FACULTY OF PHYSICAL PLANNING & ARCHITECTURE

SYLLABUS

FOR

B. ARCHITECTURE
(SEMESTER: I - X)
(Under Credit Based Continuous Evaluation Grading System)

Examinations: 2015–16

GURU NANAK DEV UNIVERSITY AMRITSAR

(ii) Subject to change in the syllabi at any time.
Please visit the University website time to time.

B.ARCHITECTURE (Semester System)
(Under Credit Based Continuous Evaluation Grading System)

Semester I (Autumn Semester)								
S.No.	Course Code	Course Title	Course Type	Credits	L	T	U	Duration of Exam.
1.	ARL–101	Theory of Structures – I	DC	03	2	1	0	3hrs
2.	ARL–102	Building Science - I (Geology, Soils & Natural Calamities)	DC	03	2	1	0	3hrs
3.	ARU–103	Arts & Graphics-I	DC	03	1	0	2	4hrs
4.	ARU–104	Architectural Drawing–I	DC	05	1	0	4	4hrs
5.	ARU–105	Building Construction-I	DC	05	1	0	4	4hrs
6.	ARU–106	Architectural Design-I	DC	05	1	0	4	6hrs
7.	ENL-101	Communicative English	IC	02	2	0	0	3hrs
8.	PBL–121	Punjabi Compulsory **OR**	IC	02	2	0	0	3hrs
9.	PBL–122	Basic Punjabi (Mudhli Punjabi)	IC	02	2	0	0	3hrs
		GRAND TOTAL:		**28**	**12**	**02**	**14**	**–**

Semester-II (Spring Semester)								
S.No.	Course Code	Course Title	Course Type	Credits	L	T	U	Duration of Exam.
1.	ARL–152	Building Science –II (Building Materials)	DC	03	2	1	0	3hrs
2.	ARL–153	History of Architecture-I	DC	03	2	1	0	3hrs
3.	ARU–154	Arts & Graphics–II	DC	03	1	0	2	4hrs
4.	ARU–155	Workshop (Carpentry, Welding & Model Making)	DC	03	1	0	2	Viva Voce
5.	ARU–156	Building Construction-II	DC	05	1	0	4	4hrs
6.	ARU–157	Architectural Design-II	DC	05	1	0	4	6hrs
7.	ENL–151	Communicative English	IC	02	2	0	0	3hrs
8.	PBL–131	Punjabi Compulsory **OR**	IC	02	2	0	0	3hrs
9.	PBL–132	Basic Punjabi (Mudhli Punjabi)	IC	02	2	0	0	3hrs
		GRAND TOTAL:		**26**	**12**	**02**	**12**	
10.	-	Inter – Disciplinary Course	ID	-	-	-	-	-

B.ARCHITECTURE (Semester System)
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Semester-III (Autumn Semester)								
S.No.	Subject Code	Course Title	Course Type	Credits	L	T	U	Duration of Exam
1.	ARL–201	Building Science –III (Climatology)	DC	03	2	1	0	3hrs
2.	ARL–202	Theory of Design–I	DC	03	2	1	0	3hrs
3.	ARU–203	Architectural Drawing–II	DC	05	1	0	4	4hrs
4.	ARU–204	Building Construction-III	DC	05	1	0	4	4hrs
5.	ARU–205	Architectural Design-III	DC	08	2	0	6	12hrs
6.	ESL–220	Environmental Studies (Compulsory)	IC	03	3	0	0	3hrs
GRAND TOTAL:				**24**	**11**	**02**	**14**	**-**
7.		Inter – Disciplinary Course	ID	-	-	-	-	-

Semester-IV (Spring Semester)								
S.No	Course Code	Course Title	Course Type	Credits	L	T	U	Dura-tion of Exam.
1	ARL–251	Theory of Structures - II	DC	03	2	1	0	3hrs
2	ARL–252	Building Science – IV (Light-ing and Acoustics)	DC	03	2	1	0	3hrs
3	ARL–253	History of Architecture-II	DC	03	2	1	0	3hrs
4	ARU–254	Arts & Graphics–III	DC	03	1	0	02	4hrs
5	ARU–256	Building Construction-IV	DC	05	1	0	04	4hrs
6	ARU–257	Architectural Design-IV	DC	08	2	0	06	12hrs
7	ARL–258	Computer Application	DC	02	2	0	0	Viva Voce
8	ARF–259	Project Oriented Study Tour	DC	02	0	0	02	Viva Voce
GRAND TOTAL:				**29**	**12**	**03**	**14**	
9		Inter – Disciplinary Course	ID	-	-	-	-	-

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Semester V (Autumn Semester)								
S.No.	Course Code	Course Title	Course Type	Credits	L	T	U	Dura-tion of Exam.
1.	ARL–301	Structure Systems	DC	03	02	01	0	3hrs
2.	ARL–302	Building Services – I	DC	03	02	01	0	3hrs
3.	ARL–303	Theory of Design-II	DC	03	02	01	0	3hrs
4.	ARU–304	Building Construction–V	DC	05	01	0	04	4hrs
5.	ARU–305	Architectural Design–V	DC	08	02	0	06	Viva Voce
6.	ARL–306	Theory of Structures – III	DC	03	02	01	0	3hrs
7.	ARL–307	Surveying and Leveling	DC	03	02	01	0	3hrs
			GRAND TOTAL:	**28**	**13**	**05**	**10**	
8.		Inter – Disciplinary Course	ID	-	-	-	-	-

Semester VI (Spring Semester)								
S.No.	Course Code	Course Title	Course Type	Credits	L	T	U	Dura-tion of Exam.
1.	ARL–351	Building Services II	DC	03	02	01	0	3hrs
2.	ARL–352	History of Architecture - III	DC	03	02	01	0	3hrs
3.	ARL–353	Landscape Architecture	DC	03	02	01	0	3hrs
4.	ARU–354	Building Construction –VI	DC	05	01	00	04	4hrs
5.	ARU–355	Architectural Design–VI	DC	08	02	0	06	Viva Voce
6.	ARF–356	Project Oriented Study Tour	DC	02	00	0	02	Viva Voce
7.	ARL–357	Building specifications, Esti-mating & Costing	DC	03	02	01	0	3hrs
			GRAND TOTAL:	**27**	**11**	**04**	**12**	
8.		Inter – Disciplinary Course	ID	-	-	-	-	-

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Semester–VII (Autumn Semester)							
Sr. No.	Course Code	Course Title	Credits	L	T	U	Duration of Exam.
1	ARE–401	Practical Training	20	0	0	0	Viva Voce
		GRAND TOTAL:	20	0	0	0	
Note: The total duration of practical training will be of 24 weeks.							

Semester –VIII (Spring Semester)								
Sr. No.	Course Code	Course Title	Course Type	Credits	L	T	U	Duration of Exam.
1	ARL–451	Housing	DC	03	02	01	0	3hrs
2	ARL-452	Urban Design & Conservation	DC	03	02	01	0	3hrs
3	ARU-454	Building Construction-VII	DC	05	01	00	04	4hrs
4	ARU-455	Architectural Design-VII	DC	08	02	00	06	Viva voce
5	ARL–456	Maintenance and Adaptation of Buildings	DC	03	02	01	0	3hrs
Elective subjects (any ONE of the following)								
6	ARL-453	Vernacular Architecture	DE	03	02	01	0	3hrs
7	ARL-457	Hospital Architecture	DE	03	02	01	0	3hrs
8	ARL-458	Disaster Management	DE	03	02	01	0	3hrs
		GRAND TOTAL:		**25**	**11**	**04**	**10**	
9	-	Inter – Disciplinary Course	ID	-	-	-	-	-

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Semester IX (Autumn Semester)								
S.No	Course Code	Course Title	Course Type	Credits	L	T	U	Duration of Exam.
1.	ARL-501	Town Planning	DC	03	02	01	0	3 hrs
2.	ARL-502	Construction Manage-ment	DC	03	02	01	0	3 hrs
3.	ARL-503	Green Buildings	DC	03	02	01	0	3 hrs
4.	ARU-505	Building Construction VIII	DC	05	01	00	04	4 hrs
5.	ARU-506	Architectural Design VIII	DC	08	02	00	06	Viva Voce
6.	ARL-507	Professional Practice & Building Bye Laws	DC	03	02	01	0	3 hrs
GRAND TOTAL:				**25**	**11**	**04**	**10**	
7.		Inter – Disciplinary Course	ID	-	-	-	-	-

Semester–X (Spring Semester)								
Sr. No.	**Course Code**	**Course Title**	**Course Type**	**Credits**	**L**	**T**	**U**	**Duration of Exam.**
ELECTIVES (ANY ONE OF THE FOLLOWING THREE THEORY SUBJECTS)								
1.	ARL-551	Architectural Conservation	DE	03	02	01	0	3 hrs
2.	ARL-552	Interior Design	DE	03	02	01	0	3 hrs
3.	ARL-553	Multistoried Buildings	DE	03	02	01	0	3 hrs
4.	ARD-554	Architectural Thesis Project	DC	20	00	00	20	Viva - Voce
GRAND TOTAL				**23**	**02**	**01**	**20**	

B. ARCHITECTURE (Semester – I)
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ARL–101 **Duration of Examination: 3 Hrs**
Theory of Structures –I **Credits: 03 (L=2, T=1, U=0)**

Course Contents:

PART I

Introduction to Elementary theory of structure, Centre of gravity (CG), definition, centre of gravity of plane figures, CG by method of moments, numerical problems, Moment of Inertia; MI of plane area, MI by method of integration, MI of rectangular section, theorem of parallel axis (M1) and perpendicular axis and numerical problems.

PART II

Bending moment (BM), shear force (SF), type of supports, loads and beams, relation between SF and BM, BM and SF diagram for cantilever and simply supported beams with concentrated load, uniformly distributed load, design examples.

Moment of resistance, theory of bending, bending stresses, basic equation of bending, section-modulus of rectangular and circular sections. Numerical problems.

PART III

Classification of frames, analysis of perfect frame, assumptions, method of sections, method of joints and design examples. Link polygon, method of construction, resultant of concurrent forces, non–concurrent forces, co– planar parallel force system and numerical problems.

Suggested Readings:

1. Punmia, B.C.,"Strength of Materials and Theory of Structures", Vol. I, Laxmi Publications, New Delhi, 2010.
2. Ramamurtham, S.; "Strength of Materials", Dhanpatrai & Sons, New Delhi, 2011.
3. Nash, W.A., "Strength of Materials", Schaums Series, McGraw Hill Book Company, New York, 1989.
4. Bansal, R.K., "Engineering Mechanics and Strength of Materials", Lakshmi Publications, New Delhi, 2009.
5. Rajput, R.K., "Strength of Materials", S .Chand & Company Ltd., New Delhi 2010.

B. ARCHITECTURE (Semester – I)
(Under Credit Based Continuous Evaluation Grading System)

ARL–102 **Duration of Examination: 3 Hrs**
Building Sciences –I **Credits : 03 (L=2,T=1,U=0)**
(Geology, Soils & Natural Calamities)

Course Contents:

PART I

Introduction to building Science, Relevance of building science in Architecture, General Geology of Earth's Crust, Modes of Rock formation. Action of River, Glacier's sea, Wind, and the underground water.

Factors governing selection of Building Stones, geological criteria governing selection of sites. Terminology and basic knowledge (causes & impact) of natural calamities–Earthquakes, Tsunami, Landslides, Floods, Volcanoes, Cyclones, Hurricanes etc.

PART II

Type and characteristics of soils, classification of soils: as per particle size, texture particle size, Texture; Highway Research Board, Unified Soil Geological and I.S. classification system.

Introduction to soil mechanics, soil as three phase system, water content, UNIT weight, specific gravity, void ratio content and functional relationship.

PART III

Bearing Capacity of Soil–basic definitions, factors affecting bearing capacity of soils. Determination of bearing capacity by plate load test, cone penetration test, Methods to improve Bearing Capacity of Soils. Earth Pressure: Introduction to Active Earth Pressure & Earth Pressure at rest.

Suggested Readings:

1. Singh, Parbin, "Engineering and Geology" ,S.K. Kataria & Sons, New Delhi, 2010.
2. Simha, Bharata. Parkash, Shamsher; "Soil Mechanics and Foundation Engineering", Nem Chand & Bros., 1990.
3. Mukherjee, Pratip Kumar; "A Textbook of Geology", World Press Pvt. Ltd.,Kolkata. 1969
4. Mears, Brainerd ,"The Changing Earth- An introductory Geology ", Van Nostrand Reinhold Company.1970
5. Harbeck ,Richard M; Johnson, Lloyd K; " Earth & Space Science", Holt, Rinehart & Winston, Inc., New York.1965

B. ARCHITECTURE (Semester – I)
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ARU–103: Arts & Graphics –I **Duration of Examination : 4 Hrs**
Credits : 03 (L=1,T=0,U=2)

Course Contents:

- Different strokes used in pencil (2B, 4B, 6B), Charcoal pencil.
- Free hand still life sketching in pencil of various solids like cones, cubes, cylinders and spheres.
- Free hand drawing of objects of daily use like lamp, jug, bottle, cup, book etc.
- Free hand sketching in pencil of trees, shrubs, human figures, lamp posts, rocks etc.

