Methodology                             | •                  | •    | •             | •    | •    | •               |      | •               |      |       |
| 0731 01 Arch 6138<br>Computational Design                            | •                  | •    |               |      |      | •               | •    |                 | •    |       |
| Courses for Elective 1 and Elective II (1 <sup>st</sup> Year Term I) |                    |      |               |      |      |                 |      |                 |      |       |
| 0731 01 Arch 6131<br>Building Performance Evaluation                 | •                  | •    | •             | •    | •    | •               |      | •               |      | •     |
| 0188 01 Edu 6171<br>Architecture Education: Concepts and Practices   | •                  | •    |               | •    | •    | •               | •    | •               |      | •     |

|                                                                             |   |   |   |   |   |   |  |   |   |   |
|-----------------------------------------------------------------------------|---|---|---|---|---|---|--|---|---|---|
| 0732 01 CE 6171<br>Advanced<br>Structural System                            | • | • |   |   |   | • |  | • | • |   |
| 0288 01 Arch 6173<br>Conservation:<br>Principle, Practice<br>and Management | • |   |   | • |   | • |  | • |   | • |
| 0731 01 Arch 6137<br>Housing: Policies<br>and Finance                       | • | • | • | • | • | • |  | • | • | • |

| Course Code<br>and Course Title                                               | PLOs                  |      |                  |      |      |                    |      |                    |      |       |
|-------------------------------------------------------------------------------|-----------------------|------|------------------|------|------|--------------------|------|--------------------|------|-------|
|                                                                               | Fundamental<br>Domain |      | Social<br>Domain |      |      | Thinking<br>Domain |      | Personal<br>Domain |      |       |
|                                                                               | PLO1                  | PLO2 | PLO3             | PLO4 | PLO5 | PLO6               | PLO7 | PLO8               | PLO9 | PLO10 |
| <b>First Year Second Term</b>                                                 |                       |      |                  |      |      |                    |      |                    |      |       |
| 0731 01 Arch<br>6200 Dissertation-<br>I                                       | •                     | •    | •                |      |      | •                  |      | •                  |      | •     |
| 0731 01 Arch<br>6202<br>Advanced Design<br>Studio                             | •                     | •    | •                | •    | •    | •                  |      | •                  |      | •     |
| 0532 01 Geog<br>6270<br>Spatial Data-<br>analysis lab                         | •                     | •    |                  |      |      | •                  | •    |                    |      | •     |
| <i>Courses for Elective 1II and Elective 1V (1<sup>st</sup> year Term II)</i> |                       |      |                  |      |      |                    |      |                    |      |       |
| 0731 01 Arch<br>6231 Regenerative<br>Design                                   | •                     | •    | •                | •    | •    | •                  |      | •                  |      |       |
| 0731 01 URP 6271<br>Rural-Urban<br>Settlement System                          | •                     | •    |                  | •    | •    | •                  |      |                    |      |       |
| 0031 01 Arch<br>6271 Individual<br>Study Module<br>(ISM)                      | •                     | •    | •                | •    | •    | •                  |      | •                  | •    | •     |
| 0288 01 Arch<br>6273 Heritage<br>Conservation and<br>Digital<br>Technologies  | •                     | •    | •                |      |      | •                  |      | •                  |      | •     |
| 0731 01 Arch<br>6283 Advanced<br>Construction<br>Technology:                  | •                     | •    |                  | •    | •    | •                  |      | •                  | •    | •     |

|                                                |   |   |   |   |  |   |  |   |   |  |
|------------------------------------------------|---|---|---|---|--|---|--|---|---|--|
| Fabrication and Material                       |   |   |   |   |  |   |  |   |   |  |
| 0731 01 Arch<br>6283 Water<br>Sensitive Design | • | • | • | • |  | • |  | • | • |  |

| Course Code<br>and Course<br>Title        | PLOs                  |      |                  |      |      |                    |      |                    |      |       |
|-------------------------------------------|-----------------------|------|------------------|------|------|--------------------|------|--------------------|------|-------|
|                                           | Fundamental<br>Domain |      | Social<br>Domain |      |      | Thinking<br>Domain |      | Personal<br>Domain |      |       |
|                                           | PLO1                  | PLO2 | PLO3             | PLO4 | PLO5 | PLO6               | PLO7 | PLO8               | PLO9 | PLO10 |
| Second Year First Term                    |                       |      |                  |      |      |                    |      |                    |      |       |
| 0731 01 Arch<br>7100<br>Dissertation-II   |                       | •    | •                | •    |      |                    |      |                    |      | •     |
| 0731 01 Arch<br>7108 Thesis<br>Colloquium |                       | •    | •                | •    |      | •                  |      | •                  | •    | •     |

## 17. Structure of the Curriculum

|                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |           |
|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| a) Duration of the Program                                                                     | 1.5 years                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | III terms |
| b) Admission Requirements                                                                      | <p>Students who are passionate about combining design and science to lead the future of the built environment, and want to use algorithms, digital data and smart materials approach for proto-typing and accelerating contribute to new novel building and innovation building solutions, are particularly welcome to join this the M. Arch program.</p> <p>Candidates seeking admission into a Master's this program must possess a Bachelor degree in Architecture or allied disciplines (Minimum CGPA 2.5 out of 4/ or 2nd class) from a recognized university (home and abroad); with 16 years of schooling; and a minimum CGPA/class/division of 3.5 out of 5. Other terms and conditions are set or revised periodically by the appropriate authority subject to the approval of EC, BOAS, and AC of Khulna University.</p> <p>Students having an 'Appeared' Certificate of her/his Bachelor degree may be admitted in this Master's M. Arch program. But she/she has to submit the original Transcript, Provisional Certificate/ Certificate/ Migration Certificate of the Bachelor degree within two months of admission. Otherwise her/his admission will be cancelled.</p> |           |
| c1) Graduating Credits / Total Minimum Credit Requirement to Complete the Program <sup>i</sup> | 48                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |           |
| c2) Available Credits                                                                          | 54                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |           |

|                                                     |          |
|-----------------------------------------------------|----------|
| <b>d) Total Class Weeks in a Term <sup>ii</sup></b> | 14       |
| <b>e) Minimum CGPA Requirements for Graduation</b>  | 2.50     |
| <b>f) Maximum Academic Years of Completion</b>      | 03 years |

| Program type                     | Min. credit requirement from major area <sup>i</sup> |                     |                     |                      |
|----------------------------------|------------------------------------------------------|---------------------|---------------------|----------------------|
|                                  | Coursework (Min.)                                    | Dissertation (Min.) | Dissertation (Max.) | Min. from Major Area |
| <b>Mixed-mode (Dissertation)</b> | 28                                                   | 20                  | -                   | -                    |

| Term Duration <sup>ii</sup> |                   |                        |            |          |
|-----------------------------|-------------------|------------------------|------------|----------|
| Teaching and Learning       | Preparatory Leave | Term Final Examination | Term Break | Total    |
| 14 Weeks                    | 2 Weeks           | 4 Weeks                | 2 Weeks    | 22 Weeks |

### g1) Area-wise Credit Distribution

| Area                                          | Course Type | Number of Courses | Credits   | Total Credits |
|-----------------------------------------------|-------------|-------------------|-----------|---------------|
| General Education (GED) Courses <sup>**</sup> | Theory      | 3                 | 09        | 09            |
|                                               | Sessional   | 0                 | 0         |               |
| Core/Compulsory Courses                       | Theory      | 2                 | 6         | 36            |
|                                               | Sessional   | 5                 | 30        |               |
| Optional/Elective Courses                     | Theory      | 4                 | 12        | 18            |
|                                               | Sessional   | 2                 | 06        |               |
| Capstone Courses <sup>***</sup>               | Sessional   | 3                 | 20        | 20            |
| <b>Total</b>                                  |             | <b>13</b>         | <b>54</b> | <b>54</b>     |

<sup>\*\*</sup> 16.66 % from GED courses

<sup>\*\*\*</sup> Thesis, project, internship etc. courses

### g2) Category of Course

| Area                            | Course Type | Course Title                                                                                                     | Credits |
|---------------------------------|-------------|------------------------------------------------------------------------------------------------------------------|---------|
| General Education (GED) Courses | Theory      | 1) Research Methodology<br>2) Individual Study Module (ISM)<br>3) Architecture Education: Concepts and Practices | 9       |
| Core/ Compulsory Courses        | Theory      | 1) Research Methodology<br>2) Architectural Thinking and Criticism                                               | 06      |

|                            |           |                                                                                                                         |           |
|----------------------------|-----------|-------------------------------------------------------------------------------------------------------------------------|-----------|
|                            | Sessional | 1) Design Communication<br>2) Advanced Design Studio<br>3) Dissertation 1<br>4) Dissertation II<br>5) Thesis Colloquium | 30        |
| Optional/ Elective Courses | Theory    | 1) Elective I<br>2) Elective II<br>3) Elective III<br>4) Elective IV                                                    | 12        |
|                            | Sessional | 1) Computational Design<br>2) Spatial Data Analysis                                                                     | 06        |
| Capstone Courses           | Sessional | 1) Dissertation 1<br>2) Dissertation II<br>3) Thesis Colloquium                                                         | 20        |
| <b>Total</b>               |           |                                                                                                                         | <b>54</b> |

### 18. Year/Term-wise Distribution of Courses

| First Year First Term |                  |                      |               |                    |           |         |               |
|-----------------------|------------------|----------------------|---------------|--------------------|-----------|---------|---------------|
|                       | Course Code      | Course Title         | Course Status | Contact Hours/Week |           | Credits | Prerequisites |
|                       |                  |                      |               | Theory             | Sessional |         |               |
| <b>Core Courses</b>   | 0319 01 Soc 6153 | Research Methodology | Core          | 3.0                | -         | 3.0     | None          |
|                       | 0731 01          | Architectural        | Core          | 3.0                | -         | 3.0     | None          |

|                    |                                                                                        |                                     |          |      |      |      |      |
|--------------------|----------------------------------------------------------------------------------------|-------------------------------------|----------|------|------|------|------|
|                    | Arch 6101                                                                              | History,<br>Theory and<br>Criticism |          |      |      |      |      |
|                    | 0731 01<br>Arch 6102                                                                   | Design<br>Communicatio<br>n         | Core     | -    | 6.0  | 4.0  | None |
|                    | Term Total Core                                                                        |                                     |          | 6.0  | 6.0  | 10.0 | -    |
| Optional<br>Course | -                                                                                      | Elective I*                         | Optional | 3.0  | -    | 3.0  | None |
|                    | -                                                                                      | Elective II*                        | Optional | 3.0  | -    | 3.0  | None |
|                    | 0731 01<br>Arch 6138                                                                   | Computational<br>Design             | Optional | -    | 4.5  | 3.0  | None |
|                    | Term Total Optional                                                                    |                                     |          | 6.0  | 4.5  | 9.0  | -    |
| Total              | Core Courses:03, Optional Courses: 03,<br>Theory Courses: 04, Sessional Courses:<br>02 |                                     |          | 12   | 10.5 | 19.0 | -    |
|                    |                                                                                        |                                     |          | 22.5 |      |      |      |

| First Year Second Term |                                                                                  |                           |               |                    |            |         |               |
|------------------------|----------------------------------------------------------------------------------|---------------------------|---------------|--------------------|------------|---------|---------------|
|                        | Course Code                                                                      | Course Title              | Course Status | Contact Hours/Week |            | Credits | Prerequisites |
|                        |                                                                                  |                           |               | Theor y            | Session al |         |               |
| Core Courses           | 0731 01 Arch 6202                                                                | Advanced Design Studio    | Core          | -                  | 9.0        | 6.0     | Yes           |
|                        | 0731 01 Arch 6200                                                                | Dissertation-I            | Core          | -                  | 6.0        | 4.0     | None          |
|                        | Term Total Core                                                                  |                           |               | -                  | 15         | 10      | -             |
| Optional Course        | -                                                                                | Elective –III **          | Optional      | 3.0                | -          | 3.0     | None          |
|                        |                                                                                  | Elective –IV **           | Optional      | 3.0                |            | 3.0     | None          |
|                        | 0532 01 Geog 6270                                                                | Spatial Data-analysis lab | Optional      | -                  | 4.5        | 3.0     | None          |
|                        | Term Total Optional                                                              |                           |               | 6.0                | 4.5        | 9.0     | -             |
| Total                  | Core Courses:02, Optional Courses: 03, Theory Courses: 02, Sessional Courses: 03 |                           |               | 6.0                | 19.5       | 19.0    | -             |
|                        |                                                                                  |                           |               | 25.5               |            |         |               |

| <b>Second Year First Term</b> |                    |                     |                      |                           |                  |                |                      |
|-------------------------------|--------------------|---------------------|----------------------|---------------------------|------------------|----------------|----------------------|
|                               | <b>Course Code</b> | <b>Course Title</b> | <b>Course Status</b> | <b>Contact Hours/Week</b> |                  | <b>Credits</b> | <b>Prerequisites</b> |
|                               |                    |                     |                      | <b>Theory</b>             | <b>Sessional</b> |                |                      |
| <b>Core Courses</b>           | 0731 01 Arch 7100  | Dissertation -II    | Core                 | -                         | 18.0             | 12.0           | Yes                  |
|                               | 0731 01 Arch       | Thesis              | Core                 | -                         | 6.0              | 4.0            | Yes                  |

|       |                                                                                     |            |  |      |      |      |   |
|-------|-------------------------------------------------------------------------------------|------------|--|------|------|------|---|
|       | 7108                                                                                | Colloquium |  |      |      |      |   |
| Total | Core Courses:02, Optional Courses: 00,<br>Theory Courses: 00, Sessional Courses: 02 |            |  | -    | 24.0 | 16.0 | - |
|       |                                                                                     |            |  | 24.0 |      |      |   |

*\*List of offered optional theory courses for Elective I, II*

| Course Code       | Course Title                                     |
|-------------------|--------------------------------------------------|
| 0731 01 Arch 6131 | Building Performance Evaluation                  |
| 0732 01 CE 6171   | Advanced Structural System                       |
| 0188 01 Edu 6171  | Architecture Education: Concepts and Practices   |
| 0288 01 Arch 6173 | Conservation: Principle, Practice and Management |
| 0731 01 Arch 6137 | Housing: Policies and Finance                    |

*\*\*List of offered optional theory courses for Elective III and IV*

| Course Code       | Course Title                                               |
|-------------------|------------------------------------------------------------|
| 0731 01 Arch 6231 | Regenerative Design                                        |
| 0731 01 URP 6271  | Rural-Urban Settlement System                              |
| 0731 01 Arch 6271 | Individual Study Module (ISM)                              |
| 0288 01 Arch 6273 | Heritage Conservation and Digital Technologies             |
| 0731 01 Arch 6283 | Advanced Construction Technology: Fabrication and Material |
| 0731 01 Arch 6283 | Water Sensitive Design                                     |

Note: Elective Theory courses to be taken from any specialization stream without repetition and subject to approval of the adviser.

## 19.Course Description

### First Year First Term

|                                           |                    |                    |
|-------------------------------------------|--------------------|--------------------|
| <b>Course Code:</b> 0731 01 Arch 6102     | <b>Year:</b> First | <b>Term:</b> First |
| <b>Course Title:</b> Design Communication |                    |                    |
| <b>Course Status:</b> Core                |                    |                    |
| <b>Credit:</b> 4.0                        |                    |                    |

| <b>Prerequisite(s):</b> None |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Rationale</b>             | This course introduces architectural design processes and representation methods through planned and systematic collaboration. It orients, using hands-on methodology and precedents, to contemporary and emerging inquiry tools, schematics/options, synthesis and design, criticism and development, presentation/visualization, and production that describe an entire spectrum of an architectural project in depth and detail.                                                                                          |
| <b>Course Objectives</b>     | <ol style="list-style-type: none"> <li>1. Provide knowledge of contemporary and emerging processes and representational methods in architectural design.</li> <li>2. Instill the ability to gather information, define problems, analyze and critically judge, and formulate strategies for continuous design development in a professional manner.</li> <li>3. Instill the ability to explore, develop, define and communicate design through collaboration, speaking, numeracy, writing, drawing, and modeling.</li> </ol> |

| <b>Course Contents/Tasks</b> |                                                                                                                                          | <b>CLOs</b> |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| <b>1</b>                     | Conceptualization of design process in diverse contexts and their application in architectural design development and production.        | 1,2         |
| <b>2</b>                     | Process of inquiry; analysis and synthesis; verbal, and written presentation on/in architecture.                                         | 3           |
| <b>3</b>                     | Hands-on exercise/experiment with contemporary and advanced methods of visualization and representation (manual, electronic, graphical). | 1,2,3       |
| <b>4</b>                     | Site visits to appreciate the multiplicities and challenges of communication for materializing concepts in real-life situations..        | 4           |
| <b>5</b>                     | Collaboration with professional/industry enterprises using state-of-the-art techniques.                                                  | 1, 2        |

| <b>Course Learning Outcomes (CLOs)</b> | Upon completion of this course the students will be able to: |                                                                                                                                       | <b>Mapping with PLOs</b> |
|----------------------------------------|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
|                                        | CLO1                                                         | Demonstrate skills in contemporary and emerging design processes and representational methods in addressing an architectural problem. | PLO2,PLO3,PLO7           |
|                                        | CLO2                                                         | Collect information, define problems, analyze and critically judge, and formulate strategies for continuous design development.       | PLO3,PLO6                |
|                                        | CLO3                                                         | Acquire professional-level proficiency in a variety of communication techniques:                                                      | PLO8                     |

|  |      |                                                                                            |             |
|--|------|--------------------------------------------------------------------------------------------|-------------|
|  |      | traditional, electronic, and experimental.                                                 |             |
|  | CLO4 | Select appropriate tools and techniques to deal with the particular nature of the problem. | PLO2, PLO10 |

#### Mapping CLOs with the Teaching-Learning and Assessment Strategy

| CLOs | Teaching-Learning Strategy                       | Assessment Strategy                                            |
|------|--------------------------------------------------|----------------------------------------------------------------|
| CLO1 | Lectures and hands-on workshops                  | Desk critiques, studio pin-ups, and mid-term and final reviews |
| CLO2 | Skill-based tutorials and problem-based learning | Desk critiques, studio pin-ups, and mid-term and final reviews |
| CLO3 | Individual and Team Work                         | Desk critiques, studio pin-ups, and mid-term and final reviews |
| CLO4 | Hands-on workshops                               | Desk critiques, studio pin-ups, and mid-term and final reviews |

