Curriculum

Undergraduates
Session: 2021-2022

Department of Architecture

Shahjalal University of Science and Technology
Sylhet, Bangladesh

Published by:

Office of the Registrar
Shahjalal University of Science and Technology (SUST)
Sylhet 3114, Bangladesh

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Contents

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Ordinance for Semester System for Bachelor's Degree

(This ordinance will replace other ordinances/resolutions etc. on the issues described here; however, it will not affect ordinances/resolutions on issues not mentioned here.)

1. Student Admission

1.1 Undergraduate Admission:
The admission committee of the university will conduct the admission process for Bachelor's degree as per the rules. The student will be admitted in the first semester of an academic year in the individual discipline of different schools. However the admission of foreign students will be subjected to the verification of academic records as per the university rule.

1.2 Student Status and Student Level:
Every student has to maintain his/her student status by getting admission paying necessary fees and register for required credits every semester. Unless a student graduate early by taking courses in advance, every student has to get admission in every semester successively. For book keeping purpose a student's level will be expressed by his/her year and semester. A student will be transferred to next level if he/she completes or appears in 80% of his designated courses at his/her present level. Once a student reaches 4th year 2nd (5th year 2nd for Architecture) semester he/she will be kept at this level until he/she graduates.

1.3 Re-Admission:
A student has to take re-admission if his/her student status is not maintained or one or more semesters were cancelled because of disciplinary action against him/her. In case of semester cancellation the student has to get re-admission in the same semester. The level (Year and Semester) of re-admission will be determined by his completed/appeared credits. A student will be eligible for re-admission in the first year first semester of the subsequent session if he/she was present in at least 25% of the classes of his/her major courses and his/her admission/semester fees was clear in the past semester/session. Re-admitted students will always be assigned the original Registration Number.

1.4 Student's Advisor:
After admission every batch of student will be assigned to a student's Advisor from the teacher of his/her discipline to guide him/her through the semester system. Advisors will always be accessible to the students and will be ready to mentor them in their academic activities, career planning and if necessary, personal issues. There will be a prescribed guideline for the Advisors to follow.

2. Academic Calendar

2.1 Number of Semesters:
There will be two semesters in an academic year. The first semester will start on 1st January and end on 30th June, the Second semester will start on 1st July and end on 31st December. The routine of the final examination dates along with other academic deadlines will be announced in the academic calendar at the beginning of each semester.

2.2 Duration of Semesters:

The duration of each semester will be as follows:

Classes and Preparatory weeks	15 weeks
Final Examination	04 weeks
Total	19 weeks

These 19 weeks may not be contiguous to accommodate various holidays and the Recess before the final examination may coincide with holidays. The final grading will be completed before the beginning of the next semester.

3. Course Pattern

The entire Bachelor's degree program is covered through a set of theoretical, practical, project, viva and seminar courses. At the beginning of every academic session a short description of every available course will be published by the syllabus committee of each discipline.

3.1 Course Development:

3.1.1 Major and Non-Major Courses:
Syllabus committee of every discipline will develop all the courses that will be offered by that particular discipline and has to be approved by the respective school and the Academic Council. These include major courses for the respective discipline as well as non-major courses that will be offered to other disciplines. Non-major courses will be developed with close cooperation of the disciplines concerned keeping into consideration of the need of that discipline.

3.1.2 Syllabus:
(a) Major and Non-Major Courses: Syllabus committee will select and approve the courses from major courses of the discipline as well as non-major courses offered by other disciplines to complete the syllabus. The syllabus committee will also select a group of courses as core-courses and without these courses a student will not be allowed to graduate even if he completes the credit requirement. The committee may assign pre-requisite for any course if deemed necessary.
(b) Second Major Courses: The syllabus committee will select a set of courses of 28-36 credits from the major courses for a second major degree.

3.1.3 Course Instruction:
At the beginning of every semester the course instructor has to make a detailed plan of the course instruction in the prescribed form and supply it to the head of the discipline to make it available to the students. The course plan should have the information about the suggested text books, number of lectures per topic, number and type of assignments, number and approximate dates of mid-semester examinations and mandatory office hours reserved for the students of the course offered. If not otherwise mentioned the medium of instruction is always English.

3.2 Course Identification System:
Each course is designated by a three-letter symbol for discipline abbreviation followed by a three-digit number to characterize the course. To avoid confusion new

or modified courses should never be identified by reusing a discontinued course number.

3.2.1 Discipline Identification:
The three-letter symbol will identify a discipline offering the course as follows. If same course is offered to more than one discipline, if necessary, an extra letter shown in the list may be used after the three digits to specify the department receiving the non-major course.

		School of Applied Sciences and Technology:	
1.	ARC	Architecture	A
2.	CEP	Chemical Engineering and Polymer Science	B
3.	CEE	Civil and Environmental Engineering	C
4.	CSE	Computer Science and Engineering	D
5.	EEE	Electrical and Electronic Engineering	E
6.	FET	Food Engineering and Tea Technology	F
7.	IPE	Industrial and Production Engineering	G
8.	MEE	Mechanical Engineering	Q
9.	PME	Petroleum and Mining Engineering	H
		School of Life Sciences:	
10.	BMB	Biochemistry and Molecular Biology	I
11.	GEB	Genetic Engineering and Biotechnology	J
		School of Physical Sciences:	
12.	CHE	Chemistry	K
13.	GEE	Geography and Environment	L
14.	MAT	Mathematics	M
15.	OCG	Oceanography	S
16.	PHY	Physics	N
17.	STA	Statistics	O
		School of Social Sciences:	
18.	ANP	Anthropology	a
19.	BNG	Bangla	b
20.	ECO	Economics	c
21.	ENG	English	d
22.	PSS	Political Studies	e
23.	PAD	Public Administration	f
24.	SCW	Social Work	g
25.	SOC	Sociology	h
		School of Agriculture and Mineral Sciences:	
26.	FES	Forestry and Environmental Science	P
		School of Management and Business Administration:	
27.	BUS	Business Administration	i
		Institute of Information and Communication Technology:	
28.	SWE	Software Engineering	W

3.2.2 Course Number:
The three-digit number will be used as follows:
(a) First Digit: The first digit of the three digit number will correspond to the year intended for the course recipient.
(b) Second Digit: A discipline should use the number 0 and 1 for the second digit to identify non-major courses. The digits 2-9 are reserved for major courses to identify the different areas within a discipline.
(c) Third Digit: The third digit will be used to identify a course within a particular discipline. This digit can be used sequentially to indicate follow up courses. If possible even numbers will be used to identify laboratory courses.

3.2.3 Course Title and Credit:
Every course will have a short representative course title, declaration if it is core course, a number indicating the total credits as well as reference to prerequisite courses if any.

3.2.4 Theory and Lab Course:
If a single course has both Theory and Laboratory/Sessional part, then the course must be split into separate Theory and Lab courses and both should have separate course number. A student may not register for a lab course without registering or completing the corresponding theory course.

3.3 Assignment of Credits:

3.3.1 Theoretical:
One lecture per week (or 13 lectures in total) of 1 hour duration per semester will be considered as one credit. (There will be 10 minutes recess between theory classes). A theory course will have only integer number of credits.

3.3.2 Laboratory Classes:
Minimum two contact hours of a laboratory class per week (or 26 contact hours in total) per semester will be considered as one credit. A laboratory course may have half integer credits with a minimum of 1 credit.

3.3.3 Seminar, Thesis, Projects, Monographs, Fieldwork, Viva etc.:
Will be assigned by the respective discipline.

3.4 Classification of the Courses:
The Bachelor's degree courses will be classified into several groups and the syllabus committee will finalize the curricula selecting courses from the groups shown below.

3.4.1 Major Courses:
A student has to take at least 70% courses from his/her own discipline. Out of these courses a section will be identified as core courses and every student of a particular discipline will be required to take those courses.

3.4.2 Non-Major Courses:
Every student is required to take at least 20% (including mandatory) courses from related disciplines. If any Non-Major course is declared as Core course a student is

required to take that course to graduate. The Non-Major courses will be designed, offered and graded by the offering disciplines.

3.4.3 Other Courses:
After completion of the required mandatory, major and non-major courses a student may take few other courses of his/her choice not directly related to his/her discipline to fulfill the total credit requirement.

3.4.4 Credit-Only Courses:
The credit of these Credit-Only courses will be added to the total credits if passed but will not affect the CGPA as there will be no grades for these courses.

4. Course Registration

4.1 Registration:
A student has to register for his/her courses and pay necessary dues within the first two weeks of every semester. Departmental student advisor will advise every student about his/her courses and monitor his/her performances. A student at any level is expected to register the courses at his level provided he/she does not have any incomplete courses from previous levels. A student will not be allowed to appear in the examination if his/her semester and examination fee is not cleared.

4.2 Minimum and Maximum Credits:
A student, if s/he is not a clearing graduate, has to register for at least 12 credits minimum and 30 credits maximum every semester.

4.3 Incomplete Courses:
If a student has incomplete courses, he/she has to register his/her available incomplete courses from preceding levels before s/he can register courses from current or successive levels. If an incomplete course is not offered in a given semester the student has to take the courses when it is offered next time**.** A student will not be allowed to take 100 and 300 level and 200 and 400 level courses simultaneously. 100 level courses mean courses of 1st and 2nd semesters, 200 level courses mean courses of 3rd and 4th semesters and so on. A student with incomplete courses will not be eligible for Distinction.

4.4 Course Withdrawal:
A student can withdraw a course by a written application to the Controller of Examinations through the Head of the discipline on or before the last day of instruction. The Controller of Examinations will send the revised registration list to the disciplines before the examination. There will be no record of the course in transcript if the course is withdrawn.

4.5 Course Repetition:
If a student has to repeat a failed or incomplete course and that course is not offered any more, the discipline may allow him/her to take an equivalent course from the current syllabus. For clearing graduates if any incomplete course is not offered in the running semester, the discipline may suggest a suitable course to complete the credit requirement.

5. Graduation Criteria

5.1 Major Degree:

5.1.1 Total Credits:
School of Physical Sciences, School of Social Sciences and School of Management and Business Administration have a requirement of 140 credits to graduate from its disciplines. School of Applied Sciences and Technology, School of Life Sciences and School of Agriculture and Mineral Science have requirement of 160 (200 for Architecture) credits for graduation.

5.1.2 Total Years:
A regular student is expected to graduate in 8 semesters (4 years) or in 10 semesters (5 years) for the discipline of Architecture. A student may graduate in shorter time period if s/he is willing to take extra courses in a systematic way. A student will be given 4 (2 years) extra semesters in addition to 8/10 semesters to complete his/her degree. The regular examination year will be identified by the session and the end-month (June or December) of the semester the student graduates.

5.1.3 Minimum Credit for a Clearing Graduate:
For a clearing graduate (8th and subsequent semesters) condition for maximum and minimum credit requirements is relaxed.

5.1.4 Break in study:
In very special cases, a student may take re-admission and complete his degree after a break of study of a minimum of one to a maximum of three years if he/she has completed at least 80% of required courses. He/she has to have recommendations from the discipline, and the application has to be approved by the Academic Council. These students will not get any additional time benefit.

5.2 Second Major Degree:
5.2.1 Total Credits:
A student may apply for a second major degree if he/she completes an extra 28-36 credit requirement designated by the offering discipline.

5.2.2 Total Semesters:
A student has to complete the credit requirement of second major degree within 8 regular and 4 extra semesters.

5.2.3 Requirement of Major Degree:
A student will not be given a second major degree if he/she fails to complete his regular major degree. A student will not be allowed to enroll in Masters program before completion of his/her second major degree even if he/she complete his/her major degree requirement.

5.2.4 Registration Criteria:
An offering discipline will decide on the number of seats for second major, enrollment criteria and get it approved from the academic council. Students willing

to get a second major have to apply to the offering discipline for enrollment and the discipline will enroll them as per the admission criteria. During registration enrolled students have to get their courses approved from the offering department completing a separate registration form.

5.2.5 Class Routine:
After enrollment a regular student may start taking the second major courses starting 3rd semester. The class routine may be arranged to accommodate the student need.

5.2.6 Certificate and Mark sheet:
A student completing the requirement will be given an additional certificate and grade sheet for his second major degree.

6. Examination System

A student will be evaluated continuously in the courses system, for theoretical classes s/he will be assessed by class participation, assignments, quizzes, mid-semester examinations and final examination. For laboratory work s/he will be assessed by observation of the student at work, viva-voce during laboratory works, from his/her written reports and grades of examinations designed by the respective course teacher and the examination committee.

6.1 Distribution of Marks:

The marks of a given course will be as follows:

Class Attendance	10%
Mid-Semester Examinations	20%
Assignments/Evaluation/Class Test/Quiz Test	10%
Final Examination	60%

6.1.1 Class Participation:

The marks for class participation will be as follows:

Attendance (Percentage)	Marks	Attendance (Percentage)	Marks	Attendance (Percentage)	Marks
95 and above	10	80 to 84	7	65 to 69	4
90 to 94	9	75 to 79	6	60 to 64	3
85 to 89	8	70 to 74	5	Less than 60	0

A student will not be allowed to appear at the examination of a course if his/her class attendance in that course is less than 50%.

6.1.2 Assignments and Mid-Semester Examinations:
There should be at least two mid-semester examinations for every course. The course teacher may decide the relative marks distribution between the assignments, tutorial and mid-semester examinations, however at least 50% contribution should come from the mid-semester examinations. The answer script should be returned to the students as it is valuable to their learning process.

6.1.3 Final Examination:
The final examination will be conducted as per the Semester Examination Ordinance.
(a) Duration of the Final Examination: There will be a 3-hour final examination for every course of 3 credits or more after the 13th week from the beginning of the semester. Courses less than 3 credits will have final examination of duration 2 hours.
(b) Evaluation of Answer Script: The students of the School of Applied Science and Technology and the School of Agriculture and Mineral Sciences will have two answer scripts to answer separate questions during final examination. Two separate examiner will grade the two scripts separately and the marks will be added together to get the final mark. For the students of the other schools there will be a single answer script which will be evaluated by two examiners. The two marks will be averaged and if the marks by the two examiners differ by 20% or more the concerned answer scripts will be examined by a third examiner and the two closest marks among the three will be averaged to get the final mark.

7. Grading System

7.1 Letter Grade and Grade Point:
Letter Grade and corresponding Grade-Point for a course will be awarded from the roundup marks of individual courses as follows:

Numerical Grade	Letter Grade	Grade Point
80% and above	A+	4.00
75% to less than 80%	A	3.75
70% to less than 75%	A-	3.50
65% to less than 70%	B+	3.25
60% to less than 65%	B	3.00
55% to less than 60%	B-	2.75
50% to less than 55%	C+	2.50
45% to less than 50%	C	2.25
40% to less than 45%	C-	2.00
Less than 40%	F	0.00

7.2 Calculation of Grades

7.2.1 GPA:
Grade Point Average (GPA) is the weighted average of the grade points obtained in all the courses completed by a student in a semester.

7.2.2 CGPA:
Cumulative Grade Point Average (CGPA) of only major and both major and second major degree will be calculated by the weighted average of every course of previous semesters along with the present semester. For clearing graduates if the roundup value of the third digit after decimal is nonzero the second digit will be incremented by one. A student will also receive a separate CGPA for his second major courses.

7.2.3 F Grades:

A student is given an 'F' grade if he fails or is absent in the final examination of a course. If a student obtains an 'F' grade his grade will not be counted for GPA and s/he has to repeat the course. An 'F' grade will be in his/her record and s/he will not be eligible for Distinction.

8. Distinction

8.1 Distinction:

Candidates for four-year Bachelor's degree will be awarded the degree with Distinction if his/her overall CGPA is 3.75 or above. However, a student will not be considered for Distinction if (a) s/he is not a regular student (has semester drop, incomplete courses in any semester or break of study) (b) has 'F' grade in one or more courses.

Ref.: This Ordinance was approved in the 126th Academic Council (26 June 2013). Clause 3.4.1 was cancelled in 127th Academic Council (27 August 2013). 128th Academic Council (21 November 2013) decided to make it effective from 01 January 2014. Clause 6.1 of 126th Academic Council (13 December 2018) and decided to be effective it from the academic session (2018-2019). Clause 1.3 was revised in 155th Academic Council (17 April 2019).

Course Code: MSC004	Credits: 03	Semester: 4-2	Year: 4th
Course Title: Military Science (সামরিক বিজ্ঞান)			

Rationale/যৌক্তিকতা : বাংলাদেশ ন্যাশনাল ক্যাডেট কোর বি এন সি সি এর সু দীর্ঘ ঐতিহ্যের ইতিহাস রয়েছে। ১৯২৩ সালে ইন্ডিয়ান টেরিটোরিয়াল ফোর্স (ITF) এ্যাক্ট পাশ হবার পর অক্সিলারি টেরিটোরিয়াল ফোর্সেস কমিটির সু পারিশক্রমে ঢাকাতে একটি ইউনিভার্সিটি ট্রেনিং কোর (UTC) গঠন করা হয় এবং এর মথ্য দিয়ে ক্যাডেট কোরের যাত্রা শুরু হয়। জ্ঞান, শৃ জ্খলা ও একতা এই তিন মূ ল মন্ত্রে উদ্বু দ্ধ করে দেশেরে যু ব সমাজ তথা স্কু ল, কলেজ ও বিশ্ববিদ্যালয়ের ছাত্রছাত্রীদের লেখাপড়াররর পাশাপাশি সামরিক প্রশিক্ষণের মাধ্যমে দ্বিতীয় সারির প্রতিরক্ষা বাহিনী হিসেবে গড়ে তোলা এবং নৈতিক চরিত্র বিকাশ এই কোর্সের লক্ষ্য।

Course Objectives/লক্ষ্য ও উদ্দেশ্য: এই কোর্সটি পাঠ্যসূ চিতে অন্তভু ´ক্ত করার উদ্দেশ্য হল-

দেশের কাজে ত্যাগের মনোভাব এবং শিক্ষার্থীদের মধ্যে ভ্রাতৃ ত্ববোধ গড়ে উঠবে।

শিক্ষার্থীদের নৈতিক চরিত্রের উন্নতি সাধন করবে।

দেশের প্রতিরক্ষা কাজে উৎসাহ ও উদ্দীপনা যোগাবে।

জাতীয় উন্নয়নমূ লক কর্মকাণ্ড ও দু র্যোগের সময় সৃ শৃ জ্খল স্বেচ্ছাসেবক বাহিনী হিসেবে গড়ে তু লবে।

বহিঃশত্রুর আক্রমনের প্রেক্ষিতে দ্বিতীয় সারির প্রতিরোধ বাহিনী হিসেবে গড়ে তু লবে ।

Course Learning Outcomes(CLOs)/ফলাফল :

এই কোর্সটি অধ্যয়নের ফলে শিক্ষার্থীরা যে সকল বিষয়ে সম্যক জ্ঞান ও দক্ষতা অর্জন করবে–

CLO-1: ব্যক্তিস্বার্থ, হীনমন্যতা, রাজনীতি ও নৈতিক পদস্খলন থেকে মু ক্ত থাকবে।

CLO-2: রাষ্ট্রীয় পর্যায়ে বিভিন্ন কর্মকাণ্ডে নিরাপত্তা বাহিনীকে সহয়তা প্রদান করতে পারবে।

CLO-3: দেশপ্রেমিক ও মানবতাবাদী সু ন্দর ও ভালো মনের মানু ষ হিসেবে গড়ে তু লতে সাহায্য করবে।

CLO-4: আত্মবিশ্বাসে বলীয়ান হয়ে উঠবে।

CLO-5: সু শৃ জ্খল ও আনু গত্যশীল যু ব সমাজ তৈরি করবে।

Mapping CLOs to PLOs

CLO/ PLO	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO 10
CLO1	√	√		√		√			√	
CLO2		√	√	√	√	√		√	√	√
CLO3	√	√			√		√	√		√
CLO4	√		√	√	√	√	√		√	
CLO5	√	√			√			√	√	√

Course Contents/পাঠ্যক্রম :

পঠিত বিষয় (তত্ত্বীয় ও ব্যবহারিক) : বি এন সি সি'র ইতিহাস-ঐতিহ্য, বি এন সি সি'র সাংগঠনিক কাঠামো, মহান স্বাধীনতা যু দ্ধের পটভূ মি ও কারণ, স্বাধীনতা যু দ্ধের সেক্টর সমূ হ, ড্রিল, কু চকাওয়াজ, ম্যাপ রিডিং, যু দ্ধের নানা কৌশল, যু দ্ধে ব্যবহৃত অস্ত্রের পরিচয়, বাংলাদেশের সশস্ত্র বাহিনীর পরিচয়, নেতৃ ত্বের বৈশিষ্ট্য, শরীর চর্চা, প্রাথমিক চিকিৎসা, সমাজ সেবা, দু র্যোগ ব্যবস্থাপনা, ভূ মিকম্প ব্যবস্থাপনা, ঘূ র্ণিঝড় ব্যবস্থাপনা, অগ্নি নির্বাপনের কৌশল, সাংস্কৃ তিক প্রশিক্ষণ ইত্যাদি।

Recommended Books/সহায়ক গ্রন্থ :

বি এন সি সি : সামরিক বিজ্ঞান সদর দপ্তর কর্তৃ ক নির্ধারিত ও প্রকাশিত।

Session: 2020-2021

OBE Curriculum of
Department of Architecture
Shahjalal University of Science and Technology, Sylhet, Bangladesh

PART A

OBE Curriculum of
Department of Architecture
Shahjalal University of Science and Technology, Sylhet, Bangladesh

1. Title of the Academic Program
Bachelor of Architecture

2. Name of the University
Shahjalal University of Science and Technology, Sylhet

3. Vision of the University
To emerge as an institute of eminence in the fields of engineering, technology business and management in serving the industry and the nation by empowering students with a high degree of technical, managerial and practical competence.

4. Mission of the University
M1. To strengthen the theoretical, practical and ethical dimensions of the learning process by fostering a culture of research and innovation among faculty members and students.

M2. To encourage long-term interaction between the academia and industry through the involvement of the industry in the design of the curriculum and its hands-on implementation

M3. To strengthen and mould students in professional, ethical, social and environmental dimensions by encouraging participation in co-curricular and extracurricular activities.

5. Name of the Faculty offering the program
School of Applied Sciences and Technology

6. Name of the Department offering the program
Department of Architecture

7. Vision of the Department:
This program will strive to play an essential and innovative role in enhancing the living environment condition by promoting architecture education through professionals.

8. Mission of the Department:
The Bachelor of Architecture program offers students professional degree to practice architecture. Mission of this program is:

M1. To produce skilled professionals with cultural consciousness and artistic intellect, committed to society and culture.

M2. To empower the students to critically engage the complexities of society and the natural environment by inspiring the fundamental principles of design.

M3. To make the students proficient with the latest communication, representation and technical knowledge in professional practice and instill professional and ethical responsibility.

9. Name of the Degree / Program

Bachelor of Architecture (B. Arch)

10. Description of the Program

The Department of Architecture offers one distinct undergraduate degree, which is the five-year Bachelor of Architecture (B.Arch.). Curriculum centers on the design studio and culminates in a year-long research and design project. Computing, theoretical, technological, and historical issues are progressively integrated into the design projects beginning in the first year. Projects range in scale and form, but relate to issues in contemporary culture with a focus on globalization and urban contexts. The curriculum of the Department of architecture is based on the general requirements of higher education scientific faculties and, at the same time, draws from the particular social needs. The curriculum also focuses on design application and production as they evolve both in the immediate milieu of professional architectural practice in Bangladesh and abroad, under the influence of political, social, financial and cultural transformations.

11. Program Accreditation

Department of architecture, SUST is accredited by Institute of Architects Bangladesh (IAB).

12. Program Educational Objectives (PEO)

The Bachelor of Architecture program aims:

PEO 1: To equip students with necessary skills to practice context-based architecture with an emphasis on methodological design process, with deeper understanding on local environment, climate, society and economy.

PEO 2: To acknowledge architecture as a part of cultural study by growing intellectual awareness towards world history and civilization, allow students to recognize both tangible and intangible forces behind shaping architecture.

PEO 3: To make the students competent to apply state of the art computer technologies and tools in architectural design process and communication. Students will be trained with adequate fundamental knowledge in structural analysis and construction methods required for architectural design.

PEO 4: To aware the students of legislative issues of architectural design such as building laws, accreditation code and introduce ethical perspective of professional practice and train to be a responsible social being.

PEO 5: To promote students with creative skills and aesthetic perception towards various medium of arts related to build environment.

PEO 6: To develop leadership skill among students to work in a multidisciplinary scenario, prove as an effective team person with communication and presentation ability.

Mapping of Department's Mission with PEO

MISSION STATEMENTS	PEO1	PEO2	PEO3	PEO4	PEO5	PEO6
M1	3	3	1	2	3	2
M2	3	3	2	1	3	1
M3	1	1	3	3	3	3

13. Program Learning Outcomes (PLO)

The department have identified following Intended Program Learning Outcomes (PLO) of graduated students. After successful completion of degree, students will be able:

PLO 1: To possess sufficient **knowledge** and skills to begin professional careers in architectural practice and related fields.

PLO 2: To **evaluate** context-based design issues addressing social, cultural, environmental, technological diversity with relation to built environment.

PLO 3: To **understand** diversity of needs, values, behavioral norms, economy, in process of architectural design.

PLO 4: To **apply** architectural research methods in design process and conduct research works by using qualitative and quantities analytical approach.

PLO 5: To **apply** and integrate computer technology in architectural design process and communication.

PLO 6: To **demonstrate** critical thinking in process of art and architectural design with references to other mediums or art.

PLO 7: To effectively **use** verbal, written and other communication skill for presentation, future study, using English and native languages.

PLO 8: To possess a fundamental **knowledge** for future higher study in architecture, planning, conservation and other multidisciplinary research.

PLO 9: To **recognize** and perform professional, social, ethical responsibility through practice of **creation** and professional commitment.