Suggested Readings:

1. Williams, Guy R., “Drawing and Sketching” Museum Press,1963
2. Gill, Robert W., “Basic Rendering”, Thames & Hudson Australia Pty Limited, 1991
3. Goldman, Ken, “Charcoal Drawing”, Water Foster Publishing Incorporated, 2011
4. Gill, Robert W., “Rendering With Pen & Ink” Thames & Hudson Australia Pty Limited, 1990
5. Pitz, Henry C, “Charcoal Drawing” Watson-Guptill Publications, Incorporated, 1950

B. ARCHITECTURE (Semester – I)
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ARU–104: Architectural Drawing–I **Duration of Examination : 4 Hrs**
Credits : 05 (L=1,T=0,U=4)

Course Contents:

- Various types and grades of lines used in Architectural Drawing.
- Free hand lettering.
- Use of different scales (plain & diagonal) in Architecture.
- Drawing of plan, elevation and section of simple objects.
- Orthographic Projections of lines, planes & solids in various positions
- Section through solids
- Isometric/ axonometric views of solid compositions and buildings

Suggested Readings:

1. Bhatt, N.D. and Panchal, U.M. (2004). "Engineering Drawing – Plane and Solid Geometry", Charotar Publishing House, Bombay, India Reprint 44th Edition 2002.

2. Dhawan, R.K. (2005). "A Textbook of Engineering Drawing", S. Chand Publishers, New Delhi, India

B. ARCHITECTURE (Semester – I)
(Under Credit Based Continuous Evaluation Grading System)

ARU–105: Building Construction–I **Duration of Examination : 4 Hrs**
Credits : 05 (L=1,T=0,U=4)

Course Contents:

1. Introduction to tools used in masonry.
2. Types of Bricks.
3. Various types of brick bonds and wall junctions up to 13–1/2" wall thickness.
4. Brick Bonds:
    a. English Bond
    b. Flemish Bond (Single and Double)
    c. Rat Trap Bond

- Wall Junctions (English & Flemish bonds).
    a. L Junction
    b. Tee
    c. Cross, and
    d. Oblique
    e. (Laying of brick bonds/ junctions on sites)
- Dressing, laying and bonding in Stone Masonry.
    a. Random Rubble
    b. Coursed Rubble
    c. Ashlar
- Construction of brick jaalis and boundary walls
- Components of arches and types of Arches.
- Arches in bricks and stones
    a. Flat
    b. Segmental
    c. Semicircular
    d. Multi-foliated
- Finishing of brick and stone surfaces

Suggested Readings:

1. Watson, Don A., “Construction Materials and Processes”, McGraw Hill Co., University of Michigan, 1972.
2. Mckay, W.B., “Building Construction”, Vol.1, 2, 3, Longmans, U.K. 1981.
3. Alanwerth, “Materials”, The Mitchell Pub. Co. Ltd., London, 1986.
4. Chudley, R., “Building Construction Handbook”, British Library Cataloguing in Publication Data, London, 1990.
5. Barry, R., “Building Construction”, East West Press, New Delhi, 1999.

B. ARCHITECTURE (Semester – I)
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ARU–106: Architectural Design–I **Duration of Examination : 6 Hrs**
Credits : 05 (L=1,T=0,U=4)

Course Contents:
Two dimensional compositions using geometrical shapes like rectangle, circle, Square, triangle based on Principles of Design: Rhythm, Balance, Contrast, Emphasis.

Three dimensional compositions using geometrical forms like cube, cuboid, cylinder, pyramid, sphere etc.

Introduction to anthropometric study, basic dimensions of human beings in various postures

Study and design of small spaces like Drawing Room, Dining room, Bed room, Kitchen, Toilets, Study, Class room, Offices etc. based on circulation; furniture-size, shape and design; clearances; heights; light; ventilation etc.

Design of simple structures like Bus Shelter, Milk Bar, Ice-cream parlour etc.

Suggested Readings:

1. Chiara, Joseph De "Time Saver Standards for Building Types", McGraw–Hill Professional Publishing, 2001.
2. Smithies, K.W. "Principals of Design in Architecture", Chapman & Hall, 1983.
3. Ching, Francis D.K. "Architectural Form, Space and Order", Van Nostrand Reinhold International Thomson Publishing, Inc.: New York, 1996.
4. Rompilla, Ethel, "Color for Interior Design", Harry N. Abrams, New York, First Edition, 2005.

B. ARCHITECTURE (Semester – I)
(Under Credit Based Continuous Evaluation Grading System)

ENL–101 **Duration of Examination: 3 Hrs**
Communicative English **Credits: 02 (L=2,T=0,U=0)**

Objective: To introduce students to the skills and strategies of reading and writing by identifying organizational patterns, spotting classification systems and understanding associations between ideas. This course will prepare students to read a variety of texts and also to communicate more effectively through writing. The course will also pay special attention to vocabulary building.

Prescribed Text books:

1. *Making Connections: A Strategic Approach to Academic Reading* by Kenneth J. Pakenham, Second Edition.
2. *The Written Word* by Vandana R. Singh, Oxford University Press, New Delhi.

Course Contents:

1. Reading and Comprehension Skills:

Students will be required to read and comprehend the essays in Unit 1 and 2 of the book *Making Connections: A Strategic Approach to Academic Reading* by Kenneth J. Pakenham, Second Edition. They will be required to answer the questions given after each essay.

2. Developing Vocabulary and using it in the Right Context:

The students will be required to master "Word List" and "Correct Usage of Commonly Used Words and Phrases" from the Chapter "Vocabulary" in the book *The Written Word.*

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3. Writing Skills

Students will be required to learn "Report Writing" and "Letter Writing" as in the book *The Written Word.*

Students will be required to write long essays based on the prescribed text book *Making Connections: A Strategic Approach to Academic Reading.*

Minor 1:

Syllabus to be covered:

1. Unit 1 from *Making Connections: A Strategic Approach to Academic Reading* by Kenneth J. Pakenham, Second Edition.
2. Report Writing from *TheWritten Word.*

Suggested Paper Pattern:

1. Report Writing (8 marks)
2. Short answer type questions from Unit 1 of *Making Connections: A Strategic Approach to Academic Reading* (6 marks)
3. Essay type question from Unit 1 of *Making Connections: A Strategic Approach to Academic Reading* (6 marks)

Minor 2:

Syllabus to be covered:

1. "Word List" from the Chapter "Vocabulary" in the book *The Written Word.*
2. Unit-2 from the book *Making Connections: A Strategic Approach to Academic Reading* by Kenneth J. Pakenham, Second Edition.

B. ARCHITECTURE (Semester – I)
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Suggested Paper Pattern:

1. Word List from the Chapter "Vocabulary" in the book *The Written Word* (8 marks)
2. Short answer type questions from Unit 2 of *Making Connections: A Strategic Approach to Academic Reading* (6 marks)
3. Essay type question from Unit 2 of *Making Connections: A Strategic Approach to Academic Reading* (6 marks)

Suggested Paper Pattern for Major Exam:

1. Letter Writing as prescribed in *The Written Word /*1 out of 2 (10 marks)
2. Short answer type questions from Unit 1,2 of *Making Connections: A Strategic Approach to Academic Reading* (14 marks)
3. "Word List" and "Correct Usage of Commonly Used Words and Phrases" from the Chapter "Vocabulary" present in the book *The Written Word.* (10 marks)
4. Essay type question from Unit 1,2 of *Making Connections: A Strategic Approach to Academic Reading* 1 out of 2 (8 marks)
5. Report Writing from *The Written Word* (8 marks)

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PBL121: pj`bl l`zml **– I**

p`T-km Eq p`T-psqk-

Credits: 2–0–0

(I) 1. E`qm En`qm (sp. virE`m isG sD Eq f`. sihdrblr isG, gr n`nk dv wnlvristl, Eimqsr) ivcl hT ilK kh`xlk`r :
(a) grmK isG ms`iPr : gt`r
(E) sj`n isG : pT`x dl Dl
(e) krq`r isG dgl : acl Efl v`ll grg`bl
(kh`xl-s`r, ivS`-vsq, kh`xl-kl`, kh`xlk`r)

2. grmKl ErQgr`Pl dl jgq, (plql; mh`rnl; ibdl, itpl q EDk); ivr`m icn, Sbd jV (SD-ESD)

(II) 1. E`qm En`qm (sp. virE`m isG sD Eq f`. sihdrblr isG, gr n`nk dv wnlvristl, Eimqsr) ivcl hT ilK kh`xlk`r :
(a) sqK isG Dlr : s-Jl kD
(E) klvq isG ivrk : aj`V
(e) mihdr isG srn` : jQd`r mkd isG
(kh`xl-s`r, ivS`-vsq, kh`xl-kl`, kh`xlk`r)

2. lK rcn` (jlvnl-prk, sm`jk Eq clq iviSE- aq):
10 lK ilKv`ax (kl`s ivc Eq Gr lel EiBE`s)

(III) 1. E`qm En`qm (sp. virE`m isG sD Eq f`. sihdrblr isG, gr n`nk dv wnlvristl, Eimqsr) ivcl hT ilK kh`xlk`r :
(a) pm pk`S : m`V` bd`
(E) glz`r isG sD : klCx
(e) mhn Bf`rl : Gtx`
(s) virE`m isG sD : dldl
(kh`xl-s`r, ivS`-vsq, kh`xl-kl`, kh`xlk`r)

2. pr` pV k pSn- d aqr dx`
(E`qm En`qm psqk d kh`xl B`g ivcl 15 pirE- d EiBE`s krv`ax)

B. ARCHITECTURE (Semester – I)
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PBL-122: ਮੁੱਢਲੀ ਪੰਜਾਬੀ

(In lieu of Punjabi Compulsory)

2–0–0

ਪਾਠ–ਕ੍ਰਮ

1. ਪੰਜਾਬੀ ਭਾਸ਼ਾ,
   ਗੁਰਮੁਖੀ ਲਿਪੀ
   ਗੁਰਮੁਖੀ ਲਿਪੀ : ਬਣਤਰ ਅਤੇ ਤਰਤੀਬ

2. ਗੁਰਮੁਖੀ ਆਰਥੋਗ੍ਰਾਫੀ
   ਸੁਰ ਬਣਤਰ ਅਤੇ ਉਚਾਰਨ
   ਵਿਅੰਜਨ ਬਣਤਰ ਅਤੇ ਉਚਾਰਨ

3. ਪੰਜਾਬੀ ਸ਼ਬਦ ਬਣਤਰ
   ਸਾਧਾਰਨ ਸ਼ਬਦ
   ਇਕ ਉਚਾਰਖੰਡੀ ਸ਼ਬਦ

ਯੂਨਿਟ ਅਤੇ ਥੀਮ

1. ਪੰਜਾਬੀ ਭਾਸ਼ਾ : ਨਾਮਕਰਣ ਅਤੇ ਸੰਖੇਪ ਜਾਣ ਪਛਾਣ, ਗੁਰਮੁਖੀ ਲਿਪੀ : ਨਾਮਕਰਣ, ਗੁਰਮੁਖੀ ਵਰਣਮਾਲਾ; ਪੈਂਤੀ ਅੱਖਰੀ, ਅੱਖਰ ਕ੍ਰਮ, ਸੁਰ ਵਾਹਕ (ਓ ਅ ਏ), ਲਗਾਂ ਮਾਤਰਾਂ, ਪੈਰ ਵਿਚ ਬਿੰਦੀ ਵਾਲੇ ਵਰਣ, ਪੈਰ ਵਿਚ ਪੈਣ ਵਾਲੇ ਵਰਣ, ਬਿੰਦੀ, ਟਿੱਪੀ, ਅੱਧਕ।