#### Learning Materials

|                               |                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Recommended Readings</b>   | <ol style="list-style-type: none"> <li>1. Frascara, J., (2004). <i>Communication Design – Principles, Design and Practice</i>. Allworth Press.</li> <li>2. Davis, M., and Hunt, J. (2017). <i>Visual communication design: An introduction to design concepts in everyday experience</i>. Bloomsbury Publishing..</li> </ol>                                                                                |
| <b>Supplementary Readings</b> | <ol style="list-style-type: none"> <li>1. Sherwin, D. (2010). <i>Creative workshop: 80 challenges to sharpen your design skills</i>. How Books.</li> <li>2. Zimmerman, J., Forlizzi, J., and Evenson, S. (2007). Research through design as a method for interaction design research in HCI. In <i>Proceedings of the SIGCHI conference on Human factors in computing systems</i> (pp. 493-502).</li> </ol> |

|                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |                    |
|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------|
| <b>Course Code:</b> 0731 01 Arch 6138     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>Year:</b> First | <b>Term:</b> First |
| <b>Course Title:</b> Computational Design |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |                    |
| <b>Course Status:</b> Optional            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |                    |
| <b>Credit:</b> 3.0                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |                    |
| <b>Prerequisite(s):</b> None              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |                    |
| <b>Rationale</b>                          | This course improves traditional design processes/methods by encoding design decisions using advanced computing. It contains methods adapted from allied technological fields, namely computer science, mathematics, and applied geometry, to address design problems. The course suits the students interested in pushing disciplinary boundaries, developing a unique design research agenda, and acquiring the necessary technical competence to explore computational design at the highest level of creativity and scholarly rigour. |                    |                    |
| <b>Objectives</b>                         | <ol style="list-style-type: none"> <li>1. Understand the potential of computation and its role in the design process, not merely as a collection of tools but as a way of thinking about design.</li> <li>2. Enable algorithmic thinking by being able to use computer programming and applications for exploring, optioneering, developing, defining, and communicating design.</li> <li>3. Set out new creative potential by acquiring skills in next-generation tools and techniques.</li> </ol>                                       |                    |                    |

| <b>Course Contents</b> |                                                                                                                                                             | <b>CLOs</b> |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| <b>1</b>               | Theoretical and technical understanding of computational design and practice through the introduction to basic scripting and parametric tools.              | 1, 4        |
| <b>2</b>               | Digital simulation, computational geometry, and shape grammars – as well as embodied and tangible forms of design interaction, fabrication, and expression. | 2, 3        |
| <b>3</b>               | Advanced digital tools and methods for Building Information Modelling (BIM).                                                                                | 2, 3        |
| <b>4</b>               | Building Information Modeling (BIM) for creating and managing information on a construction project across the project lifecycle                            | 3,4         |

|                                        |                                                              |                                                                                                                    |                          |
|----------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|--------------------------|
| <b>Course Learning Outcomes (CLOs)</b> | Upon completion of this course the students will be able to: |                                                                                                                    | <b>Mapping with PLOs</b> |
|                                        | CLO1                                                         | Synthesize interdisciplinary knowledge of cultural and natural systems with technological systems.                 | PLO1, PLO6               |
|                                        | CLO2                                                         | Apply interdisciplinary knowledge using computational design thinking and methods to solve architectural problems. | PLO2, PLO6,PLO7          |

|  |      |                                                                                                         |            |
|--|------|---------------------------------------------------------------------------------------------------------|------------|
|  | CLO3 | Use computational knowledge and skills for professional design tasks and/or advanced learning.          | PLO8, PLO6 |
|  | CLO4 | Practice the ethical application of digital and computational technologies in/for architectural design. | PLO9       |

#### Mapping CLOs with the Teaching-Learning and Assessment Strategy

| CLOs  | Teaching-Learning Strategy                       | Assessment Strategy                         |
|-------|--------------------------------------------------|---------------------------------------------|
| CLO1  | Lectures and hands-on workshops                  | Task Assignment, Presentation and Viva voce |
| CLO2  | Lectures and hands-on workshops                  | Task Assignment, Presentation and Viva voce |
| CLO 3 | Skill-based tutorials and problem-based learning | Task Assignment, Presentation and Viva voce |
| CLO 4 | Lecture and workshop                             | Task Assignment, Presentation and Viva voce |

#### Learning Materials

|                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Recommended Readings</b>   | <ol style="list-style-type: none"> <li>1. Menges, A., and Ahlquist, S. (2011). <i>Computational design thinking: computation design thinking</i>. John Wiley and Sons.</li> <li>2. Yuan, P. F., Leach, N., and Menges, A. (2018). <i>Digital fabrication</i>. Tongji University Press Co., Ltd.</li> <li>3. Garber, R. (2014). <i>BIM design: realising the creative potential of building information modelling</i>. John Wiley and Sons.</li> </ol> |
| <b>Supplementary Readings</b> | <ol style="list-style-type: none"> <li>1. Tedeschi, A. (2014). <i>AAD, Algorithms-aided design: parametric strategies using Grasshopper</i>. Le penseur publisher</li> <li>2. Epstein, E. (2012). <i>Implementing successful building information modeling</i>. Artech House.</li> </ol>                                                                                                                                                              |

|                                                                   |                    |                    |
|-------------------------------------------------------------------|--------------------|--------------------|
| <b>Course Code:</b> 0731 01 Arch 6101                             | <b>Year:</b> First | <b>Term:</b> First |
| <b>Course Title:</b> Architecture: History, Theory, and Criticism |                    |                    |
| <b>Course Status:</b> Core                                        |                    |                    |
| <b>Credit:</b> 3.0                                                |                    |                    |
| <b>Prerequisite(s):</b> None                                      |                    |                    |

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Rationale</b>  | This course provides the necessary understanding of the precedence and context of architectural design and the evaluative skills to not only improve on the past but to engage in constructive dialogue for the present and future. It imparts a sense of judgment, and introduces them to the methods of design criticism to facilitate a critical appraisal of the design process (e.g. context, conceptualization, contextualization, and reasoning concerning realizing/making/building). With an explicit grounding in the history of architecture and its allied disciplines, the course expands students' knowledge and abilities to understand, discuss and critically evaluate design works and strategies. |
| <b>Objectives</b> | <ol style="list-style-type: none"> <li>1. Value history, theory and criticism as an essential and profoundly correlated triad in architectural thinking and practice</li> <li>2. Situate architectural design, construction and materiality in the context of the socio-technical climate of the past</li> <li>3. Appraise the historical role of theory in shaping the thinking and practice in the discipline of architecture</li> <li>4. Prepare for the comprehension, evaluation and production of architectural theory and criticism</li> </ol>                                                                                                                                                                |

| Course Contents |                                                                                                                    | CLOs |
|-----------------|--------------------------------------------------------------------------------------------------------------------|------|
| Section A       |                                                                                                                    |      |
| 1               | Contextualizing history-theory-criticism                                                                           | 1    |
| 2               | History of the theory in/of architecture                                                                           | 1,2  |
| 3               | Theory in the history of architecture                                                                              | 1, 2 |
| Section B       |                                                                                                                    | CLOs |
| 1               | Role of criticism in architecture                                                                                  | 1    |
| 2               | Context (site/forum), presentation, voice, vocabulary, audience, and objectivity of architectural/design criticism | 2,3  |
| 3               | Approach, medium, and methods of architectural/design criticism                                                    | 4    |

|                                        |                                                              |                                                     |                          |
|----------------------------------------|--------------------------------------------------------------|-----------------------------------------------------|--------------------------|
| <b>Course Learning Outcomes (CLOs)</b> | Upon completion of this course the students will be able to: |                                                     | <b>Mapping with PLOs</b> |
|                                        | CLO1                                                         | Appraise the creative/synthetic nature of criticism |                          |

|  |      |                                                                                                     |                        |
|--|------|-----------------------------------------------------------------------------------------------------|------------------------|
|  | CLO2 | Apply various methods of architectural criticism in relation to history and theory of architecture  | PLO5,<br>PLO6          |
|  | CLO3 | Evaluate contemporary design problems against historical and theoretical discourses on architecture | PLO1,<br>PLO2,<br>PLO6 |
|  | CLO4 | Comprehend, produce and evaluate critical writings                                                  | PLO1,<br>PLO3          |

### Mapping CLOs with the Teaching-Learning and Assessment Strategy

| CLOs | Teaching-Learning Strategy                                                                     | Assessment Strategy                    |
|------|------------------------------------------------------------------------------------------------|----------------------------------------|
| CLO1 | Lecture & Peer group discussion/activity                                                       | Group Presentation & Final Examination |
| CLO2 | Lecture & Peer group discussion/activity                                                       | Peer assessment                        |
| CLO3 | Lecture & Field/architectural site visit                                                       | Poster Presentation & Final Exam       |
| CLO4 | Lecture (with few guest lectures) & Class exercise (peer groups) on reading/writing techniques | Independent write up & Peer critiquing |

### Learning Materials

|                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Recommended Readings</b>   | <ol style="list-style-type: none"> <li>1. Crysler, C. G., Cairns, S., and Heynen, H. (Eds.). (2012). <i>The SAGE handbook of architectural theory</i>. Sage.</li> <li>2. Hartoonian G. (2017). <i>Time, History, and Architecture. Essays on Critical Historiography</i>, Routledge</li> <li>3. Mallgrave H. F. (Ed.) (2006). <i>Architectural Theory (Vol. I). An Anthology from Vitruvius to 1870</i>. Blackwell</li> <li>4. Goodman, D. J., and Mallgrave, H. F. (2011). <i>An introduction to architectural theory: 1968 to the present</i>. John Wiley and Sons.</li> <li>5. Oh, Y. (2010). <i>Toward A Theory of Design Critiquing-The Furniture Design Critic Program</i> (Doctoral dissertation, Carnegie Mellon University).</li> <li>6. Rendell, J., Hill, J., Dorrian, M., and Fraser, M. (Eds.). (2007). <i>Critical architecture (Vol. 1)</i>. Routledge.</li> <li>7. Twemlow A. (2017). <i>Sifting the Trash</i>, The MIT Press</li> </ol>                                                                                                                                                            |
| <b>Supplementary Readings</b> | <ol style="list-style-type: none"> <li>1. Hays, K. M. (1984). <i>Critical architecture: Between culture and form</i>. <i>Perspecta</i>, 21, 15-29.</li> <li>2. Heynen H. (1999). <i>Architecture and modernity: a critique</i>. MIT Press</li> <li>3. Lang, J., and Moleski, W. (2016). <i>Functionalism revisited: architectural theory and practice and the behavioral sciences</i>. Routledge.</li> <li>4. Leach N. (ed.) (1997). <i>Rethinking Architecture. A reader in cultural theory</i>. Routledge</li> <li>5. Plowright P. D. (2014). <i>Revealing Architectural Design Methods, Frameworks and Tools</i>. Routledge</li> <li>6. Raman P. G. and R. Coyne (2000). The Production of Architectural Criticism, <i>Architectural Theory Review. Journal of the Department of Architecture, Planning and Allied Arts</i>. Vol. 5(1), pp 83-103</li> <li>7. Rendell J. (2005). <i>Critical architecture: Introduction</i>. <i>The Journal of Architecture</i>, Vol. 10(3), pp. 227-228</li> <li>8. Smith K. (ed.) (2012). <i>Introducing Architectural Theory. Debating A Discipline</i>. Routledge</li> </ol> |

|                                           |                    |                    |
|-------------------------------------------|--------------------|--------------------|
| <b>Course Code:</b> 0319 01 Soc 6153      | <b>Year:</b> First | <b>Term:</b> First |
| <b>Course Title:</b> Research Methodology |                    |                    |
| <b>Course Status:</b> Core                |                    |                    |
| <b>Credit:</b> 3.0                        |                    |                    |
| <b>Prerequisite:</b> None                 |                    |                    |

|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Rationale</b> | The course instills essential competence for designing and conducting research on/in Architecture to facilitate design-research in postgraduate studios. With the conviction that research-driven design projects become more meaningful and effective in undertaking socio-technical problems of contemporary societies, students learn how research informs design and scholarly writing, using both classical and emerging methodologies and tools.                                                                                                                                                                       |
| <b>Objective</b> | <ol style="list-style-type: none"> <li>1. Enable the understanding of the role of research in/for design.</li> <li>2. Inculcate ability to use scientific methodologies/methods to posit architectural works within broader conceptual/theoretical discourses.</li> <li>3. Impart skills for conducting research independently, critically and systematically, and producing design projects and scholarly texts.</li> <li>4. Improve the ability to present and communicate architectural research in visual and written forms.</li> <li>5. Enhance ability to read, interpret and evaluate research critically.</li> </ol> |

| Course Contents |                                                            | CLOs       |
|-----------------|------------------------------------------------------------|------------|
| Section A       |                                                            |            |
| 1               | The implication of research                                | 1          |
| 2               | Philosophy of science: ontology, epistemology and axiology | 1, 3, 4, 7 |
| 3               | Methodology                                                | 4, 5       |
| 4               | Ethics                                                     | 6          |
| Section B       |                                                            | CLOs       |
| 1               | Research in/for/on architecture                            | 1, 3, 4    |
| 2               | Architectural research methods and techniques              | 4,5        |
| 3               | Fieldwork in/for/on architecture                           | 4,5        |
| 4               | Research communication/presentation in architecture        | 2,5,6      |

| <b>Course Learning Outcomes (CLOs)</b> | Upon completion of this course, the students will be able to: |                                                                                    | <b>Mapping with PLOs</b> |
|----------------------------------------|---------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------|
|                                        | CLO1                                                          | Apprise the role of research as an essential element of designerly thinking.       |                          |
|                                        | CLO2                                                          | Conduct independent research for academic inquiry, practice and scholarly writing. |                          |
|                                        | CLO3                                                          | Posit architectural works within and along                                         |                          |

|  |      |                                                                                         |                  |
|--|------|-----------------------------------------------------------------------------------------|------------------|
|  |      | wider conceptual and theoretical discourses.                                            | PLO5             |
|  | CLO4 | Select and use appropriate methodologies to support research.                           | PLO2, PLO5, PLO6 |
|  | CLO5 | Understand, collect and analyze data using qualitative, quantitative and mixed methods. |                  |
|  | CLO6 | Present and communicate architectural research, using visual and written medium.        | PLO3, PLO4       |
|  | CLO7 | Read critically, interpret and evaluate research.                                       | PLO6             |

### Mapping CLOs with the Teaching-Learning and Assessment Strategy

| CLOs | Teaching-Learning Strategy                                             | Assessment Strategy                                                     |
|------|------------------------------------------------------------------------|-------------------------------------------------------------------------|
| CLO1 | Lecture and Peer group work (interactive)                              | Group presentation and Qand A performance evaluation                    |
| CLO2 | Lecture and Academic writing exercise                                  | Assignment (on design-research proposal writing)                        |
| CLO3 | Lecture and Peer discussion                                            | Peer assessment and Final Examination                                   |
| CLO4 | Lecture and Peer discussion                                            | Design-research proposal report (on a selected topic) and Poster design |
| CLO5 | Lecture and Online research                                            |                                                                         |
| CLO6 | Lecture and Peer presentation                                          |                                                                         |
| CLO7 | Lecture and Class reading exercise (peer groups) on reading techniques | Reflective paragraph writing and Final examination                      |

### Learning Materials

|                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Recommended Readings</b>   | <ol style="list-style-type: none"> <li>1. Groat L. and D. Wang (2002). <i>Architectural Research Methods</i>. Wiley</li> <li>2. Zeisel J. (2006). <i>Inquiry by Design</i>, W. W. Norton</li> <li>3. Kumar R. (2014). <i>Research Methodology</i>, Sage</li> <li>4. Sanoff H. 2016. <i>Visual Research Methods IN Design</i>. Routledge</li> </ol>                                                                                                                                                                                                                                                     |
| <b>Supplementary Readings</b> | <ol style="list-style-type: none"> <li>1. Ruedi K. and I. Bordon (2000). <i>The Dissertation: An Architecture Student's Handbook</i>. Architectural Press</li> <li>2. Cuff, D. (1992). <i>Architecture: The Story of a Practice</i>. MIT Press.</li> <li>3. Hanington, B., and Martin, B. (2019). <i>Universal methods of design expanded and revised: 125 Ways to research complex problems, develop innovative ideas, and design effective solutions</i>. Rockport publishers.</li> <li>4. Denzin N. K. and Y. S. Lincoln, (2017). <i>The SAGE Handbook of Qualitative Research</i>, Sage</li> </ol> |

|                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |                    |
|----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------|
| <b>Course Code:</b> 0731 01 Arch 6131                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Year:</b> First | <b>Term:</b> First |
| <b>Course Title:</b> Building Performance and Evaluation |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |                    |
| <b>Course Status:</b> Optional                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |                    |
| <b>Credit:</b> 3.0                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |                    |
| <b>Prerequisite(s):</b> None                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |                    |
| <b>Rationale</b>                                         | The urban population will become half of the world's population within next few decades. A sustainable built environment will have no alternative in the upcoming days. So efficient and intelligent utilization of available resources is highly needed now. A cultural change is required at all levels of the building industry; from procurement to design, construction, use and maintenance of the building throughout its life cycle. This course aims to provide students with all this basic knowledge of the design construction and operation of low-energy and green buildings. Study of this course will help graduates to develop analytic and inquisitive perspectives to meet 21century challenges.                                                                                 |                    |                    |
| <b>Course Objectives</b>                                 | <ol style="list-style-type: none"> <li>1. Enhance students' skills on state-of-the-art issues like internally and externally loaded building energy, building user and utility relationships, building maintenance, indoor air quality, and thermal comfort in buildings.</li> <li>2. Equip students with the skills to assess whether a particular built environment is fulfilling its designed targets and aspirations or not.</li> <li>3. Learn analyse and improve the level of building performance that leads to user satisfaction and increase the building occupancy rate.</li> <li>4. Check with the international trends in building performance evaluation techniques, building energy simulation, building energy audit, retro-commissioning, and net-zero energy buildings.</li> </ol> |                    |                    |

| Course Contents |                                                                                                                                                                                                                                                                    | CLOs       |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| Section A       |                                                                                                                                                                                                                                                                    |            |
| 1               | <b>Energy use criteria in built environment:</b> energy use pattern and distribution in buildings. Internal and external load of building energy in different socio-cultural and physical context.                                                                 | 1, 2, 3    |
| 2               | <b>Green building design and passive features:</b> green roof, wall, shading devices, building thermal insulation, smart glass, solar films, daylight utilization, natural ventilation, hybrid systems, green living quality, phase change materials applications. | 1, 2       |
| 3               | <b>Contemporary problems:</b> density planning, urban heat island effects, energy use efficiency, and thermal imbalance factors.                                                                                                                                   | 2, 3       |
| 4               | <b>Advanced technological developments:</b> advanced glazing systems, building integrated photovoltaic (BIPV) products and systems, LED lighting, zero-energy building features, building energy management systems (BEMS), and retro commissioning.               | 1, 2       |
| 5.              | <b>Environment assessment criteria:</b> BEAM-Plus, LEED rating system, NZEB Calculation and Cost Optimality.                                                                                                                                                       | 1, 2, 3, 4 |
| Section B       |                                                                                                                                                                                                                                                                    | CLOs       |
| 1.              | <b>Building typology:</b> classification of buildings based on utility and user relationship in a different socio-cultural context.                                                                                                                                | 2, 3       |
| 2.              | <b>Post-occupancy Evaluation (PoE) and Building Performance</b>                                                                                                                                                                                                    | 1, 2, 4    |

|    |                                                                                                                                                                                                        |         |
|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
|    | <b>Evaluation (BPE):</b> PoE and BPE in new, existing and refurbished buildings to achieve continuous improvement and maintenance.                                                                     |         |
| 3. | <b>Building performance evaluation methods:</b> study of BPE methods and their applicability in different socio-cultural and economic contexts.                                                        | 1, 2, 3 |
| 4. | <b>Building Codes and By-laws:</b> interpretation and analysis of building codes and building construction rules in order to upgrade the level of quality, effectiveness and efficiency of a building. | 1, 2, 4 |

| Course Learning Outcomes (CLOs) | Upon completion of this course the students will be able to: |                                                                                                                                                                                                                                                                                                                     | Mapping with PLOs             |
|---------------------------------|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
|                                 | CLO1                                                         | Identify the importance and criticality of building performance assessment for a low-carbon society and for sustainable development.                                                                                                                                                                                | PLO1, PLO2, PLO5, PLO10       |
|                                 | CLO2                                                         | Assess the contribution of new materials, technologies, and procedures to realize higher efficiency of building use.                                                                                                                                                                                                | PLO2, PLO3, PLO6              |
|                                 | CLO3                                                         | Relate socio-cultural and economical factors with the building performance issues.                                                                                                                                                                                                                                  | PLO2,PLO5,PLO6                |
|                                 | CLO4                                                         | Development of personal skills:<br>a) Analyze complex options and apply information to develop a design research proposal.<br>b) Frame effective personal research including reasoned argument.<br>c) Be concise and persuasive in viewpoints.<br>d) Negotiate and work within peer group to express/ present views | PLO1, PLO3, PLO6, PLO8, PLO10 |