14. Mapping of University's Mission with PEO

MISSION STATEMENTS	PEO1	PEO2	PEO3	PEO4	PEO5	PEO6
M1	3	1	3	3	2	1
M2	3	1	3	3	2	2
M3	1	1	1	3	3	3

15. Mapping of PEO with PLO

No	Program Educational Objectives	Program Learning Outcomes (PLO)								
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
PEO 1	To equip students with necessary skills to practice context-based architecture with an emphasis on methodological design process, with deeper understanding on local environment, climate, society and economy	3	3	3	2	1	2	1	1	3
PEO 2	To acknowledge architecture as a part of cultural study by growing intellectual awareness towards world history and civilization, allow students to recognize both tangible and intangible forces behind shaping architecture.	3	3	3	3	1	3	2	1	3
PEO 3	To make architects competent to apply state of art computer technologies and tools in architectural design process and communication. Students will be trained with adequate fundamental knowledge in structural analysis and construction methods required for architectural design.	3	3	1	3	3	1	3	3	3
PEO 4	To be aware of legislative issues of architectural design such as building laws, accreditation code and introduce ethical perspective of professional practice and train to be a responsible social being	3	1	3	1	1	3	1	1	3
PEO 5	To promote students with creative skills and aesthetic perception towards various medium of arts related to build environment.	3	1	1	3	3	1	3	1	1
PEO 6	To develop leadership skill among students to work in a multidisciplinary scenario, prove as an effective team person with communication and presentation ability.	3	3	1	3	3	1	1	1	3

16. Graduate Attributes and knowledge area:

The Program provides students with training in architectural design and related technical and academic knowledge. Students are provided with knowledge from multiple disciplines related with Program Objectives and Intended Learning Outcomes. All the courses are designed to cover nine thematic areas including both lectures and practical sessions. The following areas are:

1. Architectural design
2. Architectural presentation and communication
3. Architectural history and theory
4. Architectural technology
5. Ecology and environmental design

17. Area of professional contribution

Major objective of the program is to train professional architects. Besides that, graduates can contribute in various field considering their own interest. Students graduating from program can contribute in different professional fields related to build environment. This program can also give students to develop skill in other creative sectors. After finishing this program graduates can achieve professional competence to work as:

1. Architect
2. Interior architect
3. Planner
4. Architectural conservator
5. Researcher
6. Architectural project manager
7. Architecture education
8. Architectural critic
9. Environmental professional
10. Art and graphics designer
11. Construction management
12. Facility planning

PART B

OBE Curriculum of
Department of Architecture
Shahjalal University of Science and Technology, Sylhet, Bangladesh
Department of Architecture
Undergraduate Program
Session 2020-2021

B.Arch Program Profile

Years Required for B Arch Degree	5	years
Total Semesters	10	semesters
No. of Course Streams	9	
Total Credits Required for B Arch Degree	200	credits
Compulsory Courses Required	176	credits
Optional Courses Required	24	credits
Total Credits Offered	218	credits
Major Compulsory Courses Offered	145	credits
Non-Major Compulsory Courses Offered	29	credits
Major Optional Courses Offered	38	credits
Non-Major Optional Courses Offered	6	credits
Total No. of Course	78	
Credits for B. Arch Thesis	17	credits

B.Arch Program Course Streams

No	Area of Study	Credits
Stream 1	**General Studies**	**20 credits**
ENG 101	English Communication Skills	1-1
ENG 102	English Language (Lab)	1-1
MAT 101A	Mathematics	1-1
SSS 100	History of the Emergence of Independent Bangladesh	1-1
PHY 111A	Physics for Architects	1-2
ECO 105A	Principles of Economics	1-2
SOC 201A	Principles of Sociology	2-2
ARC 227	Philosophy	2-1
ANP 303A	Culture, Space and Place	3-1
STA 401A	Statistics for Architects	4-1

Stream 2	**History & Theory of Architecture**	**24 credits**
ARC 121	A&A I: Ancient civilizations	1-1
ARC 123	Art & Architecture II: Medieval Europe	1-2
ARC 125	DT I: Basic Design Theory	1-1
ARC 127	DT II: Art Appreciation	1-2
ARC 221	A&AIII**:** South Asian Architecture	2-1
ARC 223	A&A IV: Modern Architecture	2-2
ARC 224	Heritage Field Work I	2-2
ARC 225	DT III: Architecture Design Method	2-1
ARC 321	A&AV: Contemporary Architecture	3-1
ARC 323	A&A VI: Society & Arch. of Bengal	3-2
ARC 324	Heritage Field Work II	3-2
ARC 325	DT IV: Facilities Planning & Design	3-1
ARC 327	Behavior Studies in Architecture	3-2
ARC 421	Heritage studies & Conservation	4-1

Stream 3	**Design Studio**	**88 credits**
ARC 132	Design Studio I	1-1
ARC 134	Design Studio II	1-2
ARC 232	Design Studio III	2-1
ARC 234	Design Studio IV	2-2
ARC 332	Design Studio V	3-1
ARC 334	Design Studio VI	3-2
ARC 431	Interior Design	4-1
ARC 432	Design Studio VII	4-1
ARC 433	Landscape Design	4-2
ARC 434	Design Studio VIII	4-2
ARC 436	Interior Design Studio	4-1
ARC 438	Landscape Design Studio	4-2
ARC 532	Design Studio IX	5-1
ARC 534	Thesis II: Design Studio X	5-2

Stream 4	**Environmental Design**	**8 credits**
ARC 141	ED I: Climate and Design I	1-2
ARC 243	ED II: Visual and Sonic Environment	2-1
ARC 244	ED III: Climate and Design II	2-2
ARC 542	Environmental Simulation Lab	5-1

Stream 5	Architectural Representation	20 credits
ARC 152	Architectural Graphics I: Basic Drawing	1-1
ARC 154	Architectural Graphics II: Rendering	1-2
ARC 252	Architectural Sketching & Modelling	2-1
ARC 254	Graphic Art & Design	2-2
ARC 256	Computer Application I	2-1
ARC 258	Photography and Media studies	2-1
ARC 352	Working drawing	3-1
ARC 454	Computer Application II	4-1

Stream 6	Architectural Technology	27 credits
ARC 261	Building Services I - Plumbing	2-2
ARC 263	Construction Materials and Methods	2-2
ARC 365	BIM Technology in Architecture	3-2
ARC 564	Cost Estimation & Specification	5-1
ARC 567	Building Maintenance and Retrofitting	5-1
MEE 315A	Building Services II- Mechanical	3-1
EEE 305A	Building Services III - Electrical	3-2
CEE 201A	Structure I- Basic Mechanics	2-1
CEE 203A	Structure II-Mechanics of Solids	2-2
CEE 301A	Structure III – Building Structures	3-1
CEE 302A	Construction Workshop and Material Lab	3-2
CEE 304A	Field Survey for Architects	3-2
CEE 401A	Project Management	5-1

Stream 7	Design in Social & Ecological Context	10 credits
ARC 171	Ecology & Environment	1-2
ARC 371	Vernacular Architecture & Settlements	3-2
ARC 471	Architecture for Sustainability	4-1
ARC 473	Community Architecture and Planning	4-2
ARC 475	Planning & Management for Disaster Resilience	4-2

Stream 8	Planning for the Built Environment	8 credits
ARC 281	Introduction to Spatial Planning	2-2
ARC 381	Urban Design	3-2
ARC 481	Housing	4-2
ARC 483	Rural Studies of Bangladesh	4-1

Stream 9	Architectural Research and Practice	13 credits
ARC 495	Architectural Research Methodology	4-2
ARC 592	Architecture in Dialogue: Seminar	5-1
ARC 598	Professional Practice I: Internship	5-1
ARC 594	Thesis I: Research Development	5-1
ARC 596	Thesis III-Dissertation	5-2
ARC 593	Professional Practice II: Codes & Ethics	5-2

Compulsory Courses

First Year: 1st Semester

Course No.	Course Title	Hours/Week			Pre-requisite
		Theory	Lab	Credits	
ARC 121	A&A I: Ancient civilizations	2	0	2	-
ARC 125	DT I: Basic Design Theory	2	0	2	-
ARC 132	Design Studio I	0	9	4.5	-
ARC 152	Architectural Graphics I: Basic Drawing	0	6	3	-
ENG 101	Effective Communication in English	2	0	2	-
ENG 102	English Language (Lab)	0	2	1	-
MAT101A	Mathematics	2	0	2	-
SSS 100	History of the Emergence of Independent Bangladesh	3	0	3	-
Total Credits				**19.5**	

First Year: 2nd Semester

Course No.	Course Title	Hours/Week			Pre-requisite
		Theory	Lab	Credits	
ARC 123	Art & Architecture II: Medieval Europe	2	0	2	-
ARC 127	DT II: Art Appreciation	2	0	2	-
ARC 134	Design Studio II	0	9	4.5	ARC 132 ARC 152
ARC 141	ED I: Climate and Design I	2	0	2	-
ARC 154	Architectural Graphics II	0	6	3	ARC 132 ARC152
ARC 171	Ecology & Environment	2	0	2	-
ECO105A	Principles of Economics	2	0	2	-
PHY 111A	Physics for Architects	2	0	2	-
Total Credits				**19.5**	

Second Year: 1st Semester

Course No.	Course Title	Hours/Week			Pre-requisite
		Theory	Lab	Credits	
ARC 221	A&AIII: South Asian Architecture	2	0	2	-
ARC 225	DT III: Architecture Design Method	2	0	2	-
ARC 232	Design Studio III	0	12	6	ARC 134 ARC 154
ARC 243	ED II: Visual and Sonic Environment	2	0	2	
ARC 256	Computer Application I	0	6	3	-
CEE 201A	Structure I- Basic Mechanics	2	0	2	-
Total Credits				**17**	

Second Year: 2nd Semester

Course No.	Course Title	Hours/Week			Pre-requisite
		Theory	Lab	Credits	
ARC 223	A&A IV: Modern Architecture	2	0	2	-
ARC 224	Heritage Field Work I	0	1w	1	-
ARC 234	Design Studio IV	0	12	6	ARC 232
ARC 261	Building Services I - Plumbing	2	0	2	-
ARC 263	Construction Materials and Methods	2	0	2	-
ARC 281	Introduction to Spatial Planning	2	0	2	-
CEE 203A	Structure II-Mechanics of Solids	3	0	3	-
Total Credits				**18**	

Third Year: 1st Semester

Course No.	Course Title	Hours/Week			Pre-requisite
		Theory	Lab	Credits	
ARC 321	A&AV: Contemporary Architecture	2	0	2	-
ARC 332	Design Studio V	0	18	9	ARC 234
ARC 352	Working drawing	0	6	3	-
CEE 301A	Structure III – Building Structures	3	0	3	-
MEE 315A	Building Services II- Mechanical	2	0	2	-
Total Credits				**19**	

Third Year: 2nd Semester

Course No.	Course Title	Hours/Week			Pre-requisite
		Theory	Lab	Credits	
ARC 323	A&A VI: Society & Arch. of Bengal	2	0	2	-
ARC 324	Heritage Field Work II	0	1w	1	_
ARC 334	Design Studio VI	0	18	9	ARC 332
ARC 381	Urban Design	2	0	2	-
EEE 305A	Building Services III - Electrical	2	0	2	-
CEE 302A	Constr. Workshop and Material Lab	0	4	2	-
CEE 304A	Field Survey for Architects	0	1w	1	-
Total Credits				**19**	

Fourth Year: 1st Semester

Course No.	Course Title	Hours/Week			Pre-requisite
		Theory	Lab	Credits	
ARC 431	Interior Design	2	0	2	-
ARC 432	Design Studio VII	0	18	9	ARC 334
ARC 436	Interior Design Studio	0	6	3	-
CEE 401A	Project Management	2	0	2	-
Total Credits				**16**	

Fourth Year: 2nd Semester

Course No.	Course Title	Hours/Week			Pre-requisite
		Theory	Lab	Credits	
ARC 433	Landscape Design	2	0	2	-
ARC 434	Design Studio VIII	0	18	9	ARC 432
ARC 438	Landscape Design Studio	0	6	3	-
ARC 481	Housing	2	0	2	-
ARC 495	Architectural Research Methodology	2	0	2	-
Total Credits				**18**	

Fifth Year: 1st Semester

Course No.	Course Title	Hours/Week

		Theory	Lab	Credits	Pre-requisite
ARC 532	Design Studio IX	0	18	9	ARC 434
ARC 594	Thesis I: Research Development	0	4	2	ARC 434
ARC 598	Professional Practice I: Internship	-	8w	2	-
Total Credits				**13**	

Fifth Year: 2nd Semester

Course No.	Course Title	Hours/Week			Pre-requisite
		Theory	Lab	Credits	
ARC 534	Thesis II: Design Studio X	0	24	12	ARC 532 ARC 594
ARC 593	Professional Practice II: Codes & Ethics	2	0	2	-
ARC 596	Thesis III-Dissertation	0	6	3	ARC 532 ARC 594
Total Credits				**17**	

Optional Courses

Course no	Course Title	Theory credit	Lab Credit	Hour /week
Set A	**2nd Year** 1st Semster			
ARC 252	Architectural Sketching & Modelling	0	2	4
ARC 258	Photography and Media studies	0	2	4
ARC 227	Philosophy	2	0	2
* Required credits of optional courses from Set A is 4 (2 courses)				
Set B	**2nd Year** 2nd Semster			
ARC 244	ED III: Climate and Design II	2	0	2
ARC 254	Graphic Art & Design	0	2	4
SOC201A	Principles of Sociology	2	0	2
* Required credits of optional courses from Set B is 4 (2 courses)				
Set C	**3rd Year** 1st semester			
ANP 303A	Culture, Space and Place	2	0	2
ARC 325	DT IV: Facilities Planning & Design	2	0	2
* Required credits of optional courses from Set C is 2 (1 course)				
Set D	**3rd Year** 2nd semester			
ARC 327	Behavior Studies in Architecture	2	0	2
ARC 371	Vernacular Architecture & Settlements	2	0	2
ARC 365	BIM Technology in Architecture	0	2	4
* Required credits of optional courses from Set D is 2 (1 course)				
Set E	**4th** Year 1st Semester			
ARC 454	Computer Application II	0	2	4
ARC 471	Architecture for Sustainability	2	0	2
ARC 483	Rural Studies of Bangladesh	2	0	2
STA 401A	Statistics for Architects	2	0	2
* Required credits of optional courses from Set E is 4 (2 courses)				
Set F	**4th** Year 2nd Semester			
ARC 421	Heritage studies & Conservation	2	0	2
ARC 473	Community Architecture and Planning	2	0	2
ARC 475	Planning & Management for Disaster Resilience	2	0	2
* Required credits of optional courses from Set F is 4 (2 courses)				
Set G	**5th Year** 1st semester			
ARC 592	Architecture in Dialogue: Seminar	0	2	4
ARC 542	Environmental Simulation Lab	0	2	4
* Required credits of optional courses from Set G is 2 (1 course)				
Set H	**5th** Year 2nd Semester			
ARC 564	Cost Estimation & Specification	0	2	4
ARC 567	Building Maintenance and Retrofitting	2	0	2
* Required credits of optional courses from Set H is 2 (1 course)				

Requirements for receiving B. Arch. degree:

1. Credit requirement for B. Arch. degree at SUST is 200.
2. Students need to complete 176 credits compulsory courses with 24 credits optional courses.
3. For each semester (2nd year to 5th year), students can register for max. 4 credits (2 courses) optional courses.
4. Required credits of optional courses from each set must be completed.
5. Optional courses will be offered at the beginning of each semester (2nd year to 5th year).
6. Design Survey reports will carry 20% marks of the Design Studios III-VIII.

PART C

OBE Curriculum of
Department of Architecture
Shahjalal University of Science and Technology, Sylhet, Bangladesh

Year/ Semester	**1st Year 1st Semester**		
Course Title	**Art & Architecture I: Ancient Civilizations**		
Course Code	ARC 121	**Module**	2
No. of Credits	2.0	**Course Hour**	2.0

COURSE RATIONALE
This course intends to develop skills for cultural interpretation of built environment through survey and analysis of historic structures, which is an inherent part of architecture education.

COURSE OBJECTIVES
- To facilitate basic knowledge about the evolutionary process of early human society and architecture.
- To provide the knowledge of different political regimes and religious philosophy that influence development ancient civilizations.
- Acquaint students with the major drivers behind shaping any civilization and their influence of art and architecture development.
- Helping the students to develop skill towards art & architecture appreciation where students could identify architectural styles with relevance to age, time and location.

COURSE CONTENT
Overview of the perceptual process of evolution in the Art and Architecture of ancient civilizations. Critical evaluation of ancient architecture and settlement design of major four river valley civilizations: the Nile river valley (Ancient Egypt), the Tigris/Euphrates river valley (Ancient Mesopotamia), the Indus river valley (Ancient India) and the Huang He river valley (Ancient China).
Introduction to classical architecture of Greece and Rome; Critical evaluation of the classical Architecture of Greece and Rome from political, social and philosophical point of view. Aegean and the Etruscan influence on development of Greek and Roman architecture.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		**MAPPING CLO TO PLO**								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	7	**8**	**9**
CLO 1	recognize the principal buildings of the various ancient civilizations	*		*						
CLO 2	demonstrate an understanding of the factors that influence the architectural traditions of each of the ancient civilizations through construction technique, material culture		*							*
CLO 3	be able to compare the architecture of the various civilizations in terms of design idea, social belief, religious philosophy		*						*	
CLO 4	gain an awareness of the inherent connections of the built environment to the natural environment, and the subsequent implications for cultural and environmental sustainability		*						*	
CLO 5	get a basic introduction to the language of architectural form and space and order and apply to design studio								*	

Books Recommended

1. **letcher B.:** A History of Architecture, Architectural Press; 20th edition (21 Sep 1996)
2. **Fazio M. A:** World History of Architecture, Publisher: McGraw-Hill Professional;2nd Rev ed.
3. **Cole E.:** The Grammar of Architecture, Bulfinch
4. **Harvey, J. H.:** The Gothic World 1100-1600, London, 1950
5. **Francis D. K. Ching**: A Visual Dictionary of Architecture
6. **Murray, P.:** Architecture of the Renaissance, New York, 1971
7. **Million, Henry, A. (ed**): The Triumph of the Baroque Architecture in Europe 1600-1750, London, 1999
8. **Minor, V. H.:** Baroque and Rococo Art and Culture, London

Course Title	**DT I: Basic Design Theory**		
Course Code	ARC 125	**Module**	2
No. of Credits	2.0	**Course Hour**	2.0

COURSE RATIONALE
This course will introduce and enrich the knowledge about architecture, space, aesthetics and design based on visual design elements and process.

COURSE OBJECTIVES
- To motivate and inspire on what human and space does mean, what aesthetics and design holds power and what architecture/ architects can do for the society and human being.
- To develop awareness on human and behavior, aesthetics and psychology, function and needs, space and architecture.
- Acquaint students with the continuous process of design and thinking.
- To make students competent to apply the basic design elements, color and texture.
- Helping the students to develop ability to apply the fundamental treatment of forms, space and order in architecture.
- To promote taking creative innovations based on aesthetics and design with all design elements.

COURSE CONTENT

Introduction to visual design: Definition of design; Design thinking process; An introduction to various design elements (e.g. point, line, plane, shape, volume) Form: properties of form; Primary shapes and solids; Regularity, transformation and articulation of forms; Geometric states while addition; Edges & corners, Understanding the principles of design (e.g. Axis, Symmetry, Hierarchy, Rhythm, Datum, Transformation, Harmony, Dynamism, Movement), Understanding the study of proportion and scale, Idea of composition; pattern language, Solid-void dynamism, Understanding space with harmonious forms in nature and analysis with respect to their color, texture and structure.

Introduction to architecture: Definition of Architecture, Context of architecture as satisfying human needs: functional, aesthetic and psychological-outline, The design process in Architecture, Elements of Architecture : Introducing idea of space and form, Understanding perceptual effects of architectural spaces governed by enclosure: Horizontal and vertical elements defining space, Opening- defining space in terms of quality of space, light and view, Internal and External spaces, Continuous spaces, Spatial relationship and its types, Spatial organizations. Principles of architecture: Understanding fundamental principles with reference to the architectural form and space, Study of relationship between architectural form and Circulation elements.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		**MAPPING CLO TO PLO**								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	7	**8**	**9**
CLO 1	define design and thinking process of architecture.				*					
CLO 2	understand and make relation between human and architecture.				*	*				
CLO 3	think differently to pick up design from surroundings.					*	*			
CLO 4	apply design elements, color and texture.	*	*	*				*		
CLO 5	apply the principles of forms, space, order and treatment to create space.	*	*	*				*		
CLO 6	create a new space based on aesthetics and design.								*	*

Books Recommended

1. **James C. Snyder;** Introduction to Architecture, McGraw Hill**,** 1979.
2. **Francis D. K. Ching:** Architecture: Form, Space, and Order.
3. **Paul Zelanski & Mary Pat Fisher,** Design principles & Problems.
4. **Matthew Frederick:** 101 Things I Learned in Architecture School.
5. **Nicole Bridge:** Architecture 101: From Frank Gehry to Ziggurats.
6. **Scott Foresman:** Art.
7. **Simon Unwin:** Analysing Architecture.
8. **Francis D. K. Ching:** A Visual Dictionary of Architecture
9. **Newman, Oscar;** Defensible Space, New York, Collin Books, 1973.
10. **Laseau, Paul and Tice, James Frank Lloyd Wright;** Between Principal and Form, New York, Van Nostrand Reinhold Co., 1973.

11. **Pye, David;** The Nature and Aesthetics of Design, New York, Van Nostrand Reinhold Co., 1978.
12. **Von Meiss, Pierre;** Elements of Architecture, New York, Van Nostrand Reinhold Co., 1990.
13. **Zevi, Bruno;** Architecture as Space, New York, Horizon Press, 1957.

Course Title	**Design Studio I**		
Course Code	ARC 132	**Module**	3
No. of Credits	4.5	**Course Hour**	9

COURSE RATIONALE

This is a foundation course for design. This course intends to develop fundamental skills for visual design to give a basis for architecture design education.

COURSE OBJECTIVES

- Helping the students to understand the elements and principles of basic design as the building blocks of creative design through exercises that will develop the originality, expression, skill and creative thinking.
- To introduce basic design principles to develop basic 2-dimensional visual compositions.
- Understanding of architectural design aesthetic through simple projects
- To introduce a series of exercises which will help the students to experiment with form and volume
- To involve students in a series of exercises which will look at graphic and abstract representations of art.

COURSE CONTENT

Study of human senses and their relation to design; Introduction to visual composition through Elements of Design: Properties, qualities and characteristics of point, line, shape, form, color and texture, Understanding of forms in nature,

Study of material for design, Understanding the Principles of Design: Scale, Proportion, Balance, Harmony, Rhythm, Order and Contrast, Introducing the concept of Space in visual composition.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		**MAPPING CLO TO PLO**								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	7	**8**	**9**
CLO 1	understand basic visual design process (Knowledge)	*								
CLO 2	distinguish between visual design elements including point, line, shape to make 2 dimensional visual compositions.						*			
CLO 3	apply visual design principles in 2-Dimensional compositions with colour, texture and demonstrate basic ability to deal with simple model making techniques and materials (Application).	*					*			

CLO 4	interpret basic design idea and concepts verbally and in written (Communication)							*		
CLO 5	critically evaluate self-works and other basic compositions based on composition principles. (Evaluation)		*							
CLO 6	formulate basic compositions based on their individual ideas. (Creation).	*	*							

Books Recommended

1. **Pramar V.S**., Design fundamentals in Architecture, Somaiya Publications Pvt. Ltd., New Nelhi, 1973.
2. **Francis D.K.Ching**, "Architecture: Form, Space and Order, Van Nostrand Reinhold Co., (Canaa),1979.
3. **Elda Fezei, Henny Moore**, Hamlyn, London, New York, Sydney, Toronto, 1972.
4. **Lawrence Bunchy C**.: Acrylic for Sculpture and Design, 450, West 33rd Street, New York, N.Y.10001, 1972.
5. **Exner V., Pressel D.**, "Basics Spatial Design", Birkhanser, 2009.
6. **Snyder, James**: Introduction to Architecture
7. **Scot Foresman:** Art.
8. **Owen Cappleman & Michael Jack Jordon**, Foundations in Architecture: An Amotated Anthology of Beginning Design Project, Van Nostrand Reinhold New York, 1993.
9. **Charles Wallschlacgerm & Cynthia Busic**-Snyder, Basic Visual Concepts and Principles for Artists, Architects and Designers, McGraw Hill, New York 1992.

Course Title	**Architectural Graphics I: Basic Drawing**		
Course Code	ARC 152	**Module**	5
No. of Credits	3.0	**Course Hour**	6.0

COURSE RATIONALE

This course intends to inculcate the fundamental graphical language and principles to represent architectural drawings in the students.

COURSE OBJECTIVES

- Acquaint students with the basic principles and medium of fundamental graphical representation.
- Helping students to understand 2-dimensional architectural presentation drawings
- Apply the knowledge of graphical representations to produce basic architectural drawing.

COURSE CONTENT

Line drawing quality; Study of scale; Lettering; Execution of plan, elevation and section; Execution of oblique, isometric and diametric drawings; Introduction to mechanical perspective.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		**MAPPING CLO TO PLO**								
After successful completion of the course, students will be able to		**1**	**2**	**3**	**4**	**5**	**6**	7	**8**	**9**
CLO 1	understand 2-dimensional architectural presentation drawings	*				*				
CLO 2	translate different graphical language and symbols							*		
CLO 3	utilize different architectural scales accordingly					*				
CLO 4	use proper techniques and instruments for hand-drawn graphics					*				
CLO 5	execute simple architectural building drawings	*				*				

Books Recommended

1. **Ching, F.D.K.:** Architectural Graphics.
2. **Gill, R.W.:** Rendering with Pen & Ink.

Course Title	**Effective Communication in English**		
Course Code	ENG 101	**Module**	1
No. of Credits	2.0	**Course Hour**	2.0

COURSE RATIONALE

This course is expected to develop two basic skills i.e. reading and writing. A variety of reading strategies and texts will be used to effectively develop first year students'
academic reading skills thereby facilitating their future study. Also, the course focuses on developing the writing skills of students by familiarizing them with grammar rules, providing them with practice and enabling them to demonstrate the accurate use of grammar in their writing.

COURSE OBJECTIVES

- To enable students to write with accuracy.
- To facilitate effective and comprehensible writing.
- To raise awareness of common errors that occur in writing.
- To develop student's ability to understand write-ups on issues of general concern.
- To improve the vocabulary of learners for effective communication.

COURSE CONTENT

a) Reading

Different Reading Strategies
Guessing Meaning from the Context
Critical Reading (Analyze)
Critical Reading (Synthesize)
Critical Reading (Evaluate)
Annotation
Summary Writing

Material
A selection of 08-10 editorials and reports from newspapers/magazines/journals, etc.
Reading texts in New Headway Upper Intermediate Student's Book (Current edition)
Selected passages from recommended books
A selection of other material may be supplied as handouts as deemed necessary by the instructor

b) Writing
Forms and functions of different word categories (Noun, verb, adjective, etc.)
Aspects and uses of tense
Subject-verb agreement
Use of infinitive, gerund, present participle, past participle, modals, causatives, conditionals, subjunctives, modals.
Use of sentence connectors/ cohesion markers/ punctuation
Effective combination of sentences (simple, complex, compound)
Developing a paragraph

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		MAPPING CLO TO PLO								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	7	**8**	**9**
CLO 1	apply grammar rules							*		
CLO 2	produce grammatically correct meaningful sentences							*		
CLO 3	express oneself correctly by using appropriate words, phrases, sentences or ideas							*		
CLO 4	critically reflect on a text (grasp abstract ideas and interpret them effectively, arrive at well-reasoned conclusions and solutions)						*	*		
CLO 5	extract information from passages accurately						*		*	

Books Recommended
1. **Tibbits, E. E. ed**. Exercises in Reading Comprehension. Longman
2. **Liz and John Soars.** (Current edition). New Headway Upper Intermediate Student's Book
3. **Oxford**: Oxford University Press
4. Cliff's TOEFL
5. Other Resources recommended by course instructors

Course Title	**English Language Lab**		
Course Code	ENG 102	**Module**	1
No. of Credits	1.0	**Course Hour**	2.0

COURSE RATIONALE
This course is designed to improve the speaking and listening skills of students in the English language. Emphasis is laid on proper pronunciation for accurate articulation and recognition of speech sounds as well as correct stress, intonation and language use in varied situations.

COURSE OBJECTIVES
- To enable students' understanding of the variations in pronunciation.
- To teach proper pronunciation and accurate articulation.
- To facilitate appropriate stress and intonation in speech.
- To encourage use of English effectively in everyday situations.
- To ensure overall improvement of oral communication through listening and speaking.

COURSE CONTENT
(a) Speaking
Articulators
English Phonetic Alphabet (British and American) and International Phonetic Alphabet (IPA)
Stress rules of English
Intonation rules and functions of intonation
Communication Styles and Cultural Context
Fluency, mistakes, misunderstandings, audience, taboos, self-esteem, confidence
Activities: dialogue, debate, extempore speech, interview, role-play

(b) Listening
Basics of listening
Various types of Pronunciation
IPA, RP, Transcription
Different accents and intonation patterns
Activities for Meaning-focused Listening, Information Transfer Strategies,
Listening Practice through selection of audio clips.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		MAPPING CLO TO PLO								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	7	**8**	**9**
CLO 1	read the symbols of the International Phonetic Alphabet used to represent the sounds of the English language.							*		
CLO 2	understand all that is being said in English in varied accents							*		
CLO 3	interpret information accurately						*	*		
CLO 4	apply appropriate intonation and stress patterns in English words and sentences				*			*		
CLO 5	produce continuous speech clearly and convincingly							*		

Books Recommended
1. **Anderson, A. & Lynch, T**. Listening. Oxford: Oxford University Press, 1988
2. **Hancock, Mark**. English Pronunciation in Use. New York: Cambridge University Press, 2004
3. **Anderson, Kenneth, et al**. Study Speaking. Cambridge University Press, 2007

4. **Hancock, Mark**. English Pronunciation in Use. Cambridge University Press, 2004
5. **Jones, Daniel**. Cambridge English Pronunciation Dictionary. Cambridge University Press, 2011
6. **Richards J, et al**. Person to Person. Oxford University Press, 2007
7. **Richards, Jack C, and David Bohlke**. Speak Now: 1. Oxford University Press, 2013
8. **Roach, Peter**. English Phonetics and Phonology. Cambridge University Press, 2009

Course Title	**Mathematics**		
Course Code	MAT 101A	**Module**	1
No. of Credits	2.0	**Course Hour**	2.0

COURSE RATIONALE

This course intends to teach architecture students with fundamental knowledge of mathematical problem solving to prepare them for upper-level courses.