B. ARCHITECTURE (Semester – I)
(Under Credit Based Continuous Evaluation Grading System)

2. ਗੁਰਮੁਖੀ ਆਰਥੋਗ੍ਰਾਫੀ ਅਤੇ ਉਚਾਰਨ; ਸੁਰਾਂ ਦੀ ਬਣਤਰ ਅਤੇ ਉਚਾਰਨ (ਲਘੂ-ਦੀਰਘ ਸੁਰ); ਸੁਰ ਅਤੇ ਲਗਾਂ ਮਾਤਰਾਂ; ਵਿਅੰਜਨਾਂ ਦੀ ਬਣਤਰ ਅਤੇ ਉਚਾਰਨ; ਪੈਰ ਵਿਚ ਪੈਣ ਵਾਲੇ ਵਰਣਾਂ (ਹ, ਰ, ਵ) ਦਾ ਉਚਾਰਨ ; ਲ ਅਤੇ ਲ਼ ਦਾ ਉਚਾਰਨ; ਭ, ਧ, ਢ, ਝ, ਘ ਦਾ ਉਚਾਰਨ; ਪੈਰ ਵਿਚ ਬਿੰਦੀ ਵਾਲੇ ਵਰਣਾਂ ਦਾ ਉਚਾਰਨ।

3. ਪੰਜਾਬੀ ਸ਼ਬਦ-ਬਣਤਰ : ਸਾਧਾਰਨ ਸ਼ਬਦ; ਇਕੱਲਾ ਸੁਰ (ਜਿਵੇਂ ਆ); ਸੁਰ ਅਤੇ ਵਿਅੰਜਨ (ਜਿਵੇਂ ਆਰ); ਵਿਅੰਜਨ ਅਤੇ ਸੁਰ (ਜਿਵੇਂ ਪਾ); ਵਿਅੰਜਨ ਸੁਰ ਵਿਅੰਜਨ (ਜਿਵੇਂ ਪਾਰ); ਕੋਸ਼ਗਤ ਸ਼ਬਦ (ਜਿਵੇਂ ਘਰ, ਪੀ); ਵਿਆਕਰਣਕ ਸ਼ਬਦ (ਜਿਵੇਂ ਨੂੰ, ਨੇ); ਪੰਜਾਬੀ ਸ਼ਬਦ ਰਚਨਾ-1; ਲਿੰਗ-ਪੁਲਿੰਗ, ਇਕ ਵਚਨ-ਬਹੁ ਵਚਨ; ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ-1: ਖਾਣ-ਪੀਣ, ਸਾਕਾਦਾਰੀ, ਰੁੱਤਾਂ, ਮਹੀਨਿਆਂ, ਗਿਣਤੀ, ਮੌਸਮ ਆਦਿ ਨਾਲ ਸੰਬੰਧਿਤ।

B. ARCHITECTURE (Semester – II)
(Under Credit Based Continuous Evaluation Grading System)

ARL–152: Building Science–II (Building Materials) **Duration of Examination : 3 Hrs**
Credits : 03 (L=2,T=1,U=0)

Course Contents:

Elementary elements of a building; their functions and characteristics
Brick: Classification; Uses; Composition of brick earth; Useful and harmful ingredients; Properties of good brick earth; Strength of bricks; Sizes and weight of bricks; Tests; Special forms; Manufacturing process of brick in brief.

Stone: Sources; Choice and uses of stone; Characteristics of good stone; Tests for stones; Preservation; Destroying agents; Stone quarrying, dressing and polishing; Artificial Stone.

PART II

Lime: Sources; Uses; Classification; Characteristics of good lime; testing lime stone; storing; manufacture in brief.

Cement: Characteristics and properties; Composition; Harmful ingredients; Tests; Field Examination; Uses; Storage; Varieties; Manufacturing process in brief.

Concrete: Properties; Uses; Material based Classification; Proportion of ingredients; Mixing and laying of lime concrete and cement concrete; Consolidating concrete; Construction Joints in concrete; Finishing concrete; curing of concrete; Special type of Concrete; Water Cement ratio; Consistency of concrete

PART-III

Timber: Structure of timber tree, Felling of trees, Characteristics of timber, Defects, diseases, Decay, Seasoning, Preservation, Conversion; Market forms Industrial forms; Various uses of timber.
Paints: Uses; Classification; Constituents; Characteristics; application on different surfaces; destroying agents; various paints.

Varnishes: Uses, Ingredients; Types; Characteristics of good varnish, Polishing, process of varnishing.

Suggested Readings:

1. Rangwala, S.C., “Engineering Materials”, Charotar Publishing House, Gujarat, 1997.
2. Punmia, B.C., “Building Construction”, Laxmi Publications Pvt. Ltd., New Delhi,
3. Lyons, Arthur, “Materials for Architects and Builders – An introduction”, Arnold, London, 1997.
4. Watson, Don A, “Construction Materials and Process”, McGraw Hill Co., University of Michigan, New Jersey, 1972.
5. Launders, Jack M., “Construction Materials and Methods Careers”, South Holland, Illinois Wilcox Co. Ltd., 1986.
6. Mckay, W.B.; “Building Construction”, Longmans, UK, 1981.
7. Ching, Francis D.K., “Building Construction”, Illustrated VNR.1975

B. ARCHITECTURE (Semester – II)
(Under Credit Based Continuous Evaluation Grading System)

ARL–153: History of Architecture–I **Duration of Examination : 3 Hrs**
Credits : 03 (L=2,T=1,U=0)

Course Contents:

PART I

- A brief reference to the shelters of prehistoric times
- River valley civilizations: Development of Architecture in Indus Valley, Nile Valley and plains of Tigris & Euphrates.
- Development of Architecture in Greek Civilization: Greek Orders, Temples, Optical Corrections, Theatres, Agora, Acropolis, etc.
- Development of Architecture during Roman period: Roman Orders, Temples, forums, basilicas, thermae, amphitheatres, etc.

PART II

- An overview of developments during the Vedic period
- Development of Buddhist Architecture: Ashokan pillars/ stambhas, Development of stupas, Development of rock cut architecture through the Hinayana & the Mahayana phase (chaityas & viharas)
- Genesis of Hindu Architecture during the Gupta & the Chalukyan period

PART III

- Development of Dravidian Architecture through different phases: Pallavas, Cholas, Pandyas, Vijainagar & Madura
- Indo–Aryan Architecture: Orissa, Khajuraho & Gujarat
- Jain Architecture

Suggested Readings:

1. Cruickshank, Dan; Sir Banister Fletcher's "A History of Architecture", CBS Publishers & Distributors, Delhi, 1999.
2. Fletcher, B., 'History of Architecture', CBS Publishers & Distributors, Delhi, 1999.
3. Brown, P., 'Indian Architecture (Buddhist and Hindu Periods)', DB Taraporevala Sons & Co. Private Ltd., Bombay, 1971.
4. Grover, S., 'Buddhist and Hindu Architecture in India', CBS Publishers & Distributors, Delhi, 2003.
5. Tadgel, C., 'The History of Architecture in India', Architecture Design & Technology Press, London, 1990.
6. Acharya, P.K., 'Hindu Architecture in India and Abroad', Oriental, New Delhi, 1979.

B. ARCHITECTURE (Semester – II)
(Under Credit Based Continuous Evaluation Grading System)

ARU–154: Arts & Graphics–II **Duration of Examination : 4 Hrs**
Credits : 03 (L=1,T=0,U=2)

Course Contents:

- Preparation of Colour wheel in Poster Colours. Use and application of colour wheel
- Outdoor free hand sketching of trees, shrubs, simple buildings, human figures, automobiles etc. in color (Water Colours, Pencil Colours and Poster Colours).
- Rendering of various scenes (small structures) such as Milk bar, Bus Stop, Cafeteria, Petrol filling station etc. in Pen & Ink, Water Colour and mix media.

Suggested Readings:

1. Oliver, Robert S., "The Sketch in Color (Architecture)", Van Nostrand Reinhold, 1984.

2. Suffudy, "Sketching Techniques", Watson-Guptill, 1985.

3. Smith, Ray, "Water Color Landscape", DK Adult, 1993.

4. Kasprisin, Ronald J., "Water Color in Architecture", Van Nostrand Reinhold, 1989.

5. Chen, S.M., "Architecture in Pen & Ink", Mcgraw-Hill, 1994.

6. Williams, G. R., "Drawing and Sketching", Museum Press, 1963.

7. Gill, R.S., "Basic Rendering", Thames & Hudson Australia Pvt. Ltd, 1991.

8. Ken. Goldman, "Charcoal Drawing", Walter Foster Publishing, 1996.

9. Gill, R.W., "Rendering with Pen & Ink:, Thames & Hudson, July 1984.

10. Campanario G., "The Art of Urban Sketching" Quarry Books, Dec 2012.

B. ARCHITECTURE (Semester – II)
(Under Credit Based Continuous Evaluation Grading System)

ARU–155: Workshop
(Carpentry, Welding & Model Making) **Duration of Examination : Viva Voce**
Credits : 03 (L=1,T=0,U=2)

Course Contents:

- **Carpentry**

– Measuring, cutting, sawing of natural wood in workshop,
– Different types of tools used for making joints namely; mortise & tenon joint, mitred joint, lap dove tail joint, T–lap joint, corner lap joint, cross lap joint, bridle joint, shoulder angle joint, through dovetail joint, rafter joint & notching joint.

- **Welding**

Process, types of welding namely gas welding/ oxy–acetylene & arc welding, equipment used, different types of welds and their suitability.

- **Model Making**

Introduction: Importance of architectural models in the profession, materials used in making different types of architectural models: their types and selection criteria. Techniques for fabrication of geometrical shapes like cube, cuboids, pyramids, prisms etc. Use of wood, cork sheet, mount board, ivory sheet, acrylic, x–ray sheet, tooth picks, threads, pins, etc. Preparation of Model Base: Components of site layout like parking, roads, pavements, landscaping, trees, slope/contours etc. by using materials like ply board, clay, Plaster of Paris, saw dust, foam, cork sheet, velvet sheet, sand paper, thermocol, etc. Preparation of Block Model: Building blocks by using materials like thermocol, wood, mount board, ivory sheet, foam etc. Preparation of Detailed Model: Building blocks with details like windows, doors, porch, balconies, pergola, terraces, parapet etc. Sectional model with details of inside, by using materials like wood, cork sheet, mount board, ivory sheet, acrylic, x–ray sheet, tooth picks, threads, pins, etc.

Suggested Readings:

1. Mills, Criss B., “Designing with Models”,John Wiley & Sons, New Jersey,.
2. Knoll, Wolfgang & Hechinger, Martin, “Architectural Models”, J.Ross Publishing, 2006.
3. Watson, Don A., “Construction Materials and Processes”, McGraw Hill Co., University of Michigan, 1972.
4. Mckay, W.B., “Building Construction”, Vol.1, 2, 3 Longmans, U.K.1981.
5. Alanwerth, “Materials”, The Mitchell Pub. Co. Ltd., London, 1986.
6. Chudley, R., “Building Construction Handbook”, British Library Cataloguing in Publication Data, London, 1990.
7. Rangwala, S.C., “Engineering Materials”, Charotar Pub.House, Gujarat, 1997.

B. ARCHITECTURE (Semester – II)
(Under Credit Based Continuous Evaluation Grading System)

ARU–156: Building Construction–II **Duration of Examina~tion: 4 Hrs**
Credits : 05 (L=1,T=0,U=4)

Course Contents:

- Foundations of walls and columns in stone and brick masonry.
- Damp proof courses of internal and external walls.
- Simple joints used in joinery of doors and windows.
- Introduction to hardware used in doors and windows.
- Various types of timber windows:
    1. Casement with ventilators
    2. Wire mesh
    3. Clerestory
    4. Bay
    5. Fixed, side and top hung, pivoted, louvered
- Various types of timber doors
    - Ledged, battened and braced.
    - Panel and Wire mesh
    - Flush
    - Glazed
- Details of lintel, Chhajja and sills in concrete, brick and stone.
- Flat slab construction of RCC/RBC roof slab incorporating terrace and parapet details.
- Plinth band, sill band, lintel band in masonry structures.

Suggested Readings:

1. Don A. Watson, “Construction Materials and Processes”, McGraw Hill Co., University of Michigan 1972.
2. Mckay, W.B., “Building Construction”, Vol.1, 2, 3 Longmans, U.K. 1981.
3. Alanwerth, “Materials”, The Mitchell Pub. Co. Ltd., London, 1986.
4. Chudley, R., “Building Construction Handbook”, British Library Cataloguing in Publication Data, London, 1990.
5. Barry, R, “Building Construction”, East west press, New Delhi, 1999.

B. ARCHITECTURE (Semester – II)
(Under Credit Based Continuous Evaluation Grading System)

ARU–157: Architectural Design–II **Duration of Examination : 6 Hrs**
Credits : 05 (L=1,T=0,U=4)

Course Contents:

- Memorial, Gateway etc.
- Small structures like Enquiry Booth, Extension counter like ATM, etc.
- Snack Bar, Petrol Pump, Police Assistance Booth, Rural Dispensary, Suvidha Kendra etc.
- Small single storied dwelling units like Studio Apartment, Tourist cottage, etc.