#### Mapping CLOs with the Teaching-Learning and Assessment Strategy

| CLOs | Teaching-Learning Strategy              | Assessment Strategy       |
|------|-----------------------------------------|---------------------------|
| CLO1 | Lecture and Case studies                | Term paper and Final exam |
| CLO2 | Problem-based Learning and Presentation | Assignment and Final Exam |
| CLO3 | Lecture and Group Discussion            | Viva voce and Final Exam  |
| CLO4 | Workshop and presentation               | Assignment and Final Exam |

#### Learning Materials

| Recommended Readings |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                      | <ol style="list-style-type: none"> <li>1. Mumovic, D., and Santamouris, M. (Eds.). (2013). <i>A Handbook of Sustainable Building Design and Engineering: "An Integrated Approach to Energy, Health and Operational Performance"</i>. Routledge.</li> <li>2. Hardy, A. E., Schramm, U., and Preiser, W. F. (Eds.). (2018). <i>Building Performance Evaluation: From Delivery Process to Life Cycle Phases</i>. Springer.</li> <li>3. Wolfgang F.E. Preiser, Andrea E. Hardy, Ulrich Schramm, (2017), <i>Building</i></li> </ol> |

|                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                               | <i>Performance Evaluation: From Delivery Process to Life Cycle Phases</i> , Springer,                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Supplementary Readings</b> | <ol style="list-style-type: none"> <li>1. Akram, M. W., MohdZublie, M. F., Hasanuzzaman, M., and Rahim, N. A. (2022). Global Prospects, Advance Technologies and Policies of Energy-Saving and Sustainable Building Systems: A Review. <i>Sustainability</i>, 14(3), 1316.</li> <li>2. Meir, I. A., Garb, Y., Jiao, D., and Cicelsky, A. (2009). Post-occupancy evaluation: An inevitable step toward sustainability. <i>Advances in building energy research</i>, 3(1), 189-219.</li> </ol> |

|                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |
|---------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| <b>Course Code:</b> 0188 01 Edu 6171                                | <b>Year:</b> First                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>Term:</b> First |
| <b>Course Title:</b> Architecture Education: Concepts and Practices |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |
| <b>Course Status:</b> Optional                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |
| <b>Credit:</b> 3.0                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |
| <b>Prerequisite(s):</b> None                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |
| <b>Rationale</b>                                                    | The aim of the course to produce post-graduates able to transpose the erudition with a thorough understanding of the ways in which architectural education has evolved in response to changing cultural and disciplinary conditions both nationally and internationally. In addition, the course will provide the knowledge for qualitatively outstanding and well-grounded architectural education and research; and consequently a well-informed professional practice. |                    |
| <b>Course Objectives</b>                                            | <ol style="list-style-type: none"> <li>1. Understand Pedagogy and establish its relation with Architecture</li> <li>2. Impart professional educator training in strengthening their expertise in design teaching, education and practice.</li> <li>3. Develop skill in the use of fundamental teaching procedures, techniques and methods of teaching.</li> </ol>                                                                                                         |                    |

| Course Contents |                                                                    | CLOs  |
|-----------------|--------------------------------------------------------------------|-------|
| Section A       |                                                                    |       |
| 1               | Evolution, Nature and Scope of Architecture Education:             | 1,2   |
| 2               | Architecture Pedagogy in National and International Context        | 1, 2  |
| 3               | Review of Architecture Education in Bangladesh                     | 1, 3  |
| 4               | Pedagogy of Architecture and Approaches of Teaching                | 1,3   |
| 5               | Elements and Principles of Architecture Education,                 | 1,2,3 |
| 6               | Critical evaluations of model of architectural education;          | 1,2,3 |
| Section B       |                                                                    | CLOs  |
| 1.              | Academic program design and Principles of Architecture Curriculum  | 1,3   |
| 2.              | Lesson Planning and Tools and Techniques of Evaluation             | 1,3   |
|                 | Educational Psychology, Thought Processes and Classroom Management | 1,3   |
|                 | Practical Training and Preparation of mock classes                 | 1,3   |

| Course Learning Outcomes (CLOs) | Upon completion of this course the students will be able to: |                                                                                                                                            | Mapping with PLOs                   |
|---------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
|                                 | CLO1                                                         | Introduce the students with the theory, concepts, and research in the field of institutional learning                                      | PLO1, PLO5, PLO10                   |
|                                 | CLO2                                                         | Learn the techniques and skill of conducting teaching in the formal classroom, and to equip with various classroom management techniques.  | PLO2, PLO6, PLO 08, PLO09, PLO10    |
|                                 | CLO3                                                         | Develop skill in the use of fundamental teaching procedures, techniques and methods of teaching for architectural education and practices. | PLO1, PLO2, PLO4, PLO7, PLO8, PLO10 |

### Mapping CLOs with the Teaching-Learning and Assessment Strategy

| CLOs | Teaching-Learning Strategy         | Assessment Strategy        |
|------|------------------------------------|----------------------------|
| CLO1 | Lecture and presentation           | Assignment and Final Exam  |
| CLO2 | Lecture and presentation           | Quiz and Final Exam        |
| CLO3 | Problem-based Learning and Lecture | mock classes and Viva-voce |

| Learning Materials     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Recommended Readings   | <ol style="list-style-type: none"> <li>1. Bruce Joyce(2014), "Models Of Teaching" Pearson; 9 edition (April 14, 2014)</li> <li>2. Dutton, T.A. (Ed.). 1991, Voices in Architectural Education: Cultural Politics and Pedagogy, Bergin and Garvey, New York, NY, USA.</li> <li>3. Gelernter (1988) "Reconciling Lectures and Studios." Journal of Architectural Education 41(2): 46-52.</li> <li>4. Perry, E. (1995) "Design Thinking: the studio as a laboratory of architectural design research." Architectural Research Quarterly 1(4): 16 - 21.</li> <li>5. Ahmed A. S. M., and Naqi, A. (2006). State of Architectural Education in Bangladesh, Roundtable discussion on The Education of Architecture in Bangladesh (pp. 1-5). Institutes of Architects Bangladesh (IAB).</li> </ol>                                                                                                                                                                                                             |
| Supplementary Readings | <ol style="list-style-type: none"> <li>1. George Kneller(1971), "Philosophy of Education" John Wiley and Sons Inc</li> <li>2. Ashraf Salama, (1995) "New Trends in Architecture Education", Raleigh, N.C.</li> <li>3. Salama, A. M. (1998). A new paradigm in architectural pedagogy: integrating environment-behavior studies into architectural education teaching practices. In Shifting balances: Changing roles in policy, research, and design (pp. 128-139).</li> <li>4. Dutton, T. A. (1987). Design and studio pedagogy. Journal of architectural education, 41(1), 16-25.</li> <li>5. Cohen, L. M., L. (1994). Research Methods in Education. London: Routledge.</li> <li>6. Hejduk, J. (1988) Education of an Architect. New York City: Irwin S. Chanin School of Architecture of the Cooper Union, Rizzoli.</li> <li>7. Kock, A. (2002). The Redesign of Studio Culture. A Report of the AIAS Studio Culture Force. Washington D.C: American Institute of Architecture Students</li> </ol> |

|                                                                |             |             |
|----------------------------------------------------------------|-------------|-------------|
| Course Code:0288 01 Arch 6173                                  | Year: First | Term: First |
| Course Title: Conservation: Principle, Practice and Management |             |             |

|                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Course Status:</b> Optional |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Credit:</b> 3.0             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Prerequisite(s):</b> None   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Rationale</b>               | The multidisciplinary nature of this course familiarizes with the realities of contemporary practices of heritage conservation. It covers the entire range of architectural conservation approaches – from international to local, aiming to develop knowledge and skills to assess, value and professionally engage with heritage buildings.                                                                                                                                                                                      |
| <b>Course Objectives</b>       | <ol style="list-style-type: none"> <li>1. Provide a clear understanding of the context, concepts, and theories of heritage conservation.</li> <li>2. Familiarize with contemporary building and artefacts conservation process and post-conservation coordination.</li> <li>3. Introduce heritage assessment and diagnosis.</li> <li>4. Provide necessary knowledge and confidence to provoke sensitivity to social responsibilities, sustainability and contextual interventions to perform as heritage professionals.</li> </ol> |

| Course Contents |                                                                                                                                                                                                    | CLOs    |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| Section A       |                                                                                                                                                                                                    |         |
| 1               | Contemporary practice of heritage; needs, debates, philosophies, principles, and ethics of conservation.                                                                                           | 1       |
| 2               | The role, contribution, and debate of national and international agencies; law, charters, policy papers, and operational guidelines.                                                               | 1       |
| 3               | Recording, documentation, intervention, conservation planning and process, including post-conservation coordination of contemporary buildings and artefacts.                                       | 2, 3    |
| 4               | Management and heritage sites; its mission, interpretative program, visitor infrastructure, funding strategies, volunteers, public relations, budgeting, and other essential operational concerns. | 1, 2    |
| Section B       |                                                                                                                                                                                                    | CLOs    |
| 1.              | Heritage assessment, diagnosis techniques, and methods covering condition mapping, damage mapping, pathologies of the historic materials etc.                                                      | 2, 3    |
| 2.              | SDG goal of UNESCO; its aims, conventions and working papers.                                                                                                                                      | 1, 2, 3 |
| 3.              | Assessment procedure of World Heritage (WH) tentative list; case study and examples.                                                                                                               | 3, 4    |
| 4.              | Heritage Impact Assessment (HIA) and its working methodology, process and reporting.                                                                                                               | 3, 4    |

| <b>Course Learning Outcomes</b> | Upon completion of this course the students will be able to: |                                          | <b>Mapping with PLOs</b> |
|---------------------------------|--------------------------------------------------------------|------------------------------------------|--------------------------|
|                                 | CLO1                                                         | Understand current heritage conservation |                          |

|               |       |                                                                                                       |                  |
|---------------|-------|-------------------------------------------------------------------------------------------------------|------------------|
| <b>(CLOs)</b> |       | practices across global, national, and local scales.                                                  |                  |
|               | CLO2  | Analyze and critically assess heritage conservation, documentation, and heritage management problems. | PLO4, PLO6, PLO8 |
|               | CLO 3 | Evaluate various heritage assessment and diagnosis techniques and methods.                            | PLO2, PLO6, PLO8 |
|               | CLO 4 | Build professional and technical capacity.                                                            | PLO8, PLO10      |

#### Mapping CLOs with the Teaching-Learning and Assessment Strategy

| <b>CLOs</b> | <b>Teaching-Learning Strategy</b>       | <b>Assessment Strategy</b> |
|-------------|-----------------------------------------|----------------------------|
| CLO1        | Lecture                                 | Quiz and Class Test        |
| CLO2        | Problem-based learning and presentation | Assignment and Final Exam  |
| CLO3        | Lecture and group discussion            | Assignment and Final Exam  |
| CLO4        | Lecture and presentation                | Class Test and Final Exam  |

#### Learning Materials

|                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Recommended Readings</b>   | <ol style="list-style-type: none"> <li>1. Feilden, B. (2007). <i>Conservation of historic buildings</i>. Routledge.</li> <li>2. Feilden, B. B. M. (1989). <i>Guidelines for conservation: a technical Manual</i>.</li> <li>3. Mathews M. (1998). <i>Conservation Engineering</i>. University at Karlsruhe.</li> <li>4. Irwin, J. K. (2003). <i>Historic preservation handbook</i>. McGraw-Hill Professional Publishing.</li> <li>5. Appleyard, D. (1979). <i>The conservation of European cities</i>.</li> </ol>                                                           |
| <b>Supplementary Readings</b> | <ol style="list-style-type: none"> <li>1. Fitch, J. M. (1990). <i>Historic preservation: Curatorial management of the built world</i>. University of Virginia Press.</li> <li>2. Stipe, R. E. (Ed.). (2003). <i>A richer heritage: Historic preservation in the twenty-first century</i>. Univ of North Carolina Press.</li> <li>3. Menon A. (Ed). <i>Conservation of Immovable Sites</i>. INTACH Publication, N. Delhi.</li> <li>4. Stubbs, J. H., and Makaš, E. G. (2011). <i>Architectural conservation in Europe and the Americas</i>. John Wiley and Sons.</li> </ol> |

|                                                 |                    |                    |
|-------------------------------------------------|--------------------|--------------------|
| <b>Course Code:</b> 0732 01 CE 6171             | <b>Year:</b> First | <b>Term:</b> First |
| <b>Course Title:</b> Advanced Structural System |                    |                    |
| <b>Course Status:</b> Optional                  |                    |                    |
| <b>Credit:</b> 3.0                              |                    |                    |
| <b>Prerequisite(s):</b> None                    |                    |                    |

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Rationale</b>         | In their B. Arch study, students learn about basic structural systems while they apply them to their design studio projects. But technological innovations have become radical, while advanced structural materials and systems are ever evolving. Construction of complex structures is now becoming possible, which was unthinkable previously. This course introduces these new construction materials, technologies and structural systems that will enable students to conceptualize, design and collaborate with regard to their projects. |
| <b>Course Objectives</b> | <ol style="list-style-type: none"> <li>1. Introduce various advanced construction materials and their usage.</li> <li>2. Provide knowledge of advanced construction methods.</li> <li>3. Provide knowledge of advanced structural systems and their practical applicability.</li> </ol>                                                                                                                                                                                                                                                          |

| Course Contents |                                                                                                                                                                                                       | CLOs    |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| Section A       |                                                                                                                                                                                                       |         |
| 1               | <b>Materials used in long span/advanced structures:</b> High strength concrete, steel, laminated timber, Fibre Reinforced Polymer (FRP), other composite materials.                                   | 1       |
| 2               | <b>Emerging Construction Methods:</b> New generation construction techniques for tall buildings, long span structures, shell, dome, bio-mimicry in Architecture projects etc.                         | 1, 2    |
| Section B       |                                                                                                                                                                                                       | CLOs    |
| 1.              | <b>Complex Structural Systems 1:</b> Analysis of structural force system and analysis procedure of frame structures, plate structures, folded structures, shell structures, and truss structures etc. | 1, 3    |
| 2.              | <b>Complex Structural Systems 2:</b> Analysis of structural force system and analysis procedure of cable structures, tent structures, pneumatic structures, and arch structures.                      | 1, 2, 3 |

| Course Learning Outcomes (CLOs) | Upon completion of this course the students will be able to: |                                                                               | Mapping with PLOs             |
|---------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------|
|                                 | CLO1                                                         | Conceptualize various advanced materials and construction techniques.         | PLO1, PLO2                    |
|                                 | CLO2                                                         | Gain knowledge of state-of-the-art structural systems and their applications. | PLO1, PLO2, PLO6              |
|                                 | CLO3                                                         | Obtain skills to analyze the Complex Structural System.                       | PLO1, PLO2, PLO6, PLO8, PLO9, |

### Mapping CLOs with the Teaching-Learning and Assessment Strategy

| CLOs | Teaching-Learning Strategy            | Assessment Strategy                |
|------|---------------------------------------|------------------------------------|
| CLO1 | Lecture and group discussion          | Quiz and Class Test and Final Exam |
| CLO2 | Learning and presentation             | Assignment and Final Exam          |
| CLO3 | Problem-based learning and discussion | Assignment and presentation        |