COURSE OBJECTIVES

- To give students fundamental knowledge of mathematical problem-solving skill.
- To teach importance and relevance of mathematics for architectural education and knowledge.
- To ensure a multidisciplinary approach for architecture education

COURSE CONTENT

Differential Calculus: Function; limit; continuity; differentiation; successive and partial differentiation; Rolle's theorem; mean value theorem; maxima and minima. Integral Calculus: Integration by various methods; standard integrals; definite integrals; length of curves; area bounded by plane curves; volumes and surface areas of solids of revolution. Coordinate Geometry of Two Dimensions: Coordinate systems; pair of straight lines; circle; tangent and normal at a point on a circle; general equation of second degree. Coordinate Geometry of Three Dimensions: Distance between points; angle between two straight lines; plane through three points; angle between two planes; straight line through two points.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		**MAPPING CLO TO PLO**								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	7	**8**	**9**
CLO 1	understand derivatives and applications	*								
CLO 2	solve exponential and logarithmic functions	*								
CLO 3	learn application of define integrals	*			*					
CLO 4	understand the relation of architectural design with mathematical basics.								*	
CLO 5	apply coordinate geometry of two and three dimensions	*			*					

Books Recommended

1. **Thomas and Finney**: Calculus and Analytic Geometry
2. **E. W Swokowski:** Calculus with Analytic Geometry
3. **H. Anton**: Calculus
4. **Rahman and Bhattacharjee**: Co-ordinate geometry of two and three dimensions
5. **Loney, S. L.:** Coordinate Geometry of Two dimensions
6. **Smith, C.:** The Analytical Geometry of Conic Section

Course Title	**History of the Emergence of Independent Bangladesh**		
Course Code	SSS 100	**Module**	1
No. of Credits	3.0	**Course Hour**	3.0

COURSE RATIONALE

This course deals with the following interrelated themes and topics that are essential to understand the emergence of Bangladesh. These themes include land and people, politics, economy, governance, society, religion and culture, global connections as well as the basic topics on the freedom struggle and War of Liberation. Issues under each of the broad themes will be discussed from the perspective of historical evolution and contemporary significance.

COURSE OBJECTIVES

- Offer insight into the historical changes, the long struggle for freedom and above all the War of Independence led by the Father of the Nation Bangabandu Sheikh Mujibur Rahman that have shaped today's Bangladesh.
- Describe impact of geographical features in Bengal
- Explore ethnic compositions of Bangladesh
- Understand the development of Bengali language and its impact in Bangladeshi culture
- Comprehend cultural syncretism and religious tolerance
- Realize distinctive identity of Bangladesh in the context of undivided Bangladesh

COURSE CONTENT

1. Description of the country and its people: Impact of Geographical features in Bengal, Ethnic composition of Bangladesh, Development of Bengali Language and its impact, Cultural syncretism and religious tolerance, Distinctive identity of Bangladesh in the context of undivided Bangladesh.
2. Proposal for undivided sovereign Bengal, the partition of the Subcontinent, 1947 and Foreshadowing Bangladesh: Rise of communalism under the colonial rule, Lahore Resolution 1940, The proposal of Suhrawardi and Sarat Bose for undivided Bengal: consequences, The creation of Pakistan 1947, Foundation of Awami Muslim League and Foreshadowing Bangladesh.
3. Pakistan: Structure of the state and disparity: Central and provincial structure, Influence of Military and Civil bureaucracy, Economic, social and cultural disparity.
4. Language Movement and quest for Bengali identity: Misrule by Muslim League and Struggle for democratic politics, The Language Movement: context, phases and International Recognition of Bengali Language, United front of Haque – Vasani – Suhrawardi: election of 1954, consequences.

5. Military rule: the regimes of Ayub Khan and Yahia Khan (1958-1971): Definition of military rules and its characteristics, Ayub Khan's rise to power and characteristics of his rule (Political repression, Basic democracy, Islamisation), Fall of Ayub Khan and Yahia Khan's rule.
6. Rise of nationalism and the Movement for self-determination: Resistance against cultural aggression and resurgence of Bengali culture, Sheikh Mujibur Rahman and the 6 points movement, Reactions: Importance and significance, The Agortola Case 1968.
7. The mass- upsurge of 1969 and 11-point movement: Background, Program, Significance.
8. Election of 1970 and its Impact: Legal Framework Order (LFO), Programed of different political parties, Election result and centers refusal to comply
9. Non-Cooperation Movement and 7th March Speech, 1971: The non-cooperation movement, Speech of 7th March: Background of the speech, major characteristics of the speech, impact of this speech, International recognition of 7th March Speech as part of world heritage.
10. Declaration of Independence of Bangladesh: Operation Searchlight, declaration of Independence of Bangladesh by Bangobondhu, Beginning of the Liberation War of Bangladesh
11. The war of Liberation 1971: Genocide, repression of women, refugees, Formation of Bangladesh government and proclamation of Independence, The spontaneous early
12. resistance and subsequent organized resistance (Mukti Fouz, Mukti Bahini,
13. guerillas and the frontal warfare), Publicity Campaign in the war of Liberation
14. (Shadhin Bangla Betar Kendra, the Campaigns abroad and formation of public
15. opinion), Contribution of students, women and the masses (Peoples war) and
16. different political parties, The role of Great powers and the United Nations in
17. the Liberation war, The contribution of India in the Liberation War, The Anti
18. liberation activities of the occupation army, the Peace Committee, Al-Badar,
19. AlShams, Rajakars, pro Pakistan political parties and Pakistani Collaborators
20. killing of the intellectuals, Trial of Bangabondhu and reaction of the World
21. Community, Formation of joint command and the Victory, The overall
22. contribution of Bangabondhu in the Independence truggle.
23. The Bangabondhu Regime 1972-1975: Homecoming, Making of the constitution, Reconstruction of the war-ravaged country, Foreign Policy of Bangabondhu, The murder of Bangabondhu and his family and the ideological turn-around.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		**MAPPING CLO TO PLO**								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	7	**8**	**9**
CLO 1	A broader understanding and further curiosity of the rich history, culture and heritage of the country.			*						
CLO 2	Able to appreciate the importance and relevance of history as a bridge between the past, present and the future.		*							
CLO 3	Become familiar with the contribution of the Father of the Nation Bangabandu Sheikh Mujibur Rahman during independent war and construction of Bangladesh.			*						*
CLO 4	Realize the nationalism and self-determination							*		
CLO 5	Improve critical thinking on anti-Bangladeshi activities during liberation war and after the independence and present days							*		
CLO 6	A broader understanding and further curiosity of the rich history, culture and heritage of the country.			*						

Books Recommended

1. Ahmed, Salahuddin and Bazlul Mobin Chowdhury (eds.): Bangladesh: National Culture and Heritage: An Introductory Reader (Dhaka: Independent University Bangladesh, 2004).
2. Harun-or-Roshid: The Foreshadowing of Bangladesh: Bengal Muslim League andMuslim Politics, 1906-1947 (Dhaka: The University Press Limited, 2012)
3. Jahan Rounaq: Pakistan: Failure in National Integration, (Dhaka: The University Press Limited, 1977)
4. ManiruzzamanTalukder: Radical Politics and the Emergence of Bangladesh, (Dhaka: Mowla, Brothers, 2003)
5. Muhith, A M A: History of Bangladesh: A Subcontinental Civilization, (Dhaka: UPL, 2016)
6. Samad Abdus: History of Liberation War of Bangladesh, (Dhaka: Aparajeyo Bangla Prakashani, 2019)
7. Milton Kumar Dev, Md. Abdus Samad, History of Bangladesh, (Dhaka: Biswabidyalya Prokasoni, 2014)
8. Schendel, Willem Van: A History of Bangladesh (Cambridge: Cambridge University Press, 2009)

৯. নীহার রঞ্জন রায়ঃ বাঙালীর ইতিহাস, (কলকাতাঃ দে'জ পাবলিশিং, ১৪০২ বঙ্গাব্দ)

১০. সালাহউদ্দিন আহমেদ ও অন্যান্য (সম্পাদিত)ঃ বাংলাদেশের মু ক্তি সংগ্রামের ইতিহাস ১৯৪৭-১৯৭১ (ঢাকাঃ আগামী প্রকাশনী, ২০০২)

১১. আবু ল মাল আবদু ল মু হিতঃ বাংলাদেশঃ জাতিরাষ্ট্রের উদ্ভব (ঢাকাঃ সাহিত্য প্রকাশ, ২০০০)

১২. সিরাজু ল ইসলাম (সম্পাদিত)ঃ বাংলাদেশের ইতিহাস ১৭০৪-১৯৭১, ৩ খন্ড (ঢাকাঃ এশিয়াটিক সোসাইটি অব বাংলাদেশ, ১৯৯২)

১৩. মু নতাসির মামু ন ও অন্যান্যঃ স্বাধীন বাংলাদেশের অভ্যু দয়ের ইতিহাস (ঢাকাঃ সু বর্ণ, ২০১৭)

১৪. ড. আবু মো. দেলোয়ার হোসেনঃ স্বাধীন বাংলাদেশের অভ্যু দয়ের ইতিহাস (ঢাকাঃ বিশ্ববিদ্যালয় প্রকাশনী, ২০১৪)

১৫. ড. আবু মো. দেলোয়ার হোসেনঃ ড. মোহাম্মদ সেলিম (সম্পাদনা)ঃ বাংলাদেশ ও বহির্বিশ্বে (ঢাকাঃ বাংলাদেশ ইতিহাস সমিতি, ২০১৫)

১৬. ড. আবু মো. দেলোয়ার হোসেনঃ বাংলাদেশের ইতিহাস ১৯০৫-১৯৭১ (ঢাকাঃ বিশ্ববিদ্যালয় প্রকাশনী, ২০১৬)

Year/ Semester	1st Year 2nd Semester		
Course Title	Art & Architecture II: Medieval Europe		
Course Code	ARC 123	Module	2
No. of Credits	2.0	Course Hour	2.0

COURSE RATIONALE

This course intends to develop skills for cultural interpretation of built environment through survey and analysis of historic structures, which is an inherent part of architecture education.

COURSE OBJECTIVES

- Aims to understand the chronological changes in society and belief in European nations after Roman era and continuity through
- Helping the students to study the spread of Christianity as a religion and influence on architectural development through Europe focusing on church architecture.
- Acquaint students with the construction techniques, structural evolution, material culture through different style of European medieval architecture
- Foster the analytical and critical potential of the student on the built environment
- Make the students understanding the influence of Renaissance on development art and architecture in modern era by studying works from famous Renaissance men and their works.

COURSE CONTENT

A critical evaluation of the architecture of Western civilization. Its roots in Etruscan and Roman architecture which developed through the ages of Early Christian, Byzantine and Romanesque periods resulting in the Gothic style. Moorish architecture in Spain. Climatic, geographical, religious and social influences on the architecture in these periods. Structural innovations and construction systems adopted in different periods.

Revival of classical thoughts in the Renaissance period and contribution of architects. Evolution of Renaissance philosophy through phases with relevance to works of Renaissance men, emphasizing development in Milan, Florence and Venice. Introduction to Baroque and Rococo style in art and architecture. Movement in Neoclassic style: Greek revival, Palladianism and influence of École des Beaux-Arts in development of early modernism.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		MAPPING CLO TO PLO								
	After successful completion of the course, students will be able to	1	2	3	4	5	6	7	8	9
CLO 1	distinguish between various architectural styles emerged from 400 AD to 1800AD in Europe. (Knowledge)		*	*						
CLO 2	identify phases of development of church architecture in Europe with relevance to structure, material culture and construction technique.			*						
CLO 3	build a chronological framework for understanding the development of construction techniques (Application).							*		
CLO 4	Interpret verbally and in written, to questions regarding architectural history, design, and significance (Communication)								*	
CLO 5	apply critical thinking to theories in the history of architecture (Evaluation).							*		

Books Recommended

1. **Fletcher. B A;** History of Architecture, Architectural Press; 20th edition (21 Sep 1996)
2. **Fazio. M A;** World History of Architecture, Publisher: McGraw-Hill Professional;2nd Rev ed.
3. **Cole. E**; The Grammar of Architecture, Bulfinch
4. **Harvey. J. H.;** The Gothic World 1100-1600, London, 1950.
5. **Murray, P**; Architecture of the Renaissance, New York, 1971.
6. **Million, Henry, A. (ed);** The Triumph of the Baroque Architecture in Europe 1600-1750, London, 1999.
7. **Minor, V. H.;** Baroque and Rococo Art and Culture, London

Course Title	DT II: Art Appreciation		
Course Code	ARC 127	Module	ARC 127
No. of Credits	2.0	Course Hour	2.0

COURSE RATIONALE

The course aims to incorporate the basic knowledge and skills of social-cultural interpretation of various forms of art (both visual and applied) in the study of Architecture.

COURSE OBJECTIVES

- To introduce the basic languages of appreciation and criticism.
- To teach to appreciate and evaluate various form of art in a wide range of boundary conditions.
- To enable students to relate to the vast world of Art and Architecture while working on creative projects in the design studio sessions.

COURSE CONTENT

Criticism and Appreciation. Definition of art; Relationship between art & science; Art as social phenomenon; Function of art; The method of art; Branches of art; Evolution of different art forms; Introduction to concept, perception and development of art in different context. Characteristics of various forms of art, meaning of art, art as experience and expression, the language of visual art, typology of visual art, analysis of the work of art; theory of criticism.

Introduction to the subject matter and purpose of aesthetics; Aesthetics in the realm of art and design, its relation to the common people. Aesthetics and the act of creation, Aesthetic knowledge as a system; Methods of aesthetics; Aesthetic activity,

Essence and principal forms of aesthetics, Theoretical models of Aesthetics; Aesthetics as meta category: the Mood, Rasa and the Style; Psychology of perception and creation; Developments of ideas and their trends in the field of aesthetic activity, the concept and the architectural concept, theory of criticism.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		MAPPING CLO TO PLO								
	After successful completion of the course, students will be able to	1	2	3	4	5	6	7	8	9
CLO 1	appreciate different forms of art throughout the globe emerging from prehistory to the contemporary period.						*			
CLO 2	interpret arts in terms of their social-cultural and political correspondents in history.		*							
CLO 3	develop capacity to think visually, alongside verbally.							*		
CLO 4	acquire a clear understanding on art media and method, and how they are related to technical/technological advancement.					*				
CLO 5	communicate positive visual qualities, with the ability to furnish criticisms where necessary.							*		
CLO 6	apply critical thinking in a range of corresponding fields of history and theory in architecture.						*			

Books Recommended

1. **Faulkner, R., Ziegfeld, E., and Smagula, H**.: Art Today.
2. **Lyas, C**.: Aesthetics.
3. **Nelson, R.S. and Shiff, R**.: Critical Terms for Art History
4. **Read, H**.: The Meaning of Art.
5. **Yuri Borev**: Aesthetics (Sociological Aspect)
6. **Colin Lies**: Aesthetics (Philosophical Aspect)
7. **Herbert Read**: The Art of Sculpture (Sculpture)
8. **Ashok Mitra**: *Paschim Europer Chitrakala, Chhobi kake bole, Europe er vashkarjo*.
9. **Moin Choudhury**: *Shristir Siri*.
10. **Dhiman Das Gupta**: Composition, *Cinemar image*.
11. **Satyajit Roy**: *Bishoy Chalachitra*.
12. **Sunil Gangopadhyay**: *Chhobir desh kobitar desh, Onnodesher kobita*.

Course Title	**Design Studio II**		
Course Code	ARC 134	**Module**	3
No. of Credits	4.5	**Course Hour**	9.0

COURSE RATIONALE

This is a foundation course for architectural design. This course intends to develop fundamental skills for visual design to give a basis for architecture design education.

COURSE OBJECTIVES

- To introduce the elements and principles of basic design as the building blocks of creative design through exercises that will develop the originality, expression, skill and creative thinking.
- To introduce basic design principles to create visual composition by using 3-dimensional form.
- Make the students understand simple space design issues with understanding of color, material, material and texture.
- To involve students in a series of exercises which will look at graphic and abstract representations of art.
- To teach student techniques of designing simple functional space in small scale.

COURSE CONTENT

Relationship of Form and Space in three dimensions. Basic composition with colour schemes; Lines, planes, primary shapes. Platonic solids and other geometric forms. Introduction to the process of form making. Interaction of Form and Space. Exposure to the domain of architecture w with simple functions. Study of a simple Architectural space.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		MAPPING CLO TO PLO								
	After successful completion of the course, students will be able to	1	2	3	4	5	6	7	8	9
CLO 1	understand basic visual design process (Knowledge)	*								
CLO 2	distinguish between visual design elements of different 3d forms						*			
CLO 3	apply visual design principles in 3-D compositions using addition, subtraction, interlocking, platinic solids. (Application).	*					*			
CLO 4	interpret basic design idea and concepts verbally and in written (Communication)							*		
CLO 5	critically evaluate self-works and other basic compositions based on composition principles. (Evaluation)						*			
CLO 6	formulate basic compositions based on their individual ideas. (Creation).	*								

Books Recommended

1. **Pramar V.S.:** Design fundamentals in Architecture, Somaiya Publications Pvt. Ltd., New Nelhi, (1973)
2. **Ching, Francis D.K.**: Architecture: Form, Space, & Order, 4th Edition, Wiley (2014)

3. **Lawrence Bunchy C**.: Acrylic for Sculpture and Design, 450, West 33rd Street, New York, (1972)
4. **Exner V., Pressel D**.: "Basics Spatial Design", Birkhäuser (2009)
5. **Snyder, James C., Catanese, Anthony J.:** Introduction to Architecture, McGraw-Hill College (June 1, 1979)
6. **Kleine, Holger**: The Drama of Space, Birkhäuser; 1st edition (2017)

Course Title	**ED I: Climate and Design**		
Course Code	ARC 141	**Module**	ARC 141
No. of Credits	2.0	**Course Hour**	2.0

COURSE RATIONALE

The course presents an overview of Global Climatic factors, elements of climates; focusing on tropical climates. It covers basically, studies on how climatic factors affect human comfort and analysis of climatic problems in the design process.

COURSE OBJECTIVES

- To introduce students with the fundamental knowledge about Climate and Tropical Climate.
- Introduce students to the relevance of environmental control (climatic essentially) considerations in the design activities with special emphasis on principles of thermal design, natural ventilation and other climatic factors.
- Understanding of the interplay of Man-Shelter-Climate in architectural design processes.
- To help students to identify and analyze climatic problems in the design process.

COURSE CONTENT

Introducing concept of environmental design; Global climatic factors, Elements of climate, Classification & characteristics of tropical climates; Site Climate; Understanding thermal comfort: Man and his response to climate; Thermal balance of the human body, Thermal comfort indices, Effective temperature, CET, Comfort zone. Understanding Solar geometry: Apparent movement of the sun, Sun path diagrams (solar chart), Solar angles, Shadow angles, solar shading masks; Means of thermal control: mechanical & structural controls, Designing shading devices.
Introducing principles of thermal design in buildings: Thermal quantities, heat flow rate, conductivity (k–value) & resistivity, conductance through a multi-layered body, surface conductance, transmittance, calculation of U value, convection, radiation, concept of sol-air temperature & solar gain factor, thermal balance equation. Understanding Periodic heat flow in building: time lag & decrement factor & its application in selection of appropriate materials for walls & roof. Effect of Insulation & cavity on time lag & its practical use; Ventilation and air movement through and around the buildings.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		**MAPPING CLO TO PLO**								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	7	**8**	**9**
CLO 1	explain the impact of climate on building design process. (Knowledge)		*							
CLO 2	understand in the control of climatic elements in the design process. (Knowledge)		*							
CLO 3	analyze climatic factors that adverse or undermine human comfort in the living environment. (Knowledge)					*				
CLO 4	design context based architectural design with climatic considerations. (Skills)		*							
CLO 5	get theoretical and practical knowledge of collecting climate data and processing them for architectural design. (Application)					*				

Books Recommended

1. **O.H. Koenigsberger:** Climate: Design Manual of tropical climate.
2. **M.S. Ingersoll**: Manual of tropical climate.
3. **M. Evans**: Housing, Climate & Comfort.
4. **B. Givoni**: Man, Climate & Architecture.
5. **Donald Watson & Kenneth labs**: Climatic Design.
6. **Norbert Lechner**: Heating, Cooling, Lighting: Sustainable Design Methods for Architects.
7. **M.A Muktadir**: Designing Building in the Tropics.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO	**MAPPING CLO TO PLO**								
After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	7	**8**	**9**
understand architectural presentation drawings of a building	*								
cast shade and shadow on 2D and 3D architectural drawings	*				*				
draw 3-dimensional drawings of a building such as axonometric view, perspective, etc.	*				*				
utilize proper techniques and instruments for drafting with ink							*		
render architectural presentation drawings with drafting pen and ink					*		*		
present a complete sheet of architectural building drawings					*		*		

Course Title	**Architectural Graphics II: Rendering**		
Course Code	ARC 154	**Module**	5
No. of Credits	3.0	**Course Hour**	6.0

COURSE RATIONALE

This course intends to inculcate the advanced graphical language and principles to represent architectural drawings, in the students.

COURSE OBJECTIVES

- To help the students understanding the principles and media of advanced graphical representation.
- To introduce and exercise 3D architectural presentation drawings.

COURSE CONTENT

Execution of mechanical perspective; Introduction to shades, shadows and reflections; Presentation & rendering.
Execution of single view drawings such as Axonometric drawings, mechanical perspectives; Introduction to shades, shadows and reflections; Presentation & rendering. Presentation techniques in various media.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		MAPPING CLO TO PLO								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	7	**8**	**9**
CLO 1	understand architectural presentation drawings of a building	*								
CLO 2	cast shade and shadow on 2D and 3D architectural drawings	*				*				
CLO 3	draw 3-dimensional drawings of a building such as axonometric view, perspective, etc.	*				*				
CLO 4	utilize proper techniques and instruments for drafting with ink							*		
CLO 5	render architectural presentation drawings with drafting pen and ink					*		*		
CLO 6	present a complete sheet of architectural building drawings					*		*		

Books Recommended

1. **Ching, Francis D.K.**: Architectural Graphics
2. **Gill, Robert W.:** Rendering with Pen & Ink

Course Title	**Ecology & Environment**		
Course Code	ARC 171	**Module**	7
No. of Credits	2.0	**Course Hour**	2.0

COURSE RATIONALE

Understanding the environment and the eco-system is fundamental for built-environment design in urban and natural settings. This course intends to improve knowledge and design-skills for ecological and environmental considerations in architecture.

COURSE OBJECTIVES

- Acquaint students with the importance of natural balance of the eco-system.
- To develop skills to study, compare and understand the biodiversity of nature.
- Help the students understanding the impact of urbanization over the environment.
- To provide the knowledge about reduction and prevention of environmental pollution.

- To facilitate necessary knowledge about the new approaches in environmental technology and practices to improve our living environment.

COURSE CONTENT

Origin and development of ecological study, Definitions: habitat, bio-geographical distribution and abundance, ecological foot-print, Evolution and adaptation, Study of ecological communities, Ecological relationships, Trophic levels and energy flow, Eco-system development and bio-diversity, Types of Ecology.
Relationship of eco-systems with built-environment, Environmental problems in built environment, Concepts of ecological conservation (soil, water, air and biodiversity), Environmental pollution and mitigation measures, Applied ecology, Eco-centric design concepts e.g. bio-mimicry, cradle to cradle design, industrial ecology.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		MAPPING CLO TO PLO								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	7	**8**	**9**
CLO 1	outline the basics of ecology, biodiversity and interrelations in the eco-system		*						*	
CLO 2	understand the relationship between architecture and its environment		*							
CLO 3	identify the environmental issues in the local context		*							
CLO 4	apply measures of ecological conservation and sustainability in design				*					
CLO 5	Conceptualize environmental techniques in design									*

Books Recommended

1. **David L. Jones**: Architecture and the Environment
2. **G E Thompson, F R Steiner**: Ecological Design and Planning
3. **A. Ambelu, B Deboch, D Lenjissa**: Ecology
4. **Peter D. Stiling:** Ecology- theories and Applications
5. **H.D. Kuma**: Modern Concepts of ecology
6. **Eugene P. Odum and Gray W. Barret**: Fundamentals of Ecology

Course Title	**Principles of Economics**		
Course Code	ECO105A	**Module**	ECO105A
No. of Credits	2.0	**Course Hour**	2.0

COURSE RATIONALE

This ECO105A course provides an introduction to the main ideas and concepts involved in modern economics and attempts to provide students with an understanding of how the economy works, what type of problems economists attempt to solve, and how they set about trying to solve them. The course is primarily concerned with the analysis of individual decision-making agents, the behaviour of firms and industries in the economy (microeconomics), on the

economy as a whole (macroeconomics) and the inherent problems facing underdeveloped and developing countries (economic development).

COURSE OBJECTIVES

- Helping the students to understand economics as a forceful factor of architectural development.
- To provide an introduction to macroeconomic analysis outlining how the national income is measured and determined.
- To provide students with an understanding of economic theories and analysis in the field of development economics.
- To provide the knowledge of the impact of GDP, growth and development, socio-economic development on building industry in Bangladesh.

COURSE CONTENT

Exploring Subject Matter of Economics: Economics – Definition and Scope; understanding economic principles; economic resources-allocation and distribution problems; economic models-circular flow diagram and production possibilities frontier, concept of opportunity cost.
Introduction to Macroeconomics: Key macroeconomic indicators and their performance measurement - GNP, GDP, inflation, unemployment.
Money and banking: functions of money, function of commercial and central bank, monetary policy; fiscal policy and structure of govt. budget.
Development and related issues: Growth and development; concept of poverty and poverty measures; HDI; key human-socio-economic development indicators of Bangladesh, Sustainable Development Goals (SDG).

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		**MAPPING CLO TO PLO**								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	7	**8**	**9**
CLO 1	Understand the analysis of individual decision-making agents, the behaviour of firms and industries in the economy			*						
CLO 2	Understand the concept of elasticity quantitatively and qualitatively in economic analysis and know differences between different types of markets				*				*	
CLO 3	Explain macroeconomic concepts and use simple economic models to interpret the behaviour of key macroeconomic variables			*	*					
CLO 4	Understand monetary and fiscal policy and Government budget			*						
CLO 5	Understand the main issues confronting underdeveloped and developing countries			*					*	

Books Recommended

1. ARNOLD, R. A. (2014): ECONOMICS, SOUTH WESTERN PUBLISHING COMPANY, ELEVENTH EDITION

2. BANGLADESH ECONOMIC REVIEW RELEVANT ISSUES.
3. MANKIW, N. G. (2012): PRINCIPLES OF ECONOMICS, THOMSON SOUTH WESTERN PUBLISHING, SIXTH EDITION
4. SAMUELSON, P. A. AND NORDHAUS,W. D. (2009): ECONOMICS, MCGRAW-HILL USA, NINETEENTH EDITION.
5. TODARO, M. P. AND SMITH,S. C. (2012): ECONOMICS OF DEVELOPMENT IN THE THIRD WORLD, LONGMAN, ELEVENTH EDITION

Course Title	**Physics for Architects**		
Course Code	PHY 111A	**Module**	1
No. of Credits	2.0	**Course Hour**	2.0

COURSE RATIONALE

This course intends to teach fundamental laws and principles of physics with emphasis on the application of physical principles to the problems of architecture.

COURSE OBJECTIVES

- To provide basic idea about physics in relation with architectural design.
- To introduce concepts of temperature, heat, heat engines, laws of thermodynamics.
- Teach theory of lights and its characteristics and relation with architectural lighting.

COURSE CONTENT

Heat: Temperature, Humidity, Temperature related vapor and humidity, Heat transmission; Thermal Conductivity of solid and liquids, heat flow through different medium, convection, conduction, radiation, ventilation, laws of radiation, short and long-wave radiations. Light: Photometry and illumination, measurements and units; Theories of light and its characteristics, Lamps, diffraction and polarization; defect of images. Sound: Simple harmonic motion, wave motion, transmission and intens ity of sound waves, reflection, refraction and absorption of sound; units of sound intensity; building acoustics.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		**MAPPING CLO TO PLO**								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	7	**8**	**9**
CLO 1	understand how thermodynamics have impact on built environment.		*							
CLO 2	apply their fundamental knowledge of thermodynamics to next level courses				*				*	
CLO 3	understand the properties of light and its relation to making of space.		*							

CLO 4	gain knowledge of sound wave system and basic of acoustic principles inside built environment.		*							

Books Recommended

1. **Halliday and Resnick**: Physics I and II.
2. **Brijlal:** Heat and Thermodynamics.
3. **Brijlal:** A text book of sound.
4. **Brijlal:** Optics.
5. **Beiser:** Perspectives of modern physics.

Year/ Semester	**2nd Year 1st Semester**		
Course Title	**Art & Architecture III: South Asian Architecture**		
Course Code	ARC 221	**Module**	2
No. of Credits	2.0	**Course Hour**	2.0

COURSE RATIONALE

This course intends to develop skills for cultural interpretation of built environment through literature survey and analysis of historic structures of Indian Sub-continent, as those are certainly the significant predecessors of modern-day architecture of Bangladesh.