Suggested Readings:

1. Smithies, K.W; “Principals of Design in Architecture”, Chapman & Hall, London, 1983
2. Ching, Francis D.K; “Architectural Form , Space and Order”, Van Nostrand Reinhold International Thomson Publishing, Inc.: New York, 1996
3. Rompilla, Ethel; “Color for Interior Design”, Harry N. Abrams ,New York, First Edition, 2005
4. Chiara, Joseph De; “Time Saver Standards for Building types” McGraw–Hill Professional Publishing, 2001

B. ARCHITECTURE (Semester – II)
(Under Credit Based Continuous Evaluation Grading System)

ENL–151 Duration of Examination : 3 Hrs
Communicative English Credits : 02 (L=2,T=0,U=0)

Objectives: To equip students with the skill of reading and writing dexterously. By the end of the course the students will be skilled in the art of expressing their ideas in short and long compositions, noting information effectively and summarizing and abstracting more efficiently.

Prescribed Text books:
1. *Making Connections: A Strategic Approach to Academic Reading* by Kenneth J. Pakenham, Second Edition.
2. *The Written Word* by Vandana R. Singh, Oxford University Press, New Delhi.

Course Contents:

1. Reading and Comprehension Skills:

Students will be required to read and comprehend the essays in Unit 3 and 4 of the book *Making Connections: A Strategic Approach to Academic Reading* by Kenneth J. Pakenham, Second Edition. They will be required to answer the questions given after each essay.

2. Writing Skills

Students will be required to learn Paragraph and Essay Writing and Note Making, Summarizing and Abstracting as in the book *The Written Word* by Vandana R. Singh, Oxford University Press, New Delhi.

Minor 1:

Syllabus to be covered:
1. Unit 3 from *Making Connections: A Strategic Approach to Academic Reading* by Kenneth J. Pakenham, Second Edition.
2. ABC of Good notes, Sub dividing your Notes and Summarizing and abstracting included in the Chapter "Note Making, Summarizing and Abstracting" from *The Written Word.*

Suggested Paper Pattern:
1. Theoretical questions based on ABC of Good notes, Sub dividing your Notes and Summarizing and abstracting included in the Chapter "Note Making, Summarizing and Abstracting" *The Written Word* (8 marks).
2. Short answer type questions from Unit 3 of *Making Connections: A Strategic Approach to Academic Reading* (6 marks).
3. Essay type question from Unit 3 of *Making Connections: A Strategic Approach to Academic Reading* (6 marks).

B. ARCHITECTURE (Semester – II)
(Under Credit Based Continuous Evaluation Grading System)

Minor 2:

Syllabus to be covered:

1. Abbreviations and Symbols and Note making in practice from the chapter "Note-Making, Summarizing and Abstracting in the book *The Written Word*

2. Unit-4 from the book *Making Connections: A Strategic Approach to Academic Reading* by Kenneth J. Pakenham, Second Edition.

Suggested Paper Pattern:

1. A practical question on Note making in practice "Note-Making, Summarizing and Abstracting" from the chapter the book *The Written Word* (8 marks)

2. Short answer type questions from Unit 4 of *Making Connections: A Strategic Approach to Academic Reading* (6 marks)

3. Essay type question from Unit 2 of *Making Connections: A Strategic Approach to Academic Reading* (6 marks)

Suggested Paper Pattern for Major Exam:

1. Practical Question on Paragraph and Essay Writing as prescribed in *The Written Word* /1 out of 2 (10 marks)
2. Short answer type questions from Unit 3,4 of *Making Connections: A Strategic Approach to Academic Reading* (16 marks)
3. Essay type question from Unit 3,4 of *Making Connections: A Strategic Approach to Academic Reading* 1 out of 2 (10 marks)
4. Practical Question on Note Making from *The Written Word* (8 marks)
5. Theoretical Question(s) based on the two chapters from the book *The Written Word* (6 marks)

B. ARCHITECTURE (Semester – II)
(Under Credit Based Continuous Evaluation Grading System)

PBL-131: ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ–II

p`T-km Eq p`T psqk~

Credits: 2-0-0

(I) 1. E`qm En`qm (sp. virE`m isG sD Eq f`. sihdrblr isG, gr n`nk dv wnlvristl, Eimqsr) ivcl hT~ ilK kvl :

(a) B`el vlr isG
(E) p: prn isG
(e) p: mhn isG
(kivq`-s`r, ivS`–vsq, k`iv-kl`, kvl)

2. pj`bl Sbd bxqr : D`q/ml, vDqr (Egqr, ipCqr, ivalqpq Eq rp~qrl), sm`s |

(II) 1. E`qm En`qm (sp. virE`m isG sD Eq f`. sihdrblr isG, gr n`nk dv wnlvristl, Eimqsr) ivcl hT ilK kvl :

(a) Eimq` plqm
(E) f`. hrBjn isG
(e) iSv km`r bt`lvl
(kivq`-s`r, ivS`-vsq, k`iv-kl`, kvl)

2. pr` rcn` : kl`s ivc 10 iviSE~ (siBE`c`rk, D`rimk Eq r`jnlqk) q pr` rcn` d EiBE`s krv`ax |

(III) 1. E`qm En`qm (sp. virE`m isG sD Eq f`. sihdrblr isG, gr n`nk dv wnlvristl, Eimqsr) ivcl hT ilK kvl :

(a) f`. jsvq isG nkl
(E) f`. jgq`r
(e) f`. srjlq p`qr
(s) p`S
(kivq`-s`r, ivS`-vsq, k`iv-kl`, kvl)

2. mh`vr q EK`x (EK`x q mh`vr` kS ivc) 200 mh`virE~ Eq 100 EK`x~ n v`k~ ivc vrqx d EiBE`s krv`ax (kl`s ivc q Gr lel) |

B. ARCHITECTURE (Semester – II)
(Under Credit Based Continuous Evaluation Grading System)

PBL-132: ਮੁੱਢਲੀ ਪੰਜਾਬੀ

(In lieu of Punjabi Compulsory)

2–0–0

ਪਾਠ–ਕ੍ਰਮ

1. ਪੰਜਾਬੀ ਸ਼ਬਦ–ਬਣਤਰ
   ਸੰਯੁਕਤ ਅਤੇ ਮਿਸ਼ਰਤ ਸ਼ਬਦ
   ਬਹੁ–ਉਚਾਰਖੰਡੀ ਸ਼ਬਦ

2. ਪੰਜਾਬੀ ਵਾਕ–ਬਣਤਰ
   ਸਾਧਾਰਨ–ਵਾਕ : ਕਿਸਮਾਂ
   ਸੰਯੁਕਤ–ਵਾਕ : ਕਿਸਮਾਂ
   ਮਿਸ਼ਰਤ–ਵਾਕ : ਕਿਸਮਾਂ

3. ਪ੍ਰਕਾਰਜੀ ਪੰਜਾਬੀ
   ਚਿੱਠੀ ਪੱਤਰ
   ਪੈਰ੍ਹਾ ਰਚਨਾ
   ਸੰਖੇਪ ਰਚਨਾ
   ਅਖਾਣ ਅਤੇ ਮੁਹਾਵਰੇ

ਯੂਨਿਟ ਅਤੇ ਥੀਮ

1. ਪੰਜਾਬੀ ਸ਼ਬਦ-ਬਣਤਰ : ਸੰਯੁਕਤ ਸ਼ਬਦ; ਸਮਾਸੀ ਸ਼ਬਦ (ਜਿਵੇਂ ਲੋਕ ਸਭਾ); ਦੋਜਾਤੀ ਸ਼ਬਦ (ਜਿਵੇਂ ਕਾਲਾ ਸਿਆਹ); ਦੋਹਰੇ ਸ਼ਬਦ/ਦੁਹਰਰੁਕਤੀ (ਜਿਵੇਂ ਧੂੜ੍ਹ ਧਾੜ੍ਹ/ਭਰ ਭਰ), ਮਿਸ਼ਰਤ ਸ਼ਬਦਾਂ ਦੀ ਬਣਤਰ/ਸਿਰਜਨਾ; ਅਗੇਤਰਾਂ ਰਾਹੀਂ (ਜਿਵੇਂ ਉਪ ਭਾਸ਼ਾ), ਪਿਛੇਤਰਾਂ ਰਾਹੀਂ (ਜਿਵੇਂ ਰੰਗਲਾ), ਪੰਜਾਬੀ ਸ਼ਬਦ ਰਚਨਾ–2: ਪੜਨਾਵੀਂ ਰੂਪ, ਕਿਰਿਆ/ਸਹਾਇਕ ਕਿਰਿਆ ਦੇ ਰੂਪ; ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ–2: ਮਾਰਕੀਟ/ਬਾਜ਼ਾਰ, ਵਪਾਰ, ਧੰਦਿਆਂ ਨਾਲ ਸੰਬੰਧਿਤ।

B. ARCHITECTURE (Semester – II)
(Under Credit Based Continuous Evaluation Grading System)

2. ਪੰਜਾਬੀ ਵਾਕ-ਬਣਤਰ : ਕਰਤਾ ਕਰਮ ਕਿਰਿਆ; ਸਾਧਾਰਨ ਵਾਕ, ਬਿਆਨੀਆ, ਪ੍ਰਸ਼ਨਵਾਚਕ, ਆਗਿਆਵਾਚਕ, ਸੰਯੁਕਤ ਅਤੇ ਮਿਸ਼ਰਤ ਵਾਕਾਂ ਦੀਆਂ ਕਿਸਮਾਂ; ਸੁਤੰਤਰ ਅਤੇ ਅਧੀਨ ਉਪਵਾਕ; ਸਮਾਨ (ਤੇ/ਅਤੇ) ਅਤੇ ਅਧੀਨ (ਜੋ/ਕਿ) ਯੋਜਕਾਂ ਦੀ ਵਰਤੋਂ; ਪੰਜਾਬੀ ਵਾਕਾਂ ਦੀ ਵਰਤੋਂ : ਵਿਭਿੰਨ ਸਮਾਜਕ/ਸਭਿਆਚਾਰਕ ਪ੍ਰਸਥਿਤੀਆਂ ਦੇ ਅੰਤਰਗਤ; ਘਰ ਵਿਚ, ਬਾਜ਼ਾਰ ਵਿਚ, ਮੇਲੇ ਵਿਚ, ਸ਼ੌਪਿੰਗ ਮਾਲ/ਸਿਨਮੇ ਵਿਚ, ਵਿਆਹ ਵਿਚ, ਧਾਰਮਿਕ ਸਥਾਨਾਂ ਵਿਚ, ਦੋਸਤਾਂ ਨਾਲ ਆਦਿ।

3. ਇਸ ਯੂਨਿਟ ਵਿਚ ਚਿੱਠੀ ਪੱਤਰ (ਨਿੱਜੀ/ਦਫ਼ਤਰੀ/ਵਪਾਰਕ), ਪੈਰਾ ਰਚਨਾਂ, ਸੰਖੇਪ ਰਚਨਾ ਅਤੇ ਅਖਾਣ ਮੁਹਾਵਰਿਆਂ ਦੀ ਵਰਤੋਂ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀ ਦੀ ਭਾਸ਼ਾਈ ਯੋਗਤਾ ਨੂੰ ਪਰਖਿਆ ਜਾਵੇਗਾ।

B.ARCHITECTURE (Semester – III)
(Under Credit Based Continuous Evaluation Grading System)

ARL–201: Building Science–III (Climatology) **Duration of Examination 3 Hrs.**
Credits : 03 (L=2,T=1,U=0)

Course Contents:

PART I

Global Climatic Factors (Tropics): Basic Elements of Climate, Temperature, Humidity, Wind, Solar Radiation, Vegetation, etc., their measurements and effect. Climate zones and their classification–Tropical Climate, Cool Temperate, Hot–arid, Warm–Humid, etc. Concept of Macro climate and Micro Climate.
Thermal Qualities: Heat and Temperature, Solar Factor, Concept of Thermal Comfort, Heat Balance of Human Body, Effective Temperature and Corrective Effective Temperature, C.E.T. Analysis,

PART II

Heat Flow through Buildings. Concept of U–value, Heat Balance Equation of Buildings. Convection, Conduction, Radiation, Conductance, Resistance, Transmittance, etc.
Solar Radiation / Sun Angles: Solar Radiation, Position of Sun and methods of Recording it, Solar Penetration inside Buildings, Solar Charts, Solar Azimuth Angle, Solar Altitude Angle, Shadow Angle Protector, Design of Shading Devices – Horizontal and Vertical Shadow Angles and Vertical and Horizontal Shading Devices.