### Learning Materials

|                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Recommended Readings</b>   | <ol style="list-style-type: none"> <li>1. Soboyejo, W. O., and Srivatsan, T. S. (2006). <i>Advanced structural materials: properties, design optimization, and applications</i>. CRC press.</li> <li>2. Huff, T. (2021). <i>A Practical Course in Advanced Structural Design</i>. CRC Press.</li> <li>3. Karnovsky, I. A., and Lebed, O. (2021). <i>Advanced methods of structural analysis</i>. Springer Nature.</li> <li>4. Gayed, R., and Ghali, A. (2021). <i>Structural Analysis Fundamentals</i>. CRC Press.</li> <li>5. Jain, A.K. (1999), "Reinforced Concrete Limit State Design", Nemchand and Bros, Roorkee</li> <li>6. Anson, M., Ko, J. M., and Lam, E. S. S. (2002). <i>Advances in Building Technology: (ABT 2002)</i>. Elsevier.</li> </ol> |
| <b>Supplementary Readings</b> | <ol style="list-style-type: none"> <li>1. Babalola, A., Musa, S., Akinlolu, M. T., and Haupt, T. C. (2021). A bibliometric review of advances in building information modeling (BIM) research. <i>Journal of Engineering, Design and Technology</i>.</li> <li>2. Chang, S. Y., Al Bahar, S. K., and Zhao, J. (Eds.). (2012). <i>Advances in Civil Engineering and Building Materials</i>. CRC Press.</li> </ol>                                                                                                                                                                                                                                                                                                                                             |

|                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                    |                    |
|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------|
| <b>Course Code:</b> 073101Arch6137                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>Year:</b> First | <b>Term:</b> First |
| <b>Course Title:</b> Housing: Policies and Finance |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                    |                    |
| <b>Course Status:</b> Optional                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                    |                    |
| <b>Credit:</b> 3.0                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                    |                    |
| <b>Prerequisite(s):</b> None                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                    |                    |
| <b>Rationale</b>                                   | This course offers graduate students a critical review of history, theories and concepts that inform current practices, approaches and crises in the field of housing. It critically examines housing policies and the role of the state and market in different political economies and analyzes structures and processes in different national housing systems, housing production processes and the role of key actors. The course reviews international shifts in housing policy since the 1960s, in light of housing policies of Bangladesh and other developing countries. The course examines housing finance concepts and factors under different socio-economic spectrums to assess housing informality in developing countries. Through an extensive set of readings and critical analysis, this course intends to open up students' fresh minds for criticism, debate, possibilities and to enable them to postulate individual strategies for future praxis. |                    |                    |
| <b>Objectives</b>                                  | <p>Specific objectives of this course are to:</p> <ol style="list-style-type: none"> <li>1. Discuss, contrast and compare key ideas, precedents and theoretical discourse in global housing policy and finance.</li> <li>2. Explore the housing informality in Global South and its socio-economic, socio-spatial and political construct.</li> <li>3. Examine the role of different stakeholders in housing provision under other political economies.</li> <li>4. Critically examine current practices and approaches in housing provision and their impacts on society, culture, and the environment.</li> </ol>                                                                                                                                                                                                                                                                                                                                                      |                    |                    |

| Course Contents |                                                                                     | CLOs    |
|-----------------|-------------------------------------------------------------------------------------|---------|
| Section A       |                                                                                     |         |
| 1               | Concepts: Socio-economic, socio-spatial and socio-political perspectives of housing | 1, 2    |
| 2               | Housing and economic development: historical consequences                           | 1, 2    |
| 3               | Housing provision system: Role of state and market                                  | 1, 2    |
| 4               | Housing policy: Political economy of housing in Global South and Global North.      | 1, 2, 3 |
| 5               | Policy to Practices: Process vs Product                                             | 2, 3    |
| 6               | Sustainable housing provision- the indicators                                       | 1, 2, 3 |
| Section B       |                                                                                     | CLOs    |
| 1               | Housing finance mechanisms: Practices in Global South                               | 1, 2, 3 |
| 2               | Housing affordability: Measurement and indicators                                   | 2, 3    |
| 3               | Housing subsidies: Supply side vsDemand side                                        | 2, 3    |
| 4               | Housing informality: A way of life                                                  | 1, 2, 3 |

|   |                                                       |         |
|---|-------------------------------------------------------|---------|
| 5 | Pro-poor housing indicators- Global South             | 2, 3    |
| 6 | Housing intervention in Bangladesh: A critical review | 1, 2, 3 |

| Course Learning Outcomes (CLOs) | Upon completion of this course the students will be able to: |                                                                                                                             | Mapping with PLOs      |
|---------------------------------|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|------------------------|
|                                 | CLO1                                                         | Identify and critically analyze the key theories and practices in housing history, and contemporary discourse.              | PLO1, PLO2, PLO3, PLO4 |
|                                 | CLO2                                                         | Identify and critically analyze the key issues of housing problems in the Global South.                                     | PLO6, PLO9, PLO10      |
|                                 | CLO3                                                         | Interpret and evaluate the different housing policies and financial mechanisms of Global South and the Global North.        | PLO5, PLO6             |
|                                 | CLO4                                                         | Develop capacity for critical thinking and the ability to formulate pro-poor housing strategies for the lower-end populace. | PLO8, PLO9, PLO10      |

#### Mapping CLOs with the Teaching-Learning and Assessment Strategy

| CLOs | Teaching-Learning Strategy              | Assessment Strategy                 |
|------|-----------------------------------------|-------------------------------------|
| CLO1 | Lecture and Team Teaching               | Assignment and Group presentation   |
| CLO2 | Problem-based Learning and Presentation | Field survey and Group presentation |
| CLO3 | Field survey and Group Discussion       | Assignment and Term paper           |
| CLO4 | Field survey and Essay Writing          | Term paper                          |

#### Learning Materials

| Recommended Readings |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                      | <ol style="list-style-type: none"> <li>1. NHA. (2016). <i>National Housing Policy</i>. National Housing Authority</li> <li>2. UN Habitat 2016. <i>Habitat III Policy Papers</i>. Available online: <a href="https://habitat3.org/wp-content/uploads/PU3-HABITAT-III-POLICY-PAPER.pdf">https://habitat3.org/wp-content/uploads/PU3-HABITAT-III-POLICY-PAPER.pdf</a></li> <li>3. UN Habitat 2016. <i>New Urban Agenda</i>. Available online: <a href="https://habitat3.org/wp-content/uploads/NUA-English.pdf">https://habitat3.org/wp-content/uploads/NUA-English.pdf</a>; <a href="https://habitat3.org/wp-content/uploads/NUA-Bangla.pdf">https://habitat3.org/wp-content/uploads/NUA-Bangla.pdf</a></li> <li>4. Caprotti, F., Cowley, R., Datta, A., Broto, V. C., Gao, E., Georgeson, L., ... and Joss, S. (2017). The New Urban Agenda: key opportunities and challenges for policy and practice. <i>Urban research and practice</i>, 10(3), 367-378</li> <li>5. Hamdi, N. (1995). <i>Housing without houses: participation, flexibility, enablement</i>. Intermediate Technology Publications Ltd (ITP).</li> <li>6. Turner, J. F. C. (1972). Housing as a Verb. In J. F. C. Turner and R. Fichter (Eds.), <i>Freedom to Build: Dweller Control of the Housing Process</i> (pp. 148-175). The Macmillan Company.</li> <li>7. Davies, M. (2006). <i>Planet of slums</i>. Verso, London.</li> <li>8. Angel, S. (2000). <i>Housing policy matters: A global analysis</i>. Oxford University Press.</li> </ol> |

## Supplementary Readings

1. AlSayyad, N. (2004). Urban informality as a ‘‘new’’ way of life. In A. Roy and N. Alsayyad (Eds.), *Urban informality: Transnational perspectives from the Middle East, Latin America and South Asia* (pp. 7–30). Lexington Books.
2. Cernea, M. M. (2000). The Risks and Reconstruction Model for Resettling Displaced Populations. In S. Guggenheim and M. Koch-Weser (Eds.), *Social Development in the World Bank: Essays in Honor of Michael M. Cernea* (pp. 235-264). Springer.
3. Choguill, C. L. (1988). Problems in providing low-income urban housing in Bangladesh. *Habitat International*, 12(3), 29-39.
4. Doling, J. (1999). Housing policies and the little tigers: how do they compare with other industrialised countries?. *Housing studies*, 14(2), 229-250.
5. Harris, R., and Arku, G. (2006). Housing and economic development: The evolution of an idea since 1945. *Habitat International*, 30(4), 1007-1017.
6. Keivani, R., and Werna, E. (2001). Refocusing the housing debate in developing countries from a pluralist perspective. *Habitat International*, 25(2), 191-208.
7. Minnery, J., Argo, T., Winarso, H., Hau, D., Veneracion, C. C., Forbes, D., and Childs, I. (2013). Slum upgrading and urban governance: Case studies in three South East Asian cities. *Habitat International*, 39, 162-169.
8. Mostafa, A. (2017). *Evolution of Participatory and Support Based Approach for Strengthening Tenure Security, Housing and Community Resilience*: UPPR, UNDP.
9. Parvin, A., Hakim, S. S., and Islam, M. A. (2022). Policy, design, and way of life in resettlement projects: The case of Ashrayan, Bangladesh. *International Journal of Disaster Risk Reduction*, 103073.
10. Ward, P. M., and Smith, C. (2015). Housing rehab for consolidated informal settlements: A new policy agenda for 2016 UN-Habitat III. *Habitat International*, 50(2015), 373-384.

## First Year Second Term

|                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                     |
|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------------|
| <b>Course Code:</b> 0731 01 Arch 6202        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Year:</b> First | <b>Term:</b> Second |
| <b>Course Title:</b> Advanced Design Studio  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                     |
| <b>Course Status:</b> Core                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                     |
| <b>Credit:</b> 6.0                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                     |
| <b>Prerequisite(s):</b> Design Communication |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                     |
| <b>Rationale</b>                             | This course introduces design as a process of critical inquiry and experimentation, covering the entire spectrum of architectural design. It promotes ways of seeing, understanding and interpreting objects, places and events, learning to look beyond the obvious and often absurd qualities of things. By assuming a Design Research approach, the course facilitates knowledge acquisition and the development of advanced skills in conceptualization, resolution and representation of well-reasoned ideas through drawings and modelling. |                    |                     |
| <b>Objectives</b>                            | <ol style="list-style-type: none"> <li>1. Encourage questioning, lateral thinking, innovation/creativity, and engagement with design in a self-critical manner.</li> <li>2. Foster issues as diverse as human survival and work out alternative and often unconventional ways of thinking and building while redefining what architecture can be and do.</li> <li>3. Deal with the technicalities of climate, structure, services and construction in an integrated manner.</li> </ol>                                                            |                    |                     |

| Course Contents/Tasks                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | CLOs       |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| This Advanced Design Studio provides exposure to four particular streams of specialization, enabling the student to choose and maintain for her/himself a focus. The student begins by choosing one specialization from the following four streams. Under this particular stream, the Design Project will be co-designed/developed and supervised, in a one-to-one manner, by a distinguished tutor. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |            |
| 1                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Building services and technology:</b> Within the building industry, the building services and technology system, especially due to its ever-evolving nature, is of vital importance. In this module, the student will learn/identify a complex/new/innovative component (e.g. technology, device) of the system, assess its relevance critically, and produce an integrated design solution at the scale of a building project. Students may consider an entire building system and/or construction technologies that would inspire creative design ideas (conceptual, spatial, formal, tectonic, etc.) and their construction. This specialization will also enable in-depth exploration and philosophical underpinning – empathetic to students' ideals and aspirations. | 1, 2, 3, 4 |
| 2                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Digital craft lab:</b> A paradigm shift is noticeable in the field of Architecture today through the advancement of digitalization, robotics and their cumulative. It calls for new or adapted concepts, where                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 1, 2, 3, 4 |

|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |            |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
|   | physical space seamlessly intertwines with digital content and electronic connections' language ties in with physical connections to digitally think and produce new technologies, forms, materialities and aesthetics. The studio will maintain a design-manufacturing workflow where digital data will be produced using advanced CAD (especially parametric and BIM) and then directly fed to manufacturing equipment to fabricate various part geometries through CAM (e.g. Additive/Subtractive manufacturing, 3D printing, Robotic manipulation).                                                                                                                                                                                                                                                                                             |            |
| 3 | <b>History and Theory:</b> The need for conservation and rehabilitation of architectural history/heritage is nothing new, although the scope of working as a professional in this field and seeking potential specialization for this globalized yet culturally corroding world is still growing. Against this backdrop, this specialization will strive to instigate novel thinking, new questions, and new standards of professional practice (including ethics) and produce new toolkits (and theories) to look at the 'old'. Additionally, this specialization will encourage critical probing into the history of particular buildings, philosophies, styles and monographs of a specific architect/practice (especially contemporary and modern masters of Bangladesh) and design/develop building concepts, schemes and details accordingly. | 1, 2, 3, 4 |
| 4 | <b>Environment, Behavior, and Climate:</b> The global environmental (and energy) crises call for a deeper understanding of environmental design principles and their sympathetic and sensible application in architectural practice. Considering this, the stream will facilitate learning environmental design concepts, methods and processes of the various stages of a project to foster a healthy, safe, less energy-intensive and carbon-neutral environment. Advanced computational modelling and simulation techniques and toolkits of building sciences will be used for design and presentation.                                                                                                                                                                                                                                          | 1, 2, 3, 4 |

| Course Learning Outcomes (CLOs) | Upon completion of this course the students will be able to: |                                                                                                                                                                                                                    | Mapping with PLOs |
|---------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
|                                 | CLO1                                                         | Research, analyze, and synthesize knowledge about specific sites in producing architectural design responses, with particular attention to users, topography, landscape ecology, sensory information, and climate. | PLO1, PLO6, PLO2  |
|                                 | CLO2                                                         | Work in a specialized studio under expert supervision and develop interpersonal and verbal communication skills, critical thinking abilities and design through group activities and formative studio exercises.   | PLO3, PLO4        |
|                                 | CLO3                                                         | Explore creative processes and idea generation, reconcile divergent factors, and integrate knowledge and skills to produce design                                                                                  | PLO7, PLO10       |

|  |      |                                                                                                                                |      |
|--|------|--------------------------------------------------------------------------------------------------------------------------------|------|
|  |      | solutions.                                                                                                                     |      |
|  | CLO4 | Perform technical documentation and specifications in design realization and construction cost planning and control processes. | PLO5 |

### Mapping CLOs with the Teaching-Learning and Assessment Strategy

| CLOs | Teaching-Learning Strategy                       | Assessment Strategy                                            |
|------|--------------------------------------------------|----------------------------------------------------------------|
| CLO1 | Lectures and hands-on workshops                  | Desk critiques, studio pin-ups, and mid-term and final reviews |
| CLO2 | Skill-based tutorials and problem-based learning | Desk critiques, studio pin-ups, and mid-term and final reviews |
| CLO3 | Skill-based tutorials and problem-based learning | Desk critiques, studio pin-ups, and mid-term and final reviews |
| CLO4 | Lectures and hands-on workshops                  | Desk critiques, studio pin-ups, and mid-term and final reviews |

### Learning Materials

|                               |                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Recommended Readings</b>   | <ol style="list-style-type: none"> <li>1. Kuniavsky, M. (2003). <i>Observing the user experience: a practitioner's guide to user research</i>. Elsevier.</li> <li>2. Lunenfeld, P. (2003). <i>Design research: Methods and perspectives</i>. MIT press.</li> </ol>                                                                                                   |
| <b>Supplementary Readings</b> | <ol style="list-style-type: none"> <li>1. Miller, E. (2012). <i>Universal methods of design: 100 ways to research complex problems, develop innovative ideas, and design effective solutions</i>.</li> <li>2. Tymkow, P., Tassou, S., Kolokotroni, M., and Jouhara, H. (2013). <i>Building services design for energy efficient buildings</i>. Routledge.</li> </ol> |

|                                                |                    |                     |
|------------------------------------------------|--------------------|---------------------|
| <b>Course Code:</b> 0532 01 Geog 6270          | <b>Year:</b> First | <b>Term:</b> Second |
| <b>Course Title:</b> Spatial Data Analysis Lab |                    |                     |
| <b>Course Status:</b> Optional                 |                    |                     |
| <b>Credit:</b> 3.0                             |                    |                     |
| <b>Prerequisite(s):</b> None                   |                    |                     |

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Rationale</b>         | This course provides the knowledge and skills necessary to investigate spatial patterns resulting from social and physical processes operating on or near the Earth's surface. Key theoretical concepts of quantitative geography are examined, including measures of geographical distribution (including point and areal pattern analysis) and spatial autocorrelation, interpolation and network connectivity. Focus remains on understanding the theories and contexts of spatial analysis so that students can identify and apply the best tool for problem-solving and to correctly and appropriately interpret and present results. |
| <b>Course Objectives</b> | <ol style="list-style-type: none"> <li>1. Develop fundamental knowledge and understanding of contemporary and upcoming spatial data analysis methods.</li> <li>2. Familiarize with relevant software and programming language for spatial data analysis, management and decision making.</li> <li>3. Critically judge the appropriateness of different geographic and statistical analysis tools, and appreciate how they affect architectural design on various social issues.</li> </ol>                                                                                                                                                 |

| <b>Course Contents/Tasks</b> |                                                                                                                                                                                                                                                                                            | <b>CLOs</b> |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| 1                            | Overview on spatial data analysis                                                                                                                                                                                                                                                          | 1           |
| 2                            | Techniques of spatial data analysis and management                                                                                                                                                                                                                                         | 1, 2        |
| 3                            | Learning a basic programming language and software about spatial data analysis and management (e.g. PYTHON, ArcGIS, R-Analysis of Spatial Data, QGIS, ClusterPy and GeoGrouper, GRASS etc. The course teacher will choose the appropriate software package according to the students need) | 1, 2        |
| 4                            | Data processing/analysis skills with programming language                                                                                                                                                                                                                                  | 1, 2        |
| 5                            | Tools for analyzing the geographic and geometric information                                                                                                                                                                                                                               | 2, 3        |
| 6                            | Use tools and software to understand the complexity of the analysis techniques and the lack of interactivity of the tools (if there is any)                                                                                                                                                | 2, 3        |
| 7                            | Analyze data using tools to achieve specified data goals and predict conclusions                                                                                                                                                                                                           | 2, 3        |
| 8                            | Present decision-making process.                                                                                                                                                                                                                                                           | 2, 3        |

|               |                                                             |                |
|---------------|-------------------------------------------------------------|----------------|
| <b>Course</b> | Upon successful completion of the course, the students will | <b>Mapping</b> |
|---------------|-------------------------------------------------------------|----------------|

| Learning Outcomes (CLOs) | be able to: |                                                                                                                                | with PLOs                     |
|--------------------------|-------------|--------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
|                          | CLO1        | Understand the spatial data and its analysis process.                                                                          | PLO1, PLO2                    |
|                          | CLO2        | Acquire basic data processing skill with programming language to analyze large set of spatial data.                            | PLO1, PLO2, PLO6              |
|                          | CLO3        | Analyze the geographic and geometric information with various software and develop multiple scenarios as a suggestive measure. | PLO1, PLO2, PLO6, PLO7, PLO10 |

### Mapping CLOs with the Teaching-Learning and Assessment Strategy

| CLOs | Teaching-Learning Strategy                           | Assessment Strategy                |
|------|------------------------------------------------------|------------------------------------|
| CLO1 | Lecture, Desktop Review and Workshop                 | Presentation and viva              |
| CLO2 | Lecture, workshop and problem-based learning         | Assignment and internal assessment |
| CLO3 | Lecture, Group Discussion and Problem-based Learning | Assignment and Presentation        |

### Learning Materials

|                               |                                                                                                                                                                                        |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Recommended Readings</b>   | 1. Wegmann, M., Schwalb-Willmann, J., and Dech, S. (2020). <i>An Introduction to Spatial Data Analysis: Remote Sensing and GIS with Open Source Software</i> . Pelagic Publishing Ltd. |
|                               | 2. Brunsdon, C., and Comber, L. (2014). <i>An introduction to R for spatial analysis and mapping</i> . Sage.                                                                           |
|                               | 3. Yamagata, Y., and Seya, H. (Eds.). (2019). <i>Spatial analysis using big data: Methods and urban applications</i> . Academic Press.                                                 |
| <b>Supplementary Readings</b> | 1. Gao, J. (2022). <i>Fundamentals of Spatial Analysis and Modelling</i> . CRC Press.                                                                                                  |
|                               | 2. Van Oort, P. (2006). <i>Spatial data quality: from description to application</i> . Wageningen University and Research.                                                             |

|                                       |                    |                     |
|---------------------------------------|--------------------|---------------------|
| <b>Course Code:</b> 0731 01 Arch 6200 | <b>Year:</b> First | <b>Term:</b> Second |
| <b>Course Title:</b> Dissertation I   |                    |                     |
| <b>Course Status:</b> Core            |                    |                     |
| <b>Credit:</b> 4.0                    |                    |                     |
| <b>Prerequisite(s):</b> None          |                    |                     |