COURSE OBJECTIVES

- To introduce students to the chronological development of Indian sub-continental architecture after Indus-valley civilization and continuity.
- Acquaint students with development of Vedic culture, Buddhism, Hinduism and Islam as a cultural force on architectural development through the sub-continent focusing on religious architecture.
- Accumulate ideas about construction techniques, structural evolution, material cultural through different style of Indian ancient and medieval architecture with emphasis on architectural elements. (Roof, window, floor, ornament)
- To Foster the analytical and critical potential of the student on the built environment by analyzing cultural, environmental, technological forces.
- To provide the basic knowledge of design principles conception on architectural elements used in ancient and medieval Indian to be to apply in design studios.

COURSE CONTENT

The course will include the basic essence of south Asian Architecture associating chronological development in the early age. Study of art and Architecture in the South Asia with special emphasis on the styles of the Vedic, Buddhist and Hindu periods up to the 17th century.

Critical evaluation of the art and architecture under the Muslim rule in South Asia. The course will conclude with Sources of Muslim Architecture in South Asia Region; Imperial style; Sur or Pathan period; Mughal period. The emphasis will be laid on the medieval developments in continuation to its earlier roots

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		**MAPPING CLO TO PLO**								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	7	**8**	**9**
CLO 1	distinguish various architectural styles emerged from 800 - 1700AD in Indian sub-continent. (Knowledge)	*		*			*			
CLO 2	explain the impact of religious philosophy with political ideology on society and architectural styles. (Knowledge)		*	*					*	
CLO 3	identify phases of development of religious architecture in Indian sub-continent with relevance to structure, material culture and construction technique. (Knowledge)		*						*	
CLO 4	build a chronological framework for understanding the development of construction techniques (Application).	*								
CLO 5	apply critical thinking to theories in the history of Indian architecture (Evaluation).				*		*			

Books Recommended

1. **Grover, S.**: Buddhist and Hindu Architecture in India.
2. **Brown, P.**: Indian Architecture (Buddhist and Hindu Period), Taraporevala Sons, Bombay, 1965.
3. **Thapar, R.**: A History of India
4. **Edwards, M.**: Indian Temples and Palace, Paul Hamlyn, London, 1959.
5. **Nehru, J.:** The Discovery of India, Meridian Books, London, 1946.
6. **Piggot, S.** Pre-historic India, Penguin Books, Harmondsworth, 1966.
7. **Rawlinson, H. G.:** India: A Short Cultural History, The Cresset Press, London, 1937
8. **Grover, S.:** Islamic Architecture in India
9. **Brown, P.:** Indian Architecture (Islamic Period)
10. **Koch, E:** Mughal Architecture
11. **Shahnawaz, A.K.M:** History of Indian Sub-continent – Sultan Period
12. **Shahnawaz, A.K.M:** History of Indian Sub-continent – Mughal Period

Course Title	**DT III: Architecture Design Method**		
Course Code	ARC 225	**Module**	2
No. of Credits	2.0	**Course Hour**	2.0

COURSE RATIONALE

This course intends to inculcate in the students the methodological approach of design development as a combined process.

COURSE OBJECTIVES

- To introduce the students with the theories of different design processes and their development phases.

- Help the students to conceptualize basic theories in developing ideas and generating concepts in architecture.
- To develop skills to formulate and analyze architectural programs
- To introduce students to the site planning and context-based design.

COURSE CONTENT

To introduce students with methodological approach for architectural design; To examine, analyze, study, and discuss how design can be understood, described, and developed as a process of inquiry, thought, and action; Understanding of concepts, notions, ideas, design considerations in architecture; Types of concepts; Methods for developing ideas and concepts in architecture.
Architectural Program formulation: Collection and organization of data, Data analysis to develop architectural program; Site planning: introduce students to the site and context as prime generators of design decisions; Spatial, behavioral and Perceptual context of site analysis and their relationship to the built environment; Introduction to element of site-planning and landscaping; Zoning development issues; The Design Phases in Standard Architectural Practice ; Post design evaluation: technical, functional and behavioral evaluation.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		**MAPPING CLO TO PLO**								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	7	**8**	**9**
CLO 1	apply the theories of methodological approaches in architectural design	*			*					
CLO 2	distinguish ideas, design considerations, notions and different types of concepts	*								
CLO 3	formulate design concepts in multiple processes		*				*			
CLO 4	organize and present data using various relationship matrices				*					
CLO 5	apply scientific methods to formulate architectural programs				*					
CLO 6	explain site-context relationship to the built environment.		*		*					

Books Recommended

1. **Simon Unwin**: Analysing architecture
2. **Peter Zumthor**: Thinking Architecture
3. **Leland M. Roth, Amanda C. Roth Clark**: Understanding Architecture: Its Elements, History, and Meaning
4. **Andrea Simitch, Val Warke**: The Language of Architecture: 26 Principles Every Architect Should Know
5. **James C. Snyder and Anthony J. Catanese**: Introduction to Architecture
6. **Holger Kleine**: The Drama of Space
7. **Francis D. K. Ching and James F. Eckler**: Introduction to Architecture

8. **Andrew Charleson:** Precedents in Architecture: Analytic diagrams, Formative Ideas and Parts

Course Title	**Design Studio III**		
Course Code	ARC 232	**Module**	3
No. of Credits	6.0	**Course Hour**	12.0

COURSE RATIONALE

This course is an introductory building design course for the architecture students as it teaches
students to implement architecture design methodologies and exercise multiple design project work through entire course

COURSE OBJECTIVES

- To develop skills to formulate different spatial organizations.
- To provide the knowledge of ergonomics and its application on architecture.
- Helping the students to understand the relation between functional space and formal vocabulary.
- Helping the students to develop ability to transform preliminary concepts into final design.

COURSE CONTENT

Consideration of human being as the basis of architectural design; Study of anthropometry and ergonomics; Study of relationship between man – space – form – function. Introduction to scale and proportion in architecture; Understanding of environmental features interacting in shaping the architecture.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		**MAPPING CLO TO PLO**								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
CLO 1	apply functional and ergonomic design process	*			*					
CLO 2	formulate various spatial organizations and functional arrangements	*								
CLO 3	understand spatial sequences (indoor, semi-outdoor, outdoor, etc.) and their proportion	*								
CLO 4	translate conceptual sketches to design three-dimensional space	*						*		
CLO 5	relate formal expressions with functional requirements	*		*						
CLO 6	utilize site surroundings and site forces for generating architectural design	*	*							

Books Recommended

1. **De Chiara, J.:** Time Saver Standards for Building Types

2. **Pickard, Q. (ed):** The Architects Handbook
3. **Ching, Francis D.K.**: Architecture: Form, Space, & Order, 4th Edition, Wiley

Course Title	**ED II: Visual and Sonic Environment**		
Course Code	ARC 243	**Module**	4
No. of Credits	2.0	**Course Hour**	2.0

COURSE RATIONALE

Light is very powerful element of environment to enhance the architectural quality of spaces. Study on visual environment will enhance the skill of students to utilize natural lights and avoid discomfort in designed spaces created from unpleasant lighting. Appropriate sonic environment in designed spaces is very important to ensure proper working environment. Study on sound isolation, absorption, speech privacy and sound reinforcement will enhance the capacity of students to design spaces with pleasant sonic environment.

COURSE OBJECTIVES

- To introduce basic principles of design considering different aspects of visual and sonic environment.
- Acquaint students with the properties and application of natural and artificial light.
- To facilitate necessary knowledge about the issues related to sound control and space planning.

COURSE CONTENT

Visual: The environment, physical nature of the lighting environment, human responses to environmental vision factors. Daylight in Architecture, prediction tools and techniques of supplementary and artificial lighting, designing for daylight in the tropics. Lighting and indoor space quality.
Sonic: The concepts and problems related to Architectural acoustics; properties of sound; the fundamentals of sound perception, generation and propagation; Behavior of sound in enclosed spaces. Principles of acoustic design of rooms for speech. Music and multi-purpose use. The concept of noise and noise control; criteria for noise control design and acoustical measurements.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		**MAPPING CLO TO PLO**								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	7	**8**	**9**
CLO 1	evaluate the spaces to ensure proper lighting design	*								
CLO 2	provide controlled light in indoor spaces for pleasant visual environment		*							
CLO 3	design artificial indoor lighting for different tasks			*						
CLO 4	modify scale and experience of spaces with light design		*							
CLO 5	design spaces with special attention on sound control through sound insulation and isolation of spaces with different sound level		*							
CLO 6	understand how to redirect, reinforce or distribute sound through architectural element		*							

Books Recommended

1. **Egan, M.D:** Concept in Lighting for Architecture
2. **Egan, M.D:** Architectural Acoustics.
3. **Koenigsberger, O.H:** Manual of Tropical Housing & Building
4. **Lechner, Norbert**: Heating, Cooling, Lighting: Sustainable Design Methods for Architects
5. **Muktadir, M.A:** Designing Buildings in the Tropic
6. **Robbesis, Claude L:** Day Lighting; Design and analysis
7. **Sage Russell:** The Architecture of Light

Course Title	**Computer Application I**		
Course Code	ARC 256	**Module**	5
No. of Credits	3.0	**Course Hour**	6.0

COURSE RATIONALE

This course intends to train students to apply digital tools for design drawings and presentation by developing skills in computer graphics software for image making, editing, post-processing and vector graphics illustration.

COURSE OBJECTIVES

- To introduce computer operation principles and explore image editing through computer graphics software like Photoshop, Illustrator, Corel draw etc.
- To expose the students to image making and vector graphics illustration through visual compositions using graphics applications.
- To introduce students with technical aspects (Image size, resolution, printing, scanning, file management, color mode, output format etc.) of computer aided two-dimensional graphics for digital, web and print format.
- Helping the students to conduct graphic design projects applying digital tools.

COURSE CONTENT

Basic computer application; To understand and to use graphic software in Architectural presentation and design. Introduction to vector and raster graphics software (e.g. Photoshop, Illustrator, CorelDraw) and their application; Introduction to computer aided design, Using suitable Computer Aided Design through Design projects, 2-D graphics and 3-D modeling with the help of software (e.g. AutoCAD, 3D studio Max, Sketch-up, Rhino); Rendering in different platforms (e.g. V-Ray, Lumion); Developing understanding of complex form, lighting conditions and material mapping in simulated environment.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO	**MAPPING CLO TO PLO**

	After successful completion of the course, students will be able to	1	2	3	4	5	6	7	8	9
CLO 1	understand the technical aspects of computer graphics applications used in all visual formats.	*								
CLO 2	perform image editing and prepare presentation with graphic applications.	*				*				
CLO 3	visualize design ideas through illustrations with digital tools.	*				*				
CLO 4	operate AutoCAD software using basic drawing commands					*				
CLO 5	apply computer-aided 3-D visualization as an efficient way of representation/ exhibition of the designed product.	*				*		*		
CLO 6	attain professionalism and communication skills through involvement of lab-based teamwork, sharing professional graphic design sample and competitive design projects	*						*		

Books Recommended

1. PRADEEP MAMGAIN: AUTODESK 3DS MAX 2020: A DETAILED GUIDE TO MODELING, TEXTURING, LIGHTING, AND RENDERING, 2ND EDITION.
2. MUNIR HAMAD: AUTOCAD 2020, BEGINNING AND INTERMEDIATE.

Course Title	**Structure I - Basic Mechanics**		
Course Code	CEE 201A	**Module**	6
No. of Credits	2.0	**Course Hour**	2.0

COURSE RATIONALE

This course facilities for gathering the basic knowledge about the effects of force on solid mass and to develop student's ability to visualize the distribution of forces on a solid body. This course will also offer knowledge of centroids, friction, moment of inertia and flexible chords. This knowledge is a prerequisite for many engineering courses offered in the subsequent semesters that capture the detailed analysis and design of engineering structures or structural components.

COURSE OBJECTIVES

- To introduce rigid body mechanics. Equivalent force systems: concepts of moment, couple, resultant. Equilibrium: free-body diagram; equations of equilibrium. Structural analysis: trusses by method of sections and method of integration,

- To develop skills to determine the location of the center of gravity and centroid for a system of discrete particles and a body of arbitrary shape,
- To develop the ability for determining the moment of inertia for areas of different geometric configurations, and
- To familiarize with the basic theory of Flexible cords and Flexible chords.

COURSE CONTENT

Statics of particles: This chapter is devoted to the study of forces contained in a single plane. The analysis of forces in three-dimensional space is also analyzed here.
Rigid bodies: Equivalent systems of forces. In this chapter, the effect of forces exerted on a rigid body, and how to replace a given system of forces with a simpler equivalent system is shown.
Centroids: Definitions, Center of gravity, Mass center and Centroid, Centroids of Areas, Principle of Symmetry, Integrating for Centroids (Arc of a Circle, Plane Triangle, Sector of Circle, Area without an axis of symmetry, Right circular cone), and Composite figures are discussed and determined in this chapter.
Moment of inertia of areas: Introduction, Rectangular moment of inertia, Polar moment of inertia, Radius of gyration, Determination of moment of inertia (Rectangle, Triangle, Circle), Transfer formula-parallel axes, Choice of the differential element, Composite areas, and Product of inertia are discussed and determined in this chapter.
Structural analysis: The forces in the members of a simple truss using the method of joints and the method of sections are determined in this chapter.
Fundamentals of friction: This chapter presents frictional force, limiting frictional force, coefficient of kinetic friction, laws of friction, angle of friction, and belt friction.
Fundamentals of flexible cords: This chapter shows how to solve and analyze the parabolic chord and the catenary.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		**MAPPING CLO TO PLO**								
	After successful completion of the course, students will be able to	1	2	3	4	5	6	7	8	9
CLO 1	Draw complete free-body diagrams and write appropriate equilibrium equations from the free-body diagram, including the support reactions on a structure	*							*	
CLO 2	Analyze various statically determinate systems such as beams, and trusses	*					*		*	
CLO 3	Locate the centroid of an area, center of mass, center of volume effectively	*					*		*	
CLO 4	Calculate the moment of inertia of areas for different geometric configurations	*					*		*	

CLO 5	Determine the coefficient of friction and the resultant tension of flexible chords and	*							*	
CLO 6	Relate and apply fundamental sciences for learning the essential engineering concepts and theories of different branches.	*							*	

Books Recommended

1. Andy Ruina and Rudra Pratap, Introduction to Statics and Dynamics, Oxford University Press, 2011
2. F. P. Beer and E. R. Johnston, Vector Mechanics for Engineers, Vol I - Statics, Vol II – Dynamics, 9th Ed, Tata McGraw Hill, 2011.
3. H. Shames, Engineering Mechanics: Statics and dynamics, 4th Ed, PHI, 2002.
4. J. L. Meriam and L. G. Kraige , Engineering Mechanics, Vol I – Statics, Vol II –Dynamics, 6th Ed, John Wiley, 2008.
5. R. C. Hibbler, Engineering Mechanics: Principles of Statics and Dynamics, Pearson Press, 2006.
6. R.S. Khurmi, Engineering Mechanics, S.Chand and Co., 2001
7. V.M. Faires and S.D. Chambers, Analytic Mechanics, 3rd Ed, The Macmillan Company, 2001.

Course Title	**Architectural Sketching & Modelling**		
Course Code	ARC 252	**Module**	5
No. of Credits	2.0	**Course Hour**	4.0

COURSE RATIONALE

Sketching and model-making are integral part of architectural communication. This course intends to teach the students efficient ways to communicate through using these media.

COURSE OBJECTIVES

- To develop skills of line drawing, value, shapes, form profile.
- Helping the students to develop ability in free-hand perspective, quick sketching techniques.
- To guide students with architectural model-making techniques through interactive workshops.
- Acquaint students with model-making materials, tools and techniques.

COURSE CONTENT

Introducing sketching and modelling as means of architectural communication. Provide the student with the knowledge, skills and aptitude required to use a range of fundamental architectural sketching and modeling skills based on observation of the physical world, in particular the built world. Sketching as a tool for design idea development. Importance of 3d models in architectural representation. Students will be encouraged to maintain a sketchbook to record all their visual and conceptual research, and in which to draw on regular basis as a means to develop ideas and technical proficiency.

Methods of model making. Developing skill to use different model making tools. Students will be assigned in different studio projects to develop skill in 3d model making. Introduction to Carpentry, wood Joints, clay modeling, Composite Form generation with use of mixed materials.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		**MAPPING CLO TO PLO**								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
CLO 1	draw perspective with innovative tools (string, table, etc.)							*		
CLO 2	improve hand-eye coordination and line quality							*		
CLO 3	render with pen, water colour, etc.							*		
CLO 4	apply rendering techniques of 3D sketch, people, tree, landscape, etc.					*		*		
CLO 5	demonstrate small-scale Parametric 3D installation					*		*		
CLO 6	build human-scale installation							*		

Books Recommended

1) **Gabriel Campanario**: The Urban Sketching Handbook: Architecture and Cityscapes
2) **Harold Speed**: The Practice and Science of Drawing
3) **Arthur Wesley Dow**: Composition
4) **Betty Edwards:** Drawing on the right side of the brain
5) **Léon Krier, James Howard Kunstler:** Drawing for Architecture
6) **Stephanie Travis**: Sketching for Architecture + Interior Design

Course Title	**Photography and Media studies**		
Course Code	ARC 258	**Module**	5
No. of Credits	2.0	**Course Hour**	4.0

COURSE RATIONALE

The course aims to introduce the theory, concept and practices in photographic art and technique as an essential complementary component to the visual basics in Architecture.

COURSE OBJECTIVES

- To develop skills to examine the chronological development of photography as a technology and an independent branch in art.
- To help the students understanding the technical aspects, modes and methods of photography and photographic reproduction.
- Apply the knowledge to incorporate photography as a tool and representational technology in architecture.
- Helping the students to develop ability to integrate visual communication skills based on creative aptitude of the learners.

COURSE CONTENT

Photography: Introduction to photography- photography as a representation art and as an independent art media, basic conception of image, Importance of photography in Architectural study and documentation. Operations of camera, types of camera, lenses, films, pixel. Understanding exposure, depth of field. Photography projects: typical exercises starting with under-over-optimum exposure, depth of field, etc. and continuing with landscape- panorama, micro, night-time, profile-portrayal, modeling, theme photography; photography of architecture (interior-exterior) and its mock-up models.

Media & Architecture: Explaining and value the relationship between architecture and media. Critically examine the contemporary and historical modes in which architecture engages with media. Some forms of media tools at the architect's disposal to be studied include: the magazine, the journal article, the exhibition, the manifesto, the website, the competition, and the employment of social media. Students will explore different medias to express their idea about architecture.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		**MAPPING CLO TO PLO**								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	7	**8**	**9**
CLO 1	apply various techniques of visual communication through the 2-dimensional means of photographic reproduction.					*		*		
CLO 2	identify photography as a medium of art and practice design principles that are highly relevant to the study of architecture						*			
CLO 3	communicate concepts in specific visual and verbal modes.							*		
CLO 4	generate high degree of adaptability in varied mediums of visual and/or aesthetic representation.					*				
CLO 5	utilize photography as a mean for architectural documentation							*		
CLO 6	operate camera and use its components related to photo-production					*				

Books Recommended

1) **Carson D. (1999)**; *Fotografiks*; Gingko Pr. Inc., NY.
2) **Lenman R. (2008)**; *The Oxford Companion to the Photograph*; Oxford University Press, UK.
3) **NGS US (2011)**; *National Geographic – Complete Photography*; NGS, US.

Course Title	**Philosophy**		
Course Code	ARC 227	**Module**	1
No. of Credits	2.0	**Course Hour**	2.0

COURSE RATIONALE

different socio-political era of human civilization. Students are able to know the basic constituents of philosophy and the thought process of philosophers. Students will able to realize, recognize and compare the trends and traits of iconic philosophical thoughts of the world.

COURSE OBJECTIVES

- To introduce the students with various notions, attributes of basic terms and definition of philosophy
- Acquaint students with the geo-political context and philosophical thoughts of different human civilizations.
- Helping the students to study, compare and realize the various school of thoughts, from east to west, from ancient to modern era.

COURSE CONTENT

Introduction to philosophy, definition of philosophy, purpose of philosophy. Fundamental of philosophy; Nature of philosophical enquiry; Relationship of philosophy to science, history, politics, religion and especially to architecture.

Historical overview of Ancient, Medieval and Modern philosophy, both Oriental and Occidental. From Socrates to Sartre and beyond.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		**MAPPING CLO TO PLO**								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	7	**8**	**9**
CLO 1	apply various techniques of visual communication through the 2-dimensional means of photographic reproduction.					*		*		
CLO 2	identify photography as a medium of art and practice design principles that are highly relevant to the study of architecture						*			
CLO 3	communicate concepts in specific visual and verbal modes.							*		
CLO 4	generate high degree of adaptability in varied mediums of visual and/or aesthetic representation.					*				
CLO 5	utilize photography as a mean for architectural documentation							*		
CLO 6	operate camera and use its components related to photo-production					*				

Books Recommended

1. **Carson D. (1999)**; *Fotografiks*; Gingko Pr. Inc., NY.
2. **Lenman R. (2008)**; *The Oxford Companion to the Photograph*; Oxford University Press, UK.
3. **NGS US (2011)**; *National Geographic – Complete Photography*; NGS, US.

Year/ Semester	**2nd Year 2nd Semester**
Course Title	**Art & Architecture IV: Modern Architecture**

Course Code	ARC 223	**Module**	2
No. of Credits	2.0	**Course Hour**	2.0

COURSE RATIONALE

This course will explore the historical and philosophical considerations of architecture around the world emphasis on the time period between 1850 to1950 and beyond in some cases, alongside parallel artistic, political and social movements, in order to synthesize a greater theoretical context of the movements that constitute the canon of Modernist architecture.

COURSE OBJECTIVES

- To introduce the students with various society and culture of modern era, and their architectural styles and thoughts
- To provide the knowledge of the forces behind the movement as well as analyze the factors that lead the movement towards declination
- Helping the students to study, compare and realize this complex movement on different perspective
- Acquaint students with the remarkable architecture and notable pioneer architects of the modern era
- To facilitate necessary knowledge to apply the knowledge to develop interest and consciousness for further study and investigation

COURSE CONTENT

Beginnings of modernity: Neoclassicism, Industrialization and its impact on Urbanization, The Chicago school and invention of skyscraper; Opposition to industrial arts and production: Arts and Crafts movement, Art Nouveau, Vienna secession, Wright's early works. Modern architecture institutionalization: Adolf Loos and critique of ornamentation, Peter Behrens, Werkbund, Expressionism, Futurism, Constructivism, Cubism, Supremacism, De–Stijl.

Modern architecture institutionalization (Continues): Bauhaus, works of Walter Gropius, Richard Meyer and Mies Van Der Rohe. Modernism in Scandinavian region. Role of International Congresses of Modern Architecture (CIAM) in canonizing architecture. Post WW II developments and spread of international style: Later works of Corbusier, Louis Kahn, Paul Rudolph, Philip Johnson. Issues of Modernity, Tradition and Identity in the developing World.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		**MAPPING CLO TO PLO**								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	7	**8**	**9**
CLO 1	judge the social and cultural facts of the modern time period that influenced architecture		*							
CLO 2	identify the factors that made the movement flourish around the world			*						
CLO 3	compare and relate various aspect and philosophy behind this complex movement							*		
CLO 4	recognize notable architects, their thoughts and master creations						*			
CLO 5	express their understanding on the declination of the movement							*		
CLO 6	evaluate the role of the movement on the development of later trends of Architecture								*	

Books Recommended

1. **Kenneth Frampton**: Modern ure and independence.

Course Title	Heritage Field Work I		
Course Code	ARC 224	Module	2
No. of Credits	1.0	Course Hour	1 week

COURSE RATIONALE

This course plays a supplementary role to the corresponding theory courses on modern and contemporary architecture in Bangladesh.

COURSE OBJECTIVES

- Acquaint students with the influences of Bengal heritage on the development of contemporary Bengal architecture.
- Helping the students to acquire practical experience of the contemporary landmark projects of Bengal architecture.
- To facilitate the students with a scope to meticulously explore the service design and construction details of the high-density buildings.
- To provide the students an opportunity to visit renowned architectural firms in Bangladesh.

COURSE CONTENT

Students will visit contemporary buildings in Bangladesh to acquire practical knowledge. Students have to submit a report based on their fieldwork experience.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		MAPPING CLO TO PLO								
	After successful completion of the course, students will be able to	1	2	3	4	5	6	7	8	9
CLO 1	explain the development of Bengal architecture during modern and contemporary period from practical experience						*			
CLO 2	understand documentation and analytical process of historical /contemporary buildings.				*					
CLO 3	prepare verbal and visual presentations on contemporary Bengal architecture							*		
CLO 4	identify the contemporary construction techniques and details		*							
CLO 5	evaluate the contemporary architecture of Bengal with relation to socio-cultural, socio-political, environmental and ecological contexts		*							
CLO 6	apply the contemporary service design process in the upcoming design studios.	*							*	

Books Recommended

1. **Niklaus Graber, Andreas Ruby, Viviane Ehrensberger**: Bengal Stream- The Vibrant Architecture Scene of Bangladesh; CMV

2. **Saif Ul Haque, Raziul Ahsan, Kazi Khaleed Ashraf**: Pundra Nagar to Sherebangla Nagar; Architecture in Bangladesh; Chetana Sthapatya Unnayan Society

Course Title	Design Studio IV		
Course Code	ARC 234	Module	3
No. of Credits	6.0	Course Hour	12.0

COURSE RATIONALE

This course intends to teach the students climatic design aspects and passive control process through multiple design exercises.

COURSE OBJECTIVES

- To provide the knowledge of climate-responsive design and its application on architecture.
- To introduce the students with passive climatic controlling devices and methods.
- Applying the knowledge to determine the building orientation with respect to cardinal directions.
- Helping the students to understand context-based design and circulation design.

COURSE CONTENT

Case studies to comprehend the underlying relationship among function, form, space and technology in architecture. Analysis of function in order to formulate architectural program to generate site specific architectural form in three dimensions. Understanding of basic concepts of architectural forms and identification of spaces in term of exterior-interior; served-service; activity-circulation etc. Report writing based on literature survey and field studies. Design of buildings with simple functions. Emphasis will be given in how to address climate through design process. To understand and design building circulation by path-space relationship.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		MAPPING CLO TO PLO								
	After successful completion of the course, students will be able to	1	2	3	4	5	6	7	8	9
CLO 1	relate site contexts and orientation with built-form and site planning	*	*							
CLO 2	explain energy-efficiency in environmentally integrated buildings and their properties		*						*	
CLO 3	apply passive heating and cooling methods efficiently	*	*							
CLO 4	control natural lighting and air ventilation inside the building	*	*							
CLO 5	articulate the façade design to achieve maximum comfort	*	*							
CLO 6	design circulation system for facilities buildings	*		*						

Books Recommended

1. **Joseph De Chiara:** Time Saver Standards for Building Types
2. **Quentin Pickard (ed):** The Architects Handbook
3. **O. H. Koenigsberger et al**: Manual of Tropical Housing and Building-Climate Design
4. **M.A. Muktadir**: Designing Building in the Tropics

Course Title	**Building Services I- Plumbing**		
Course Code	ARC 261	**Module**	6
No. of Credits	2.0	**Course Hour**	2.0

COURSE RATIONALE

This course intends to teach the students the design and application of plumbing systems inside and outside the buildings.

COURSE OBJECTIVES

- To provide the knowledge of the basic concepts of water supply system.
- To introduce the students with sanitation and water treatment systems in buildings.
- Applying the knowledge to determine water requirements and capacity.
- Helping the students to understand the solid-waste management and drainage system of different buildings.

COURSE CONTENT

Water Supply: sources, demand, treatment and distribution of water. Sources of water supply, Plumbing system types for various buildings. Quality of potable water. Calculation of water requirements for various building types. Water treatment methods– Screening, Aeration, Sedimentation, Filtration, Disinfection, Softening. Storage and distribution of water. Choice of pipe materials, types of fixtures and fittings. Sanitation: Introduction to various sanitary pipes, joints, fittings and fixtures, their function, placement and constructional details. Principles of storm water drainage. Types of drain pipes. Storm water gutter / Storage sumps. Study of storm water disposal at site and settlement level. Rain water harvesting system. Recycling of water. Waste water treatment and disposal methods. Solid waste, collections, treatments and disposal. Biogas system and Modern renewable energy system.