PART III

Wind: Wind Direction and speed and their impact on Design of Window openings, Heating and cooling effect through topography and Orientation of Buildings, Air Pattern inside and Around the Buildings. Position, Placement and size of windows.
Micro Climate: Effects of Topography and natural built up surroundings. Human comfort conditions and design of various building element to gain comfort, Site selection Site planning and Orientation of Buildings. Application of All Climatic Factors on the Design of Buildings, Traditional / Vernacular Shelter Design for Various Climatic Zones.

Suggested Readings:

1. Konniesberger, Ed., “Manual of Tropical Housing”, Longman Group. U.K., 2000.
2. Olgay,V; “Design with Climate”, Princeton University Press,London, 1963.
3. Ewans, Martin, “Climatology”, MN: Lerner Publications Company, Germany, 1971
4. Krishan, Arvind; “Climate Responsive Architecture”, Tata Mc Graw Hill, New Delhi.
5. Lal. D.S; “Climatology”, Sharda Pustak Bhawan, Allahabad, 2001.

B.ARCHITECTURE (Semester – III)
(Under Credit Based Continuous Evaluation Grading System)

ARL–202: Theory of Design –I **Duration of Examination 3 Hrs.**
Credits : 03 (L=2,T=1,U=0)

Course contents:

PART I

Theory of design, its scope and application, Elements of design: Mass, space, line, colour, texture, proportions. Principles of design: Rhythm, Balance, Harmony, Contrast, Variety. Objectives of design: Beauty, Order, Efficiency, Usefulness, Economy. Scale: Importance of scale in Architecture, Architectural scale, Human scale and monumental scale. Role of Color in Architecture, Theory of colors, effects and properties of colors,

PART II

Introduction to Form, Function and Circulation. Interrelationship of Form, Function and circulation in Architectural design. Organization of form & space, Mass space relationship.
Function: Formal & informal function, Zoning, Hierarchy of functions, activity charts and interdependence of form and function, functionalism and concepts of form follows function.
Circulation & Activity: Movement through space, Hierarchy of circulation spaces and linkages, various circulation patterns, Path space relationship and typology of the circulation space, Horizontal & vertical circulation and Movement as part of Activity. Analysis and classification of Circulation: Elements of horizontal and vertical circulation

PART III

Design Process: Design brief, Area programme analysis, Concept and Design development:
Design objectives, Thrust areas, Design methodology, Design idea and its evolution through design development, 3-dimensional visualization. Contextualization: Historical, Physical, Socio cultural & economic context.
Building types–Residential, Commercial, Institutional, Industrial and Recreational. Architectural character and Style, Study of modern and traditional Iconic buildings

Suggested Readings:

1. Ching, Francis D.K.; “Architecture form Space and Order”, Van Nostrand Reinhold, NY, 1996.
2. Smith, C. Ray; “Interior Design in The 20th Century”, Harper & Row, 1986.
3. Bunce, Fredrick W.; “The Iconography of Architectural Plans”, D.K. Print World, 2002.
4. Rompilla, Ethel; “Color for Interior Design”, Harry M. Abrams. Inc. Publisher, 2005.

B.ARCHITECTURE (Semester – III)
(Under Credit Based Continuous Evaluation Grading System)

ARU–203: Architectural Drawing–II **Duration of Examination 4 Hrs.**
Credits : 05 (L=1,T=0,U=4)

Course Contents:

I) Perspective (Normal and Birds' eye view):
- Introduction to basic terms, principles, types and techniques of perspective drawing
- One and two point perspectives of building forms
- Sectional Perspectives

II) Sciography:
- Introduction to basic principles of sciography and its application in the field of Architecture.
- Study of shadow of objects on
  - Horizontal surfaces
  - Vertical surfaces
  - Inclined surfaces
  - Curved surfaces
  - Complex surfaces
- Sciography of buildings/ building components in plan and elevation
- Sciography applied on the perspectives of the buildings

Suggested Readings:

1. D'Amelio, Joseph; "Perspective Drawing Handbook", Dover Publications, New York, 2004.
2. Smith, Ray; "Introduction to Perspective", Dorling Kindersley Publishers Ltd., 1999.
3. Warren, P.E. & Luzadder, J; "Fundamentals of Engineering Drawing", Prentice Hall, 1977.
4. Wyatt, William E.; "General Architectural Drawing", Chas. A. Bennett Co., Inc., 1969.
5. Bhatt, N.D.; "Engineering Drawing", Charotar; Tenth Edition, New Delhi, 1996.

B.ARCHITECTURE (Semester – III)
(Under Credit Based Continuous Evaluation Grading System)

ARU–204: Building Construction –III **Duration of Examination 4 Hrs.**
Credits : 05 (L=1,T=0,U=4)

Course Contents:

- Various type of floors and floor finishes.
- Various types of wall construction
  - Cavity wall
  - Hollow block wall
  - Dhajji wall
  - Concrete block wall
  - Mud block wall
  - Shear wall
- Different types of staircase and their various construction techniques

  Staircase:
  - Dog legged
  - Open well
  - Spiral
  - Helical
  - Cantilever

  Construction Techniques:
  - R.C.C. staircase
  - Waist slab
  - Folded slab
  - Central beam
  - M.S. staircase
- Section through a double storied building incorporating the above details.

Suggested Readings:

1. Bindra, S.P & Arora, S.P.; 'Text Book on Building Construction", D. R & Sons, 1977.
2. Watson, Don A.; "Construction Materials and Processes", McGraw Hill Co., New York 1972.
3. Mckay, W.B.; "Building Construction", Vol.1, 2, 3 Longmans, U.K., 1981.
4. Alanwerth; "Materials", The Mitchell Pub. Co. Ltd., London, 1986.
5. Chudley, R.; "Building Construction Handbook", British Library Cataloguing in Publication Data, London, 1990.
6. Barry, R.; "Building Construction", East West Press, New Delhi, 1999.

B.ARCHITECTURE (Semester – III)
(Under Credit Based Continuous Evaluation Grading System)

ARU–205: Architectural Design–III **Duration of Examination: 12 Hrs.**
Credits: 08 (L=2,T=0,U=6)

Course Contents:

- Residential building with small work area like Artist's Cottage, Architect's Residence, Farm House etc.
- Residential complex like Guest House, Hostel, Inn etc.
- Design of a house for physically challenged as per norms of the barrier–free environment.

Suggested Readings:

1. Chiara, Joseph De; "Time Saver Standards for Building Types", McGraw–Hill Professional Publishing. 2001.
2. Neufert, Ernst; "Architect's Data", 3rd Edition, Wiley–Blackwell, U.K., 2012.
3. Ching F.D.K; "Design Drawing", Van Nostrand Reinhold, 1998.
4. Smith P.F.; "Architecture and the Human Dimension", George Baldwin Ltd, 1979.
5. Ching F.D.K; "A Visual Dictionary of Architecture", Van Nostrand Reinhold, 1997.

B.ARCHITECTURE (Semester – III)
(Under Credit Based Continuous Evaluation Grading System)

ESL220: Environmental Studies (Compulsory)

Credit: 3–0–0

1. **The multidisciplinary nature of environmental studies:** Definition, scope & its importance, Need for public awareness.

2. **Natural resources**: Natural resources and associated problems.

   a) **Forest resources**: Use of over exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.

   b) **Water resources**: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.

   c) **Mineral resources**: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

   d) **Food resources**: World food problems, change caused by agriculture and overgrazing, effects or modern agriculture, fertilizer-pesticide problem, salinity, case studies.

   e) **Energy resources**: Growing of energy needs, renewable and non-renewable energy resources, use of alternate energy sources, case studies.

   f) **Land recourses**: Land as a resource, land degradation, soil erosion and desertification.

   g) Role of an individual in conservation of natural resources, Equitable use of resources for sustainable lifestyles.

3. **Ecosystem:**
   Concept of an ecosystem, Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in the ecosystem, Ecological succession, Food chains, food webs and ecological pyramids.
   Introduction, types, characteristic features, structure and function of the following ecosystems:
   a. Forest ecosystem
   b. Grassland ecosystem
   c. Desert ecosystem
   d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

4. Biodiversity and its Conservation:

Definition: Genetic, species and ecosystem diversity, Biogeographical classification of India.

Value of Biodiversity: Consumptive use; productive use, social, ethical, aesthetic and option values.

Biodiversity of global, National and local levels, India as mega-diversity nation "Hot-spots of bi-odiversity.

Threats to Biodiversity: Habitat loss, poaching of wild life, man wildlife conflicts Endangered and endemic species of India.

Conservation of Biodiversity: In situ and Ex-situ conservation of biodiversity.

5. Environmental Pollution:

Definition, Causes, effects and control measures of:

a) Air Pollution
b) Water Pollution
c) Soil Pollution
d) Marine Pollution
e) Noise Pollution
f) Thermal Pollution
g) Nuclear Hazards

Solid Waste Management: Causes, effects and control measures of urban and industrial wastes.

Role of an individual in prevention of pollution.

Pollution case studies Disaster Management: Floods, Earthquake, Cyclone and Landslides

6. Social Issues and Environment:

* From unsustainable to sustainable development
* Urban problems related to energy
* Water conservation, rain water harvesting, watershed management
* Resettlement and rehabilitation of people; its problems and concerns. Case studies
* Environmental ethics: Issues and possible solutions.
* Climate change, global warning, acid rain, ozone layer depletion, nuclear accidents and holo-cause. Case studies.
* Wasteland reclamation
* Consumerism and waste products
* Environmental Protection Act
* Air (prevention and Control of Pollution) Act
* Water (prevention and Control of Pollution) Act
* Wildlife Protection Act
* Forest Conservation Act
* Issues involved in enforcement o£. environmental legislation
* Public awareness

7. Human population and the environment

* Population growth, variation among nations
* Population explosion-Family welfare programme
* Environment and human health
* Human rights
* Value education
* HIV / AIDS
* Women and child welfare
* Role of information technology in environment :and human health
* Case studies

*** Road Safety Rules & Regulations:** Use of Safety Devices while Driving, Do's and Don'ts while Driving, Role of Citizens or Public Participation, Responsibilities of Public under Motor Vehicle Act, 1988, General Traffic Signs

*** Accident & First Aid:** First Aid to Road Accident Victims, Calling Patrolling Police & Ambulance

8. Field Work: Visit to a local area to document environmental assets–river / forest / grassland / hill / mountain. Visit to a local polluted site–Urban / Rural / Industrial / Agricultural. Study of common plants, insects, birds. Study of simple ecosystems–pond, river, hill slopes, etc. (Field work equal to 5 lecture hours)

References:

1. Agarwal, K. C. 2001. Environmental Biology, Nidhi Publications Ltd. Bikaner.
2. Bharucha, E. 2005. Textbook of Environmental Studies, Universities Press, Hyderabad.
3. Bharucha, E. 2004. The Biodiversity of India, Mapin Publishing Pvt. Ltd. Ahmedabad.
4. Brunner, R. C. 1989. Hazardous Waste Incineration, McGraw Hill Inc. New York.
5. Clark, R. S. 2000. Marine Pollution, Clanderson Press Oxford.
6. Cunningham, W. P., Cooper, T. H., Gorhani, E. & Hepworth, M. T. 2001. Environmental Encyclopedia, Jaico Publications House, Mumbai.
7. De, A. K. 1989. Environmental Chemistry, Wiley Eastern Ltd.
8. Down to Earth, Centre for Science and Environment, New Delhi.
9. Hawkins, R. E. 2000. Encyclopedia of Indian Natural History, Bombay Natural History Society.
10. Heywood, V. H & Waston, R. T. 1995. Global Biodiversity Assessment, Cambridge House, Delhi.
11. Jadhav, H. & Bhosale, V. M. 1995. Environmental Protection and Laws. Himalaya Pub.

12. Joseph, K. and Nagendran, R. 2004. Essentials of Environmental Studies, Pearson Education (Singapore) Pte. Ltd., Delhi.
13. Kaushik, A. & Kaushik, C. P. 2004. Perspective in Environmental Studies, New Age International (P) Ltd, New Delhi.
14. Miller, T. G. Jr. 2000. Environmental Science, Wadsworth Publishing Co.
15. Odum, E. P. 1971. Fundamentals of Ecology. W.B. Saunders Co. USA.
16. Rajagopalan, R. 2005. Environmental Studies from Crisis to Cure. Oxford University Press, New Delhi.
17. Sharma, B. K. 2001. Environmental Chemistry. Geol Publishing House, Meerut.
18. Sharma, J. P. 2004. Comprehensive Environmental Studies, Laxmi Publications (P) Ltd, New Delhi.
19. Sharma, P. D. 2005. Ecology and Environment, Rastogi Publications, Meerut.
20. Subramanian, V. 2002. A Text Book in Environmental Sciences, Narosa Publishing House, New Delhi.
21. Survey of the Environment. 2005. The Hindu.
22. Tiwari, S. C. 2003. Concepts of Modern Ecology, Bishen Singh Mahendra Pal Singh, Dehra Dun.
23. Townsend, C., Harper, J. and Michael, B. 2001. Essentials of Ecology, Blackwell Science.
24. Booklet on Safe Driving. Sukhmani Society (Suvidha Centre), District Court Complex, Amritsar.