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Rationale</b>         | As the terminal course for the degree, the dissertation offers the student to demonstrate competence, expertise, originality and relevance. Being an essential part of the thesis as this course provides the opportunity to undertake an in-depth study of a critical issue or theme within architecture. In this preparatory phase of the dissertation, the student critically investigates complex question(s) that concerns the discipline of architecture. Topics include but are not limited to architectural design, history and/or theory of architecture, architectural/building science, urban design, indigenous/vernacular/rural architecture and architectural technology. Toward improving his/her understanding of the topic/theme of study, the student looks for available materials and the relationship of their research to prior/prevaling works, targeting a specific outcome with implication for larger discourse(s). In this phase, under the guidance of a supervisor and based primarily on secondary sources (with possible pilot fieldwork), the student frames the aim, question(s), objectives and methods and produces propositions regarding the topic/problem, position, relevant scholarly research, and methodology. With this preparation, the student develops the final draft proposal overseen by an assigned supervisor(s) based on comments from a panel of examiners. |
| <b>Course Objectives</b> | <ol style="list-style-type: none"> <li>1. Provide skills and attitudes to develop a research problem into a comprehensive research proposal diligently</li> <li>2. Instill the capacity to design and conduct a research independently</li> <li>3. Learn to formulate a robust methodology for research and fieldwork within a fixed timeframe</li> <li>4. Acquaint yourself with essential research/inquiry skills and tools.</li> <li>5. Instill attitude and competence to work closely with/under a supervisor, and a panel of experts.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

| <b>Course Contents</b> |                                                                                                                                                                                                                                                   | <b>CLOs</b> |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| 1                      | <b>Writing:</b> Drafting the thesis proposal containing background information, problem statement, research question(s), design objective(s), and scopes and limitations of the specific thesis to contribute the knowledge in the research area. | 1, 3        |
| 2                      | <b>Literature review:</b> Produce the draft proposal containing related literature based on the specific thesis, by holding a deeper understanding of the context, national and international ambit.                                              | 2, 3        |
| 3                      | <b>Research design and approach:</b> Develop research design and research approach to the thesis based on appropriate epistemology and methodology.                                                                                               | 1, 4        |

|   |                                                                                                                                                                                                          |         |
|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| 4 | <b>Working under supervision:</b> Finalize and submit the thesis proposal with regular feedback from the Supervisor based on literature review, conceptual understanding, and analysis of relevant data. | 3, 4, 5 |
|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|

| Course Learning Outcomes (CLOs) | Upon completion of this course the students will be able to: |                                                                                                                   | Mapping with PLOs |
|---------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|-------------------|
|                                 | CLO1                                                         | Acquire skills and attitudes to independently develop, design and conduct a research adhering to a fixed timeline | PLO2, PLO3, PLO8  |
|                                 | CLO2                                                         | Critically contextualize the research topic within established debates, academic literature(s) and/or practices   | PLO1, PLO6        |
|                                 | CLO3                                                         | Formulate a research proposal with a sound research design and methodology                                        | PLO2, PLO9        |
|                                 | CLO4                                                         | Improve fundamental research skills and use multiple data collection tools                                        | PLO3, PLO6, PLO8  |
|                                 | CLO5                                                         | Continue to improve research under the close supervision of supervisor(s), and a panel of experts                 | PLO10             |

#### Mapping CLOs with the Teaching-Learning and Assessment Strategy

| CLOs | Teaching-Learning Strategy                                                            | Assessment Strategy                                                                                                                      |
|------|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| CLO1 | Scheduled meeting/presentation with supervisor(s) and regular discussion and feedback | Proposal quality, punctuality and timeliness                                                                                             |
| CLO2 | Scheduled meeting/presentation with supervisor(s) and regular discussion and feedback | Progress monitoring, assessment of the quality and depth of reviewed literature                                                          |
| CLO3 | Scheduled meeting/presentation with supervisor(s) and regular discussion and feedback | Progress monitoring, assessment of the methodological quality (including scopes) of draft proposal                                       |
| CLO4 | Scheduled meeting/presentation with supervisor(s) and regular discussion and feedback | Assessment of the quality and appropriateness of research methods and tools selected and presentation quality of pilot fieldwork outcome |
| CLO5 | Scheduled meeting/presentation with supervisor(s) and regular discussion and feedback | Motivation                                                                                                                               |

#### Learning Materials

| Recommended Readings | 1. Katerina, R. (2006). The Dissertation: An Architecture Student's Handbook. Taylor and Francis. |
|----------------------|---------------------------------------------------------------------------------------------------|
|----------------------|---------------------------------------------------------------------------------------------------|

|                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                               | <ol style="list-style-type: none"> <li>2. Creswell, J. W., and Creswell, J. D. (2017). Research design: Qualitative, quantitative, and mixed methods approaches. Sage publications.</li> <li>3. Krathwohl, D. R., and Smith, N. L. (2005). How to prepare a dissertation proposal: Suggestions for students in education and the social and behavioral sciences. Syracuse University Press.</li> <li>4. Booth, W. C., Booth, W. C., Colomb, G. G., Colomb, G. G., Williams, J. M., and Williams, J. M. (2003). <i>The craft of research</i>. University of Chicago press.</li> <li>5. Machi, L. A., and McEvoy, B. T. (2021). The literature review: Six steps to success.</li> <li>6. Woodwell, D. (2013). Research Foundations: How Do We Know what We Know?. Sage Publications.</li> <li>7. Yin, R. K. (2009). Case study research: Design and methods (Vol. 5). sage.</li> <li>8. Bolker, J. (1998). Writing your dissertation in fifteen minutes a day: A guide to starting, revising, and finishing your doctoral thesis. Holt Paperbacks.</li> </ol> |
| <b>Supplementary Readings</b> | <ol style="list-style-type: none"> <li>1. Stake, R. E. (1995). The art of case study research. sage.</li> <li>2. Silvia, P. J. (2007). How to write a lot: A practical guide to productive academic writing. American Psychological Association.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

|                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                    |                     |
|---------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------------|
| <b>Course Code:</b> 0731 01 Arch 6283                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>Year:</b> First | <b>Term:</b> Second |
| <b>Course Title:</b> Advanced Construction Technology: Fabrication and Material |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                    |                     |
| <b>Course Status:</b> Optional                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                    |                     |
| <b>Credit:</b> 3.0                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                    |                     |
| <b>Prerequisite(s):</b> None                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                    |                     |
| <b>Rationale</b>                                                                | The course intends to explore issues and concepts relating to contemporary developments in materials, construction and building engineering technology. Students will engage with these new theories and technologies in an investigative environment to develop an understanding of various structural technology, building fabric, materiality, detailing and the connection between design, construction and structures. Students will learn to critique the suitability of using those technologies while designing contemporary structures. |                    |                     |
| <b>Objectives</b>                                                               | <ol style="list-style-type: none"> <li>1. Familiarize with advanced construction Technology, material and behavior.</li> <li>2. Provide a clear understanding of contemporary construction issues and façade fabrication.</li> <li>3. Understand the sustainability and environmental issues of using advanced materials and technology.</li> <li>4. Prepare students to demonstrate the outcome professionally through the critique of advanced construction practices through transferable learning skills.</li> </ol>                         |                    |                     |

| Course Contents |                                                                                                                                                                                                                           | CLOs   |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| Section A       |                                                                                                                                                                                                                           |        |
| 1               | <b>Advance Structure :</b> Advanced structural systems and their load distribution system, structural detail and expression.                                                                                              | 2,4    |
| 2               | <b>Newer Construction Technology :</b> Contemporary construction technology which includes pre-fabrication, BIM and other software base design solutions.                                                                 | 2,5    |
| 3               | <b>Contemporary Material and Fabrication :</b> Advanced design process and construction technology using high-performance steel, Aluminum, Glass, tensile membrane and other fabrication material as a building material. | 1,2, 5 |
| Section B       |                                                                                                                                                                                                                           | CLOs   |
| 1               | <b>The Benefit of Newer Technology:</b> The Benefit of new industrialized techniques to the building industry and their positive impact on the design industry.                                                           | 1,4    |
| 2               | <b>Effect of Advance Fabrication:</b> Analyze the socio-economic and climatic effect of using technological advancement in the construction industry.                                                                     | 3,4    |
| 3               | <b>Sustainability Issues:</b> Building and material technologies of low environmental impact.                                                                                                                             | 3      |

| <b>Course Learning Outcomes (CLOs)</b> | Upon completion of this course the students will be able to: |                                                                                                                                           | <b>Mapping with PLOs</b> |
|----------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
|                                        | CLO1                                                         | Carry out self-guided research in order to appraise the use of advanced materials as they impact the design process.                      | PLO1, PLO6,              |
|                                        | CLO2                                                         | Demonstrate skills in the detailing of contemporary complex building structures and envelopes.                                            | PLO1,PLO8                |
|                                        | CLO3                                                         | Explain and debate complex sustainability and environmental issues related to the use of materials.                                       | PLO2,PLO5,PLO6           |
|                                        | CLO4                                                         | Employ research methods into contemporary construction practices and critique engineering principles used in advanced materials behavior. | PLO4,PLO9                |
|                                        | CLO5                                                         | Apply transferable skills to achieve professional and disciplinary outcomes.                                                              | PLO8,PLO10               |

#### Mapping CLOs with the Teaching-Learning and Assessment Strategy

| <b>CLOs</b> | <b>Teaching-Learning Strategy</b> | <b>Assessment Strategy</b> |
|-------------|-----------------------------------|----------------------------|
| CLO1        | Lecture and Team teaching         | Quiz and Class Test        |
| CLO2        | Lecture and Presentation          | Assignment and Final Exam  |
| CLO3        | Lecture and Group discussion      | Quiz and Class Test        |
| CLO4        | Lecture and Presentation          | Assignment / Class Test    |
| CLO5        | Lecture and Group discussion      | Viva voce and Assignment   |

#### Learning Materials

|                               |                                                                                                                                                                                                                                                                                 |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Recommended Readings</b>   | <ol style="list-style-type: none"> <li>1. Chudley R.,GreenR.,Hurst M. and Toplis S.,(2012) <i>Advanced construction technology</i>. Pearson Education.</li> <li>2. Herzog T.,Krippner R., and Lang W., (2017). <i>Façade Construction Manual</i>. Walter de Gruyter.</li> </ol> |
| <b>Supplementary Readings</b> | <ol style="list-style-type: none"> <li>1. Dunn, N. (2012). Digital fabrication in architecture. Laurence King Publishing.</li> <li>2. Rivera, R. (2014). Membrane Structures: First Steps toward Form Finding. Membranas Estructurales.</li> </ol>                              |

|                                                                     |                    |                     |
|---------------------------------------------------------------------|--------------------|---------------------|
| <b>Course Code:</b> 0288 01 Arch 6273                               | <b>Year:</b> First | <b>Term:</b> Second |
| <b>Course Title:</b> Heritage Conservation and Digital Technologies |                    |                     |
| <b>Course Status:</b> Optional                                      |                    |                     |
| <b>Credit:</b> 3.0                                                  |                    |                     |
| <b>Prerequisite(s):</b> None                                        |                    |                     |

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Rationale</b>         | <p>In the last decade, a radical shift has been evident in the understanding and perceptions of traditional built environment and heritage management disciplines because of the emerging digital media/tools (AR/VR/XR). The advantages of digital technologies are being used in digital documentation, research, and conservation and in developing digital twins, advanced interpretation, and virtual tourism.</p> <p>Therefore, knowledge of the state-of-the-art tools and methods of digital documentation and advanced visualization is inevitable for a concerned heritage architect. This course introduces digital heritage conservation theories and practical implications of advanced emerging technologies to the students to be competent in dealing with challenging real-world problems with confidence.</p> |
| <b>Course Objectives</b> | <ol style="list-style-type: none"> <li>1. Introduce various methods and tools for digital documentation of Cultural Heritage (CH) sites and artefacts</li> <li>2. Demonstrate standard methods of data acquisition, storage, management, and interpretation of heritage.</li> <li>3. Attain practical grounding and skills in developing Augmented Reality/Virtual Reality/Mixed Reality environments suitable for story telling of a heritage site.</li> <li>4. Provide the ability to conceptualize, design, and build an interactive digital heritage project (mock-up or prototype).</li> </ol>                                                                                                                                                                                                                             |

| Course Contents |                                                                                                                                                                                                                                                               | CLOs |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| Section A       |                                                                                                                                                                                                                                                               |      |
| 1               | International charters, guidelines and principles of digital heritage                                                                                                                                                                                         | 1    |
| 2               | Methods and tools of digital documentation. Aspects of 3D data acquisition, storage, management and long-term preservation. IPR (intellectual property rights), ethics of digitization, protection against illicit traffic and authentication of CH artefacts | 1, 2 |
| 3               | Inter-operability between formats. International initiatives from Europeana Digital Library, UNESCO World Heritage sites programs works etc. Charter on the Preservation of the Digital Heritage, UNESCO 2003                                                 | 1    |
| 4.              | 3D model viewers and repositories.                                                                                                                                                                                                                            | 3    |
| Section B       |                                                                                                                                                                                                                                                               | CLOs |
| 1.              | Photogrammetry and the 3D modelling                                                                                                                                                                                                                           | 1, 3 |

|    |                                                                                                                                                                                        |         |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| 2. | Heritage building information modelling (HBIM)(Autodesk Revit)                                                                                                                         | 1, 2, 3 |
| 3. | Computer-based environments (AR/VR/MR), their applications, development methods and tools (360-degree panorama, VRML, Game Engine)AgisoftPhotoscan, Autodesk ReCap and Autodesk Revit) | 3, 4    |
| 4. | Photographs to 3D acquisition hands-on with the AgisoftPhotoscan/Autodesk ReCap/RealityCapture Pro. the documentation of 3Dhistorical buildings (HB).                                  | 3, 4    |

| Course Learning Outcomes (CLOs) | Upon completion of this course the students will be able to: |                                                                                                                             | Mapping with PLOs |
|---------------------------------|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|-------------------|
|                                 | CLO1                                                         | Conceptualize the various methods and aspects of heritage conservation applying emerging digital media/tools/ technologies. | PLO1, PLO2        |
|                                 | CLO2                                                         | Learn about state-of-the-art digital technologies for heritage conservation.                                                | PLO2, PLO6        |
|                                 | CLO 3                                                        | Execute real-world conservation problems performing digital media/tools/apps/techniques.                                    | PLO3, PLO8, PLO10 |

#### Mapping CLOs with the Teaching-Learning and Assessment Strategy

| CLOs | Teaching-Learning Strategy              | Assessment Strategy                |
|------|-----------------------------------------|------------------------------------|
| CLO1 | Lecture                                 | Quiz and Class Test and Final Exam |
| CLO2 | Problem-based learning and presentation | Assignment and Final Exam          |
| CLO3 | Hand-on learning and presentation       | Assignment and Viva-voca/ Quiz     |

#### Learning Materials

|                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Recommended Readings</b>   | <ol style="list-style-type: none"> <li>1. Champion, E. (2021). Virtual Heritage: A Guide (p. 153). Ubiquity Press.</li> <li>2. Remondino, F.(2011) Heritage recording and 3D modeling with photogrammetry and 3D scanning. Remote Sens.</li> <li>3. Hassani, F.(2015) Documentation of cultural heritage techniques, potentials and constraints. <i>In Arch. Photogramm. Remote Sens. Spat. Inf. Sci.-ISPRS Arch.</i>, 40, 207–214.</li> </ol> |
| <b>Supplementary Readings</b> | <ol style="list-style-type: none"> <li>1. Champion, E., and Rahaman, H. (2020). Survey of 3D digital heritage repositories and platforms. <i>Virtual Archaeology Review</i>, 11(23), 1-15.</li> <li>2. UNESCO.(2003) Digital Heritage. Available online: <a href="https://en.unesco.org/themes/information-preservation/digital-heritage">https://en.unesco.org/themes/information-preservation/digital-heritage</a></li> </ol>                |

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                     |
|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------------|
| <b>Course Code:</b> 0731 01 Arch 6271               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>Year:</b> First | <b>Term:</b> Second |
| <b>Course Title:</b> Independent Study Module (ISM) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                     |
| <b>Course Status:</b> Optional                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                     |
| <b>Credit:</b> 3.0                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                     |
| <b>Prerequisite(s):</b> None                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                     |
| <b>Rationale</b>                                    | <p>Independent (secondary) research plays a vital role in graduate studies. This ISM is designed to enable students to explore an Architectural topic in depth. In discussion with and approval from her/his supervisor, the student pursues this particular study topic of her/his interest, which is not otherwise offered by the program. Typically, this course may be used as part of the student's preparation for the upcoming thesis, especially to help her/him write the literature review section.</p> <p>A formal, written agreement is drawn up, giving a clear account of the topic, program of study, assignments, evaluation, and other pertinent details. The Head's and/or supervisor's approval for written agreement is required. Regular meetings and reports are expected. Evaluation is based on 100% continuous assessment and must be worked out between the concerned student and the supervisor before seeking approval.</p> |                    |                     |
| <b>Objectives</b>                                   | <ol style="list-style-type: none"> <li>1. Support (to identify and design) a small-scale research project of the student's area of interest to improve her/his knowledge base.</li> <li>2. Facilitate an in-depth appraisal of the identified topic based primarily on secondary sources.</li> <li>3. Provide skills to critically review and evaluate historical and current theory/policy materials for a deeper understanding of the topic.</li> <li>4. Improve capabilities for independent research and producing academic reports.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                     |                    |                     |

| <b>Course Contents</b>                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                            | <b>CLOs</b> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| The student approaches a supervisor and works out an agreed topic. The student receives regular feedback from the supervisor (who will have consulted with the Program Coordinator and formally assigned by the Discipline). The student keeps submitting weekly assignments/literature reviews and ends with a complete proposal/term paper (about 8,000 words) at the end of the term. |                                                                                                                                                            |             |
| 1                                                                                                                                                                                                                                                                                                                                                                                        | Short proposal (about 1,000 words) with rationale, the general area of focus and scope of the field and aims for the particular Individual Study proposed. | 1,2         |
| 2                                                                                                                                                                                                                                                                                                                                                                                        | Methods by which material and information will be accessed and analysed.                                                                                   | 2,3         |
| 3                                                                                                                                                                                                                                                                                                                                                                                        | Annotated bibliography; and a final (week-wise) reading list with                                                                                          | 1,2,3       |

|   |                                           |         |
|---|-------------------------------------------|---------|
|   | proper referencing in any academic style. |         |
| 4 | Final report/term paper/review paper.     | 1,2,3,4 |

| Course Learning Outcomes (CLOs) | Upon completion of this course the students will be able to: |                                                                                                                                                   | Mapping with PLOs      |
|---------------------------------|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
|                                 | CLO1                                                         | Gain in-depth knowledge and understanding of the topic student has chosen.                                                                        | PLO1, PLO2, PLO3, PLO4 |
|                                 | CLO2                                                         | Critically reflect on current and/or important issues, theoretical or professional, and debates on the topic.                                     | PLO6, PLO9, PLO10      |
|                                 | CLO3                                                         | Evaluate relationships between theory, research and scholarship, policy and practice, bringing research evidence to bear in informing discussion. | PLO5, PLO6             |
|                                 | CLO4                                                         | Produce academic writing in the form of an elaborate written report/term paper.                                                                   | PLO8, PLO9, PLO10      |

#### Mapping CLOs with the Teaching-Learning and Assessment Strategy

| CLOs | Teaching-Learning Strategy                          | Assessment Strategy               |
|------|-----------------------------------------------------|-----------------------------------|
| CLO1 | Lecture and Problem-based Learning and Presentation | Assignment and Group presentation |
| CLO2 | Literature review and Field survey                  | Field survey and presentation     |
| CLO3 | Literature review and Field survey                  | Field survey and presentation     |
| CLO4 | Essay writing                                       | Term paper (min. 3000 words)      |