Application: Layout design and construction. Layout design and details of water supply distribution system in a Campus. Layout design and details of sewage and drainage system for different building types. Storm water drainage and rain water harvesting system design for a building project. Study of internal & external drainage system of various buildings including small residences, apartments, public buildings etc. Single stack system, one pipe and two pipe systems, Gradients used in laying drains and sewers.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO	**MAPPING CLO TO PLO**

	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	7	**8**	**9**
CLO 1	calculate water use, requirements and capacity	*								
CLO 2	understand waste water treatment and disposal methods		*							
CLO 3	design storm water drainage & rain water harvesting system		*		*					
CLO 4	manage solid waste collections, treatments and disposal	*	*							
CLO 5	select appropriate plumbing fixtures and fittings for multi-storied buildings	*								
CLO 6	integrate the knowledge with concurrent architectural design	*				*				

Books Recommended

1. **B.C. Punmia**, "Waste Water Engineering", Laxmi Publications. 2009
2. **S.J. Arceivala**, "Waste Water Treatment for Pollution Control", Tata McGraw Hills Publication, 2008
3. **K.N. Duggal,** Elements of Environmental Engineering, Chand & Co. 2010
4. **Charanjeet S. Shah**; Water Supply and Sanitation; Galgotia Publication 2015

Course Title	**Construction Methods and Materials**		
Course Code	ARC 263	**Module**	6
No. of Credits	2.0	**Course Hour**	2.0

COURSE RATIONALE

The course aims to study the properties of traditional and contemporary building and finish material, their selection criteria and use of construction as well as their response to specific environment. This course is also designed for the introduction of basic principles of building construction, understanding the behavior of various components of buildings, general details of several types of construction system.

COURSE OBJECTIVES

- To facilitate necessary knowledge about the properties, characteristics, strength, manufacture, processing and application of materials.
- Make the students understand the advantages and limitations of material according to types of building.
- To expose the students to the construction methods of several components of a structure such as foundation, brick work, floor, stair, door and windows etc.
- To enable the students to learn detailing of both structural and finishing works of a construction.
- Getting idea about the behavior of different elements of construction systems in relation to properties of materials.
- To make students familiar with detailed illustrations and specifications related to construction details and techniques.

COURSE CONTENT

Construction materials: Classification of different types to building materials. Preparation, manufacturing, use and application of brick, cement, sand, concrete, steel, timber, etc. Classification of different types to finish materials. Selection, Preparation, application and maintenance of glass, plastic, tiles, paint, roofing insulation, etc.
Construction methods: Introduction to construction surveying & layout- principles and techniques of physical surveys. Chain survey, traverse survey, plane table survey, levels and levelling, etc. Types of foundations, their methods and techniques of construction. Masonry works, different types of brick bond and their procedure, partition walls and cavity walls. Construction technique of lintels and arches. Method of damp proofing and its treatment. Types of floor and their construction system. Stairs of different materials and construction technique. Carpentry joints, door-window and their classification. Classification and construction technique of roof. Plastering system. Application of paint, varnishes and other finishes.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		**MAPPING CLO TO PLO**								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	7	**8**	**9**
CLO 1	develop practical and advanced construction knowledge required to begin professional career in architectural practice and related fields	*								
CLO 2	recognize different types of structural systems, conditions for the stability of a structure, application methods of different type of protective components and finish materials	*								
CLO 3	understand the quality assurance measures and testing procedures related to material, workmanship and performance for the specific topic	*			*					
CLO 4	explain context-based modern technology used in construction, which can be helpful for architectural-technology based further research		*		*					
CLO 5	identify the format and procedures to prepare working drawings for building construction work	*								
CLO 6	develop communication skills and professionalism through group discussions with case studies, visual presentations and on-site visits	*						*		

Books Recommended

1. **Aziz, M. A.**: Engineering Materials
2. **Sushil Kumar**: Building Construction.
3. **Smith, R. C.:** Materials of Construction
4. **Anders, C. K.:** Manufactures Manuals and Brochures
5. **Francis D. K. Ching**: Building Construction Illustrated, Wiley (2014)

Course Title	**Introduction to Spatial Planning**

Course Code	ARC 281	**Module**	8
No. of Credits	2.0	**Course Hour**	2.0

COURSE RATIONALE

The course aims to introduce the theory, concept and practices in physical planning through review and examination of city structures since the beginning of the earliest human settlements to the contemporary.

COURSE OBJECTIVES

- To provide the knowledge on the chronological development of cities since the beginning of the earliest human settlements to the contemporary megalopolises, and beyond.
- Helping the students to understand the social-cultural and political forces that influenced the growth of the cities throughout centuries.
- Help them conceptualize basic theories in physical planning in relation to the study of architecture.
- Foster the analytical and critical thinking in understanding various physical environments in terms of their social-cultural, environmental and technological correspondents.

COURSE CONTENT

Definition and scope of planning, types of spatial planning. A short history of planning: Origin and evolution of settlements and cities, New thoughts and ideas in planning after the industrial revolution. The spatial structure of cities: concentric zone theory, sector theory, multiple nuclei theory. Planning Governance: Legislation framework, tools, instruments. Spatial planning methods: Preplanning, planning and implementation. Theories of zoning. Stakeholder engagement.
Planning culture of Bangladesh; History of town planning in Bangladesh; Urban planning system and local level planning; Planning law and governance; Problem and issues of land management system in Bangladesh. Concept of contemporary planning tools and process: Community Planning, Public-Private Partnership, Built Operate Transfer, Transit-Oriented Development.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		**MAPPING CLO TO PLO**								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	7	**8**	**9**
CLO 1	distinguish various human settlements and identify their planning process		*							
CLO 2	develop a solid conceptual framework on their origin and evolution throughout history		*							
CLO 3	relate various socio-cultural, political, environmental and technological impacts to the growth of the cities throughout the globe		*							
CLO 4	communicate concepts in urban history and theory through both verbal and written presentations							*		
CLO 5	identify the limitations of planning and land management system in		*							

	Bangladesh									
CLO 6	apply critical thinking in a range of corresponding fields of history and theory in architecture and urban planning						*			

Books Recommended

1. **Doxiadis, C.A.:** Ekistics: An Introduction to the Science of Human Settlements.
2. **Gallion, A.B. & Eisner, S.:** The Urban Pattern: City Planning and Design.
3. **Hall, P.;** Urban and Regional Planning (third edition); Routledge, London; 1992.
4. **Christopher Alexander, Sara Ishikawa, and Murray Silverstein**; A Pattern Language: Towns, Buildings, Construction (1976)
5. **Strayter, J.R. & Gatzke, H.W.:** The Mainstream of Civilization.
6. **Bourne L.S. (ed.):** Internal Structure of the City.
7. **Kevin Lynch** (1960) The Image of the City.
8. **Gary Hack, et al.** (2009) Local Planning: Contemporary Principles and Practice.
9. **Professor Golam Rahman** (2008), Town planning and the political culture in Bangladesh.
10. **Sultana, S**.; Rural Settlements in Bangladesh: Spatial Pattern and Development; Graphosman, Dhaka; 1993.

Course Title	**Structure II- Mechanics of Solids**		
Course Code	CEE 203A	**Module**	6
No. of Credits	3.0	**Course Hour**	3.0

COURSE RATIONALE

This course will develop basic knowledge and use the relevant physical properties and fundamental laws governing materials and structures' behavior. Students will learn how to solve various problems of interest in Structural Analysis. In this course, the emphasis is on the physical understanding of mechanisms underlying materials' mechanical and structural behavior.

COURSE OBJECTIVES

- To understand the concept of stress and strain in the members subjected to tension and compression force
- Help students conceptualize solid mechanics' fundamental theories to calculate forces, deflections, moments, stresses, and strains in engineering structures
- To introduce the shear force and bending moment diagrams to properly analyze statically determinate beams and frames
- To make them able to analyze indeterminate beam and buckling of columns.

COURSE CONTENT

Fundamental concepts of stress and strain: This chapter presents a review of the fundamental concepts of stress and strain. A brief discussion on axial stress, axial strain, shearing stress, shearing strain, and bearing stress, bearing strain. Stress calculation of thin-walled pressure vessels.

Mechanical properties of materials: This chapter deals with analyzing mechanical properties of materials, stress-strain diagram, Hook's law for axial and shearing deformation, and Poisson's ratio. Calculate the stress and strain of different members: Calculate stresses and strains in members

subjected to tension, compression, shear, and temperature changes. Calculate stresses and strains of statically indeterminate members.

Joints- welded and riveted: Introduction, Types of riveted and welded joints, Strength of a simple Lap Joint: Bearing type connection, Strength of a complex Butt joint: Bearing type connection, Friction type connection, welded connection.

Shear force and bending moment diagrams for statically determinate beams and frames: Definition, determination of Shear force and bending moment for determinate beams and frames, Relation among load, shear and moment, Shear force, and bending moment diagram.

Flexural and shearing stresses in beams; Principal stresses: Introduction, Derivation of flexure formula, Economic section, Shearing stress at a loaded beam, Distribution of shearing stress, principal stress and strain.

Slopes and deflections in statically determinate beams: Introduction, Double integration method, Theorem of area moment method, conjugate beam method.

Indeterminate beam analyses: Introduction to s atically indeterminate structure, Analysis of statically indeterminate beam using moment area and conjugate beam method.

Buckling of columns: Introduction, Types of end conditions of the column, Euler's formula to columns with different end conditions, Rankine's formula for long columns, and effect of eccentric loading on the Rankine's and Euler's formula for long columns are also discussed here.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		**MAPPING CLO TO PLO**								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	7	**8**	**9**
CLO 1	Apply the theory of solid mechanics to analyze a wide variety of structural members subjected to tension, compression, shear, and temperature changes to solve real world problems	*				*	*		*	
CLO 2	Apply the concepts and methodologies of materials' mechanical properties to solve practical problems related to civil engineering structures	*				*	*		*	
CLO 3	Design of a riveted joint, as well as welded joints	*				*	*		*	
CLO 4	Present graphical variation of shear force and bending moment diagrams along the member's axis could be shown.	*				*	*		*	

Books Recommended

1. Pytel, A. and Singer, F.L. (1987), Strength of materials. Harper and Row, publishers, Inc. ISBN 0-0604531343
2. Popov, E.P. and Balan, T.A. (1998), Engineering mechanics of solids. Pearson Education, Inc. ISBN 81-7808-535-6
3. Khurmi, R.S. (1968), Strength of materials. S. Chad and Company Ltd. ISBN 81-219-2822-2
4. Beer, F.P., Johnston, E.R., Dewolf, J.T. and Mazurek, D.F. (2012) Mechanics of materials. McGraw-Hill Companies, Inc. ISBN 978-0-07-338028-5
5. Hibbler, R.C. (2012) Structural Analysis. Pearson Prentice Hall. ISBN-13: 978-0-13-257053-4

Course Title	**ED III: Climate and Design II**		
Course Code	ARC 244	**Module**	4
No. of Credits	2.0	**Course Hour**	2.0

COURSE RATIONALE

In ED-I students get a basic idea about the climatic design aspects. Implementing the theoretical concepts and technical knowledge in practical design is very much important for architects. This course helps the students to learn about specific climatic zones, characteristics of places and study the design responses. Also, equip the students with the skill to integrate climatic data with the design process and create a comfortable living environment in different context.

COURSE OBJECTIVES

- Make the students understand the geographical influence on climatic zones.
- Getting clearer idea about design interpretation of climatic data.
- Apply the knowledge to integrate the climatic aspects and design development stages.

COURSE CONTENT

Understanding climatic characteristics and traditional design response in different climatic zones. Design for climatic types: Building design & lay out planning consideration for warm humid, hot dry, composite & tropical upland climates, Shading device design principle. Relationship to the environment and response to climate. Geo-physical forces and built form; Passive means of controlled environment; Solar land planning and development.

Working with climatic data sets analysis, climate graph, the Mahoney tables and its recommended specification. Concept of climate responsive design process including: analysis of climatic data and forward analysis of design scheme, interpretation of climatic data and plan development, climate responsive building element design and performance modeling. Understanding the Bangladeshi building materials and design techniques with respect to climatic design.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO	**MAPPING CLO TO PLO**

	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	7	**8**	**9**
CLO 1	identify the climatic zones and distinguish between different climatic conditions		*							
CLO 2	determine design objectives in different climatic conditions			*						
CLO 3	apply space design techniques and design elements for different climatic context	*								
CLO 4	understand the reason behind different types of traditional forms and planning technique			*						
CLO 5	interpret the climatic data into design considerations		*		*					
CLO 6	simulate and experiment techniques of scaled models to analyze the climatic design efficiency				*	*				

Books Recommended

1. **O.H. Koenigsberger**: Climate Design Manual of tropical climate
2. **M.S. Ingersoll**: Manual of tropical climate
3. **M. Evans**: Housing, Climate & Comfort
4. **B. Givoni** : Man, Climate & Architecture
5. **Donald Watson & Kenneth labs**: Climatic Design

Course Title	**Graphic Art & Design**		
Course Code	ARC 254	**Module**	5
No. of Credits	2.0	**Course Hour**	4.0

COURSE RATIONALE

This course intends to teach the students the application of graphical reproduction in architecture and related design media.

COURSE OBJECTIVES

- To introduce the students with different graphics design media.
- To demonstrate them the application of graphical tools and instruments.
- To develop skills of visual communication using software.
- To make them competent with product design and sculpture making.

COURSE CONTENT

Basic techniques used in graphic art. Selection of drawing instruments, surfaces, typography. Graphic reproduction techniques and the pros and cons of the different systems to achieve the most effective presentation. Design of posters, products, display, portfolio.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO	**MAPPING CLO TO PLO**

	After successful completion of the course, students will be able to	1	2	3	4	5	6	7	8	9
CLO 1	use graphical instruments and sculpture making tools							*		
CLO 2	distinguish various graphical media and their application						*			
CLO 3	understand the process of typography and image making						*			
CLO 4	operate graphics design software such as Illustrator, Photoshop, CorelDRAW, etc.					*				
CLO 5	illustrate book covers and magazines					*		*		
CLO 6	create 2D, 3D product design and portfolio							*		

Books Recommended

1. **Steve Bowkett**: Archi doodles.
2. **Jens Müller**: Logo Modernism.
3. **Karen Lewis**: Graphic Design for Architects: A Manual for Visual Communication.
4. **Paul Sahre**: Two-dimension Man.
5. **Robert Bringhurst**: The Elements of Typographic Style.
6. **Frank Jacobus**: Archi-Graphic: An Info graphic Look at Architecture.

Course Title	**Principles of Sociology**		
Course Code	SOC201A	**Module**	1
No. of Credits	2.0	**Course Hour**	2.0

COURSE RATIONALE

This course intends to acquire cognitive and affective knowledge of sociology to apply in architecture discipline.

COURSE OBJECTIVES

- To introduce the background and building blocks of sociological subject matters.
- To familiarize students with the concepts of scientific research and techniques.
- To give emphasis on the evaluation of societies, culture and various social institutions.
- Helping the students to understand different sociological theories on stratification, religion and so on.

COURSE CONTENT

Sociological subject matters: Nature and scope; Origin and development of sociology; Primary concepts. Scientific Research: Scientific methods and techniques for sociological investigation. Designing a social survey. Culture: Components of culture, Cultural unity and diversity; Types of society: From early hunting gathering to industrial development.

Social Institutions: Family, Religion from functionalist and conflict perspectives of institutions. Sociological issues: Social stratification and class structure, social mobility; Population and environment; Social change; Collective movements. Social theories of urban design and planning.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		**MAPPING CLO TO PLO**								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	7	**8**	**9**
CLO 1	explain the core ideas of this discipline			*						
CLO 2	conduct scientific research in corresponding fields				*					
CLO 3	distinguish different type of societies, culture and perspectives			*						
CLO 4	interpret different theoretical perspectives of religion, social stratification and social change			*						
CLO 5	analyze socio-cultural influences on architecture		*							
CLO 6	identify social conflicts among different social sectors			*						

Books Recommended

1. R. T. Schaefer and R.P. Lamm, Introducing Sociology.
2. Alex Inkels, What is Sociology.
3. T. B. Bottomore, Sociology: A guide to problems and literature.
4. Samuel Koenig, Sociology.
5. Nazmul Karim, Samajbighan Samikhan

Year/ Semester	**3rd Year 1st Semester**		
Course Title	**Art & Architecture V: Contemporary Architecture**		
Course Code	ARC 321	**Module**	2
No. of Credits	2.0	**Course Hour**	2.0

COURSE RATIONALE

This course will explore the contemporary practice and philosophical considerations of architecture around the world, as well as the Bangladesh along with artistic, political and social movements, in order to synthesize a greater theoretical context of this present notion of architecture.

COURSE OBJECTIVES

- To introduce the students with various notion and attribute of contemporary era, and their language and expression.
- To facilitate necessary knowledge about geopolitical context and philosophical thought that shaped this era.
- Helping the students to develop ability to study, compare and realize this complex movement on different paradigm.
- Make the students familiar with the remarkable architectural examples and notable pioneer architects of the time.
- Helping the students to understand and analyze the global consideration and homeland context of these complex trends.
- Apply the knowledge to develop interest and consciousness for further study and investigation.

COURSE CONTENT

Crisis of Modernism in the society and in the field of literature, art and architecture; Theories and concepts of contemporary architecture; Postmodernism as a reaction to Modernism; Deconstruction, Traditionalism and critical regionalism, architecture of high technological advancement, postmodern ecology and sustainable architecture, architecture of new modernism. Topics should be introduced with references from contemporary architects; Impact of globalization and open market system in contemporary architecture discourse.

Developments in the fields of architecture in South Asia since 1950's. Trends of post-independence architecture, adaptation to modernism through works of early modernist architects. Study of Architectural identity and regionalism in architecture in refer to works of local masters in South Asian region.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		**MAPPING CLO TO PLO**								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	7	**8**	**9**
CLO 1	explain the geopolitical and philosophical notion of the time that influenced contemporary architecture		*							
CLO 2	identify the factors that made the movement a complex one in practice								*	
CLO 3	compare and relate various aspect and philosophy behind this complex movement						*			
CLO 4	recognize notable architects, their thoughts and master creations						*			
CLO 5	evaluate the role of the architect in his own context		*							
CLO 6	generate new ideas and mark his footprint in this discourse.				*					

Books Recommended

1. **Steve Bowkett**: Archi doodles.
2. **Jens Müller**: Logo Modernism.
3. **Karen Lewis**: Graphic Design for Architects: A Manual for Visual Communication.
4. **Paul Sahre**: Two-dimension Man.
5. **Robert Bringhurst**: The Elements of Typographic Style.
6. **Frank Jacobus**: Archi-Graphic: An Info graphic Look at Architecture.

Course Title	**Design Studio V**		
Course Code	ARC 332	**Module**	3
No. of Credits	9.0	**Course Hour**	18.0

COURSE RATIONALE

Students will study, understand and prepare presentation on different structural systems with relevant case studies. Students will also study and prepare reports on the fundamental services in a building such as mechanical, plumbing and electrical installations.

This studio course will exercise students on exploring the detailed characteristics of different kind of structural systems, such as post-lintel, post-slab, wall-slab etc. in building design. The studio course, will also emphasis on multi-functional integrated design approach including considerations of structural systems with detail construction and techniques.

COURSE OBJECTIVES

- To provide the knowledge of different types of structural system and their application on architecture.
- Helping the students to understand the relation between functional space and structural expression.
- Accumulate basic ideas about the advantages and limitations of various structural system and their combination on special cases.
- Helping the students to develop ability to compare and suggest proper structural system for specific project.
- To develop skills to use computer aided design process and presentation for better communication and understanding.

COURSE CONTENT

The principles and process behind generating architectural forms. Understanding the relationship of form and space to accentuate experiential qualities in architecture. Introduction of the basic relationship between structural logic and formal expression. Influence of technology in function, form and space. Design exercises will focus on understanding structural components in building.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		**MAPPING CLO TO PLO**								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	7	**8**	**9**
CLO 1	outline the basic characteristics, advantages, limitations and possibilities of different structural systems	*							*	
CLO 2	integrate architectural design process with structural criteria		*	*						
CLO 3	suggest proper structural system for different building types (residential, commercial, mixed-use, multistoried, factory etc.)									*
CLO 4	demonstrate and explain structural understanding through visual presentation (graphical and physical model making)					*		*		
CLO 5	design building service system for facilities buildings (electrical, mechanical, plumbing, etc.)		*		*					
CLO 6	generate economical and rational design for low- and high-density complex buildings.			*						*

Books Recommended

1) **Angus J. Macdonald;** Structure and Architecture
2) **Mario G. Salvadori;** Structure in Architecture: The Building of Buildings
3) **Francis D.K.Ching;** Building Structures Illustrated: Patterns, Systems, and Design.
4) **Andrew Charleson:** Structure as Architecture: A Source Book for Architects and Structural Engineers
5) **J. E. Gordon:** Structures: Or Why Things Don't Fall Down
6) **Sigrid Adriaenssens and Philippe Block:** Shell Structures for Architecture: Form Finding and Optimization
7) **Asterios Agkathidis:** Biomorphic Structures: Architecture Inspired by Nature

Course Title	**Working Drawing**		
Course Code	ARC 352	**Module**	5
No. of Credits	3.0	**Course Hour**	6.0

COURSE RATIONALE

This course will ensure students to make ready the necessary detail drawings for civil construction of a building.

COURSE OBJECTIVES

- To motivate and to prepare students more careful about building design.
- To make students capable to know the detail treatment of a building.
- To inspire student to design in a module for better spatial, structural, material-based design.
- To make students capable to prepare all necessary detail and easily readable drawing for civil construction works of a building.
- To be able to read structural, electrical, plumbing and fire safety drawings.
- To develop a complete book containing civil construction drawing.

COURSE CONTENT

DESIGN AND DRAWINGS SPECIFYING MATERIALS AND INSTRUCTIONS FOR CONSTRUCTION, UNDERSTANDING CONSTRUCTION PROCESS AND TECHNIQUES. THE CONSTRUCTION DRAWING WILL INCLUDE PREPARATION OF WORKING AND DETAIL DRAWINGS OF ALL BUILDING COMPONENTS. DETAILS OF DRAINAGE, PLUMBING FEATURES, DAMP-PROOFING AND INSULATION. BATHROOM AND KITCHEN LAYOUTS. APPLICATION OF BUILDING CODES AND BY-LAWS.
DESIGN AND DRAWINGS SPECIFYING MATERIALS AND INSTRUCTIONS TO MANUFACTURERS OF BUILDING ELEMENTS, COMPONENTS, FITTINGS AND FIXTURES WHICH ARE INDUSTRIALLY PRODUCED UNDERSTANDING MANUFACTURING PROCESS TO GENERATE CREATIVE DESIGN. THE PRODUCTION DRAWING WILL INCLUDE DESIGNING WITH VARIETY OF MATERIALS AND MANUFACTURING PROCESS OF A RANGE OF BUILDING COMPONENTS LIKE DOOR, WINDOW, FITTING AND FIXTURE OF FUNCTIONAL AND DECORATIVE NATURE.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		**MAPPING CLO TO PLO**								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	7	**8**	**9**
CLO 1	create a professional architectural presentation drawing	*								*
CLO 2	read detail architectural working, structural, electrical, plumbing and fire safety drawings, as-built drawings of building projects		*	*						
CLO 3	prepare the detail architectural working drawing for civil construction	*				*				
CLO 4	follow a module for working to reduce construction cost	*		*						
CLO 5	prepare complete working drawing books in a practical and professional manner							*		*
CLO 6	guide team-members of a professional building project in a construction site following the working drawing book	*								*

Books Recommended

1. **Ralph W. Liebing**: Architectural Working Drawings
2. **Annette Spiro (Ed) & David Ganzoni (Ed):** The Working Drawing: The Architect's Tool
3. **Ralph W. Liebing**: Handbook of Detailing: The Graphic Anatomy of Construction

Course Title	**Structure III – Building Structures**		
Course Code	CEE 301A	**Module**	6
No. of Credits	3.0	**Course Hour**	3.0

COURSE RATIONALE

This course familiarizes students to the vertical load calculation for the components of a frame building. It also introduces students with deferent types of structures such as truss, arch, dome, shell, folded plate and shear wall. This course also deals with the fundamental design process of RCC and steel structures.

COURSE OBJECTIVES

- To introduce the vertical load calculation for the components of a building.
- Acquaint approximate analysis of multistoried buildings for vertical and lateral loads.
- To introduce students with deferent types of structures such as truss, arch, dome, shell, folded plate and shear wall.
- To make familiar with the knowledge of analysis and design of RCC and steel structures.

COURSE CONTENT

Vertical load calculation for the components of a building: Calculation of the load of wall, slab, beam, column, live load.
Approximate analysis of multistoried buildings for vertical and lateral loads: Portal method and cantilever method.
Introducing deferent types of structures: Truss, arch, dome, shell, folded plate, shear wall, etc.
Fundamental design process of RCC structures: Design of beam and slab in WSD and USD considering flexure, shear, torsion and deflection.
Fundamentals and design process of steel structures: Design of tension member, beam and column in ASD and LRFD.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		**MAPPING CLO TO PLO**								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	7	**8**	**9**
CLO 1	Analyze horizontal and vertical loads on building	*					*		*	
CLO 2	Identify the load of different components of building	*					*		*	
CLO 3	Perceive, design and analyze RCC beam and slab	*					*		*	
CLO 4	Apply critical understanding of the theory and principles of design and solution of basic elements of steel structures	*					*		*	

Books Recommended

1) Khurmi, R. S. (2013), Strength of Material. S. Chand ltd. ISBN-13: 978-81-219-0533-6
2) Pytel A., and Singer F. L. (1987), Strength of Materials. 4th Ed., Harpercollins College Div. ISBN-13: 978-0-06-045313-8
3) Arthur H. Nilson, David Darwin, Charles W. Dolan (2010), Design of Concrete Structures.14th Ed., McGraw Hill. ISBN–007-123260-5
4) George Winter, Leonard Church, Charles Edward O'Rourke, Arthur H. Nilson (1964), Design of Concrete Structures. 7th Ed., McGraw Hill. ISBN–007-123260-5
5) M. Nadim Hassoun, Akthem Al- Manaseer (2008), Structural Concrete. 4th Ed., John Wiley and Sons, Inc. ISBN– 978-0-470-17094-6.
6) Housing and Building Research Institute, Bangladesh (2006), Bangladesh National Building Code (BNBC- 2006)
7) American Concrete Institute, ACI Codes, 2003

Course Title	**Building Services II- Mechanical**		
Course Code	MEE 315A	**Module**	6
No. of Credits	2.0	**Course Hour**	2.0

COURSE RATIONALE

The intent of the subject is to make the students learn about the advanced mechanical services with special reference to lighting and acoustics.

COURSE OBJECTIVES

- To understand the basic concept of thermodynamics so that students are able to understand psychrometry and air conditioning systems.
- To introduce the fundamental principles and different methods of air conditioning.
- To make student able to apply psychrometric charts in calculating psychrometric properties.
- To make students understand the basic air conditioning processes on psychometric charts, calculate cooling load for its applications in comfort and industrial air conditioning.
- To introduce various equipment-operating principles, operating and safety controls employed in air conditioning systems.
- Getting idea about fire-fighting methods in application of building service.
- To familiarize different vertical transportation system employed in building structures.

COURSE CONTENT

Thermodynamics: Introduction: Definition and applications of thermodynamics, Basic concept and definition: Systems and control volume, state and equilibrium, process and cycles, thermodynamic properties, forms of energies, Laws of thermodynamics.
Psychrometry: Definition, psychrometric properties, psychrometric chart, and its application.
Air-conditioning: importance application of air-conditioning, air-conditioning systems, basic refrigeration cycle: Basic concept, vapor compression cycle for air-conditioning, air-conditioning equipment, cooling load calculation;
Duct system design: Concept, importance and objectives of duct system design, air handling and distribution, different types of supply and return duct systems, duct design methods;
Fire hazards, fire-fighting methods.
Vertical Transportation: Types of elevators, Determination of size and quality of elevators, Incoming and outgoing traffic handling, Escalators and moving ramps.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		**MAPPING CLO TO PLO**								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	7	**8**	**9**
CLO 1	Explain fundamental laws and concepts of thermodynamics,	*							*	

CLO 2	Illustrate the fundamental principles and applications of air conditioning system,	*								
CLO 3	Design duct systems for the application of air handling in building systems.	*	*		*				*	
CLO 4	Calculate cooling load for air conditioning systems used for various condition.	*			*				*	
CLO 5	Explain different vertical transport systems for the application in building service.		*		*					
CLO 6	Design fire-fighting system in multi-storied buildings	*			*				*	*

Books Recommended

1) Grondzik, Kwok, Stein and Reynolds. *Mechanical and Electrical Equipment for Buildings* 11th Edition (Basic Books. 2009)
2) Hundy, Trott & Welch (2008), *Refrigeration & Air-conditioning*, Butterworth-Heinemann
3) Ameen (2006), *Refrigeration & Air-conditioning*, Prentice Hall

Course Title	**Culture, Space and Place**		
Course Code	ANP 303 A	**Module**	1
No. of Credits	2.0	**Course Hour**	2.0

COURSE RATIONALE

Space and place are closely interlinked. Culture has a vital role in place making. This course has been designed to introduce graduates to the field of socio-cultural anthropology, the study of vibrant human cultures and their relation with the making of the built environment. It presents an alternative approach to look at architecture and other forms of place making and provides a framework to critically assess historical, social, and cultural significances. Anthropology considers urban design and planning from diverse social and cultural contexts. Urban planning is a crucial form of managing urban populations and spaces. An
anthropological approach to urban planning focuses on the gap between envisioned utopias and actual everyday lives in the planned spaces. Thus, anthropological studies of urban planning often document how local populations engage with and rework such urban plans. Therefore, this course aims to expose graduates to some of the core concepts of anthropology like fieldwork, ethnography, and explores the questions that guide socio-cultural and anthropological influences on architecture and space.