B.ARCHITECTURE (Semester – IV)
(Under Credit Based Continuous Evaluation Grading System)

ARL–251 **Duration of Examination 3 Hrs**
Theory of Structures –II **Credits: 03(L=2, T=1, U=0)**

Course Contents:

PART I

Introduction to different methods used for the design of reinforced concrete structures, working stress method, ultimate load method, limit state method, types of limit states, characteristic values, design values, factored load, comparison of limit state and working stress methods of design.

Design of singly reinforced beams, doubly reinforced beams, cantilever beams; depth thickness of section, area of reinforcement steel, shear check, shear reinforcement, deflection length check, design examples Introduction to T beams and L beams. Effect of continuity of beams

PART II

Introduction to various types of slabs and difference b/w one way and two way slab. Design of one way slab; thickness of section, area of reinforcement, shear check, deflection check and design examples. Design of two way slab; IS 456:2000 codal provisions, various checks and design examples. Effects of continuity of slabs.

PART III

Design of columns; long and short columns, basic equation of design IS 456 code provisions, section of column, longitudinal and lateral reinforcement. Types of footings, Design of isolated square and rectangular footing, depth of footing from one way shear criterion, from two way shear criterion (punching shear and from bending moment criterion., Area of reinforcement and design examples.

Suggested Readings:

1. Ramamurthan, S; “Design of Steel Structures”, 7th Edition, Jain Book Agency Publishers, New Delhi, 2010.
2. Bhavikatti, S.S. “Design of Steel Structures”, Limit State method of design., I.K.International publishing House Pvt. Ltd., New Delhi, 2010
3. Sheykar, M.R. “Limit State Design in Strucrural Steel”, PHI learning Pvt. Ltd. New Delhi, 2010.
4. Chandra, Ram. “Design of Steel Structures”. Standard Books, 1970.
5. Dayratnam, P. “Design of Steel Structures”, S. Chand, New Delhi, 2008.
6. Arya and Ajmani, “Design of Steel Structures”, Nem Chand & Bros., Roorkee, 1974.
7. Duggal, S.K.; “Design of Steel Structures”, Tata McGraw Hill, New Delhi, 2009.

B.ARCHITECTURE (Semester – IV)
(Under Credit Based Continuous Evaluation Grading System)

ARL–252 **Duration of Examination 3 Hrs**
Building Science–IV (Lighting & Acoustics) **Credits : 03 (L=2,T=1,U=0)**

Course Contents:

PART I

Architectural lighting, Aesthetics and functions, concept of daylight and interior light, calculation of luminance and glare.

Luminaire design, types of luminance and their application, luminance light source, calculation of day light factor, illustrations required for various types of buildings such as residential, industrial, educational, recreational, health and cultural buildings.

PART II

Fundamentals of sound – terminology, Principals of transmission and passage of sound. Factors influencing hearing conditions– Shapes, layouts, Sitting arrangements of Auditoriums, Lecture Halls, Multipurpose halls, Reverbration, reflection and absorption of sound Reverbration time, Accoustical defects– Echo, Dead spot, sound foci, etc.

PART III

Structure and air borne sound, sound absorption–coeff of different materials, classification and selection of various materials for acoustical correction, Materials of sound insulation for different nature of problem and circumstances.

Acoustical design of Class rooms, Lecture rooms, Multipurpose halls, Conference rooms, Auditorium etc. Calculation of Reverberation time and time delay.

Suggested Readings:

1. "Time Saver Standards – Building Services", Published by McGraw–Hill, New York, 2001.
2. Bindra – Arora, "Building Construction", National Book Trust, India, 1986.
3. Punmia, B.C; "Building Construction", Laxmi Publication,New Delhi, 1993.
4. Konniesberger, ed.; "Manual of Tropical Housing", Longman Group. U.K. 2000.

B.ARCHITECTURE (Semester – IV)
(Under Credit Based Continuous Evaluation Grading System)

ARL–253: History of Architecture-II **Duration of Examination: 3 Hrs.**
Credits: 03 (L=2,T=1,U=0)

Course Contents:

PART I

Early Christian Architecture and Byzantine Architecture
Development of Romanesque Architecture in Italy, Central Europe, France

PART II

Development of Gothic Architecture in France, Great Britain, Italy
Gothic Architecture in Great Britain.
Gothic Architecture in Italy.
Development of Renaissance Architecture (Early Renaissance, High Renaissance and Mannerism) in Italy.

PART III

Development of Baroque Architecture in Italy.
Development of Renaissance Architecture in Britain
Influence of new building materials and technology on the development of architecture during Industrial Revolution.

Suggested Readings:

1. Fletcher, B; "A History of Architecture", Architectural Press, 1996.
2. Kostof, S.; "A History of Architecture", Oxford University Press, USA; 2nd Edition, 1995.
3. Giedion, S.; "Space Time and Architecture", Harvard U. Press; 5th Edition, 2003.
4. Benevolo, L.; "History of Modern Architecture", Vol. I, The MIT Press, Cambridge, 1977.

B.ARCHITECTURE (Semester – IV)
(Under Credit Based Continuous Evaluation Grading System)

ARU–254: Arts and Graphics – III **Duration of Examination 4 Hrs.**
Credits : 03 (L=1,T=0,U=2)

Course contents

Rendering of Plans, Elevations, Sections, Site Plans, Perspectives, Sectional Perspectives with various rendering techniques.

- Pen and Ink, Water colour/Poster Colour, Colour Pencils, Oil pastels.
- Photomontage techniques

Rendering in 2D and 3D, using manual techniques such as pencil shading, colouring, etc. and software's such as Photoshop and Google Sketch–up. Sketching in different modes like, natural, sepia, monochrome etc.

Suggested Readings:

1 Wang, Thomas C; "Pencil Sketching", John Wiley & Sons Inc., 2001.

2 Ching, Francis DK; "Architectural Graphics" (5th Edition), John Wiley & Sons, 2009.

3 Ramsey, Charles George; Sleeper, Harold Reeve; Bassler, Bruce; "Architectural Graphic Standards", Student Edition, John Wiley & Sons, 2008.

4 Albert, Greg and Wolf, Rachel Rubin; "Basic Watercolor Techniques"(Art Instruction), North Light Books, 1991.

5 Stephen, Kliment; "Architectural Sketching and Rendering: Techniques for Designers and Artists", Watson Guptil Publications, NY., 1984.

6 Ivo, Drpic; "Sketching and Rendering of Interior Spaces", Watson Guptil Publications, NY, 1988.

7 McGarry, Richard and Madsen, Greg; "Marker Magic– Problem Solver for Designers", John Wiley & Sons, 1993.

8 Gill, W Robert; "The Thames and Hudson Manual of Rendering with Pen & Ink", WW Norton and Co. Inc, 1990.

B.ARCHITECTURE (Semester – IV)
(Under Credit Based Continuous Evaluation Grading System)

ARU–256: Building Construction - IV **Duration of Examination 4 Hrs**
Credits : 05 (L=1,T=0,U=4)

Course Contents:

- Introduction to the various types of pitched roofs and their terminology.
- Various type of steel trusses and roof coverings

Steel trusses	**Roof coverings**
– Flat	– A.C. Sheets
– Bow string	– G.I. sheets
– North light or saw tooth	– Fiberglass

1. Waterproofing of roofs, walls and basements (Materials & Techniques)
2. Expansion joints in buildings
3. Temporary supporting structures
   a. Form work/shuttering (Pneumatic)
   b. Scaffolding
   c. Shoring & underpinning
4. Various type of wall cladding
   a. Glass wall with patch fittings
   b. Aluminum Composite panels
   c. Stone (Red sand stone/slates/granite/marble)
   d. Tile (brick/ vitrified)Grit block finish

Suggested Readings:

1. Bindra, S.P & Arora, S.P. “Text Book on Building Construction”, National Book Trust, India, 1986
2. Watson, Don A. “Construction Materials and Processes”, McG.raw Hill Co., 1972.
3. McKay, W.B. “Building Construction”, Vol.1, 2, 3, Longmans, U.K. 1981.
4. Alanwerth, “Materials”, The Mitchell Pub. Co. Ltd., London, 1986.
5. Chudley, R. “Building Construction Handbook”, British Library Cataloguing in Publication Data, London, 1990.
6. Barry, R. “Building Construction”, East West Press, New Delhi, 1999.

B.ARCHITECTURE (Semester – IV)
(Under Credit Based Continuous Evaluation Grading System)

ARU–257: Architectural Design–IV **Duration of Examination 12 Hrs.**
Credits : 08 (L=2,T=0,U=6)

Course Contents

- Village Study
- Walkup apartments 3 Storied
- Residential School, Small Institute, Tourist Resort, etc

Suggested Readings:

1. Unterman, Richard & Robert, Small; "Site Planning for Cluster Housing", Van Nostrand Reinhold, 1977.
2. Chiara, Joseph De; "Time Saver Standards for Building Types", McGraw–Hill Professional Publishing. 2001.
3. Neufert, Ernst; "Architect's Data", 3rd Edition, Wiley–Blackwell, U.K., 2002.
4. Chiara, J.D; Panero J; Zelnik M; "Time Saver Standards for Housing and Residential Development ", 2nd Edition, McGraw Hill, 1995.
5. Ching; F.D.K, "A Visual Dictionary of Architecture", Van Nostrand Reinhold, 1997.

B.ARCHITECTURE (Semester – IV)
(Under Credit Based Continuous Evaluation Grading System)

ARL–258: Computer Applications **Duration of Examination : Viva Voce**
Credits : 02 (L=2,T=0,U=0)

Course Contents:

PART I

Introduction to AutoCAD – Basics of Computer Aided Design, Application of AutoCAD in Architecture, drafting using various co–ordinate systems–absolute, relative & polar relative.

PART II

Preparation of 2–D Drawings, use of various drawing commands for 2–D drawings generation and editing commands for modification of drawings, application of layers.

PART III

3–D modeling–Use of various commands for 3–D solid and surface modeling, 3–D Editing commands.
Rendering of isometric views using various rendering commands
Use of layouts, concepts of x–ref, Preparation of rendered 3–D drawing projects

Suggested Readings:

1. Goldenberg, Joseph; "AutoCAD Architecture 2010 – Comprehensive Tutorial", Autodesk, 2010.
2. Aubin, Paul F; "Mastering Auto CAD Architecture", 2010.
3. Elise, Moss, "Autodesk AutoCAD Architecture 2013 Fundamentals", SDC Publications, USA, 2013.
4. Gill, P.S.; "Engineering Graphics and Drawing", S.K. Kataria & Sons, New Delhi, 2010.

B.ARCHITECTURE (Semester – IV)
(Under Credit Based Continuous Evaluation Grading System)

ARF–259: Project Oriented Study Tour **Duration of Examination: Viva Voce**
Credits: 02 (L=0, T=0, U=2)

Objective: The main aim is to explore, study , analyze and understand the contemporary / traditional / historical architectural characteristics and details of areas, places, buildings in different parts of India and abroad.

The students shall visit places as recommended by the teachers-in-charge and approved by BOC. The tour shall be of one to two weeks of duration.

General Guidelines for the Teacher:

Study of building materials and details through sketches and photographs to be made as an individual student activity and is to be submitted in a report form. Study of concepts/ construction techniques and architectural characters for different sites/ buildings visited to be submitted in groups of students. Viva voce of individual student for both the submissions will be conducted by the teacher in-charge, who accompanied the tour, as part of the internal assessment.

B.ARCHITECTURE (Semester – V)
(Under Credit Based Continuous Evaluation Grading System)

ARL–301: Structure Systems **Duration of Examination: 3 Hrs.**
Credits : 03 (L=2,T=01,U=0)

Course-contents:

PART I

Bulk Active Structure System:
Concept, development, laws of formation, Spans, Examples, merits and demerits, Slabs (one way and two way, Flat slab, Waffle slab), Beams (Simply supported, Cantilever, Continuous, Vier-en-deel Girders), Grid (skew and square).

Form Active Structure System
Concept development, laws of formation, Spans, Examples, merits and demerits, Funicular structures (Cables and Arches),

PART II

Form Active Structure System
Tents, Pneumatic structures

Vector Active Structure System
Concepts, development, laws of formation, Spans, Examples, Merits and demerits, Trusses, Space frames, Geodesic Dome.