#### Learning Materials

|                               |                                                                                         |
|-------------------------------|-----------------------------------------------------------------------------------------|
| <b>Recommended Readings</b>   | The students will develop the list of the references with the help of their supervisor. |
| <b>Supplementary Readings</b> | The students will develop the list of the references with the help of their supervisor. |

|                                          |                    |                     |
|------------------------------------------|--------------------|---------------------|
| <b>Course Code:</b> 0731 01 Arch 6231    | <b>Year:</b> First | <b>Term:</b> Second |
| <b>Course Title:</b> Regenerative Design |                    |                     |
| <b>Course Status:</b> Optional           |                    |                     |
| <b>Credit:</b> 3.0                       |                    |                     |
| <b>Prerequisite(s):</b> None             |                    |                     |

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Rationale</b>         | The course will explore the fundamental principles of regenerative design and its application. The term “Regenerative Design” describes the processes that restore, renew and revitalize the sources of energy and materials, thereby creating sustainable systems that integrate the needs of society with the integrity of nature. Since Sustainability itself is not good enough to repair environmental disasters, regenerative design and development demand that the architects take an active part in the healing process of the earth, and not simply minimize the impact of the actions. |
| <b>Course Objectives</b> | <ol style="list-style-type: none"> <li>1. Equip students with fundamental knowledge of regenerative design principles, strategies and framework.</li> <li>2. Introduce the concept of design and planning with nature, including Biophilic design, and ecological planning and design.</li> <li>3. Discuss and criticize the process of regenerative-adaptive design and adaptation planning.</li> </ol>                                                                                                                                                                                          |

| Course Contents |                                                                                                                                                                                                                                                                                                                                                                                                               | CLOs       |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| Section A       |                                                                                                                                                                                                                                                                                                                                                                                                               |            |
| 1               | <b>Introduction:</b> Ecological and economic challenges, and built environment; modern history of sustainable architecture                                                                                                                                                                                                                                                                                    | 1          |
| 2               | <b>Definitions and paradigm shift:</b> Negative impact reduction via increased efficiency; positive impact via increased regenerative effectiveness                                                                                                                                                                                                                                                           | 1          |
| 3               | <b>Design principles of regenerative design:</b> Guiding principles; a framework for regenerative design; strategies for regenerative building design – selection of a construction system, defining of the design elements and their performance, enhancing air quality and human health, energy saving, renewable energy production, water management, design with nature, choice of regenerative materials | 1, 2, 3, 4 |
| Section B       |                                                                                                                                                                                                                                                                                                                                                                                                               | CLOs       |
| 1               | <b>Indicators and metrics of regenerative design:</b> Life cycle standards and system boundary; functional unit, year, tools and indicators; life cycle inventory.                                                                                                                                                                                                                                            | 1, 2       |
| 2               | <b>Interconnections between people and their natural environments:</b> Innate affiliation with nature; Biophilic design and patterns;                                                                                                                                                                                                                                                                         | 1, 2       |
| 3               | <b>Design and planning with nature:</b> History of planning and design that considers the environment; back to nature; design and planning with nature; ecological planning and design; the process of place; design for human ecosystems                                                                                                                                                                     | 1, 2, 3, 4 |
| 4               | <b>Regenerative-adaptive design:</b> Regenerative-adaptive design; regenerative design fundamentals – regeneration, place, patterns, the                                                                                                                                                                                                                                                                      | 1, 2, 3, 4 |

|  |                                                                                                                                                                                |  |
|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|  | generative code and regenerative design; Adaptive design fundamentals; the regenerative-adaptive design model – adaptation planning, regenerative-adaptive system of processes |  |
|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|

| Course Learning Outcomes (CLOs) | Upon completion of this course the students will be able to: |                                                                                                                                                                        | Mapping with PLOs            |
|---------------------------------|--------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
|                                 | CLO1                                                         | Understand the main issues, challenges and opportunities for designed environments in relation to regenerative design for medium and large-scale projects.             | PLO1, PLO8                   |
|                                 | CLO2                                                         | Critically discuss regenerative designed environments in relation to leading-edge issues and technologies                                                              | PLO1, PLO2, PLO5             |
|                                 | CLO3                                                         | Develop a philosophical position and stance with regard to sustainable and regenerative designed environments.                                                         | PLO1, PLO2, PLO4, PLO5, PLO6 |
|                                 | CLO4                                                         | Employ appropriate representational media to convey essential research findings and design outcomes with regard to sustainable and regenerative designed environments. | PLO3, PLO4, PLO6             |

#### Mapping CLOs with the Teaching-Learning and Assessment Strategy

| CLOs | Teaching-Learning Strategy                  | Assessment Strategy                     |
|------|---------------------------------------------|-----------------------------------------|
| CLO1 | Lecture and Group Discussion                | Class Test, Assignment and Final Exam   |
| CLO2 | Problem-based Learning and Presentation     | Assignment and Final Exam               |
| CLO3 | Problem-based Learning and Group Discussion | Presentation, Assignment and Final Exam |
| CLO4 | Problem-based Learning and Discussion       | Presentation, Exhibition and Final Exam |

| Learning Materials          |                                                                                                                                                                                                                                                                                                                                                             |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Recommended Readings</b> | <ol style="list-style-type: none"> <li>1. Roös, P. B. (2021). <i>Regenerative-Adaptive Design for Sustainable Development: A Pattern Language Approach</i>. Springer.</li> <li>2. Attia, S. (2018). <i>Regenerative and positive impact architecture: Learning from case studies</i>. Springer International Publishing, London, United Kingdom.</li> </ol> |

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|----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------------|
| <b>Course Code:</b> 0731 01 URP 6271               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Year:</b> First | <b>Term:</b> Second |
| <b>Course Title:</b> Rural Urban Settlement System |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                    |                     |
| <b>Course Status:</b> Optional                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                    |                     |
| <b>Credit:</b> 3.0                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                    |                     |
| <b>Prerequisite(s):</b> None                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                    |                     |
| <b>Rationale</b>                                   | In today's context of rapid rural transformation, and the increasing blurring of socio-economic-cultural boundaries between traditional rural and urban spaces and materialities, this course provides relevant theoretical and firsthand knowledge about contemporary discourses on rural-urban interaction. It introduces students to appropriate analytical tools for critically appraising and designing rural-urban spaces and materialities. The course particularly emphasizes on materials and learning during the post-WWII decades, in which the Global South nations underwent (and still going through) unprecedented transformation. The course assumes an eco-influenced 'Settlement' perspective, but borrows scholarly materials from disciplines such as Anthropology, Architecture, Cultural Studies, Urban Geography and Urban Planning. |                    |                     |
| <b>Objective</b>                                   | <ol style="list-style-type: none"> <li>1. To acquaint with the concept of 'Settlements' as a more ecological perspective of the built environment, going beyond the traditional 'rural' and 'urban' classification</li> <li>2. To illustrate, theoretically, about various spatial and non-spatial forms of rural and urban coexistence</li> <li>3. To learn about the conditions of rural-urban design, focusing particularly on contemporary perspectives</li> <li>4. To demonstrate the ability of understanding and applying theoretical and analytical tools to study rural-urban spaces and materialities</li> </ol>                                                                                                                                                                                                                                  |                    |                     |

| Course Contents |                                                                                                                                                                       | CLOs   |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| Section A       |                                                                                                                                                                       |        |
| 1               | ‘Settlement’ perspective and rural-urban interaction                                                                                                                  | 1      |
| 2               | <b>Rural in the urban spatial form:</b> Atale of two cities (Siena, LouangPrabang)                                                                                    | 2      |
| 3               | <b>Key debates in rural-urban linkage studies:</b> Dichotomy/continuum/flow, Dispersal, Desakota, Agropolitan (Networked model)                                       | 2, 3   |
| 4               | <b>Rural-urban spatial encounters:</b> Ruralopolises, Desakota, Urban villages, urban agriculture, fringe belts, peri-urban, agropolises, ethnic encounters/migration | 3, 4   |
| Section B       |                                                                                                                                                                       | CLOs   |
| 1               | <b>Rural-urban struggles: role of modern/modernity</b> (Mexico, Chandigarh)                                                                                           | 3<br>4 |
| 2               | <b>Planning/designing rural in urban</b> (Modular City, Linear City, Garden City, Broadacre City, Rurban, Regional Planning)                                          | 3      |
| 3               | <b>Theories:</b> (Dependency, Systems, Centre-periphery, Central Place theory)                                                                                        | 3, 4   |
| 4               | <b>Studying settlements:</b> (Settlement system analysis, typo-morphology)                                                                                            | 4      |

| Course Learning Outcomes (CLOs) | Upon completion of this course the students will be able to: |                                                                                                                                                                                    | Mapping with PLOs |
|---------------------------------|--------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
|                                 | CLO1                                                         | Familiarize with the ‘Settlements’ perspective of the built environment, by questioning ‘rural’ and ‘urban’ as discrete categories                                                 | PLO1              |
|                                 | CLO2                                                         | Appraise the myriad social, cultural, economic, spatial, and environmental ways rural and urban coexist, while touching upon its key debates                                       | PLO1, PLO5        |
|                                 | CLO3                                                         | Identify, analyze and explain the ideological, political, economic, aesthetic and socio-cultural conditions of rural-urban design, focusing primarily on contemporary perspectives | PLO1, PLO4, PLO6  |
|                                 | CLO4                                                         | Apply theoretical and analytical tools to study rural-urban spaces and materialities                                                                                               | PLO2              |

#### Mapping CLOs with the Teaching-Learning and Assessment Strategy

| CLOs | Teaching-Learning Strategy                       | Assessment Strategy                       |
|------|--------------------------------------------------|-------------------------------------------|
| CLO1 | Lecture                                          | Final Examination and class Test          |
| CLO2 | Lecture and class Reading                        | Assignment (issue based) and Presentation |
| CLO3 | Lecture and group Discussion                     | Final Exam and Class Test                 |
| CLO4 | Lecture with tutorial and field trips/excursions | Poster presentation                       |

#### Learning Materials

| Recommended Readings   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                        | <ol style="list-style-type: none"> <li>1. Bourdier J.-P. and N. AlSayyad (eds.) (1989). <i>Dwellings, Settlements, and Tradition: Cross-cultural Perspectives</i>. University Press of America.</li> <li>2. Peter Saunders (1981). <i>Social Theory and the Urban Question</i> (2<sup>nd</sup> Ed.), Routledge</li> <li>3. Gebre T. and B. Gebremedhin (2019). The mutual benefits of promoting rural-urban interdependence through linked ecosystem services. <i>Global Ecology and Conservation</i>. Vol 20. <a href="https://doi.org/10.1016/j.gecco.2019.e00707">https://doi.org/10.1016/j.gecco.2019.e00707</a></li> <li>4. Moravánszky A. (2017). Peripheral Modernism: Charles Polányi and the lessons of the village, <i>The Journal of Architecture</i>, 22:4, 662-688, DOI: 10.1080/13602365.2016.1204076</li> <li>5. Qadeer, M. A. (2000). Ruralopolises : The Spatial Organisation and Residential Land Economy of High-density Rural Regions in South Asia. <i>Urban Studies</i>, 37(9), 1583-1603. <a href="https://doi.org/10.1080/00420980020080271">https://doi.org/10.1080/00420980020080271</a></li> <li>6. Sarin, M. (1982). <i>Urban Planning in the Third World: The Chandigarh Experience</i> (1st ed.). Routledge. <a href="https://doi.org/10.4324/9780429343254">https://doi.org/10.4324/9780429343254</a></li> <li>7. Tacoli, C. (1998). Rural-urban interactions: a guide to the literature. <i>Environment and urbanization</i>, 10(1), 147-166.</li> <li>8. Wirth L. (1938). Urbanism as a way of life. <i>The American Journal of Sociology</i>, Vol. 44, No. 1, pp. 1-24</li> </ol> |
| Supplementary Readings |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                        | <ol style="list-style-type: none"> <li>1. Bowen W. M. and R. E. Gleeson (2019). <i>The Evolution of Human Settlements</i>. Palgrave Macmillan.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

|                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                    |                     |
|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------------|
| <b>Course Code:</b> 0731 01 Arch 6283       |                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>Year:</b> First | <b>Term:</b> Second |
| <b>Course Title:</b> Water Sensitive Design |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                    |                     |
| <b>Course Status:</b> Optional              |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                    |                     |
| <b>Credit:</b> 3.0                          |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                    |                     |
| <b>Prerequisite(s):</b> None                |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                    |                     |
| <b>Rationale</b>                            | The course intends to give students expertise in the concepts and techniques of <i>water-sensitive urban design (WSUD)</i> and to allow them to apply these techniques to integrate the water management into the urban landscape. The course will address data requirements, tools, approaches, relevant planning policy frameworks, decision-making, and implementation experiences needed to build and foster water-sensitive cities. |                    |                     |
| <b>Objectives</b>                           | <ol style="list-style-type: none"> <li>1. Familiarize with all forms of water as an opportunity at diverse scales.</li> <li>2. Design built environment supplements, and support the function of the natural environment.</li> <li>3. Influence decision-making process of stakeholders towards water-sensitive manners.</li> </ol>                                                                                                      |                    |                     |

| Course Contents |                                                                                                                                                                                                                                                       | CLOs    |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| Section A       |                                                                                                                                                                                                                                                       |         |
| 1.              | <b>Historical background:</b> Discussion on the historical transition of cities from the viewpoint of water management.                                                                                                                               | 1       |
| 2.              | <b>UWCM:</b> Knowledge of the main components of Urban Water Cycle management and the interactions with other essential aspects.                                                                                                                      | 2       |
| 3.              | <b>Impacts of UWM:</b> Social, environmental and economic impacts of urban water management.                                                                                                                                                          | 1, 4    |
| 4.              | <b>Tools and Techniques:</b> Structural and non-structural tools and techniques for conceptual design, operation, and maintenance.                                                                                                                    | 3       |
| Section B       |                                                                                                                                                                                                                                                       | CLOs    |
| 5               | <b>Principles and practices:</b> An introduction to WSUD (its principles, objectives, context within other urban planning and sustainability policy and practice) in developed and developing countries and implementation of urban design practices. | 2, 3, 4 |
| 6               | <b>Sustainable Sanitation:</b> Introduce City Wide Integrated Sanitation (CWIS) focusing on both Fecal Sludge Management (FSM) and Solid Waste Management (SWM).                                                                                      | 2, 3    |
| 7               | <b>Stakeholder Involvement:</b> Analyze the importance of stakeholder involvement in the urban water management process                                                                                                                               | 5, 6    |
| 8.              | <b>Mainstreaming:</b> Ways of mainstreaming water-sensitive elements to the urban development process. Discussion on concrete examples(real-world and hypothetical) of such mainstreaming                                                             | 4, 6    |

| <b>Course Learning Outcomes (CLOs)</b> | Upon completion of this course the students will be able to: |                                                                                                                  | <b>Mapping with PLOs</b> |
|----------------------------------------|--------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|--------------------------|
|                                        | CLO1                                                         | Appraise the role of water as a resource in the urban context.                                                   | PLO1, PLO9               |
|                                        | CLO2                                                         | Understand and analyze the various components of the urban water cycle, including their interactions.            | PLO1, PLO2               |
|                                        | CLO3                                                         | Assess and choose a range of structural and non-structural techniques for WSUD.                                  | PLO2, PLO6               |
|                                        | CLO4                                                         | Design a range of WSUD scenarios for a given urban layout.                                                       | PLO3, PLO6               |
|                                        | CLO5                                                         | Explain and critique implementation and institutional issues relating to WSUD, including maintenance and policy. | PLO8                     |
|                                        | CLO6                                                         | Work collaboratively in a multi-disciplinary team.                                                               | PLO4, PLO10              |

#### **Mapping CLOs with the Teaching-Learning and Assessment Strategy**

| <b>CLOs</b> | <b>Teaching-Learning Strategy</b> | <b>Assessment Strategy</b>                           |
|-------------|-----------------------------------|------------------------------------------------------|
| CLO1        | Lecture and Peer discussion       | Peer Assessment and Final Exam                       |
| CLO2        | Lecture and Group discussion      | Group discussion and Q and A performance Evaluation. |
| CLO3        | Lecture and Group discussion      | Final Exam                                           |
| CLO4        | Group Work                        | Assignment and Final Exam                            |
| CLO5        | Lecture and Peer discussion       | Class test and Final Exam                            |
| CLO6        | Lecture and Group work            | Q and A performance Evaluation.                      |

#### **Learning Materials**

|                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Recommended Readings</b>   | <ol style="list-style-type: none"> <li>Howe, C., and Mitchell, C. (2011). <i>Water sensitive cities</i>: IWA Publishing.</li> <li>Grant, G. (2016). <i>The water sensitive City</i>. John Wiley and Sons.</li> <li>Rogers, B. C., Dunn, G., Hammer, K., Novalia, W., de Haan, F. J., Brown, L., ...and Chesterfield, C. (2020). Water Sensitive Cities Index: A diagnostic tool to assess water sensitivity and guide management actions. <i>Water research</i>, 186, 116411.</li> </ol> |
| <b>Supplementary Readings</b> | <ol style="list-style-type: none"> <li>McCallum, T., and Boulot, E. (2015). Becoming a Water Sensitive City: A Comparative Review of Regulation in Australia.</li> <li>Barron, N. J., Kuller, M., Yasmin, T., Castonguay, A. C., Copa, V., Duncan-Horner, E., ... and Deletic, A. (2017). Towards water sensitive cities in Asia: An interdisciplinary journey. <i>Water Science and Technology</i>, 76(5), 1150-1157.</li> </ol>                                                        |