COURSE OBJECTIVES

- Facilitate students with the necessary knowledge about key concepts in anthropology
- Acquaint graduates with the basic knowledge about culture, place and space
- Acquaint graduates with alternative methods and tools appropriate for design investigation and communication in a culturally sensitive way
- Facilitate necessary knowledge on urban design and planning keeping cultural issues in consideration.
- Equip graduates to conduct design exercise based on information collected from the cultural reading of place-making practice inside a society

COURSE CONTENT

Introduction discussion (Key issues such as culture, ethnography, urban anthropology)
Ethnographic approach (Participant observation, cultural logic, pattern)
Place and spaces (definition, relation of place and places, place making process, neighborhood, urban settlement)
Urban planning and design (social and cultural context of urban planning and design, historical perceive of urban planning, formation of city, types of city, factors associated with city planning and designed)
Theories and methods (Theories of place and space, Foucault on space and power, ethnography and other relevant methods)

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		**MAPPING CLO TO PLO**								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	7	**8**	**9**
CLO 1	Interpret key anthropological terms related to culture, space, and place.	*		*						
CLO 2	Distinguish alternative methods and tools appropriate for design investigation and communication in a culturally sensitive way			*	*			*		
CLO 3	Outline the theoretical perspective in cultural explanation to conduct architectural design research			*	*				*	
CLO 4	Apply cultural context in urban planning and design		*		*					
CLO 5	Identity urban place-making process, urban settlement, and urban neighborhood through context analysis, conceptualization, and problem engagement.		*							
CLO 6	Formulate a conscious "think anthropologically" to have a deeper understanding of nature, culture, and architecture				*		*			
CLO 7	Explain which socio-cultural-environmental features can contribute to a better architectural design			*					*	

Books Recommended

1. Ester, GisbertAlemnay (2016) An Architecture by means of Anthropology: Beyond learning the tools of social science.
2. Haviland, William (2006) Cultural Anthropology, Holt, Rinchart and Winston.
3. Jaffe Rivke and KoningAnouk de.2016. Introducing Urban Anthropology. Routledge
4. Setha M. Low, Denise Lawrence-Züniga (edt.) 2003. Anthropology of Space and Place: Locating Culture.
5. Setha M. Low 2005. Theorizing the City: The New Urban Anthropology Reader.

6. Stender, Marie.2016. Towards an Architectural Anthropology—What Architects can Learn from Anthropology and vice versa.
7. Victor Buchli. 2013. An Anthropology of Architecture. Berg Publishers.

Course Title	**DT IV: Facilities Planning & Design**		
Course Code	ARC 325	**Module**	2
No. of Credits	2.0	**Course Hour**	2.0

COURSE RATIONALE

This course intends to inculcate in the students the fundamental design principles and planning process of various facilities design.

COURSE OBJECTIVES

- Make the students to understand the planning process of different facilities.
- Helping the students to acquire rudimentary knowledge on programming, planning and designing of facilities.
- To develop skills to analyze and compare multidisciplinary approaches related to facilities planning.

COURSE CONTENT

Approaches to facilities planning and design. Philosophy, policies and processes within comparative and historical perspective. Fundamentals of programming, planning and design of different facilities for architecture with specialized functions. Facilities planning will emphasis on designing and planning for educational facilities, health facilities, commercial buildings and industrial facilities.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		**MAPPING CLO TO PLO**								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	7	**8**	**9**
CLO 1	outline the approaches of facilities planning and their principles	*								
CLO 2	identify and compare historical references of facilities planning			*						
CLO 3	design different facilities for specialized building types such as healthcare, educational, industrial, commercial, etc.			*						
CLO 4	integrate the needs of all stakeholders to optimize the effectiveness of facilities planning process			*						
CLO 5	conduct further multidisciplinary research on facilities design								*	
CLO 6	apply the facilities design principles in corresponding design studio projects				*					

Books Recommended

1. **C. Kenneth Tanner and Jeffery A. Lackney**: Educational Facilities Planning: Leadership, Architecture, and Management
2. **Robin Guenther & Gail Vittori**: Sustainable Healthcare Architecture
3. **Jargen Adam**: Industrial Buildings (Design Manuals)
4. **Donald Watson, Michael J. Crosbie**: Time Saver Standards for Architectural Design

Year/ Semester	**3rd Year 2nd Semester**		
Course Title	**Art & Architecture VI: Society & Architecture of Bengal**		
Course Code	ARC 323	**Module**	2
No. of Credits	2.0	**Course Hour**	2.0

COURSE RATIONALE

This course will explore the historic structure and philosophical aspects of Bengal architecture. This course also intends to develop skills for context based cultural interpretation of built environment through survey and analysis of historic structures of Bengal.

COURSE OBJECTIVES

- Helping the students to understand the chronological changes in the society of Bengal and their belief.
- To facilitate necessary knowledge about the cultural history of human development in different areas of this region.
- To develop skills to study cultural force on architectural development through Bengal focusing on religious architecture.
- To provide the knowledge of construction techniques, structural evolution, material cultural through different age of Bengal architecture with emphasis on architecture and their planning.
- Acquaint students with the influence of Bengal heritage on development art and architecture in Modern era and their practices.

COURSE CONTENT

Study of society, culture and Architecture of Bengal through the ages: Mauryan, Pala, Sena, Sultanate and Mughal periods. Language, custom, art and literature, and their relevance to Architecture and planning.

Study of society, culture and Architecture of Bengal through the ages: Colonial and post-colonial Bengal. Language, custom, art and literature, and their relevance to Architecture and planning. Contemporary architecture of Bangladesh – analyzing the roots and global forces.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		**MAPPING CLO TO PLO**								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	7	**8**	**9**
CLO 1	distinguish between various architectural styles emerged from Buddhist architecture to Muslim Architecture in Bengal (Knowledge)			*						

CLO 2	identify phases of development of Secular and Religious architecture in Bengal with relevance to structure, material culture and construction technique (Skills)		*							
CLO 3	build a chronological framework for understanding the development of Society of Bengal (Skills)			*						
CLO 4	identify the impact of religious philosophy along with political ideology on society and architectural styles of Bengal (Knowledge)		*							
CLO 5	apply critical thinking to understand theories in the history of architecture (Evaluation)						*			

Books Recommended

1. **Nazimuddin Ahmed**: Discover the monuments of Bangladesh
2. **Nazimuddin Ahmed**: Buildings of the British Raj in Bangladesh
3. **H Dani:** Muslim Architecture of Bengal, Cultural Survey of Bangladesh by Asiatic Society
4. **A B M Hossain:** Architecture, Cultural Survey of Bangladesh by Asiatic Society
5. **Sufi M Rahman**: Archaeological Heritage, Cultural Survey of Bangladesh by Asiatic Society
6. **A S M Ahmed**: Mosque Architecture in Bangladesh
7. **Perween Hasan**: Sultans and Mosques: The Early Muslim Architecture of Bangladesh

Course Title	**Heritage Field Work II**		
Course Code	ARC 324	**Module**	2
No. of Credits	1.0	**Course Hour**	1 week

COURSE RATIONALE

This course plays a supplementary role to the corresponding theory course on society and Bengal architecture.

COURSE OBJECTIVES

- Acquaint students with the influences of heritage, religion, culture, politics and climate on the development of Bengal architecture.
- Helping the students to acquire practical experience of the heritage building sites of Bengal.
- To facilitate the students with a scope to meticulously explore construction details of the heritage buildings.

COURSE CONTENT

Students will visit historical buildings and structures in Bangladesh relevant to the course. Through the field work students will be engaged with activities relating with historic building documentation and analysis. Students are required to submit a report / travel blog after finishing the trip.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		**MAPPING CLO TO PLO**								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	7	**8**	**9**
CLO 1	explain the development of Bengal architecture from Buddhist to later periods from practical experience						*			
CLO 2	understand documentation and analytical process of historical buildings.				*					
CLO 3	prepare verbal and visual presentations on heritage architecture							*		
CLO 4	identify the heritage construction techniques and details		*							
CLO 5	evaluate the heritage architecture of Bengal with relation to socio-cultural, socio-political, environmental and ecological contexts		*							
CLO 6	write and publish travel blog/ documentary in website							*		

Books Recommended

1. **Nazimuddin Ahmed**: Discover the monuments of Bangladesh
2. **A B M Hossain:** Architecture, Cultural Survey of Bangladesh by Asiatic Society

Course Title	**Design Studio VI**		
Course Code	ARC 334	**Module**	3
No. of Credits	9.0	**Course Hour**	18.0

COURSE RATIONALE

Aim of this course is to understand structures and services in the design of a complex building in the urban context with emphasis on integrated design approach to achieve high building performance considering highest usability and aesthetics.

COURSE OBJECTIVES

- Helping the students to understand design problem of a complex building consisting a high level of services and advanced structural systems.
- Make the students understand the design requirements of a multifunctional complex building.
- Getting idea about public scale in urban context through design application.
- To develop skills for innovative ideas incorporating formal and functional expressions.
- Apply the knowledge to design of multistoried buildings emphasis on earthquake resilient design.

COURSE CONTENT

Preparing and presenting report as an outcome of survey and analysis. Survey will focus on exploring issues with tall building design process. Students will prepare and present literature and site survey reports addressing design issues of high-rise building design and construction.
Comprehensive design exercise to understand the underlying complexity of building forms by exploring the characteristics of materials, structural systems, construction methods, building services and environmental requirements in relation to their creative formal expression. Creative /
innovative response to site and surrounding landscape and built-forms. Architectural design of multistoried buildings for gravity and lateral loads on earthquake resilient design. Emphasis will be giving on issues of tall building design and construction.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		MAPPING CLO TO PLO								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	7	**8**	**9**
CLO 1	demonstrate their understanding of structures and services and coordination of the same through their design projects	*								
CLO 2	communicate complex design ideas through the characteristics of materials, and structural systems		*							
CLO 3	apply design skills to achieve high building performance considering highest usability and aesthetic				*				*	
CLO 4	utilize structure and building construction to appraise spatial order and architectural expression		*							
CLO 5	apply design skills in multistoried buildings emphasis on earthquake resilient design		*		*					

Books Recommended

1. **De. Chiara & Callender:** Time Saver Standards for Building types
2. **Campi. ETH Zurich:** Skyscrapers
3. **Robert M:** Planning & Design of Airports
4. **Francis D.K.Ching:** Building Structures Illustrated: Patterns, Systems, and Design.
5. **J. E. Gordon:** Structures: Or Why Things Don't Fall Down

Course Title	**Urban Design**		
Course Code	ARC 381	**Module**	8
No. of Credits	2.0	**Course Hour**	2.0

COURSE RATIONALE

The course introduces students to theories about how cities and urban space formed. Apart from this, it involves guidelines in order to practice urban design in local context. Besides, the course offers an approach for architecture students to understand the cities in various scales.

COURSE OBJECTIVES

- To introduce students with the evolution of cities urban forms, and urban spaces.
- To develop skills to identify the element of city and their role in order to perceive the context.
- Helping the students to realize the scope and nature of urban design current context.
- Make the students to comprehend the design guidelines and principles in the field of urban design.
- Acquaint students with the current practice of urban design and their various dimensions for sustainable urban future.

COURSE CONTENT

Introduction to urban design, its aims and objectives. Global view and Context; Development of urban spaces through history; the structure of cities and the ways they can be changed, Introduction to theories about how cities are formed, and the practice of urban design and development with global examples. Modern concepts in urban design; Elements and domains of urban design; Perception and meaning of urban spaces- scale, form, order and time space relationships.
Principles and techniques of urban design, Analysis of physical pattern, Framework for development, Responsive environment – Connectivity, permeability, variety, legibility, appropriateness, richness and personalization. Introduction of models of urban analysis, contemporary theories of urban design, and strategy implementation.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		MAPPING CLO TO PLO								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	7	**8**	**9**
CLO 1	explain historical and transnational perspective on shaping of cities, urban forms and urban practices.	*								
CLO 2	analyze the city elements in order to understand the context and its social, cultural, political and environmental attributes.		*							
CLO 3	apply the urban design methods for practice and research work and through this process student will be expected to add new knowledge in the field of urban design.				*					

CLO 4	develop critical thinking of the relationship between urban design and the larger built environment and consider how urban design might play a role in advancing a sustainable urban future.	*					*		*	
CLO 5	construct comparative analysis between historical and current process and practice of urban design.						*		*	

Books Recommended

1. **Spreiregen, P. D**: Urban Design: The Architecture of Towns and Cities
2. **Howard, S.E**: Garden Cities of Tomorrow
3. **Hou, J., Spencer, B., Way, T. and Yocom, K. eds**.: Now Urbanism: The future city is here. Routledge
4. **Mostafavi, M. and Doherty, G. eds**.: Ecological urbanism. Lars Müller Publishers
5. **Cho, I.S., Heng, C.K. and Trivic, Z.: Re-framing urban space:** Urban design for emerging hybrid and high-density conditions. Routledge
6. **Hall, P**.: Cities of tomorrow: an intellectual history of urban planning and design since 1880. John Wiley & Sons
7. **Rowe, C. and Koetter, F.:** Collage city. MIT press
8. **Utopia, E.:** Architectural Provocations 1956-76. New York, NY: Prestel Pub
9. **Lynch, K.:** Reconsidering the image of the city. Springer, Boston, MA
10. **Routledge**; Responsive environments: A manual for designers

Course Title	**Building Services III - Electrical**		
Course Code	EEE 305A	**Module**	6
No. of Credits	2.0	**Course Hour**	2.0

COURSE RATIONALE

The intent of the subject is to make the students learn about the advanced electrical services with special reference to lighting and acoustics.

COURSE OBJECTIVES

- Help the students understand basic theories in conception of electrical units and standards.
- Make the students understand electrical drawing system, layout and estimation.
- To develop skills to design illumination and lighting System.

COURSE CONTENT

Electrical units and standards, Ohm's law, KVL and KCL, Basics of AC circuits, Introduction to electrical wiring, wiring system design, Fitting and Fixture layout, Conduit layout, drafting, and estimation. Design for illumination and lighting. Design for intercom, public address systems, telephone system and LAN. Design of security systems including CCTV, fire Alarm, smoke detector, burglar alarm, and sprinkler system. A design problem on a single/multi-storied building/structure.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		**MAPPING CLO TO PLO**								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	7	**8**	**9**
CLO 1	understand electrical wiring drawings	*	*							
CLO 2	distinguish different electrical system ad instruments	*	*							
CLO 3	draw simple electrical layout of single/ multi-storied structures	*	*			*				
CLO 4	place lighting fixtures appropriately in a building	*	*							

Books Recommended

1. **S.L. Uppal and G.C.Grag**: Electrical Wiring Estimating and Costing

Course Title	**Construction Workshop and Material Lab**		
Course Code	CEE 302A	**Module**	6
No. of Credits	2.0	**Course Hour**	4.0

COURSE RATIONALE

Students will determine different properties of engineering materials indicating the quality and strength of the materials

COURSE OBJECTIVES

- To introduce the strength and properties of cement
- To analyze and classify the properties of fine and coarse aggregate
- To facilitate necessary knowledge about properties of bricks and timber
- To acquaint students with the properties of concrete.

COURSE CONTENT

Determination of normal consistency of cement: This experiment determines the amount of water needed for preparation cement mortar.
Determination of initial setting time of cement: This experiment describes the beginning of setting time of cement paste i.e. the paste is rigid sufficiently to withstand a definite amount of pressure.
Determination of direct compressive strength of cement mortar: The compressive strength of cement mortar at different ages can be determined by this experiment
Sieve analysis of fine and coarse aggregate: This experiment shows the index of coarseness or fineness of the material using sieve analysis.
Sampling and testing of bricks for compressive strength and absorption: This test represents the load bearing capacity (compressive characteristics) of bricks and its water holding capacity.
Compressive strength of cylindrical concrete specimen and cubes: The compressive strength of concrete (both cylindrical and cubes) at different ages can be determined by this experiment.
Specific gravity and absorption capacity of coarse and fine aggregate: This test determines the water holding capacity (absorption) capacity of coarse and fine aggregates and their specific gravity.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		MAPPING CLO TO PLO								
	After successful completion of the course, students will be able to	1	2	3	4	5	6	7	8	9
CLO 1	Determine the normal consistency and setting time of cement	*	*		*					
CLO 2	Experiment the compressive strength of cement mortar	*	*		*					
CLO 3	Determine the specific gravity and absorption capacity of fine and coarse aggregate	*	*		*					
CLO 4	Prepare the gradation curve and the index of coarseness or fineness of aggregate by using sieve analysis	*	*		*					
CLO 5	Determine the compressive strength of concrete at different ages.	*	*		*					

Books Recommended

1 Aziz, M. A. (1995), A text book of Engineering materials. Kazi Mahfuzur Rahman, 34/2, Zigatola.

2 Claisse. P. A. (2015), Civil Engineering Materials, Butterworth-Heinemann, ISBN-13: 978-0081002759

3 Gupta, R. K. (2009), Civil Engineering Materials & Construction Practices. Jain Brothers. ISBN-10: 8183601030

4 Latifee, E. R. (2007), An Introduction to Properties and Evaluation of Engineering Materials. E. R. Latifee 5B, mallika, Dhaka. ISBN: 984-300-000839-0

5 Van Amsterdam, E. V. (2000), Construction Materials for Civil Engineering. Juta Academic. ISBN: 0702152137.

Course Title	Field Survey for Architects		
Course Code	CEE 304A	Module	6
No. of Credits	1.0	Course Hour	1 week

COURSE RATIONALE

This course intends to provide the on-field experience of survey techniques and methods.

COURSE OBJECTIVES

- To acquaint the students with different survey techniques.
- To introduce the students about field procedures.
- To enable them to calibrate area and volume of a site.

COURSE CONTENT

Field survey based on the calculation of area and volumes. Application of different survey methods: Chain survey, Traverse survey, Plane Table, Levels and Levelling, Tachometry, etc. Field procedures. Construction Layout of buildings. Contours and layout surveys. Errors and corrections in field survey.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		MAPPING CLO TO PLO								
	After successful completion of the course, students will be able to	1	2	3	4	5	6	7	8	9
CLO 1	understand and apply various survey techniques	*			*					
CLO 2	determine the construction layout of a building	*								
CLO 3	calculate area and volume of a site				*	*				
CLO 4	correct the errors in field survey					*				

Books Recommended

1. **M.A.Aziz., M.Shahjahan**, A Text book of surveying.

Course Title	Behavior Studies in Architecture		
Course Code	ARC 327	Module	2
No. of Credits	2.0	Course Hour	2.0

COURSE RATIONALE

This course emphasizes to understand diversity of behavioral needs, values, norms, human psychology in architectural design process.

COURSE OBJECTIVES

- To introduce the students with different theories and movements of human behavior science.
- To help them understanding the relationship between behavioral science and architecture and its importance.
- To familiarize them with different environmental psychology and behavior studies.

COURSE CONTENT

Man-environment relationship: Positive and normative theories. Behavioral science and modem movement. Substantive theory on environment and human behavior, Social stimulation and interaction the affordances of the built environment. Gestalt theory of perception, Cognition and effect, special behavior. Environmental Determinism, Environmental possibilism and environmental probabilism. Concept of FIT-adoptability and flexibility.

Application of behavioral study in architectural design and planning. Methods of behavioral

based programming. Barrier free environmental design. Territoriality, defensible space, and social space-the Westgate Theory. Behavioral concept in neighborhood and urban design, Speculative esthetics and symbolic Esthetics, Semantic and semiotic approaches. Contemporary socio-physical issues in environmental design.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO	MAPPING CLO TO PLO

	After successful completion of the course, students will be able to	1	2	3	4	5	6	7	8	9
CLO 1	analyze behavioral study in architecture and planning			*						
CLO 2	explain different theories of human behavior science			*						
CLO 3	incorporate human behavior to create barrier-free and democratic built environment			*	*					
CLO 4	handle human needs and feelings in buildings that adjust to the lifestyle of humans within it			*						
CLO 5	conduct further multidisciplinary research as well as design studio projects based on behavior studies								*	

Books Recommended

1. **Robert B. Bechtel(ed)**: Handbook of Environmental Psychology
2. **Amos Rapoport**: Theory in Environment Behavior Studies. (Journal)
3. **Joy Knoblauch**: The Architecture of Good Behavior

Course Title	**Vernacular Architecture & Settlements**		
Course Code	ARC 371	**Module**	7
No. of Credits	2.0	**Course Hour**	2.0

COURSE RATIONALE

To inculcate an appreciation of vernacular architecture; as an expression of local identity and indigenous traditions of the culture.

COURSE OBJECTIVES

- To facilitate necessary knowledge about the vernacular architecture and settlements around the world.
- Acquaint students with different context, climate, culture that shape the vernacular building form and texture.
- Getting idea about different vernacular techniques and principals used in vernacular design and also the changes these design face in the current contemporary context**.**

COURSE CONTENT

Defining vernacularism; House form in relation to culture, Vernacular architecture and settlement and its evolution; Concepts and approaches to the study and analysis of vernacular architecture. Vernacular architecture around the world: Symbolism and cultural expression generating vernacular building form and texture. Vernacular architecture study and survey methods. Change facing vernacular architecture in the contemporary context.

Different Geo-climatic regions of Bangladesh and impact on architectural types and its uses. Understanding vernacular architecture of Bangladesh: from aspects of Microclimate and its impact on the local architecture, local construction methods, material culture and craftsmanship detail. Influence of cultural and social belief in formation of vernacular architecture in Bangladesh. Ecology and environmental aspects of traditional built forms and settlement systems. Issues of Housing and institutional building design in vernacular context in Bangladesh. Learning from vernacular architecture: Site & Context; Self-help and community-based approaches. Future directions and prospects.

	MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO	**MAPPING CLO TO PLO**								
	After successful completion of the course, students will be able to	1	2	3	4	5	6	7	8	9
CLO 1	use vernacular architecture as a reasonable tool for a novice to understand the triangular relationship of society, architecture and physical context and its impact on design		*	*						
CLO 2	analyze regional variety of architectures logically stemming from the geo-climatic forces, human and material resources and techniques that satisfy the socio-cultural needs and desires of a given people		*							
CLO 3	understand the principles of vernacular architecture in achieving sustainability and decisions that conserve natural and built resources, including culturally important buildings and sites		*							
CLO 4	recognize the vernacular settlement type of different geo-climatic regions of Bangladesh		*							
CLO 5	conduct survey and research on vernacular built-forms in appropriate methods				*					
CLO 6	implement lessons learned from the self-built architecture in future design studio projects								*	

Books Recommended

1. **Amos Rapoport**: House form and culture
2. **Bernard Rudofsky:** Architecture Without Architects
3. **Paul Oliver:** Dwellings
4. **Willi Weber(ed):** Lessons from Vernacular Architecture
5. **R. W. Brunskill**: Vernacular Architecture: An Illustrated Handbook
6. **Henry Glassie**: Vernacular Architecture (Material Culture)
7. **K. Iftekhar Ahmed**: Up to the waist in Mud!
8. **A.K.M. Kausarul Islam**: Patterns and Changes of Vernacular Architecture in Bangladesh
9. **Johan Van Lengen**: The Barefoot Architect
10. **K. Iftekhar Ahmed, Salek M. Seraj**: Building Safer Houses in Rural Bangladesh (2004)

11. **John May**: Handmade houses & other buildings: the world of vernacular architecture
12. **Sandra Piesik**: Habitat! Vernacular Architecture for a Changing Planet

Course Title	**BIM Technology in Architecture**		
Course Code	ARC 365	**Module**	6
No. of Credits	2.0	**Course Hour**	4.0

COURSE RATIONALE

This course intends to equip the students with the strengths of Building Information Modelling technologies, widely used in architectural research and profession.

COURSE OBJECTIVES

- To introduce the students with the Building Information Modelling technology and its scopes.
- To develop skills to use BIM technology in architectural design and research process.
- To provide knowledge about design and construction integration.

COURSE CONTENT

Understanding the idea of Building information modeling. Developing competences on BIM Processes, BIM Technology, BIM Application The students will be in constant research on BIM applications from a wide variety of aspects. BIM overview, Overview of related software and Case Studies, BIM requirements and applications from around the world, BIM and the Futures. Parametric design principles. Application of BIM for building modelling and integration with engineering services and building technology. Preparing construction documents for detail architectural design.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		**MAPPING CLO TO PLO**								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
CLO 1	operate BIM software such as ArchiCAD, Revit, Vectorworks, etc.	*				*				
CLO 2	use BIM software for parametric designs					*			*	
CLO 3	take feedback for early conceptual design decisions using BIM software	*				*				
CLO 4	integrate building and engineering services	*	*							
CLO 5	produce construction level modelling including detailing, specifications and cost estimation	*				*		*		

Books Recommended

1 **Richard Garber**: BIM Design: Realizing the Creative Potential of Building Information Modelling
2 **Randy Deutsch**: BIM and Integrated Design: Strategies for Architectural Practice
3 **Chuck Eastman et al**: BIM Handbook: A Guide to Building Information Modeling for Owners, Managers, Designers, Engineers, and Contractors, John Wiley & Sons Inc., 2008

Year/ Semester	**4th Year 1st Semester**		
Course Title	**Interior Design**		
Course Code	ARC 431	**Module**	3
No. of Credits	2.0	**Course Hour**	2.0

COURSE RATIONALE

Interior design is more than an aesthetic. It is about to find the best solution for interior environment considering clients health, safety, comfort, aesthetic and functional feasibility. As integrated part of architecture interior design also plays vital role for involving human and built space.

COURSE OBJECTIVES

- To help them conceptualize basic theories of interior design and find out the scope of design.
- Make the students understand the vocabulary and principles of interior design.
- To help them to realize the environmental entities of interior space that plays significant role in interior design.
- To develop professional skills to work in a team.
- Helping the students to understand and maintain the professional ethics and design code during working process.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		**MAPPING CLO TO PLO**								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
CLO 1	understand interior design vocabulary and practice to develop the professional skills	*								
CLO 2	apply the design principles in real interior projects				*					
CLO 3	analyze color, texture, furnishing, acoustics and material of interior elements to understand the contextual idea of interior space		*							
CLO 4	apply the interior design process for conducting research work and professional field as well				*					
CLO 5	conduct further research and higher study interior design in this filed.								*	

Books Recommended

1. **John E. Flynn et al**: Architectural Interior Systems; Lighting, Acoustics, Air
2. **Francis D. K. Ching, Corky Binggeli**: Interior Design Illustrated
3. **Joseph De Chiara, Julius Panero, and Martin Zelnik**: Time-Saver Standards for Interior Design and Space Planning
4. **Flynn J**: Conditioning
5. **Ladau R**: Color in Interior Design and Architecture

Course Title	**Design Studio VII**		
Course Code	ARC432	**Module**	3
No. of Credits	9.0	**Course Hour**	18.0

COURSE RATIONALE

This studio introduces the urban issues to the students. They learn to investigate the socio-economic issues and attempt to make sustainable proposal. During urban survey the students come to direct interaction with stakeholders and learn to design spaces sensibly. The projects intend to teach how to be more responsive to local context and work for greater benefit of
people from different social classes. Conservation of buildings and places with historical and cultural significance is also practiced during the studio projects.

COURSE OBJECTIVES

- Make the students understanding the scale of urban projects.
- To develop skills to communicate with stakeholders directly.
- Helping the students to develop ability in making sustainable design proposals for urban spaces.
- To help them realizing the importance of conservation for the collective memory.
- Acquaint students with methodologies involved in urban survey and design.