PART III

Surface Active Structure System:
Singly curved shells, doubly curved shells, Hyperbolic paraboloids, folded plates

Introduction to foundation types

Suggested Readings:

1. Dayarathnam, P. “Pre-stressed Concrete Structures”, Oxford and IBM Publishing Co., New Delhi, 1982.
2. Schueller, Wolfgang; “High Rise Building Structures”, John Wiley & Sons, New York, 1976.
3. Otto, Frei.; “Pneumatic Structures”, Vol., 2, Cable Structures. The MIT Press, London.
4. Subramaniam, N.; “Principles of Space Structures”, Wheeler & Co., Allahabad, 1983.
5. Schodek, Daniel. “Structures”, Prentice Hall of India, New Delhi, 2004.
6. Engel, Heino; “Structures System”, Hatje Cantz Verlag, 2007.

B.ARCHITECTURE (Semester – V)
(Under Credit Based Continuous Evaluation Grading System)

ARL–302: Building Services-I **Duration of Examination: 3 Hrs.**
Credits : 03 (L=2,T=01,U=0)

PART I

- Importance and necessity of water supply schemes: Flow diagram
- **Quantity of Water**: Types of demands, domestic, commercial, industrial water demand, fire demand, per capita demand, prediction of population, hydrologic cycle, rainfall and run off, rainfall measurement.
- **Sources of Water Supply**: Surface sources, ground sources.
- **Collection of Water**: Different types of intakes, conveyance of water, pipe conduits, types of pipe materials, pipe joints
- **Quality of Water**: Impurities in water, Hardness in water, Standards of water quality
- **Purification of water**: Methods of treatment, sedimentation, filtration. Disinfection of water

PART II

- **Water Distribution System**: Classification of distribution, pressure in distribution systems, storage and distribution resources, layout of distribution system, appurtenances, water supply plumbing –individual buildings, fixtures and water storage in building.
- **Hot Water supply**: Hot water supply in single and multistoried buildings with special reference to National Building Code.

PART III

- **Sewerage and Sewage Disposal:**
  Basic definitions, methods of sewage Collection, types of sewers, and their layout, classification of sewerage system, sewer sections, sewer materials and joints, sewer appurtenances. storm water determination and its drainage.
- **Drainage of Buildings**:
  Principles of Building drainage, Different types of pipes, traps, sanitary fittings, plumbing systems of drainage: Single stack system, one pipe system, two pipe system, pipe sizes and gradients. Complete Layout of Water supply and sanitary system in a building.
- **Disposal in un-sewered areas:** Different types of pits, septic tank, design of septic tank, disposal of septic tank effluent. Brief description about analysis of sewage, Oxygen demand, Natural methods of sewage disposal

Suggested Readings:

1. Birdie G.S., Birdie J.S.,"Water Supply and Sanitary Engineering," Dhanpat Rai & Sons, New Delhi, 2008.
2. Chatterjee A.K.,"Water Supply and Sanitary Engineering," Khanna Publishers, Delhi, 2009.
3. CPHEEO,"Manual on water supply and treatment, "Ministry of works and housing, New Delhi, 2010.
4. Engineer Manual, "Water Supply, Water Storage", EM 1110-3-163, Government Publications, 2009.
5. Khanna P.N.,"Indian Practical Civil Engineer's Handbook," Engineers Publishers, New Delhi, 1992.
6. Shah S. Charanjit, "Water Supply and Sanitation," Galgotia Publishing's, New Delhi, 2008.
7. Fair G.M,"Water-supply and Waste-water Disposal," John Wiley& Sons, 2009.
8. Mark J Hammer,"Water-supply and Pollution-control," Prentice-Hall Higher-Education, 2008.

B.ARCHITECTURE (Semester – V)
(Under Credit Based Continuous Evaluation Grading System)

ARL–303: Theory of Design – II **Duration of Examination: 3 Hrs.**
Credits : 03 (L=2,T=01,U=0)

Course Contents:

PART I

Introduction to Modern Architecture, Reasons for evolution of modern architecture, origins – Neoclassicism and Revivalism – works of Ledoux and Boullee Durrand. Socio–Cultural and Technical transformations that led to Advent of Modern Architecture. Arts & Crafts in England, Willium Morris, Structure Rationalism & influence of Violet Le Duc, Art Nouveu – Victor Horta, Antonio Gaudi

PART II

The design philosophy and exemplary works of Louis Sullivan and Frank Lloyd Wright – the evolution of their philosophy through various stages of early works, midlife and late years. The principles of organic Architecture. Walter Gropius and Mies Van Der Rohe , New –Conception of Spaces, Paul–Rudolph Brutalism. Alvar Aalto – Spatial Compositions and Abstract Masses. The design philosophy & exemplary works of Le Corbusier. Pluralism in the 1970s, the exemplary works and design philosophy of Eero Saarinen, John Utzon, Louis I Kahn, Philip Johnson. Elementary reference to Post – Modernism in the west, Works of Venturi, Rossi, Michel Graves

PART III

Post Independence influence of Modern Masters, Corbusier and Kahn in India. Indian Modern Architects-A.P. Kanvinde, Joseph Allen Stein, Charles Correa. Balkrishna Doshi (early works). Regionalism – Raj Rewal, Late works of Doshi and Laurie Baker. Globalization and its impact on India, rise of Indian and Multi–National corporations and their architecture.

Suggested Readings:

1. Bahga, Sarabjit, Surinder Bahga and Yashinder Bahga “Modern Architecture in India”, Galgotia Publishing Co., New Delhi, 1993.
2. Bhatt, Vikram and Peter Seriver; “Contemporary Indian Architecture”: After the Masters, Ahmedabad. 1990
3. Correa, Charles M; “The New Landscape”, Bombay Strand Books, 1985.
4. Frampton, Kenneth; “Modern Architecture: A Critical History”, Thames & Hudson, UK, 2007.
5. Giedion Sigfried; “Space, Time and Architecture”, Harvard University Press, 2009.
6. William, J. Curtis; “Architecture since 1990”. Phaidon Press Limited, London, 1982
7. Lang, Jon, Madhavi Desai & Mili Desai; “Architecture and Independence- The Search for Identity – India 1880–1980”, Oxford University Press (Selected Portions only), 1997.
8. Edward, R. Ford; “The Details of Modern Architecture”, The MIT Press, 2003.

B.ARCHITECTURE (Semester – V)
(Under Credit Based Continuous Evaluation Grading System)

ARU–304: Building Construction–V **Duration of Examination: 4 Hrs.**
Credits: 05 (L=1,T=01,U=4)

Course Contents:

- Steel and aluminum doors, windows and glazing., Panel steel (Box section)
- Special doors and their detailing like
    - Sliding
    - Sliding and folding
    - Collapsible
    - Rolling shutter (curtain lath + curtain rods)
    - Pivoted
- Partitions (glass bricks, wooden, board), Paneling (board, fiber–sheet, polycarbonate sheet) and false ceiling (gypsum board, Pop, aluminum section, plywood, canvas)
- Introduction to partitions for large span structures e.g. convention centre
- Cupboards, cabinets, counters and showcase/Display windows
- Construction details of an interior like office, showroom, etc. incorporating the above details.

Suggested Readings:

1. Kumar, Sushil; “Building Construction”, Standard Publishers & Distributors, 1986
2. Ching, D.K. Francis; “Building Construction Illustrated”, CBS Publishers & Distributors, New Delhi, 1999.
3. Chudley, R.; “Building Construction Handbook”, British Library Cataloguing in Publication Data, UK, 2004.
4. Mckay, J.K.; “Building Construction Metric – Volume 4”, Orient Longman Limited Publications, New Delhi, 2000
5. Goyal, M.M.; “Handbook of Building Construction – The Essential Source of Standard Construction Practices”, Jain Book Agency, 2004
6. Chudley, R & Greeno, R..; “Building Construction Handbook”, Butterworth-Heinemann, 2006.
7. Barry, R., “Building Construction”, East West Press, New Delhi, 1999.

B.ARCHITECTURE (Semester – V)
(Under Credit Based Continuous Evaluation Grading System)

ARU–305: Architectural Design–V **Duration of Examination Viva Voce**
Credits : 8 (L=2,T=0,U=06)

Course Contents:

- Institute building
- Cultural complex – Museum, Art Gallery and Exhibition, Cultural Centre/ Convention Centre etc.
- Public buildings – Administrative complex, Judicial complex, Office building etc.

Suggested Readings:

1. Chiara, Joseph De; "Time Saver Standards for Building Types", McGraw–Hill Professional Publishing. 2001.
2. Neufert, Ernst; "Architect's Data", 3rd Edition, Wiley–Blackwell, UK, 2002.
3. Mimi, Zeiger; "New Museum Architecture: Innovative Buildings from Around the World", Thames and Hudson, UK, 2005.
4. Thomas A. Heinz; "Frank Lloyd Wright's Public Buildings", Gramercy Books, 2002.
5. Chris Van Uffelen and Chris Van Uffelen; "Contemporary Museums: Architecture - History – Collections", Braun Publishing Agency, Switzerland.

B.ARCHITECTURE (Semester – V)
(Under Credit Based Continuous Evaluation Grading System)

ARL–306 **Duration of Examination 3 Hrs**
Theory of Structure – III **Credits : 03 (L=2,T=01,U=0)**

Course-contents:

PART I

Type of walls, Design of columns and walls in masonry; allowable stresses, cross sectional area factor, shape factor, slenderness ratio, effective height/ length, effective thickness, load factor and design examples. Design of foundations in masonry work, loads on foundation, safe bearing capacity, depth of foundation, Rankin's formula, section of footing and design examples. Retaining walls in masonry, loads, resultant pressure, conditions for stability of structures, middle third rule, design examples.

PART II

Introduction to steel structures and various steel sections. Design philosophy, principles of limit state method of design. Connections, Riveted, bolted and welded connections, types of bolted joints, various failures and efficiency of joint and numerical examples. Welded connections different types of welds, advantages and disadvantages including, design of welded joints.

PART III

Behaviour of compression members subjected to axial loading, effective length, radius of gyration, slenderness ratio, permissible stresses and design examples. Behaviour of tension members, Design strength due to yielding of gross cross-section, due to rupture of critical section and due to block shear. Behaviour of steel beams, web buckling and web crippling, design procedure, shear check and deflection check.

Suggested Readings:

1. Anand S. Arya, “Masonry and Timber Structures” Name of Publisher “Nem Chand and Brothers, 2006”.
2. Frederick Putnam Spalding “Masonry Structures” Name of Publihser: Bibliolife, 2008.
3. Bhavikatti, S.S. Design of Steel Structures by Limit State method of design., I.K.International publishing House Pvt. Ltd.2010
4. Sheykar, M.R. Limit State Design in Strucrural Steel, PHI learning Pvt. Ltd. 2010.
5. Chandra, Ram. Design of Steel Structures. Standard Books, 1970.
6. Dayratnam, P. Design of Steel Structures. S. Chand, 2008.
7. Arya and Ajmani,Design of Steel Structures. Nem Chand, 1974.
8. Duggal, Design of Steel Structures. Tata Magra Hill 2009.

B.ARCHITECTURE (Semester – V)
(Under Credit Based Continuous Evaluation Grading System)

ARL–307 **Duration of Examination 3 Hrs**
Surveying & Leveling **Credits: 03 (L=2, T=1, U=0)**

Course Contents:

PART I

LINEAR MEASUREMENTS

Different methods, Instruments for Chaining, Ranging out survey lines, chaining, chain triangulation. Field Book, Field work, Instrument for setting out right angles, Obstacles in chaining, introduction to total station survey; methods and specifications.

COMPASS SURVEYING

Bearing & angles, Theory of magnetic compass, Prismatic compass magnetic declination and local attraction.

PART II

PLANE TABLE SURVEYING

General: Accessories, Working operations, methods of plane tabling. Intersection, Traversing, Resection, 3 point problems, Errors in plane tabling, Advantages & disadvantages of plane tabling.

CONTOURING

Contour interval, Characteristics of contours, Interpolation of contours, contours gradient, Use of contours maps, computation of volume of earth from contour plans, calculation of Areas, Use of Planimeter.

PART III

LEVELING

Definitions, methods of leveling, dumpy level, leveling staff, Temporary adjustment of a level, Theory of direct leveling, Differential leveling, Booking & Reducing levels, Balancing B.S.& F.S., Cross sectioning. Theodolite & its structure, Definition & terms, Measurements of horizontal angles.