## Second Year First Term

|                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                     |                    |
|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------------|
| <b>Course Code:</b> 0731 01 Arch 7100  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Year:</b> Second | <b>Term:</b> First |
| <b>Course Title:</b> Dissertation-II   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                     |                    |
| <b>Course Status:</b> Core             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                     |                    |
| <b>Credit:</b> 12.0                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                     |                    |
| <b>Prerequisite(s):</b> Dissertation I |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                     |                    |
| <b>Rationale</b>                       | <p>Architecture is as textual as it is visual and spatial. A dissertation in architecture is made of words, as this second phase of the thesis focuses on the actual writing of the dissertation. Moving forward, the student further analyses the collected literature and keeps improving the methodology from the first phase, resulting in the final structuring and writing up of the manuscript. Research, fieldwork and analytical methods may similarly be drawn from the full breadth of disciplinary, interdisciplinary or transdisciplinary sources/practices relevant to architecture. However, a large share of research methods is expected to be visual and spatial. With regular comments/inputs/critiques from a parallel colloquium course, findings/results are expected to be a set of coherent arguments with clear conclusions. The dissertation must be well written (proofread), rationally presented, ethically sound, and strictly adhered to the standard conventions of citing and referencing.</p> |                     |                    |
| <b>Course Objectives</b>               | <ol style="list-style-type: none"> <li>1. Provide skills in writing/presenting research outcome(s) in the form of a concise essay that scientifically discusses/documents the development of the entire work.</li> <li>2. Learn to appraise writing as a powerful medium for crystallizing architectural thoughts and critical arguments in the form of texts and narratives supported by visual and numerical figures and graphics.</li> <li>3. Familiarize with a thesis report's standard structure and format, similar to professional-level reports and public documents.</li> <li>4. Learn to use various data collection and analytical tools (visual, qualitative and quantitative) in addressing the research question(s).</li> </ol>                                                                                                                                                                                                                                                                                  |                     |                    |

| Course Contents |                                                                                                                                                                                                               | CLOs |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 1               | <b>Fieldwork and research:</b> Carry out necessary literature review and fieldwork to collect additional data (followed by supplementary data collection activities to compensate for missing data).          | 2, 3 |
| 2               | <b>Continuous improvement:</b> Keep improving the thesis rationale, refining questions and objectives based on constructive feedback and comments from the thesis supervisor and the examiner/reviewer panel. | 1, 2 |
| 3               | <b>Writing-up:</b> Writing up the thesis report while maintaining the right orientation to the research objectives and questions.                                                                             | 1, 3 |

| Course Learning Outcomes (CLOs) | Upon completion of this course the students will be able to: |                                                                                                   | Mapping with PLOs |
|---------------------------------|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------|-------------------|
|                                 | CLO1                                                         | Write academic reports, complying with scientific writing standards and norms                     | PLO10             |
|                                 | CLO2                                                         | Learn about, and be able to use standard scientific structure/format of academic essays/reports   | PLO2              |
|                                 | CLO3                                                         | Collect and source research materials and data from fieldwork using appropriate tools and methods | PLO3, PLO4        |

### Mapping CLOs with the Teaching-Learning and Assessment Strategy

| CLOs | Teaching-Learning Strategy                                                                                                                 | Assessment Strategy                                |
|------|--------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| CLO1 | Individual work progress monitoring under close supervision and assessment of the adequacy of the methodology                              | Progress assessment, colloquium and defense        |
| CLO2 | Discussion and comments and feedback from supervisor                                                                                       | Progress assessment and draft (chapter) submission |
| CLO3 | Fieldwork, assessment of the appropriateness of research methods/tools/techniques and analysis and synthesis of primary and secondary data | Colloquium                                         |

### Learning Materials

| Recommended Readings   | <ol style="list-style-type: none"> <li>1. Katerina, R. (2006). The Dissertation: An Architecture Student's Handbook. Taylor &amp; Francis.</li> <li>2. Creswell, J. W. &amp; Creswell, J. D. (2017). Research design: Qualitative, quantitative, and mixed methods approaches. Sage.</li> <li>3. Krathwohl, D. R., &amp; Smith, N. L. (2005). How to prepare a dissertation proposal: Suggestions for students in education &amp; the social and behavioral sciences. Syracuse University Press.</li> <li>4. Booth, W. C., Colomb, G. G., Williams, J. M., Bizup, J., &amp; FitzGerald, W. T. (2003). The craft of research. Chicago guides to writing, editing. University of Chicago Press.</li> <li>5. Machi, L. A., &amp; McEvoy, B. T. (2021). The literature review: Six steps to success. Corwin.</li> <li>6. Woodwell, D. (2013). Research Foundations: How Do We Know What We Know? Sage.</li> <li>7. Yin, R. K. (2009). Case study research: Design and methods (Vol. 5). Sage.</li> <li>8. Bolker, J. (1998). Writing your dissertation in fifteen minutes a day: A guide to starting, revising, and finishing your doctoral thesis. Holt Paperbacks.</li> </ol> |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Supplementary Readings | <ol style="list-style-type: none"> <li>1. Stake, R. E. (1995). The art of case study research. Sage.</li> <li>2. Silvia, P. J. (2007). How to write a lot: A practical guide to productive academic writing. American Psychological Association.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

|                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                     |                    |
|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------------|
| <b>Course Code:</b> 0731 01 Arch 7108  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>Year:</b> Second | <b>Term:</b> First |
| <b>Course Title:</b> Thesis Colloquium |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                     |                    |
| <b>Course Status:</b> Core             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                     |                    |
| <b>Credit:</b> 4.0                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                     |                    |
| <b>Prerequisite(s):</b> Dissertation I |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                     |                    |
| <b>Rationale</b>                       | <p>With this course, the student engages in various sharing/discussion sessions to receive constructive comments and directions from their supervisor(s), examiners and graduate students on multiple aspects of the research process. With prior approval of the thesis supervisor, key activities involve presenting various phases/parts of their dissertation, including the research problem, research question(s) and objectives, literature mapping, methodology, findings from the fieldwork and writing. The critical feedback helps continuously improve the dissertation structure and process. As the most basic supplementary course to the dissertation, it thus helps sharpen the overall research design including the design problem, refining research question(s) and objectives, selecting the relevant literature, choosing an appropriate methodology and reporting findings.</p> |                     |                    |
| <b>Course Objectives</b>               | <ol style="list-style-type: none"> <li>1. Skills to present/share various phases of the dissertation to supervisor(s), examiners and other experts.</li> <li>2. Instill advanced skills in public presentation using a combination of architectural, audio-visual and oral means.</li> <li>3. Improve attitudes of continuous development through regular peer feedback on sharpening the research problem, refining research question(s) and objectives, selecting relevant literature, and choosing the most appropriate methodology and report findings.</li> </ol>                                                                                                                                                                                                                                                                                                                                  |                     |                    |

| Course Contents |                                                                                                                                               | CLOs |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------|------|
| 1               | Formulation of the research question(s) where an individual student can apply her/his research competencies.                                  | 1,   |
| 2               | Justifications of the thesis rationale, based on constructive feedback and comments from the thesis supervisor and additional reviewer panel. | 1, 2 |
| 3               | Discussion, defence, explanation and communication through thesis presentation.                                                               | 2, 3 |
| 4               | Prepare the thesis for a public and academic sharing session and discuss the overall thesis.                                                  | 3, 4 |

|               |                                                          |                     |
|---------------|----------------------------------------------------------|---------------------|
| <b>Course</b> | Upon completion of this course the students will be able | <b>Mapping with</b> |
|---------------|----------------------------------------------------------|---------------------|

| Learning Outcomes (CLOs) | to:  |                                                                                                                                                | PLOs             |
|--------------------------|------|------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
|                          | CLO1 | Gain skills and attitudes to systematically develop a research problem/question(s) through expert and peer feedback.                           | PLO2, PLO4, PLO8 |
|                          | CLO2 | Improve attitudes toward the constructive role of the peer process in academic research in terms of exposure to internal and external experts. | PLO6, PLO9       |
|                          | CLO3 | Acquire skills in public defense                                                                                                               | PLO3, PLO10      |
|                          | CLO4 | Communicate works in a well-structured manner, using architectural and non-architectural techniques.                                           | PLO3, PLO4       |

### Mapping CLOs with the Teaching-Learning and Assessment Strategy

| CLOs | Teaching-Learning Strategy                                                                                         | Assessment Strategy                                                                 |
|------|--------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| CLO1 | Presentation before Supervisor(s) and Examiners and collect feedback and present evidence of suggested amendments. | Presentation quality in Colloquium<br>Presentation quality in Defense<br>Confidence |
| CLO2 | Engage enthusiastically in constructive Q&A sessions.                                                              |                                                                                     |
| CLO3 | Engage in regular presentation sessions with experts and peers.                                                    |                                                                                     |
| CLO4 | Make presentations using state of the art visual and non-visual techniques.                                        |                                                                                     |

### Learning Materials

|                               |                                                                                                                                                                                                                                |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Recommended Readings</b>   | 1. Gurumani, N. (2019). Scientific thesis writing and paper presentation. MJP Publisher.                                                                                                                                       |
|                               | 2. Benn, K., and Benn, C. (2006). Professional thesis presentation: A step-by-step guide to preparing your thesis in Microsoft Word. Pearson Education New Zealand.                                                            |
|                               | 3. Brinton, W. C. (1939). Graphic presentation. РиполКлассик.                                                                                                                                                                  |
|                               | 4. Roberts, C. M. (2010). The dissertation journey: A practical and comprehensive guide to planning, writing, and defending your dissertation. Corwin Press.                                                                   |
|                               | 5. Bolker, J. (1998). Writing your dissertation in fifteen minutes a day: A guide to starting, revising, and finishing your doctoral thesis. Holt Paperbacks.                                                                  |
|                               | 6. Silvia, P. J. (2007). How to write a lot: A practical guide to productive academic writing. American Psychological Association.                                                                                             |
|                               | 7. Cone, J. D., and Foster, S. L. (1993). Dissertations and theses from start to finish: Psychology and related fields. American Psychological Association.                                                                    |
| <b>Supplementary Readings</b> | 1. Lucas, S., and Stob, P. (2004). The art of public speaking (p. 382). New York: McGraw-Hill.                                                                                                                                 |
|                               | 2. Syracuse university libraries. (2022), Architecture: Thesis Preparation <a href="https://researchguides.library.syr.edu/c.php?g=978052and p=7075240">https://researchguides.library.syr.edu/c.php?g=978052and p=7075240</a> |

## 20. Grading and Evaluation

### 20.1.1 Grading Scale

Letter Grades and corresponding Grade Points will be awarded following provisions shown below:

| Numerical Grade                                        | Letter Grade  | Grade Point |
|--------------------------------------------------------|---------------|-------------|
| 80% or above                                           | A+ (A plus)   | 4.00        |
| 75 to less than 80%                                    | A (A regular) | 3.75        |
| 70 to less than 75%                                    | A- (A minus)  | 3.50        |
| 65 to less than 70%                                    | B+ (B plus)   | 3.25        |
| 60 to less than 65%                                    | B (B regular) | 3.00        |
| 55 to less than 60%                                    | B- (B minus)  | 2.75        |
| 50 to less than 55%                                    | C+ (C plus)   | 2.50        |
| 45 to less than 50%                                    | C (regular)   | 2.25        |
| 40 to less than 45%                                    | D             | 2.00        |
| Less than 40%                                          | F             | 00          |
| Incomplete                                             | I             |             |
| Withdrawn                                              | W             |             |
| Continuation (for project, thesis design, etc. course) | X             |             |

### 20.1.2 Cumulative Grade Point Average (CGPA)

GPA will be calculated as per the standard practices at the undergraduate level of Khulna University. A student's performance will be evaluated in terms of three indices, viz. Term Grade Point Average (TGPA), Yearly Grade Point Average (YGPA), and Cumulative Grade Point Average (CGPA). The TGPA is computed by dividing the total points earned in a Term by the number of credits taken in the Term. The YGPA is computed by dividing the total grade points earned in two Terms in a year by dividing the number of credits taken in that year. The CGPA is computed by dividing the total grade points accumulated up to date by the total completed credits. Thus a student who has earned 275 grade points in attempting 100 credits of courses would have an overall CGPA of 2.75. The students will be awarded the Degree with Distinction, if their CGPA is 3.75 or above.

### 20.1.3 Evaluation of Theory Courses

All theory courses will be evaluated out of 100 marks. The marks will be distributed as follows:

|                         |                  |
|-------------------------|------------------|
| Attendance:             | 10 Marks         |
| Continuous Assessments: | 30-40 Marks      |
| Term Final:             | 50-60 Marks      |
| <b>Total:</b>           | <b>100 Marks</b> |

### 20.1.4 Evaluation of Sessional Courses

All sessional courses will be evaluated out of 100 marks. The marks will be distributed as follows:

|                        |                  |
|------------------------|------------------|
| Attendance:            | 10 Marks         |
| Sessional Assessments: | 60 Marks         |
| Viva voce:             | 30 Marks         |
| <b>Total:</b>          | <b>100 Marks</b> |

- (a) For both theory and sessional courses, attendance shall carry 10 marks and the basis for awarding marks will be as follows:

| Attendance (%) | Marks |
|----------------|-------|
| ≥ 90           | 10    |
| 85 to < 90     | 9     |
| 80 to < 85     | 8     |
| 75 to < 80     | 7     |
| 70 to < 75     | 6     |
| 65 to < 70     | 5     |
| 60 to < 65     | 4     |
| < 60           | 0     |

- (b) The continuous assessments (30 to 40 marks) for theory courses may be conducted in the form of written class examinations, assignments, home-works, presentations, quizzes, viva voce, mid-term, etc. For any theoretical course, there shall be at least four assessments. Section best (A & B) assessments shall be counted. A mid-term Examination may be taken if a Discipline/POE opts for it. The concerned Discipline will allocate marks for mid-term and continuous other evaluations in such a case. The course teachers must submit the continuous assessment and sessional assessment mark sheets to the Chair of the Examination Committee before the starting of the Term final examination.
- (c) The remaining 50 to 60 marks will be allocated for the term final examination.
- (d) A student who fails in any course(s) in the Term final examinations or who registered for the course(s) but did not sit for the examination, the concerned course(s) will be considered as retake course(s).
- (e) A student retaking theory course(s) for clearing/passing or improvement must appear at the mid-term (if any) and Term final examinations. A student may attend continuous assessments also on the written approval of the Discipline Head; otherwise, the marks of continuous assessments will be maintained from the student's previous records. The marks of attendance will be carried forward from earlier Term. The obtained grade will be downgraded in case of retaking course(s).
- (f) Examination procedure related other guidelines of the latest 'Ordinance for Undergraduate Examination' of Khulna University will generally be applicable for the Master's programs, if not conflicting with this Ordinance.

### 20.1.5 Evaluation of Viva Voce

A Discipline may include Viva Voce of 01/02 credit(s) at the end of each Term. The concerned Examination committee of that Term will conduct the viva and assess the students out of 100 marks.

### 20.1.6 Dissertation under Mixed-mode

- i) There will be two components of the Dissertation, namely Dissertation Part-I in one Term for proposal development, and Dissertation Part-II in another term for completing the Dissertation. The total credit for the Dissertation will be between 15 to 20 credits. The credit allocation for proposal development and dissertation parts will be 3-5 credits and 12-15 credits, respectively.

- ii) A Dissertation (both proposal and Dissertation) will be evaluated out of 100 marks.

Marks distribution of Dissertation Part-I will be as follows:

- |                             |          |
|-----------------------------|----------|
| a) Assessment of Supervisor | 30 marks |
| b) Proposal Presentation    | 70 marks |

Marks distribution for Dissertation Part-II will be as follows:

- |                               |          |
|-------------------------------|----------|
| a) Assessment of Supervisor   | 20 marks |
| b) Dissertation Evaluation    | 50 marks |
| c) Defense (Oral examination) | 30 marks |

- iii) Dissertation Part-I will usually commence in the Master's first-year second-term and Dissertation Part-II in the second-year first-term (final Term).
- iv) The final evaluation of the Dissertation Part-II will be made at the end of the final Term. However, the evaluation of the Dissertation Part-I will be done in the corresponding Term.
- v) A student registered for Dissertation will undertake research work under the guidance of a supervisor and a co-supervisor (if necessary).
- vi) The research needs to be carried out in this University or at the appropriate place(s) approved by the Supervisor in consultation with the Discipline Head.
- vii) There shall generally be one Supervisor for each student, but a co-supervisor may also be appointed if needed. A teacher not below the rank of Assistant Professor will act as supervisor/co-supervisor. However, a Lecturer with MPhil/ Master's by Research/ Ph.D. degree is eligible to supervise/co-supervise a student. Co-supervision may also be allowed from other Disciplines of Khulna University/other universities or research institutes.
- viii) If a student has any grievance about a Supervisor, or if a Supervisor has any complaint against a student, s/he may inform the Discipline Head about the issue in writing. The Discipline will decide such matters.
- ix) Pursuant to the leave rules of Khulna University, a Supervisor can remain absent from Khulna University (not more than six months) while continuing as a Supervisor. The online defense may be arranged in such cases if deemed necessary. Otherwise, the Co-supervisor (if any) or any other competent person will act as the Supervisor as per the guideline of the concerned Examination Committee. This will be applicable for projects and internships also.
- x) Every student submitting a dissertation in partial fulfillment of the requirements of a degree will be required to appear at proposal presentation for Dissertation Part-I and defense board of Dissertation Part-II respectively on the dates fixed by the Discipline Head in consultation with the Supervisor(s). Such presentation and defense may be arranged online if deemed

necessary to the concerned authority. A student must satisfy the examiners that s/he is capable of undertaking independent work and affording evidence of satisfactory knowledge related to the theory and techniques used in his/her research work.

- xi) A student must submit the required number of printed and soft copies of Dissertation Part-II in the approved format through the Supervisors to the Discipline Head by a date to be fixed by the Discipline. The Dissertation will not usually be considered for evaluation if the plagiarism detection system yields a similarity index of more than 25% (excluding bibliography/references, quotes, and small sources with source exclusion threshold of ten-word counts). This will be applicable to the dissertations written in English. The curriculum of the concerned program will provide a specific guideline on this issue.
- xii) Each student shall certify that the research work is his/her own and that the work was not submitted elsewhere for any other degree or diploma - the entire work has not been published as a monograph or a book before the Degree is awarded.
- xiii) If any change is required in the title/supervisor/co-supervisor/examiner/etc., the Discipline Head will send it to the BOAS through EC.

### **20.1.7 Project under Mixed-mode**

- (i) A student undertaking a project work will register 03-06 credits usually in the second-year first-term (final Term) under the guidance of a Supervisor. A teacher with MPhil/ Master's by Research/ Ph.D. degree can supervise a student. The project work should be carried out in this University or at the appropriate place(s) approved by the Supervisor in consultation with the Discipline Head.
- (ii) A project will be evaluated out of 100 marks. Marks distribution of the project will be as follows:

|                               |          |
|-------------------------------|----------|
| Assessments of the Supervisor | 20 marks |
| Project Report evaluation     | 50 marks |
| Defense (Oral examination)    | 30 marks |

- (iii) Final evaluation of the project report will usually be made at the end of the final Term for the student.
- (iv) A student must submit the required number of printed and soft copies of the project report in the approved format through the supervisors to the Discipline Head by a date to be fixed by the Discipline. The project report will not usually be considered for evaluation if the plagiarism detection system yields more than 25% (excluding bibliography/references, quotes, and small sources with a source exclusion threshold of ten-word counts). This will be applicable to the reports written in English. The curriculum of the concerned program will provide a specific guideline on this issue.
- (v) Each student shall certify that the research work is his/her own and that the work was not submitted elsewhere for any other degree or diploma - the entire work has not been published as a monograph or a book before the Degree is awarded.

### **20.1.8 Internship under Mixed-mode**

- (i) A student may be offered an internship usually in the second-year first-term (final Term). In such a case, the credit will be 03-06 Credits. There will be a Supervisor. A teacher with a post-graduate degree is capable of supervising an internship. The evaluation of the internship will be as follows:

- a) Continuation of the work (by Supervisor) 20 marks
- b) Report evaluation 50 marks
- c) Defense (Oral examination) 30 marks

(ii) A student must submit the required number of printed and soft copies of the internship report in the approved format through the supervisors to the Discipline Head by a date to be fixed by the Discipline. The report will not usually be considered for evaluation if the plagiarism detection system yields more than 25% (excluding bibliography/references, quotes, and small sources with a source exclusion threshold of ten-word counts). This will be applicable to the reports written in English. The curriculum of the concerned program will provide a specific guideline on this issue.