COURSE CONTENT

Perception of urban context and the emergent forces that shape a city; Understanding urban activities, movement and environmental aspects to attain livability in cities and quality of life; Understanding urban design process – from program formulation to urban design interventions. Designing spaces between the buildings vis-à-vis urban masses I response to human needs and scale. Articulation of architecture into the public realm through design of building complexes at urban scale.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		**MAPPING CLO TO PLO**								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
CLO 1	conduct urban land-use, infrastructure, transportation, environment, socio-cultural, socio-economic survey	*	*							
CLO 2	interpret numeric and social data in visual presentation		*		*	*				
CLO 3	suggest rational design solutions and respect the context in urban design	*		*	*				*	*
CLO 4	apply urban conservation techniques and strategies				*					
CLO 5	create detail area plan and design open urban and neighborhood space	*	*							
CLO 6	resolve social, economic and environmental planning issues in city scale		*				*			

Books Recommended

1. **Gehl, J.**: Cities for people. Island press.
2. **Jacobs, J.**: The death and life of great American cities. 1961. New York: Vintage.
3. **Gindroz, R.**: The urban design handbook: techniques and working methods. WW Norton & Company.

Course Title	**Interior Design Studio**		
Course Code	ARC 436	**Module**	3
No. of Credits	3	**Course Hour**	6

COURSE RATIONALE

This course is the first approach to the profession of interior design for architecture student. Students will be introduced to the design process, elementary design vocabulary and various
presentation skills and techniques. Professional practices and responsibilities, trade resources, and the value of design organizations will be discussed. Through a series of projects and activities and an exploration of the work of notable interior designers and architects, students will begin to identify the various aspects of interior design to which they personally respond.

COURSE OBJECTIVES

- Acquaint students with the scope of interior design and basic theories about interior design.
- Helping the students to develop ability in applying the design method and principal of interior design based on contextual issues.
- Apply the knowledge of the method of local practice and resource available for interior design.
- To develop the skill of verbal and technological representation of the interior design project.

COURSE CONTENT

Preparation of interior design drawings for different types of spaces such as office, studio, bank, restaurant, club and shop. Detailed specifications of finish materials for floor, ceiling and wall. Natural and artificial lighting and ventilation. Fixed and movable furniture, decorative element, upholstery, drapery, art work, interior plantation, fountain, automation device.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		**MAPPING CLO TO PLO**								
	After successful completion of the course, students will be	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**

	able to									
CLO 1	apply the knowledge in order to perform professional skill and academic competence	*								
CLO 2	apply the design method and principles in any real interior design project				*					
CLO 3	draw professional drawing required to communicate for an interior design project					*		*		
CLO 4	evaluate the materials and their specification used in interior project and to apply the appropriate one according to contextual feasibility		*							
CLO 5	conduct further advanced study on interior design								*	

Books Recommended

1. **John E. Flynn et al**: Architectural Interior Systems; Lighting, Acoustics, Air
2. **Francis D. K. Ching, Corky Binggeli**: Interior Design Illustrated
3. **Joseph De Chiara, Julius Panero, and Martin Zelnik**: Time-Saver Standards for Interior Design and Space Planning
4. **Flynn J**: Conditioning
5. **Ladau R**: Color in Interior Design and Architecture

Course Title	**Project Management**		
Course Code	CEE 401A	**Module**	6
No. of Credits	2.0	**Course Hour**	2.0

COURSE RATIONALE

This course will familiarize the students with the basic knowledge of developing skills of understanding basic project management principles and practices. This knowledge is essential to manage projects from initiation to commissioning achieving projects' basic objectives such as time, cost, quality, and safety.

COURSE OBJECTIVES

- To introduce management tools and techniques for successful project completion
- To acquaint with project time, cost, quality, and safety management
- To make them understand project risks and uncertainties and their management strategies
- To introduce with the PMBOK and the project management manual

COURSE CONTENT

Introduction: Principles of project management and construction management, triple constraints (time-cost-quality) to achieve project goals, basic concepts of contract management, project safety and risk management.

Planning and Scheduling: Work Breakdown Structure (WBS), Gantt Chart, Critical Path Method (CPM), Program Evaluation and Review Technique (PERT), comparison and applications of CPM and PERT in various projects.

Project Delivery System and Contract Management: Basic concepts of project procurement, Project Delivery Methods: Design-Bid-Build (DBB), Design and Build, Construction Management Contract (CMC), Alliancing, Public Private Partnership (PPP),

Engineering Procurement and Contract (EPC), Build, Operate and Transfer (BOT); Contract types: Lump Sum, Unit Price, Cost Plus or Cost Reimbursable, guaranteed Maximum Price (GMP).

Project Schedule and Cost Management: Cash flow analysis, earn value management (EVM), S-curve, payback period, cost-benefit ratio, internal rate of return (IRR).

Project Quality Management: Deming's 14 points to achieve project quality, ISO 9000, Cost of Quality (CoQ), seven quality control tools, Total Quality Management (TQM), Quality Management in PMBoK.

Project Safety and Risk Management: Safety management: Safety practices at construction site from BNBC, personal and site safety, Risk management: planning for risk management, risk register, risk evaluation, risk assessment, risk control, risk residual, planning for risk response, monitoring and control risks during project execution phases.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		**MAPPING CLO TO PLO**								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
CLO 1	Develop a project's plan and schedule	*					*		*	
CLO 2	Prepare cosh flow and fininancial report	*					*		*	
CLO 3	Formulate quality assurance plan and risk response strategy	*					*		*	
CLO 4	Analyze project performance and report project status to the top management	*					*		*	

Books Recommended

1. Project Management Body of Knowledge (PMBOK)-PMI
2. Kenzer, H. (2013), Project management: a system approach to planning, scheduling, and controlling. John Wiley and Sons. ISBN-13:978-1-118-41855
3. Lewis, J.P. (2005), Project planning, scheduling, and control, 4th Ed., McGraw-Hill Pub. ISBN-13:978-0-07-146037-8
4. Gitlow, Howard S. "Quality Management" Third Edition, McGraw Hill
5. Hinze, J. W., Construction Planning & Scheduling, Essex, UK: Prentice, 3rd Ed., 2008.
6. BNBC – construction safety code chapter

Course Title	**Computer Application II**		
Course Code	ARC 454	**Module**	5
No. of Credits	2.0	**Course Hour**	4.0

COURSE RATIONALE

This course intends to equip students with deeper understanding of computer application in architectural design and research.

COURSE OBJECTIVES

- To provide the students basic understanding of the theories and concepts of spatial analysis.
- To introduce the students with the spatial and morphological analysis tools and techniques.
- Acquaint students with the basic applications of spatial simulation-based software.
- To help students visualize, analyze and explore geographically referenced information.

COURSE CONTENT

Introducing spatial analysis tools to support urban design and planning studio. Introduction to Geographic information system (GIS) and its application in spatial analysis. Understanding concepts of decision support tools in advanced design and planning process for architecture.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		MAPPING CLO TO PLO								
	After successful completion of the course, students will be able to	1	2	3	4	5	6	7	8	9
CLO 1	operate the spatial simulation software such as ArcGIS, Space Syntax, etc.					*				
CLO 2	prepare GIS based mapping and spatial analysis for advanced urban planning and design					*			*	
CLO 3	capture, store, manipulate, analyze, manage and present all types of geographical data				*	*		*		
CLO 4	characterize the earth and other geographies for the purpose of visualizing and spatial planning					*		*		
CLO 5	understand and integrate mapping techniques, surveying, remote sensing & satellite imagery, geography, geology, cartography and global positioning systems (GPS) to regional and urban planning				*				*	

Books Recommended

1. WILPEN L. GORR & KRISTEN S. KURLAND: GIS TUTORIAL 1 FOR ARCGIS PRO: A PLATFORM WORKBOOK.
2. DAVID SMITH ET AL.: UNDERSTANDING GIS

Course Title	Architecture for Sustainability		
Course Code	ARC 471	Module	7
No. of Credits	2.0	Course Hour	2.0

COURSE RATIONALE

The course focuses on the present design practice of energy efficiency and technological advancement in the field of Architecture around the world.

COURSE OBJECTIVES

- Make the students understand the necessity of sustainability in the field of architecture.
- To provide the knowledge of the historical and traditional sustainable design practice.
- To develop skills to compare the different methods of sustainable design practice ongoing around the world.
- To facilitate necessary knowledge about building technology and apply computer-based simulation techniques.
- Apply the knowledge to discover the proper type of sustainable design solutions for our local and urban context.

COURSE CONTENT

BASIC CONCEPT OF SUSTAINABILITY; RELATION OF SUSTAINABILITY AND BUILT ENVIRONMENT DESIGN. ENVIRONMENTAL FORCES AND BUILT FORM INTERACTION. PASSIVE MEANS OF BUILT ENVIRONMENT CONTROL. ISSUES OF SUSTAINABILITY AS CULTURAL PRACTICE. BUILT ENVIRONMENT DESIGN IN THE LOCAL CONTEXT: WATER AND WETLAND ARCHITECTURE AND SETTLEMENTS, SETTLEMENTS IN THE HILLY TERRAIN.
BASIC CONCEPTS OF RECYCLING, RENEWABILITY AND CONSERVATION IN DESIGN; URBAN ECOLOGY AND RESPONSIVE ENVIRONMENT; SUSTAINABLE BUILDING MATERIALS; ENVIRONMENTAL ANALYSIS, ACCOUNTING AND MONITORING OF BUILDINGS.; COMPUTER BASED SIMULATION TECHNIQUES. CONCEPTS IN BIOCLIMATIC DESIGN. TECHNOLOGIES FOR BUILT ENVIRONMENT DESIGN.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		MAPPING CLO TO PLO								
	After successful completion of the course, students will be able to	1	2	3	4	5	6	7	8	9
CLO 1	relate between sustainability and architecture			*						
CLO 2	outline the necessity of sustainable design practice			*						
CLO 3	distinguish various historical practices on basis of different climatic and cultural context		*							

CLO 4	compare between different trends of sustainable design practice ongoing around the world								*	
CLO 5	apply technology-based techniques to understanding, decision making and design					*				
CLO 6	suggest solutions for the sustainable design practice in our country or region	*								*

Books Recommended

1 **David Loyed Jones**: Architecture and the environment.
2 **Daniel E. Williams**: Sustainable design, ecology, architecture and planning
3 **David Bergman**: Sustainable Design: A Critical Guide (Architecture Briefs)
4 **Krisnan,Baker,Yannas**: Climate Responsive Architecture
5 **Patrick M Condon**: Design Charrettes for Sustainable Communities
6 **Stephen R J Sheppard**: Visual Simulation
7 **Terri Meyer Boake**: Lecture series on sustainable Architecture (www.slideshare.net)

Course Title	**Rural Studies of Bangladesh**		
Course Code	ARC 483	**Module**	8
No. of Credits	2.0	**Course Hour**	2.0

COURSE RATIONALE

This course intends to introduce students with development issues in rural context through planning and management.

COURSE OBJECTIVES

- To help the students to explore architecture as responding to social issues such as community, culture, religion, politics etc.
- To familiarize students with designing for special rural communities.
- Helping the students understanding of the settlement layout in villages, the rural occupations & life style, the housing typology, the locally available materials & craftsmanship and the integration of landscape with the built environment.

COURSE CONTENT

Understanding rural context of Bangladesh. The background of rural planning and development and the social, economic and physical context. Review of rural settlement and spatial pattern in Bangladesh, Importance of Community planning and development concepts, Rural planning and development in post-Independence period. Rural governance, services & infrastructure, Energy planning and environmental protection, Rural industry, Study of contemporary innovation and practices in rural sectors.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO	**MAPPING CLO TO PLO**

	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
CLO 1	understand the various aspects of the built environment in rural areas		*	*						
CLO 2	design in rural context and community	*	*							
CLO 3	integrate community people with rural development		*							*
CLO 4	suggest housing solutions that suit the rural occupation, society & economy				*					*
CLO 5	identify innovations and sustainable practices in rural context		*							
CLO 6	conduct further research and higher study in this field								*	

Books Recommended

1. **Prof. Rahman G.**: Town planning and the political culture in Bangladesh.
2. **Catherine Driscoll**: Cultural Sustainability in Rural Communities
3. **Wayne J. Caldwell**: Planning for Rural Resilience.

Course Title	**Statistics for Architects**		
Course Code	STA 401A	**Module**	1
No. of Credits	2.0	**Course Hour**	2.0

COURSE RATIONALE

This course intends to acquire knowledge to analyze applied data.

COURSE OBJECTIVES

- Provide the basic knowledge of statistical tools,
- Equip the students for analyzing the data using the tools of descriptive and inferential statistics.

COURSE CONTENT

Statistics: definition, nature and scope of statistics for architecture. Nature of statistical data. Attributes and variables, population and sample, parameter and statistic, tabulation, frequency distribution, graphical representations. Measures of central tendency: mean, median, mode, geometric mean, weighted mean and truncated mean. Measures of dispersion: range, standard deviation, variance, coefficient of variation, skewness and kurtosis. Probability: definition, statement and interpretation of laws of probability, Bayes' rule, random variables. Probability distributions: uses, applications and properties of Binomial, Poisson, Normal distribution and standard normal distribution. Brief discussion on sampling distributions- $\chi 2$, t and F distributions. Basic concepts of sampling techniques: simple random sampling, stratified sampling and cluster sampling. Test of hypothesis: about mean, variance, proportion, test of independence, contingency tables, test of homogeneity, confidence intervals for mean, variance, proportions, sample size determination. Correlation and Regression: definition, measure, interpretation and significance, curve fitting by least squares method and related

tests, simple linear regression model with underlying assumptions, multiple linear regression model. Design of Experiments: basic concepts.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		MAPPING CLO TO PLO								
	After successful completion of the course, students will be able to	1	2	3	4	5	6	7	8	9
CLO 1	Explain basic concepts of statistics and describe various statistical tools;	*								
CLO 2	Construct frequency distribution and present data graphically;				*			*		
CLO 3	Compute and interpret different measures of central tendency, location, dispersion, and shape characteristics;				*					
CLO 4	Demonstrate a solid understanding of probability, probability distribution, sampling distribution and sampling techniques;	*					*			
CLO 5	Perform test of the hypothesis;				*					
CLO 6	Perform correlation and regression analysis with interpretation;				*					
CLO 7	Devise design of experiments.				*				*	

Books Recommended

1. MOSTAFA, M. G., (1989) METHODS OF STATISTICS, KARIM PRESS AND PUBLICATION, DHAKA, BANGLADESH,
2. GUPTA S.C. AND KAPOOR V.K., (2000) FUNDAMENTALS OF MATHEMATICAL STATISTICS, 10TH ED, SULTAN CHAND AND SONS,
3. HOGG R V & CRAIG A T, (1995) INTRODUCTION TO MATHEMATICAL STATISTICS, 5TH ED, MACMILLAN, LONDON,
4. DECOURSEY, W J. (2003) STATISTICS AND PROBABILITY FOR ENGINEERING APPLICATIONS, NEWNES, ELSIVER SCIENCE (USA),
5. LANDAU, S. AND EVERITT, B.S. (2004) A HANDBOOK OF STATISTICAL ANALYSIS USING SPSS, CHAPMAN & HALL/CRC.

Year/ Semester	4th Year 2nd Semester		
Course Title	Landscape Design		
Course Code	ARC 433	Module	3
No. of Credits	2.0	Course Hour	2.0

COURSE RATIONALE

This course offers landscape design concepts, design and planning principles to organize the out-door environment from both object and system-based approaches.

COURSE OBJECTIVES

- Help them conceptualize basic theories in landscape design.
- Make the students understand the concept and demand of out-door space.
- To help them systematically analyze context of the landscape (i.e., social, cultural, and environmental).
- To introduce landscape design tools for different out-door scales.
- Acquaint students with the design process, focusing on site scale problems in a regional context.

COURSE CONTENT

Introduction to principles and elements of landscape design. Landscape Architecture and its necessity in the built environment. Historical development of landscape/ garden design. Landscape design process and narratives, Biosphere and eco- system and eco-system services in landscape design. Organization of various outdoor spaces. Concepts and techniques of environmental and ecological design for various eco-system (e.g., wetland, forest, grassland). Landscape character and scale, Visible landscape: spatial quality and forms, Circulation and linkages, Location and sequence of outdoor activity.

Vegetation design: Planting and gardening. Sustainability concept in landscape design (e.g., productive landscape, urban agriculture) Study of Site analysis and Site development, site selection, plane surveying, topography, soils, grading, drainage, site utilities, Environmental assessment for landscape planning and design. Utility design and maintenance.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		MAPPING CLO TO PLO								
	After successful completion of the course, students will be able to	1	2	3	4	5	6	7	8	9
CLO 1	understand the basics principles of landscape design	*							*	
CLO 2	adopt landscape design approaches for site-specific problems		*	*						
CLO 3	apply different methods to identify and analyze the existing landscape networks and contextual issues related to urban landscape			*	*				*	
CLO 4	understand design tools and landscape plans with realistic solutions				*					
CLO 5	explain critical understanding of the local and regional framework related to landscape design						*		*	
CLO 6	demonstrate an ability to implement design process into landscape design projects				*					

Books Recommended

1 **John O. Simonds, S. Barry**, *Landscape Architecture: A Manual of Environmental Planning and Design*. Fourth Edition, McGraw-Hill Education, 2013
2 **D. Catherine**, *Form & Fabric in Landscape Architecture: A Visual Introduction*. London and New York, 2001
3 **Ian L. McHarg**, *Design by Nature*. New York: J. Wiley, 1995
4 **Turner T**.: *City as Landscape*, Taylor & Francis, 1995
5 **Alexander C. et al**: *A Pattern language*, Oxford University Press, 1977

Course Title	**Design Studio VIII**		
Course Code	ARC 434	**Module**	3
No. of Credits	9.0	**Course Hour**	18.0

COURSE RATIONALE

This studio introduces student with various process of urban design required for particular problem-solving strategy in urban area. Students are introduced with large block development process by addressing contextual issues. Designing a housing project in a particular context is an exercise for student that ensure skills and knowledge regarding large scale and community design. Understanding the process in order to design a housing for a community and their impact on environment.

COURSE OBJECTIVES

- Make the students understand the meaning of urban spaces through practicing various process of urban design.
- To develop skills to realize the real problem of the city and find out the problem-solving strategy.
- Help them conceptualize basic theories in housing in current context and to compare between housing and house.
- To help the students to understand the process and guideline for designing a housing in local and international context.
- Acquaint students with the methodology to investigate a community for creating a new housing for them.

COURSE CONTENT

Study of city image, people perception of urban environment, physical development and municipal services through simulation, mapping and physical investigation. Projects focusing on urban renewal, regeneration, conservation, redevelopment and rehabilitation for urban areas. Investigation, analysis and design of housing/ communities with specific themes and their impact on the social, cultural and natural environment.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		**MAPPING CLO TO PLO**								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
CLO 1	outline various process of urban design as urban renewal, rehabilitation, regeneration and conservation	*								
CLO 2	apply the urban design method based on contextual issues for a particular problem in urban area		*							
CLO 3	analyze the data collected for understanding the community specially its social, infrastructural, economic, and other aspects				*					
CLO 4	design a housing project for thematic community through addressing social, economic, and environmental framework				*					
CLO 5	draw physical master plan of a housing project and other detail through computer technology for communication					*		*		

Books Recommended

1 **Levitt D, McCafferty J**.: *The Housing Design Handbook: A Guide to Good Practice*, 2nd edition, Routledge, 2018
2 **Aravena A., Iacobelli A.:** *Elemental: Incremental Housing and Participatory Design Manual*, 2013
3 **Hamdi N.**: *Housing Without Houses: Participation, Flexibility, Enablement*, 1995
4 **De Chiara J. et al**: *Time-Saver Standards for Housing and Residential Development*, 2nd edition, McGraw-Hill Education, 1997
5 **Heckmann F. et al**: *Floor Plan Manual Housing*, 5th Edition, Birkhäuser, 2017
6 **Spreiregen, P. D**: *Urban Design: The Architecture of Towns and Cities*, McGraw-Hill Book Company
7 **McGlynn S.**; *Responsive environments: A manual for designers*, Routledge
8 **Lynch, K.:** *Reconsidering the image of the city*. Springer, Boston, MA

Course Title	**Landscape Design Studio**		
Course Code	ARC 438	**Module**	3
No. of Credits	3.0	**Course Hour**	6.0

COURSE RATIONALE

This course offers landscape design concepts, tools and techniques to organize the out-door environment from both object and system-based approaches.

COURSE OBJECTIVES

- Help them conceptualize basic theories in landscape design.
- To develop skills to apply the concept and demand of out-door space.
- To help them systematically analyze context of the landscape (i.e., social, cultural, and environmental).
- To familiarize the students with landscape design tools for different out-door scales.
- To introduce the design process, focusing on site scale problems in a regional context.

COURSE CONTENT

Study of landscape natural and man-made elements, drawings and reports on outdoor elements and environment, Site analysis. Landscape graphics; Application of the principles and techniques of landscape design through design exercises of site planning and area development. Design of utility, maintenance and services.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		MAPPING CLO TO PLO								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
CLO 1	understand the basics principles of landscape design	*								
CLO 2	recognize landscape design and public activity and determine functional requirements of scale-specific projects			*						
CLO 3	draw landscape plans and develop 3D models for landscape projects					*		*		
CLO 4	identify and analyze the existing landscape networks and contextual issues related to urban landscape		*							
CLO 5	design tools and detail plans with realistic solutions				*					
CLO 6	design approaches according to local and regional framework				*					

Books Recommended

1 **John O. Simonds, S. Barry**, *landscape Architecture: A Manual of Environmental Planning and Design.* Fourth Edition, McGraw-Hill Education, 2013
2 **D. Catherine**, *Form & Fabric in Landscape Architecture: A Visual Introduction.* London and New York, 2001
3 **Ian, L. McHarg**, *Design by Nature.* New York: J. Wiley, 1995
4 **Turner T**.: *City as Landscape,* Taylor & Francis, 1995
5 **Alexander C. et al**: *A Pattern language,* Oxford University Press, 1977

Course Title	**Housing**		
Course Code	ARC 481	**Module**	8
No. of Credits	2.0	**Course Hour**	2.0

COURSE RATIONALE

Living accommodation is one of the most important ingredients to let human existence to survive. This course will ensure the knowledge about all aspects of living accommodation system which will let the students capable to design housing according to the needs.

COURSE OBJECTIVES

- To equip the students with the basics of living accommodation, the development of accommodation as a system.
- Acquaint students with the local and global context, culture, spatial qualities, problems and policies of housing, the impacts on human and environment.
- To aware the students on national and international housing legislations and regulations, limitations and possibilities, system of SWOT analysis.
- To make students competent to apply the latest housing technologies respecting market scenario and context to face the necessary demands of housing in different levels (high, middle and low).
- To develop leadership and cooperative qualities to work with all types of housing entrepreneurs and housing finance system.
- Foster creative innovations based on housing infrastructures, environment, spatial qualities and requirements and further research in housing.

COURSE CONTENT

Housing policy and Planning; Housing and Community; Their influence on individuals, societies and their environment, Physical, social, economic and technical aspects of housing problems in Bangladesh. Legislations and regulations;

Low-cost and low-income group housing; Role of private and public sectors in housing; PPP; housing finance, space standards, housing infrastructure and other design requirements. Current housing technologies and market scenario.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		MAPPING CLO TO PLO								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
CLO 1	Apply knowledge on housing to design practically and professionally	*			*					
CLO 2	understand and to make relation among the social needs, availability and ability locally and globally			*	*					
CLO 3	analyze critically to develop and to proceed design strategies				*		*			
CLO 4	evaluate among the social, cultural, environmental, technological diversities to work for housing		*							
CLO 5	apply housing design methods, research methods, implementation technologies, computer technologies to execute a qualitative and quantitative housing				*	*				
CLO 6	create a new innovative method by individual and/or cooperative works locally, nationally and internationally				*					

Books Recommended

1. **Adams, T**., *'The Design of Residential Area'*, Harvard University Press, 1934.
2. **Aldersons, S**., *'Housing'*, Penguin, 1962,
3. **Hamdi, N**.: *Housing Without Houses: Participation, Flexibility, Enablement*, 1995

4. **Turner, C., John**, *'Housing Priorities, Settlement Pattern and Urban Development in Modernizing Countries'*, 1968.
5. **Basu, A. R.**: *Urban Squatter Housing in the Third World*, 1988
6. **Wittkauer, R.**, *'Architectural Principles and the Age of Humanism'*, Tiranti, 1952.
7. **Schoenauer, N.**: *6,000 Years of Housing*
8. **Ameen, Shahidul, Rahaman, M.**, *'Transformation Properties in Shelter Generation: Study of a Government Built Low-Cost Housing Development Scheme'*, (Housing Development and Management, Center for Built Environment, 1996, ISBN-86699.00-7)

Course Title	**Architectural Research Methodology**		
Course Code	ARC 495	**Module**	9
No. of Credits	2.0	**Course Hour**	2.0

COURSE RATIONALE

This course intends to inculcate in the students the architectural research development process and techniques.

COURSE OBJECTIVES

- To provide the knowledge of the definition of research; explanation of research terms; description of the research process and ethics associated with the research process.
- To introduce the students with the quantitative, qualitative and triangulation research methods in research.
- Helping them to identify and apply appropriate methods for analytical data interpretation and understand the importance of analysis in research.

COURSE CONTENT

Introducing research as a tool for architectural design. Scope and importance of academic research in design process. Distinguish between research by design and design by research approach. Step wise methods of architectural design research. Writing skills and Referencing, as well as Verbal and Written presentation skills and techniques would be assessed throughout the semester. Research design, Data collection, analysis and decision-making process.

Literature review, case studies and surveys. Methods for architectural program formulation. Analogy and concept selection and development of an architectural program. Development of design guidelines and checklists. Design development strategy in a specific context / site.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		**MAPPING CLO TO PLO**								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
CLO 1	explain and adopt different approaches of research				*					
CLO 2	obtain, record, collate and analyze data using appropriate analytical techniques				*					
CLO 3	design, plan, conduct and report on investigations, which may involve primary or secondary data	*			*					
CLO 4	identify and review articles based on different research methods				*					
CLO 5	distinguish between quantitative and qualitative research methods				*					
CLO 6	maintain professional ethics and abstain from plagiarism									*

Books Recommended

1 **Groat, L.N. and Wang, D.:** Architectural Research Methods
2 **London, K. and Ostwald, M.**: Architectural Research Methods
3 **C. R. Kothari**: Research Methodology
4 **Sanoff, H.**: Methods of Architectural Programming
5 **Kumar, R.**: Research Methodology

Course Title	**Heritage studies & Conservation**		
Course Code	ARC 421	**Module**	2
No. of Credits	2.0	**Course Hour**	2.0

COURSE RATIONALE

This course intends to develop skills for understanding heritage issues and train students with fundamental ideas of heritage conservation management practice.

COURSE OBJECTIVES

- Helping the students to understand the chronological changes in society and belief in European nations after Roman era and continuity through modern period.
- To provide the knowledge of the spread of Christianity as a religion and influence on architectural development through Europe focusing on church architecture.
- Acquaint students with the construction techniques, structural evolution, material cultural through different style of European medieval architecture and understand.
- Foster the analytical and critical potential of the student on the built environment.
- Helping the students to develop ability in understanding the influence of Renaissance on development art and architecture in modern era by studying works from famous Renaissance men and their works.

COURSE CONTENT

Understanding heritage: Understanding heritage and process of heritagization. Relation with heritage, memory and place. Understanding conservation: Architectural & Urban Conservation; Its meaning, principles and scope; Definition of conservation; Preservation, restoration, renovation, reconstruction, adaptation, reuse, redevelopment, renewal etc at building and urban scale. History of conservation movements in the world. International conservation laws and role of

UNESCO. Ethics in Conservation and degrees of intervention in historic buildings and monuments and why to conserve issue. Conservation issues and context. Conservation policy, ethics, regulations, technology and finance. Understanding systematic Conservation Process and planning. Causes of decay and deterioration of cultural property: External causes of decay. The context of inspecting historic building, documentation, mapping and analysis. Preparation of inspection report. Techniques for restoration, preservation and rehabilitation. Concepts of historic towns, quarters and area concepts of heritage Zone and concept of integrated conservation. Planning and management aspects in conservation re-use and redevelopment of historic buildings and areas. Policies, legislations and agencies of conservation. Local and International case study and good practices.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		MAPPING CLO TO PLO								
	After successful completion of the course, students will be able to	1	2	3	4	5	6	7	8	9
CLO 1	distinguish between various architectural styles emerged from 400 AD to 1800AD in Europe (Knowledge)		*	*						
CLO 2	identify phases of development of church architecture in Europe with relevance to structure, material culture and construction technique (Knowledge)			*						
CLO 3	build a chronological framework for understanding the development of construction techniques (Application)				*					
CLO 4	respond verbally and in writing, to questions regarding architectural history, design, and significance (Communication)							*		
CLO 5	apply critical thinking to theories in the history of architecture (Evaluation)						*			

Books Recommended

1 **B.M. Fieldon**: The conservation of Historic Buildings
2 **Peter J Larkham**: Conservation and the City
3 **Graeme Aplin**: Heritage Identification, Conservation and Management
4 **Aylin Orbasli**: Architectural conservation

Course Title	Community Architecture and Planning		
Course Code	ARC 472	Module	7
No. of Credits	2.0	Course Hour	2.0

COURSE RATIONALE

This course intends to teach students issues of community involvement with architectural design and planning

COURSE OBJECTIVES

- To introduce a sense of spatial order, scale, culture and history in handling community architecture problems.