(iii) Each student shall certify that the research work is his/her own and that the work was not submitted elsewhere for any other degree or diploma - the entire work has not been published as a monograph or a book before the Degree is awarded.

### 20.1.9 Master's by Research Program

(i) The students under 'Master's by Research' program have to register for four parts of the Dissertation as follows:

| Sl. No. | Course                | Year | Term | Min. credit | Max. credit |
|---------|-----------------------|------|------|-------------|-------------|
| 1       | Dissertation Part-I   | 1    | 1    | 8           | 10          |
| 2       | Dissertation Part-II  | 1    | 2    | 10          | 15          |
| 3       | Dissertation Part-III | 2    | 1    | 12          | 15          |
| 4       | Dissertation Part-IV  | 2    | 2    | 15          | 20          |

(ii) A Dissertation (Part I-IV) will be evaluated out of 100 marks. Marks distribution of Dissertation Part-I, II, and III will be as follows:

- a) Assessment of Supervisor 30 marks
- b) Presentation 70 marks

(iii) Marks distribution for Dissertation Part-IV will be as follows:

- Assessment of Supervisor 20 marks
- Dissertation Evaluation 50 marks
- Defense (Oral examination) 30 marks

(iv) Usually research topic selection, title, rationale, objective, research question, literature review, sampling, research design, experiment, survey, data/information collection, analysis, result, discussion, policy implication, limitation, reference, annex, etc. related various issues will be covered (as applicable) under these four parts. The curriculum of the concerned program will provide a detailed description of coverage, objective, learning outcome, credit, etc., of these four parts.

(v) A student registered for Dissertation will undertake research under the guidance of a Supervisor and a Co-supervisor (if necessary).

(vi) The research needs to be carried out in this University or at the appropriate place(s) approved by the Supervisor in consultation with the Discipline Head.

(vii) There shall normally be one Supervisor for each student, but a co-supervisor may also be appointed if needed. A teacher not below the rank of Assistant Professor will act as

- Supervisor/Co-supervisor. However, a Lecturer with MPhil/ Master's by Research/ Ph.D. degree is eligible to supervise/co-supervise a student. Co-supervision may also be allowed from other Disciplines of Khulna University/other universities or research institutes.
- (viii) If a student has any grievance about a Supervisor, or if a Supervisor has any complaint against a student, s/he may inform the Discipline Head about the issue in writing. The Discipline will decide such matters.
  - (ix) Pursuant to the leave rules of Khulna University, a Supervisor can remain absent from Khulna University (not more than six months) while continuing as a Supervisor. The online defense may be arranged in such cases if deemed necessary. Otherwise, the Co-supervisor (if any) or any other competent person will act as the Supervisor as per the guideline of the concerned Examination Committee.
  - (x) Final evaluation of the Dissertation Part-IV will be made at the end of the final Term. However, the Dissertation Part-I, II, and III will be evaluated in the corresponding terms.
  - (xi) Every student submitting a dissertation in partial fulfillment of the requirements of a degree will be required to appear at a seminar presentation for Dissertation Part-I, II, and III and defense board for Dissertation Part-IV respectively on the dates fixed by the Discipline Head in consultation with the Supervisor (s). Such seminar presentation and defense may be arranged online if deemed necessary to the concerned authority. A student must satisfy the examiners that s/he is capable of undertaking independent work and affording evidence of satisfactory knowledge related to the theory and techniques used in his/her research work.
  - (xii) After successfully completing the seminar and dissertation defense boards, the Chairman of the concerned boards shall arrange to send six-monthly progress reports for each student in each Term to the Dean for approval. Accordingly, the Dean will approve the progress reports and report to BOAS. Progress reports shall be submitted before the end of each Term, even if the Supervisor is on leave; otherwise, the student(s) shall not be allowed to register for the following Term.
  - (xiii) A student must publish (or at least accepted for publication) an article/paper in a peer-reviewed journal or a peer-reviewed conference paper in order to complete 'Master's by Research' Degree.
  - (xiv) A student must submit the required number of printed and soft copies of Dissertation Part-IV in the approved format through the supervisors to the Discipline Head by a date to be fixed by the Discipline. The Dissertation will not usually be considered for evaluation if the plagiarism detection system yields a similarity index of more than 25% (excluding bibliography/references, quotes, and small sources with source exclusion threshold of ten-word counts). This will be applicable to the dissertations written in English. The curriculum of the concerned program will provide a specific guideline on this issue.
  - (xv) Each student shall certify that the research work is his/her own and that the work was not submitted elsewhere for any other degree or diploma - the entire work has not been published as a monograph or a book before the Degree is awarded.
  - (xvi) If any change is required in the title/supervisor/co-supervisor/examiner/etc., the Discipline Head will send it to the BOAS through EC.

### 20.1.10 Credit Requirement and Duration of the Program

The required credits and duration for Master's Programs are mentioned below.

| Program type              | Credit Requirement |                     |                     |              | Program Duration |             |             |             |
|---------------------------|--------------------|---------------------|---------------------|--------------|------------------|-------------|-------------|-------------|
|                           | Coursework (Min.)  | Dissertation (Min.) | Dissertation (Max.) | Total (Min.) | Term (Min.)      | Year (Min.) | Term (Max.) | Year (Max.) |
| Coursework                | 40                 | -                   | -                   | 40           | 02               | 1.0         | 06          | 3.0         |
| Mixed-mode (Dissertation) | 20                 | 15                  | 20                  | 40           | 03               | 1.5         | 06          | 3.0         |
| Mixed-mode (Project)      | 20                 | 3                   | 6                   | 40           | 03               | 1.5         | 06          | 3.0         |
| Mixed-mode (Internship)   | 20                 | 3                   | 6                   | 40           | 03               | 1.5         | 06          | 3.0         |
| Research                  | -                  | 45                  | 60                  | 45           | 04               | 2.0         | 06          | 3.0         |

The details of each Term Duration will be as follows:

| Item                                                          | Duration           |
|---------------------------------------------------------------|--------------------|
| Teaching and continuous assessment/ Contact with Supervisor   | 14 weeks           |
| Preparatory leave before: Final Examination/ Seminar/ Defense | 02 weeks           |
| Final Examination/ Seminar/ Defense                           | (Maximum) 04 weeks |
| Term Break                                                    | 02 weeks           |
| <b>Total</b>                                                  | <b>22 weeks</b>    |

### 20.1.11 Course Types

The courses included in the Master's curriculum may be divided into three groups as follows:

- (i) **Core Courses:** Core courses are obligatory for a degree.
- (ii) **Optional Courses:** Any other courses students may undertake to earn the Degree.
- (iii) **Major Courses:** A Discipline may offer courses from one or more major areas (if any), and after completing a certain number of credits from that area (as reported in the following table), a student can achieve a Master's degree with a major in a specified field, and that will be mentioned in the Transcript, e.g., MS in Agrotechnology (Horticulture). The curriculum of the concerned program will provide a detailed description of such cases.

### Credit Requirements for Offering Major

| Program type                     | Min. credit requirement from major area* |                     |                     |                      |
|----------------------------------|------------------------------------------|---------------------|---------------------|----------------------|
|                                  | Coursework (Min.)                        | Dissertation (Min.) | Dissertation (Max.) | Min. from Major Area |
| <b>Coursework</b>                | 20                                       | -                   | -                   | 20                   |
| <b>Mixed-mode (Dissertation)</b> | 9                                        | 15                  | 20                  | 20                   |
| <b>Mixed-mode (Project)</b>      | 15                                       | 3                   | 6                   | 20                   |
| <b>Mixed-mode (Internship)</b>   | 15                                       | 3                   | 6                   | 20                   |
| <b>Research</b>                  | -                                        | 45                  | 60                  | 45                   |

\* For achieving a Master's degree with a major in a specified field under a mixed-mode or 'Master's by Research' scheme, the concerned dissertation must be directly linked with the 'major area' under consideration.

(iv) **Viva Voce:** A Discipline may include Viva Voce of 01/02 credit(s) at the end of each Term. The concerned Examination committee of that Term will conduct the viva and assess the students out of 100 marks.

(v) **Assignment of Credit:**

**Theory Courses:** For theory courses, one-hour face-to-face learning (e.g., lecture, tutorial, seminar) per week will be equivalent to one credit.

**Sessional Courses:** For sessional courses, 1.5-hour face-to-face learning (e.g., lab work, studio, fieldwork, or clinical work) per week is equivalent to 1.0 credit. For industrial/ workplace learning, 2-hour learning per week is equivalent to 1.0 credit.

In addition to face-to-face and other means of learning, online teaching-learning might be exercised if deemed necessary to the Discipline/POE.

### 20.1.12 Course Registration

- (i) Each student will get oneself registered with the University. S/he will fill in the course registration form in consultation with the Program Coordinator under the guidance of the Discipline Head. The Program Coordinator will verify the form and submit it to the Discipline Head for forwarding it to the Registrar's office. Such submission might be made online, when and where applicable. The Registrar's office will be responsible for its distribution to relevant authorities (Disciplines and the Controller of Examinations). Course registration will be permitted within five working days at the beginning of each Term. Late registration will be permitted up to the next five working days on payment of a late fee. Student(s) having outstanding dues to the University shall not be permitted to register.
- (ii) A student has to register for the backlog/retake/re-retake core courses first followed by the fresh courses offered by the Discipline for the term s/he is going to enroll subject to the compliance with: (i) completion of prerequisite courses (if any) and (ii) maximum credit registration limit per Term. However, s/he may not choose to register the optional backlog/retake/re-retake courses first.
- (iii) A student may be allowed to register for advance course(s) in a term subject to: (i) his/her all backlog/retake/re-retake and offered core courses are either clear or registered, (ii) his/her current terms' offered all core courses are registered, (iii) completion of corresponding prerequisite courses (if any), (iv) compliance with maximum credit registration limit per Term, and (v) the desired advance courses are offered by the Discipline/POE in the current Term. However, such an advance course registration option will not be applicable for capstone courses like Thesis/ Project/ Internship/ and so on.

- (iv) A student retaking/re-taking the course will be awarded the immediate lower grade he/she obtains, and this grade will be shown and maintained on the Transcript.
- (v) A Discipline/POE will not continue an optional course if less than 30 percent of students (of total seats for that batch) register for that course within ten working days from the beginning of classes. The situation will be solved by dropping that optional course through applying article 10.3 of MS Ordinance by the next five working days. The Coordinator will maintain such records and act accordingly. However, the concerned Discipline/POE might relax this clause for only final term/year optional courses if it is deemed necessary (for example, the studentship will be toward termination or the student will have to wait for additional term/year if the considered optional course(s) are not offered).

#### **20.1.13 Limits on the Credits to be taken in a Term**

Discipline Head may allow a student to register up to a maximum of 25 credits if recommended by the Program Coordinator. However, there is no minimum credit limit per Term in Master's level study.

#### **20.1.14 Course Adjustment Procedure**

A student will have the option to add or drop course(s) from his/her registration list within fifteen working days from the beginning of classes. This can be done with the advice of the concerned Program Coordinator and consent of the Discipline Head. Adjustment of initially registered courses in any Term can be made by duly filling in the Adjustment Form. The Registrar's office will do the needful.

#### **20.1.15 Withdrawal from a Term**

If any student cannot complete the Term Final Examination due to severe illness or serious accident, he/she may apply to the Dean through the Head for total withdrawal from the Term within eight working days after the end of the Term Final Examination. However, s/he may choose not to withdraw from any sessional courses if the grade obtained in such a course is 'C' or better. A medical certificate endorsed by the Chief Medical Officer of the University must support the application. The Dean of the concerned school will decide on such an application and inform the Registrar. If a student is allowed to withdraw from a Term, he/she will have to register as fresh for the Term he/she has withdrawn. However, he/she may be allowed to register for backlog courses, if offered.

#### **20.1.16 Absence in a Term**

A student may be absent from continuous assessments (quizzes/class test/field works, etc.) during the Term. Such absences will naturally reduce points/marks, which count towards the final grade. Absence in the Mid Term (if any) and the Term Final Examination will result in 'F' grade. A student who has been absent for short periods, up to a maximum of three weeks due to illness, should request the Course Teacher or Program Coordinator to makeup continuous assessments immediately on returning to the class. A medical certificate should support such request from the Chief Medical Officer of Khulna University. The medical certificate issued by registered medical practitioners (with the registration number shown explicitly on the certificates) and endorsed by the Chief Medical officer of the University will also be acceptable only in those cases where the student has valid reasons for his absence from the University.

### **20.1.17 Special Term**

Students having any retake/re-retake course(s) may apply for a special Term to complete the total required course (maximum 09 credits) in that Term. The special Term will be offered for the final term students who have retake/re-retake courses. The examination will start four (04) weeks after publication of the result and will continue not more than 2 (two) weeks. The marks of both attendance and continuous assessments will be carried over from the previous record.

### **20.1.18 Registration for Improvement**

If any student gets a 'D' to 'C+' grade in any course, s/he may be allowed to repeat that course to improve the grade. The previous grade will be replaced from the grade sheet in such a case.

### **20.1.19 Backlog**

If a student obtains an 'F' grade in any Core course in any term, this 'F' grade will not be counted for Grade Point Average (GPA) but will be shown on the grade sheet, and in such case, he/she will have to retake the course to complete the Degree. If a student does not register for an offered Theory or Sessional course in his/her applicable Term (for example, '0541 12 Math 5101' course in his/her Master's first year first term, '0541 12 Math 5203' course in his/her Master's first year second term, '0541 12 Math 6104' course in his/her Master's second year first term), that course will be considered as a 'Backlog' course for that student in the subsequent terms. If a student gets an 'F' grade in an Optional course, he/she may, subject to availability, choose to take an optional substitute course. In such a case, that substitute course will be deemed as a fresh course. In case of registering for a Backlog Theory or Sessional course, a student has to face/appear/attend 100 marks evaluation, like a fresh course.

### **20.1.20 Credit Transfer/ Credit Waiver**

This ordinance permits credit transfer to facilitate educational mobility. That transfer of credit(s) may be inward or outward. In the case of outward credit transfer, a student of Khulna University has to apply to the Registrar through the Head of the Discipline/POE for getting a credit transfer certificate. The application must be supported by necessary documents, including a copy of the grade sheet(s). Accordingly, the Registrar will issue a credit transfer certificate mentioning the number of credits already completed at Khulna University.

In case of inward credit transfer, students from other Universities/ Institutions may apply to the Registrar of Khulna University for credit transfer. The application must be supported by necessary documents, including a copy of grade sheet(s) and curriculum. The Registrar's office will forward the application to the concerned Discipline/POE. A three-member committee headed by the Discipline Head and two senior most teachers will assess the application and recommend for approval to the Registrar. The maximum limit of credit transfer from other Universities/ Institutions will be less than or equal to 50 percent of the total credits required to complete the concerned Degree. The final transcript of such students will show only the number of credits transferred.

The same process may be applied for handling the credit waiver related applications. However, the maximum limit of inward credit waiver from other Universities/ Institutions should be less than or equal to 20 percent of the total credits required to complete the concerned Degree.

## **20.2 Grades**

Grade related issues are reported in section 20.1.

## 20.3 Grade Point Average (GPA) and Cumulative Grade Point Average (CGPA)

a) Grade Point Average (GPA) is the weighted average of Grade Points obtained in all the courses passed/completed by a student. For example, if a student has passed/completed five courses in a term having credits of C1, C2, C3, C4, and C5 and his/her points in these courses are G1, G2, G3, G4, and G5, respectively, then,

$$\text{GPA} = \frac{\sum C_i G_i}{\sum C_i}$$

b) A Numerical Example: Suppose a student has completed five courses in a term and obtained the following grades:

| COURSE | CREDIT | GRADE | GRADE POINT |
|--------|--------|-------|-------------|
| A      | 3      | A+    | 4.00        |
| B      | 3      | C+    | 3.00        |
| C      | 3      | A     | 3.75        |
| D      | 2      | B     | 3.25        |
| E      | 1      | B+    | 3.50        |

Then his/her GPA for the term will be computed as follows:

$$\text{GPA} = \frac{3(4.0) + 3(3.0) + 3(3.75) + 2(3.25) + 1(3.5)}{3 + 3 + 3 + 2 + 1} = 3.52$$

c) A student's performance will be evaluated in terms of three indices- Term Grade Point Average (TGPA), Yearly Grade Point Average (YGPA), and Cumulative Grade Point Average (CGPA). The TGPA is computed by dividing the total points earned in a Term by the number of credits taken in the Term. The YGPA is computed by dividing the total grade points earned in two Terms in a year by dividing the number of credits taken in that year. The CGPA is computed by dividing the total grade points accumulated till date by the total completed credits. Thus a student who has earned 275 grad points in attempting 100 credits of courses would have an overall CGPA of 2.75.

## 20.4 Course Withdrawal

a) 'W' is the corresponding grade for withdrawn of a course, as mentioned in section 20.1.1.

b) If any student cannot complete the Term Final Examination due to severe illness or serious accident, he/she may apply to the Dean through the Head of the concerned Discipline for total withdrawal from the Term within eight working days after the Term Final Examination. However, he/she may choose not to withdraw from any sessional course if the grade obtained in such a course is C or better. A medical certificate endorsed by the Chief Medical Officer of the University must support the application. The Dean of the concerned School will decide on such an application and inform the Academic Council. If a student is allowed to withdraw from a Term, he/she will have to register as fresh from the Term he/she has withdrawn. However, he/she may be allowed to register for backlog courses, if offered.

## 20.5 Incomplete (I) Courses

'I' is the corresponding grade for an incomplete course, as mentioned in section 20.1.1.

## **20.6 Retake**

Retake related issues are reported in section 20.1.

## **20.7 Grade Improvement**

Grade improvement related issues are reported in section 20.1.

## **20.8 Dropout/Cancellation of Studentship**

Dropout/Studentship cancellation related guidelines of the latest ‘Ordinance for Undergraduate Examination’ of Khulna University will generally be applicable for the Master’s programs, if not conflicting with this Ordinance.

## **20.9 Publication of Results**

- (i) The Controller of Examinations will publish the result and preserve all the records for one year after the Degree is awarded. The result will be published subject to completing the required number of credits and fulfilling other requirements (for example, article/paper for ‘Master’s by Research’ mode students) within the stipulated time limit, as applicable.
- (ii) A student can have his/her results re-examined by applying to the Controller of Examinations within 30 working days from the date of publication of results. However, s/he has to pay a re-examination fee fixed by the concerned authorities. The Controller of Examinations will take necessary measures regarding the matter in consultation with the Chairman of the Examination Committee. Answer script re-scrutiny and result re-examination related rules of the latest ‘Ordinance for Undergraduate Examination’ of Khulna University will generally be applicable for the Master’s programs also.

## **20.10 Subsequent Ordinances**

For related/relevant issues, which are not covered (or not cleared) here, provisions of the latest ‘Ordinance for Undergraduate Program’ and ‘Ordinance for Undergraduate Examination’ of Khulna University may be consulted and applied, if not conflicting with this Ordinance.