- To develop awareness on the need for socio-cultural expression and communication in the design of specific place in towns and cities.
- To develop awareness on the importance of community involvement/participation and co-design techniques in urban/community architecture.
- To provide the knowledge to design the built environment in the context of ecological balance, sustainable development and conservation of cultural and historical heritage.

COURSE CONTENT

Introducing community planning and design in architecture. Developing idea of neighborhood, community and society. Ideas of Co-creation and participatory design approaches, Relationship of community and culture, Understanding environmental issues with community. Socio-Cultural Basis of Design of
Communities. Orientation & Identity in Community Architecture, Creating the Sense of Place & Sense of Time. Exploring types of communities (e.g., cross-Roads Communities, agricultural communities, fishing communities, urban communities, and retirement communities),
Identifying community issues and problems, means of communication with community and use of media. Community as a key stakeholder in design and planning. Methods and tools for community engagement in design and planning. Community based management and monitoring.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		MAPPING CLO TO PLO								
	After successful completion of the course, students will be able to	1	2	3	4	5	6	7	8	9
CLO 1	explain community architecture		*							
CLO 2	use socio-cultural elements and relate historical background to community architecture		*	*						
CLO 3	recognize, classify, & compare special uses in a developed environment		*							
CLO 4	apply methods of community involvement as an effect way of stakeholder involvement				*				*	

Books Recommended

1 **Leon Krier**: The Architecture of Community
2 **Lane H. Kendig**: A Guide to Planning for Community Character
3 **Eric Damian Kelly**: Community Planning
4 **Jaimie Hicks Masterson et al**: Planning for Community Resilience

Course Title	Planning & Management for Disaster Resilience		
Course Code	ARC 473	Module	7
No. of Credits	2.0	Course Hour	2.0

COURSE RATIONALE

This course teaches architecture students to integrate and disaster resilience policies and technique with built environment through design and planning

COURSE OBJECTIVES

- To help the students to understand the causes and effects of natural calamities.
- To familiarize the students with the factors causing disaster.
- To provide an overall understanding of Disaster prevention and mitigation.
- To help them outline the concepts of disaster resistant construction.
- To expose the students to Case studies of Natural disasters in Bangladesh.

COURSE CONTENT

Concept and Issues in Disaster management: Types of environmental risks and hazards in Bangladesh, Cyclone risk, Flood risk, Earthquake risk etc. and their management, Urban
Hazards, Resilience and sustainability, Basic concept of Disaster, Hazard, Vulnerabilities and Capacity; Theories and Approaches to Disaster management, Demographic and socio-economic features:, Paradigm shift (HEP, NEP), Change in Perception, Twenty theories (economic theories, decision making theories etc.), Approaches to disaster management (sociological, anthropological etc.) Vulnerabilities and Disaster Risk Reduction (DRR): Risk and vulnerabilities assessment and management, Capacity building for disaster risk reduction, Structural response and warning systems, Site design, building codes, configuration and building systems. Design and planning in coastal ecosystem area; Institutional and regulatory
frameworks in Disaster Management: Pre disaster preparedness policy and ro admap, post disaster action plan and rehabilitation strategy, urban hazard mapping techniques and responsive planning and design, Technical and Institutional aspects of Pre and post hazard management.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		MAPPING CLO TO PLO								
	After successful completion of the course, students will be able to	1	2	3	4	5	6	7	8	9
CLO 1	create awareness about natural disasters and factors that causes them	*	*	*						
CLO 2	understand the design guidelines in disaster resistant construction			*						
CLO 3	adopt lessons from case studies of mitigating natural disasters in Bangladesh and mitigation policies by government			*						*
CLO 4	apply adaptive measures to encounter natural and man-made hazards		*		*					
CLO 5	foster knowledge about strategies for disaster management and mitigation	*	*						*	

Books Recommended

1. **Jaimie Hicks Masterson et al**: Planning for Community Resilience - A Handbook for Reducing Vulnerability to Disasters, Island Press, 2014
2. **Alexander Fekete, Frank Fiedrich (eds.)**: Urban Disaster Resilience and Security: Addressing Risks in Societies, Springer, 2018
3. **Michael K Lindell**: The Routledge Handbook of Urban Disaster Resilience, 2020
4. **Alan March and Maria Kornakova**: Urban Planning for Disaster Recovery, 2017
5. **Ronald W. Perry, Michael K. Lindell**: Emergency Planning (Wiley Pathways), John Wiley & Sons, 2006
6. **ADPC**: Handbook on Design and Construction of Housing for Flood-prone Rural Areas of Bangladesh, 2005
7. **K. Iftekhar Ahmed, Salek M. Seraj**: Building Safer Houses in Rural Bangladesh, 2004
8. **Bashirul Haq**: Battling the storm - Study on Cyclone Resistant Housing, 1999

Year/ Semester	**5th Year 1st Semester**		
Course Title	**Design Studio IX**		
Course Code	ARC 532	**Module**	2
No. of Credits	9.0	**Course Hour**	18.0

COURSE RATIONALE

This course will ensure students to deal a complex building project in a complete practical and professional manner.

COURSE OBJECTIVES

- To prepare students with the practical and professional manner to deal a complex building project.
- To make students capable to analyze FAR and to prepare Project Contract Proposal for the given project.
- To develop skills to integrate project feasibility, program, architect-client ambitions and concept in a single frame with satisfaction and perfection.
- To make students capable to design following the structural and brick module to decrease investment cost for construction.
- To enable to prepare RAJUK Approval Sheet, Fire Safety Approval Sheet and Working (construction) Drawing.
- To develop student's network and communication skill to deal with multi-professionals and project management.

COURSE CONTENT

Exercise on professionally comprehensive work including all design phases from formulation of architectural program to preparation of working drawings; Identifying design task to specific realistic problems; applying the existing codes and bylaws, and concentrating on the most significant contemporary environmental and professional challenges.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		MAPPING CLO TO PLO								
	After successful completion of the course, students will be able to	1	2	3	4	5	6	7	8	9
CLO 1	communicate with clients in a professional manner	*						*		*

CLO 2	analyze FAR and BNBC for all types of building projects	*			*					
CLO 3	prepare the RAJUK approval sheet, authority sheets, fire safety approval sheet and project agreement paper	*				*		*		
CLO 4	design and execute a building project in a practical and professional manner	*			*					*
CLO 5	design according to the client aspiration with a practical and professional point of view	*		*						*
CLO 6	conduct professional apprenticeship at an architectural consultancy firm								*	*

Books Recommended

1 BNBC-2006 and FAR-2008
2 Project Declaration and information Proposal
3 Professional RAJUK Approval Sheet, Fire Safety Approval Sheet, Working (construction) Drawing and Project Contract paper

Course Title	**Thesis I: Research Development**		
Course Code	ARC 594	**Module**	9
No. of Credits	2	**Course Hour**	4.0

COURSE RATIONALE

This is a preparatory course for developing thesis proposal of B Arch students.

COURSE OBJECTIVES

- To acquaint students with different phases of project proposal submission methods.
- To help the students to develop basic research question from a project context for further investigation.
- To enable them to develop research methods to address a thesis research question.

COURSE CONTENT

This course is the first phase of thesis stream where students will work to prepare their thesis proposal followed by adequate theoretical and physical survey. In this semester, students should go through series of individual assessments from thesis selection and research framework development. Students will be supervised by a thesis supervisor assigned by the department. At the end of this course students have to present their elaborated research proposal through thesis title defense.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		**MAPPING CLO TO PLO**								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
CLO 1	understand phases of thesis proposal development	*			*		*		*	

CLO 2	write a complete thesis proposal that will guide them for future thesis project	*			*		*		*	
CLO 3	prepare research questions from their thesis proposal				*					
CLO 4	outline the aim and objectives of the research				*					
CLO 5	conduct program research to prepare the program of the thesis project				*					
CLO 6	propose a work schedule for the upcoming thesis project								*	

Books Recommended

1 **Groat, L.N. and Wang, D**.: Architectural Research Methods
2 **London,K. and Ostwald,M**.: Architectural Research Methods
3 **Sanoff, H**.: Methods of Architectural Programming
4 **Kumar, R**.: Research Methodology.

Course Title	**Professional Practice I: Internship**		
Course Code	ARC 598	**Module**	9
No. of Credits	2.0	**Course Hour**	8 weeks

COURSE RATIONALE

This course will ensure the environment for the students to work practically and professionally held at a recognized architectural consultancy farm and thus develop architectural skill, network and communication.

COURSE OBJECTIVES

- To motivate and to prepare students with the practical and professional manner.
- To make students capable to understand professionalism and management.
- To help them integrate project client dealings, design development, project management, execution and site supervision.
- To make students confident enough to take social responsibilities.
- To enable the students to take new challenges with limited resources.
- To develop student's network and communication skill to deal with multi-professionals and project management.

COURSE CONTENT

The student is required to work in an Architectural firm under an authorized Architect/s for a minimum of 4 weeks to gain practical experience. After completing 90 credits, a student may
opt to acquire professional experience on part time basis under a member of Institute of Architects. The student shall submit a portfolio of his professional works at his convenience before final term to be evaluated by a board of examiners for a satisfactory certificate.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		MAPPING CLO TO PLO								
	After successful completion of the course, students will be able to	1	2	3	4	5	6	7	8	9
CLO 1	build and display professional attitude like a professional architect	*								*
CLO 2	cope up with professionalism	*								*
CLO 3	understand dealing all necessary aspects of a building project practically and professionally	*		*						
CLO 4	realize the social responsibilities, scopes and abilities of an architect keeping with close contact off			*						*
CLO 5	respect the client demand and architect aspiration within limitations	*		*						*
CLO 6	take forward a practical building project confidently and develop a professional network and communication skill within the industry	*						*		

Books Recommended

1 BNBC-2006 and FAR-2008
2 Project Declaration and information Proposal, Project Contract paper
3 Professional RAJUK Approval Sheet, Authority Drawing, Fire Safety Approval Sheet, Working (construction) Drawing, As Built Drawing

Course Title	Architecture in Dialogue: Seminar		
Course Code	ARC 592	Module	9
No. of Credits	2.0	Course Hour	4.0

COURSE RATIONALE

This course intends to inculcate in the students the architectural research paper preparation and publication process.

COURSE OBJECTIVES

- To familiarize the students with research paper writing and publication process.
- To provide the knowledge about ethics associated with the research paper writing and publication process.
- Helping them to identify and apply appropriate methods for representing the analytical data in research, both verbally and in written.

COURSE CONTENT

Overview of current development in research related to art and Architecture. Research and design process; Research design; Preparation of research papers including literature search, writing skills and referencing. Verbal and written presentation skills and techniques.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO	MAPPING CLO TO PLO

	After successful completion of the course, students will be able to	1	2	3	4	5	6	7	8	9
CLO 1	outline the basic structure of research papers							*		
CLO 2	prepare and publish a research paper				*			*		
CLO 3	write research proposals, abstract and referencing in proper format							*		
CLO 4	review research papers and journal articles				*					
CLO 5	recognize research publication process, journals and their indexing							*		
CLO 6	maintain professional ethics and abstain from plagiarism									*

Books Recommended

1 **Groat, L.N. and Wang, D.:** Architectural Research Methods
2 **London, K. and Ostwald, M**.: Architectural Research Methods
3 **C. R. Kothari**: Research Methodology

Course Title	Environmental Simulation Lab		
Course Code	ARC 542	Module	4
No. of Credits	2.0	Course Hour	4.0

COURSE RATIONALE

Simulation is the process of making a simplified model of some complex system and using it to predict the behavior of the system. In this course, state-of-the-art computer simulation methods for ventilation and thermal/energy analysis will be introduced.

COURSE OBJECTIVES

- To provide an understanding of building simulation methods and their underlying principles
- Handing-on experience in using computer simulation models to support the design process
- To develop an increased understanding of high-performance environmental design strategies in architecture

COURSE CONTENT

Introduction to the computer-based tools and techniques to assess and critically evaluate a design regarding its climatic factors. The focus of this exercise is to analyze the thermal, visual and acoustical performances of built-form, site-planning analysis, energy modelling and building performance, evaluation of energy efficiency using energy simulation software such as EnergyPlus, Ecotect, Radiance, Daysim, etc.

The course includes discussion of the benefits as well as the limitations of these tools and methods. Topics include fundamentals such as modeling strategies, underlying physical principles, understanding simulation assumptions, and interpreting results with an emphasis on developing the ability to translate the analysis into design decisions.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		MAPPING CLO TO PLO								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
CLO 1	develop a better understanding of building physics in architecture		*							
CLO 2	explore fundamental design issues such as building massing and envelope design		*							
CLO 3	conduct computerized building performance simulation for architecture					*				
CLO 4	interpret the outcome of the analysis on their own design intuition				*					
CLO 5	conduct further research and higher study in related filed								*	

Books Recommended

1. PETERS B., PETERS T. (2018) COMPUTING THE ENVIRONMENT: DIGITAL DESIGN TOOLS FOR SIMULATION AND VISUALISATION OF SUSTAINABLE ARCHITECTURE, WILEY

Year/ Semester	**5th Year 2nd Semester**		
Course Title	**Thesis III: Design Studio X**		
Course Code	ARC 534	**Module**	3
No. of Credits	12.0	**Course Hour**	24.0

COURSE RATIONALE

This is a thesis by design studio. Studio will develop a research-based design projects as a requirement of B arch degree.

COURSE OBJECTIVES

- To help the students to learn different phases of thesis development methods for design projects.
- To develop skills to address basic research question through architectural design.
- To develop skills to evaluate site and context in relation with proposed program to inform the design process.
- To enable them to deal with broader design problems in perspective of society, economy and environment using deeper research.
- Make the students understanding Architecture as Multifaceted Multi-disciplinary discipline

COURSE CONTENT

Identification of viable projects of significance as thesis projects. Preparation of complete design solution based on investigation and analysis of the physical and

contextual aspects of the problem, and on the understanding of design considerations of material, structure and form. Stress is given on the objective analysis of the related factors and in transforming them into a tangible Architectural solution of professionally acceptable quality. Design exercises of realistic complexities emphasizing professional level of competence. Formulation of Architectural programs for given projects. Preparation of design solution and development through the various phases.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		MAPPING CLO TO PLO								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
CLO 1	understand phases of thesis design development	*			*		*			
CLO 2	perform project work independently by adopting the case study methodology	*	*							*
CLO 3	utilize the method of research in data gathering for site selection and architectural planning and design solutions			*	*					*
CLO 4	demonstrate design presentation ability on large scale external jury						*	*		

Books Recommended

1 **Groat, L.N. and Wang, D.**: Architectural Research Methods
2 **Sanoff, H.**: Methods of Architectural Programming

Course Title	**Professional Practice II: Codes & Ethics**		
Course Code	ARC 593	**Module**	9
No. of Credits	2.0	**Course Hour**	2.0

COURSE RATIONALE

This course is offered to the outgoing students of B.Arch. Before the beginning of their career as a professional architect, this course intends to provide necessary ideas on the practice field. It is important to make them conscious about the inter-person relationship between different relevant professionals.

COURSE OBJECTIVES

- Make the students conscious of the duties and responsibilities of a professional architect.
- Enhancing the Professional ethics.
- Providing clearer idea about law and regulatory systems in the professional field.

COURSE CONTENT

The role of the Architect in the building industry and process; duties, responsibilities and obligations of the Architect; general conditions of contract; owner-Architect relationship; Architectural services; the Architect and the public; legal responsibilities of the Architect; Architects code of Conduct. Ethics.

The Architect's office; administration of construction; Competitions; the Architect and his consultants; official correspondence; professional organizations: local and

international. The regulatory system: planning and design controls, building code and approval process. Management principles and practices for the range of architectural practice.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		MAPPING CLO TO PLO								
	After successful completion of the course, students will be able to	1	2	3	4	5	6	7	8	9
CLO 1	explain roles and responsibilities of an architect	*								
CLO 2	manage office and contractual systems	*								
CLO 3	follow code of conduct and ethics									*
CLO 4	concern about regulatory and legal systems									*
CLO 5	practice according to accurate conception of the building codes and standards	*								

Books Recommended

1. **Namavati, R.:** Principles of Professional Practice.
2. **IAB:** Code of Ethics and Professional Conduct.
3. **American Institute of Architect**: The Architecture Student's Handbook of Professional Practice.

Course Title	**Thesis III-Dissertation**		
Course Code	ARC 596	**Module**	9
No. of Credits	3.0	**Course Hour**	6.0

COURSE RATIONALE

This course intends to teach the students about the preparation of report to supplement the various aspects of the thesis project of Arc 534, Design Studio X.

COURSE OBJECTIVES

- To introduce the students with the process of documentation and writing a thesis dissertation.
- To develop skills to write a thesis dissertation.
- To provide the knowledge about ethics associated with the dissertation writing process.

COURSE CONTENT

This is the third phase of thesis stream. Here students approach to report writing as a part of design effort. Preparation of report to supplement the various aspects of the thesis project of Arc 534, Design Studio X. The report should reflect the student's research in areas related of the thesis, comparative analysis and case studies. This should lead to the formation of criteria and conceptual approaches, design program and guidelines for design of the thesis in Arc 534: Design Studio X (Thesis)

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		MAPPING CLO TO PLO								
	After successful completion of the course, students will be able to	1	2	3	4	5	6	7	8	9
CLO 1	outline the basic structure of a thesis dissertation				*			*		
CLO 2	write research methodology, objectives and outcomes				*			*		
CLO 3	write research proposals, abstract and referencing in proper format							*		
CLO 4	review case studies and relevant research articles							*		
CLO 5	apply the knowledge in writing further research papers							*	*	
CLO 6	maintain professional ethics and abstain from plagiarism									*

Books Recommended

1 **Iain Borden**: The Dissertation: An Architecture Student's Handbook, 2006
2 **Groat, L.N. and Wang, D.:** Architectural Research Methods
3 **London, K. and Ostwald, M**.: Architectural Research Methods

Course Title	**Cost Estimation & Specification**		
Course Code	ARC 564	**Module**	6
No. of Credits	2.0	**Course Hour**	4.0

COURSE RATIONALE

This course aims to teach how, in relation to drawn details for building construction, to specify materials and methods of installations and precautions.

COURSE OBJECTIVES

- To introduce the students with the process of cost estimation of building construction.
- To introduce with the standards for specifications and rate schedule.
- To acquaint them with common building and finishing materials and their specifications.

COURSE CONTENT

Study of modes of measurement adopted in Bangladesh context, various methods for cost estimation of buildings. Calculation of Plinth area and cubic contents including estimation and their bases for different buildings. Calculating quantities for earth work building items, abstracting of quantities and item rate.

Definition, importance and use of specification; principles and practices, drafting of general and special specification clauses. Specification of common building materials and simple construction. Study and use of standard specification issued by engineering department in Bangladesh. Specification for special finishes, advanced/new building materials and direct construction elements.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		MAPPING CLO TO PLO								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
CLO 1	prepare Bill of Quotation (BOQ) and detail estimation	*						*		
CLO 2	identify the volume of civil works such as excavation, foundation, brickwork, casting and finishing work	*				*				
CLO 3	mention standard specifications in drawings properly	*						*		
CLO 4	prepare tender drawings and documents	*				*		*		
CLO 5	calculate the estimation of interior and electro-mechanical works	*				*				
CLO 6	suggest environmentally resilient building and finishing materials									*

Books Recommended

1. **B.N. Dutta:** Estimating and Costing
2. **P.L. Basin**: Quantity Surveying
3. **G.H. Cooper**: Building Construction and Estimating
4. **PWD Schedule – 2020**

Course Title	**Building Maintenance and Retrofitting**		
Course Code	ARC 567	**Module**	6
No. of Credits	2.0	**Course Hour**	2.0

COURSE RATIONALE

This course aims to teach the students building maintenance and retrofitting processes in order to enable them competent for their professional career.

COURSE OBJECTIVES

- To introduce the students with the policy and process of building maintenance.
- To help them understanding the factors and technical aspects affecting the maintenance.
- Acquaint the students with the utilization of retrofitting as a periodical solution.

COURSE CONTENT

Definition of building maintenance and building life cycle. Degradation and durability of building materials. Environmental influence of building materials. Factors affecting maintenance. Influence of design on building maintenance. Maintenance policy and guides. Building maintenance planning. Safety and economics in building operation. Operation and maintenance routines. Energy management. Organization of technical administration. Building inspection and schedule.

Retrofitting methods, analysis of retrofitting needs and possibilities, public demands and planning of retrofitting. Estimate/analyze deficiencies and retrofitting needs in the building stock. different solutions to common retrofitting problems. Seismic Strengthening and Seismic Retrofitting through architecture. Strengthening or Retrofitting Versus Reconstruction.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		MAPPING CLO TO PLO								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
CLO 1	understand building cycle and identify factors affecting maintenance		*							
CLO 2	minimize defects during construction and design	*								*
CLO 3	detail and choose materials during construction so that the job of maintenance is less onerous	*								*
CLO 4	take immediate remedial action									*
CLO 5	maintain the performance of the building fabric and services		*							
CLO 6	provide an efficient and acceptable operating environment to users		*							*

Books Recommended

1. **Brian J.B. Wood**: Building Maintenance
2. **PWD Bangladesh Manual**: Maintenance management, repairs, retrofitting and strengthening of buildings.
3. **Xilin Lu**: Retrofitting Design of Building Structures
4. **BNBC 2006:** (Chapter 5) Maintenance Management, Repairs, Retrofitting and Strengthening of Buildings

Non-Major Courses
(offered by Dept. of ARC for other departments)

Year/ Semester	**1st Year 2nd Semester**		
Course Title	**Computer Aided Engineering Drawing**		
Course Code	ARC 108E	**Module**	5
No. of Credits	1.5	**Course Hour**	3.0

COURSE RATIONALE
This course intends to train students to apply digital tools for engineering drawings and develop representation skills using computer aided software such as AutoCAD.

COURSE OBJECTIVES
- Helping the students to understand the basic knowledge of engineering drawing
- To provide the knowledge of the use of engineering drawing in the field of electrical engineering.
- Acquaint students with the basic tools of computer aided drafting using AutoCAD software.
- To help students to apply the knowledge through collaboration or teamwork.

COURSE CONTENT
Basic concepts and the use of engineering drawing in the design and manufacturing field of electrical engineering. Develop an understanding of 2D and 3D computer aided drafting with the requirements of good engineering drawings and be able to apply them to their work. Appropriate sketching exercises will be done during practice hours by using a package program namely AutoCAD.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		**MAPPING CLO TO PLO**								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
CLO 1	learn the symbol of different electrical fixtures in a building	*								
CLO 2	operate AutoCAD software using basic drawing commands	*		*						
CLO 3	draw the electrical layout of a room			*						
CLO 4	design electrical layout of a building			*	*					
CLO 5	place lighting fixtures appropriately in a building			*	*					
CLO 6	work as a team in different multidisciplinary projects			*				*		

Books Recommended

1. **BERND S. PALM**: INTRODUCTION TO AUTOCAD 2020: 2D AND 3D DESIGN

2. **MUNIR HAMAD**: AUTOCAD 2020, BEGINNING AND INTERMEDIATE.
3. **PRADEEP MAMGAIN**: AUTODESK 3DS MAX 2020: A DETAILED GUIDE TO MODELING, TEXTURING, LIGHTING, AND RENDERING, 2ND EDITION.

Year/ Semester	**1st Year 2nd Semester**		
Course Title	**Computer Aided Engineering Drawing**		
Course Code	ARC 108F	**Module**	5
No. of Credits	2.0	**Course Hour**	4.0

COURSE RATIONALE
This course intends to train students to apply digital tools for engineering drawings in the field of food engineering and tea industry and develop representation skills using computer aided software such as AutoCAD.

COURSE OBJECTIVES
- Helping the students to understand the basic knowledge of engineering drawing
- To provide the knowledge of the use of engineering drawing in the field of food industry and spatial planning.
- Acquaint students with the basic tools of computer aided drafting using AutoCAD software.
- To help students to apply the knowledge through collaboration or teamwork.

COURSE CONTENT
Basic concepts and the use of engineering drawing in the design and manufacturing field of food engineering and tea technology. Develop an understanding of 2D and 3D computer aided drafting with the requirements of good engineering drawings and enable students to apply them in their professional works. Appropriate sketching and drawing exercises will be done during practice hours by using a package program namely AutoCAD.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO		**MAPPING CLO TO PLO**								
	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
CLO 1	learn the types of different spatial layout in food industry	*								
CLO 2	operate AutoCAD software using basic drawing commands	*				*				
CLO 3	draw the detail 2-D layout of an industrial building					*				
CLO 4	design the basic spatial layout of a food processing and manufacturing industry					*				
CLO 5	formulate appropriate zoning in a food industry design	*				*				

CLO 6	work as a team in different multidisciplinary projects					*			*	

Books Recommended

1. **BERND S. PALM**: INTRODUCTION TO AUTOCAD 2020: 2D AND 3D DESIGN
2. **MUNIR HAMAD**: AUTOCAD 2020, BEGINNING AND INTERMEDIATE.
3. **Joseph De Chiara:** Time Saver Standards for Building Types
4. **Jargen Adam**: Industrial Buildings (Design Manuals)

Year/ Semester	**3rd Year 2nd Semester**		
Course Title	**Urban & Regional Planning**		
Course Code	ARC 301C	**Module**	8
No. of Credits	2.0	**Course Hour**	2.0

COURSE RATIONALE

The course aims to introduce the basic theory, concept and practices in physical planning through review and examination of city and regional structures since the beginning of the earliest human settlements to the contemporary, for the students of Civil and Environmental Engineering.

COURSE OBJECTIVES

- To provide the knowledge on the chronological development of cities and towns since the beginning of the earliest human settlements to the contemporary megalopolises, and beyond.
- Helping the students to understand the social-cultural and political forces that influenced the growth of the cities throughout centuries.
- Help them conceptualize basic theories in physical planning in relation to the study of built environment.
- Foster the analytical and critical thinking in understanding various physical environments in terms of their social-cultural, environmental and technological correspondents.

COURSE CONTENT

Concepts of Urban Planning: Definition, objective, scopes, trends, methods; Urban planning components: framework, forms and type of Planning; History of urbanization and planning: early to modern; Urban planning methods: Theories of zoning system.

Planning history, culture and practice in Bangladesh. Planning governance : Legistation, tools, instruments. concept of contemporary planning tools and process: Community planning, Public-Private partnership, Built-operate transfer, Transit-oriented Development.

MAPPING COURSE LEARNING OUTCOMES (CLO) TO PLO	**MAPPING CLO TO PLO**

	After successful completion of the course, students will be able to	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
CLO 1	distinguish various human settlements and identify their planning process		*							
CLO 2	develop a solid conceptual framework on their origin and evolution throughout history		*							
CLO 3	relate various socio-cultural, political, environmental and technological impacts to the growth of the cities throughout the globe		*							
CLO 4	communicate concepts in urban history and theory through both verbal and written presentations							*		
CLO 5	identify the limitations of planning and land management system in Bangladesh		*							
CLO 6	apply critical thinking in a range of corresponding fields of history and theory in regional and urban planning						*			

Books Recommended

1. **Doxiadis, C.A.:** Ekistics: An Introduction to the Science of Human Settlements.
2. **Gallion, A.B. & Eisner, S.:** The Urban Pattern: City Planning and Design
3. **Hall, P.;** Urban and Regional Planning (third edition); Routledge, London; 1992
4. **Christopher Alexander, Sara Ishikawa, and Murray Silverstein**; A Pattern Language: Towns, Buildings, Construction (1976)
5. **Gary Hack, et al.** (2009) Local Planning: Contemporary Principles and Practice
6. **Professor Golam Rahman** (2008), Town planning and the political culture in Bangladesh
7. **Sultana, S**.; Rural Settlements in Bangladesh: Spatial Pattern and Development; Graphosman, Dhaka; 1993