Suggested Readings:

1. Punmia, B.C. “Surveying and Levelling” by Laxmi publication.
2. Duggal, S.K. “Text Book of Surveying” Published by Tata McGraw–Hill ninth reprint 2008.
3. Clendinning & Oliver,“Surveying” published for the Institutes of Surveyors in Queensland, New South Wales, Victoria, South Australia, Western Australia and Tasmania by the Queensland Institute of Surveyors.
4. Arora, K.R. “Principles & use of Surveying Instruments”

B.ARCHITECTURE (Semester – VI)
(Under Credit Based Continuous Evaluation Grading System)

ARL–351: Building Services – II **Duration of Examination: 3 Hrs.**
Credits : 03 (L=2,T=01,U=0)

Course Contents:

PART I

Electrical

Basic principles of electrical circuits; Ohm's and Kirchoff's law. Calculation of power load distribution for residential buildings. Bulk supply system and location of campus transformers. Introduction to electrical fittings and electrical appliances. Systems of electrical wiring commonly used. Wires specification and current carrying capacity.

PART II

Mechanical: Fire Fighting

Classification of fire, classification of building according to fire load, causes and spread of fire. Combustibility of material and fire resistance provision in buildings from fire safety angle. Fire fighting equipment and types of fire extinguishers. Fire protection, means of escape – fire detection and alarm systems, heat and smoke detectors, fire dampers, fire doors, water curtains, etc. Comparison of detectors. Mechanical and Communication systems.

Mechanical: Conveyor Lifts

Principles of functioning, control and operation of lifts. Machine room and its equipments, lift well and pit. Ideal location, ventilation, number and size of lift cars. Escalator functioning – installation and suitability of escalators. Inter–communication and monitoring devices – System and equipment.

PART III

Air Conditioning

Introduction & basic principles of air conditioning, difference between air cooling and air conditioning. Requirements of comfort conditions, control of temperature, and humidity. Means of mechanical ventilation. Various systems of air conditioning and equipment required for air conditioning like blowers and exhaust fans, fan coil units (FCU) and air handling units (AHU) etc.

Suggested Readings:

1. Jain, V.K; "Handbook of Designing and Installation of Services in Building Complex", Khanna Publisher, New Delhi, 1998.
2. Gupta, J.B; "Electrical Installation, Estimating and Costing", S.K. Kataria & Sons, New Delhi, 2002.
3. Hammer, Mark J; "Water-supply and Pollution-control", Prentice-Hall Higher-Education, 2008.

B.ARCHITECTURE (Semester – VI)
(Under Credit Based Continuous Evaluation Grading System)

ARL–352: History of Architecture-III **Duration of Examination: 3 Hrs.**
Credits: 03 (L=2,T=01,U=0)

Course Contents:

PART I

Emergence of early Indo Islamic style of Architecture under the different Muslim dynasties. Early Turkish Sultans, Khilji, Lodhi, Tughlaq, Sayyiads. Architecture of tombs, mosques, forts, palaces, and cities. Study of concepts, spatial forms, and elements of architecture. Islamic Architecture in Northern & Southern Provinces. Emphasis on Golconda, Bijapur, Bidar, Gulbarga, etc. Study of Architectural principles and elements in all major structures.

PART II

Architecture in Mughal period. Study of major structures in Delhi & Agra. Emphasis on town planning of Mughal cities. Analysis of tombs, mosques, forts & palaces made during Mughal era.

PART III

Sikh Architecture –Architecture of Gurudwaras with special emphasis on Golden Temple, Development of Sikh Architecture in Punjab. Planning of Sikh cities. Study of various structures and their elements.

Colonial Architecture in India under the British Raj with special emphasis on Architecture of New Delhi, Calcutta, and Bombay.

Suggested Readings:

1. Nath, R., “History of Mughal Architecture”, Abhinav Publications. New Delhi, 1985.
2. Arshi, P.S., “Sikh Architecture in Punjab”, Intellectual Publishing House. New Delhi, 1985.
3. Sahai, Surinder, “Indian Architecture Islamic Period 1192–1857”, Prakash Books, New Delhi, 2004.
4. Tadgell, Christopher, “The History of Architecture in India”, Phadion Press Limited. 1994.
5. Habib, Irfan; “Medieval India the Study of a Civilization”, National Book Trust. 2008.
6. Dogra, Ramesh Chander. Dogra, Urmila; “The Sikh World– An Encyclopedia Survey of Sikh Religion and Culture”, UBSPD Publishers. 2006.
7. Brown, Percy; “Indian Architecture (Islamic Period)”, D.B. Taraporewala Sons & Co. Pvt. Ltd., Mumbai, 2010.
8. Grover, Satish; “Islamic Architecture in India”, Galgotia Publishing Company, New Delhi, 1996.

B.ARCHITECTURE (Semester – VI)
(Under Credit Based Continuous Evaluation Grading System)

ARL– 353: Landscape Architecture **Duration of Examination: 3 Hrs.**
Credits: 03 (L=2, T=01, U=0)

Course Contents:

PART I

Introduction: Definition, objective, scope and relevance of Landscape Architecture, Global and local environmental issues; Ecology: meaning and relevance of its study, building as a component in the ecological set up. Garden styles – formal and informal; History of garden styles viz. Italian, French, Persian, Mughal and Japanese.

PART II

Site Planning: meaning, purpose and methodology; site surveys: types, relevance, components; Functional and technical factors in site planning; Principles and goals of landscape design; types of landscape styles – hard and soft landscape, wet and dry landscape. Landscape design elements: types, materials, use and relevance. Hard and soft landscape, water as an important element,

PART III

Plants: Functional, aesthetic and environmental aspects of plant; Types and forms of plants; criteria for plant selection; characteristics (height, foliage, flowering etc.) of various plants, their common and botanical names. Preparation of a landscape scheme, landscape project at house level, neighborhood level etc.

Suggested Readings:

1. Rogers, Elizabeth Barlow; “Landscape Design: A Cultural and Architectural History”, First Edition. Harry N. Abrams, 2001.
2. Sullivan, Chip, Boult Elizabeth. Illustrated history of Landscape Design, John Wiley & Sons, 2010.
3. Swaffield, Simon.R.. “Theory of Landscape Architecture”, A Reader. University of Pennsylvania Press, 2002.
4. Booth, Norman. K.. “Basic Elements of Landscape Architectural Design”, Waveland Press, 1989.
5. Ingels, Jack E. “Landscaping: Principles and Practice”, Publishers Delmar Cengage Learning, USA, 2004.
6. Laurie, Michael. “An Introduction to Landscape Architecture”, American Elsevier Publishing Co., USA, 1961.
7. Randhawa, M.S; “Flowering Trees”, Indian Council of Agricultural Research, India, 1957.
8. Stuart V.C.M. “Gardens of The Great Mughals”, Cosmo Publishers, London, UK, 1987.
9. Geoffrey and Susan Jellico; “The Landscape of Man”, Van Nostrand Reinhold, USA.
10. Morrow, Baker H. “A dictionary of Landscape Architecture”, University of Mexico Press, 1987.
11. John L. Motloch; “Introduction to Landscape Design”, John Wiley & Sons; 2nd Edition, 2000.

B.ARCHITECTURE (Semester – VI)
(Under Credit Based Continuous Evaluation Grading System)

ARU–354: Building Construction VI **Duration of Examination : 3 Hrs.**
Credits : 05 (L=1,T=00,U=04)

Course Contents:

- Working Drawings of a residential unit incorporating the following details:
  - Demarcation plan
  - Foundation details
  - Working/ dimensions at all floor levels.
  - Terrace plan
  - Elevations/ Sections
  - Joinery Details
  - Toilet Details
  - Kitchen Details
  - Staircase Details
  - Electrical Plan
  - Plumbing/ sanitary layout
- Appraisals of Commercial Kitchens in Hotels/ Hostels etc.
- Case studies/ detailing of Public Toilets

Suggested Readings:

1. Watson, Don A; “Construction Materials and Processes”, McGraw Hill Co., University of Michigan, 1972.
2. McKay, W.B. “Building Construction”, Vol. 1,2,3,4, Longmans, U.K., 1981.
3. Alanwerth, “Materials”, The Mitchell Pub. Co., Ltd. London, 1986.
4. Chudley, R. “Building Construction Handbook”, British Library Cataloguing in Publication Data, London, 1990.
5. Barry, R. “Building Construction”, East West Press, New Delhi, 1999.

B.ARCHITECTURE (Semester – VI)
(Under Credit Based Continuous Evaluation Grading System)

ARU–355: Architectural Design - VI **Examination: Viva Voce**
Credits : 8 (L=2,T=0,U=06)

Course Contents:

- Major problems shall consist of I.T. Park/Shopping Mall
- 200 bedded hospital/factory
- Stadium/ Gymnasium

Suggested Readings:

1. Chiara, Joseph De; “Time Saver Standards for Building Types” McGraw–Hill Professional Publishing. 2001
2. Neufert, Ernst, “Architect’s Data” 3rd Edition, Wiley–Blackwell, UK, 2002.
3. Geraint John & Rod Sheard, “Stadia, A Design and Development Guide”, Architectural Press, University of Michigan, 2000.
4. Michelle Provoost, Matthijs Bouw & Camiel Van Winkel; “The Stadium: Architecture of Mass Sport”, Rotterdam: NAI Publishers, 2000.

B.ARCHITECTURE (Semester – VI)
(Under Credit Based Continuous Evaluation Grading System)

ARF–356: Project Oriented Study Tour **Duration of Examination: Viva Voce**
Credits : 02 (L=0,T=0,U=2)

Objective: The main aim is to explore, study , analyze and understand the contemporary/traditional/ historical architectural characteristics and details of areas, places, buildings in different parts of India and abroad.

The students shall visit places as recommended by the teachers-in-charge and approved by BOC. The tour shall be of one to two weeks of duration.

General Guidelines for the Teacher:

Study of building materials and details through sketches and photographs to be made as an individual student activity and is to be submitted in a report from. Study of concepts/ construction techniques and architectural characters for different sites/ buildings visited to be submitted in groups of students. Viva voce of individual student for both the submissions will be conducted by the teacher in-charge, who accompanied the tour, as part of the internal assessment.

B.ARCHITECTURE (Semester – VI)
(Under Credit Based Continuous Evaluation Grading System)

ARL–357: Building Specifications, Estimating and Costing

Duration of Examination: 3 Hrs.

Credits : 03 (L=2,T=01,U=0)

Course Contents:

PART I

Definition, scope and importance of specification in the building activities, Art of writing specifications of material and construction works along with emphasis on the quality of the materials and proper sequence of construction works, method of writing correct order and sequence of use of materials. Use of standard specifications drafted by CPWD, PWD etc. Writing detailed specification for various building materials. Various test and properties related like bricks, Concrete, Cement, lime, sand, various types of mortars, timber, glass, etc.

PART II

Writing detailed specification for various construction works like earthwork for foundations, Brickwork, R.B. work, R.C.C. work, plastering and pointing, various types of flooring, white washing, distempering and painting, roof terracing, stone masonry.

Introduction to Estimates, types of estimate approximate and detailed methods of approximate estimating, plinth area methods, carpet floor area method, cubic content methods, approximate content method and number system.

PART III

Use of Microsoft Excel for estimating detailed estimate, procedure of estimating, taking out quantities, bill of quantities, schedule of rates.
Exercise in estimation of small buildings, Rate Analysis: Principles and analysis of different rate of labour and material, exercises in rate analysis of different building works i.e. Earth work for foundation, flooring. Introduction to P.W.D accounts procedure as per Common Schedule of Rates.

Suggested Readings:

1. Dutta, B.N; “Estimating and Costing”, UBSPD Pvt. Limited, New Delhi (2009)
2. S.C. Rangwala; “Elements of Estimating and Costing”, Charoter Publishing House, Gujarat.
3. W.H. King and D.M.R. Esson; “Specification and Quantitative for Civil Engineers”, The English University Press, Ltd.
4. “T.N. Building Practice”, Vol., 1, Civil, Govt. Publication.
5. “P.W.D. Standard Specification”, Govt. Publication.
6. “C.P.W.D. Standard Specifications”, Govt. Publication.
7. Chakarborti. M; “Estimating, Costing, Specification and Valuation in Civil Engineering,” M. Chakraborti, Kolkatta, 1990.
8. “National Building Code”, 2005.
9. “PWD Schedule of Rates”, 2010.

B.ARCHITECTURE (Semester – VII)
(Under Credit Based Continuous Evaluation Grading System)

ARE–401: Practical Training **Duration of Examination: Viva Voce**
Credits : 20

Periods per Week:
The total period of practical training will be of 24 weeks.

Internal Assessment: **25%**
Internal Assessment shall consist of periodical reports as given below:
1. Joining Report
2. Monthly Progress reports (6nos.) 20 marks each.

University Examination
University examination shall consist of:
1. Study of building **25%**
2. Final Viva–Voce **50%**

Study of Building:
This includes a building design analysis for a study report which the students are required to do in extra office hours. The study should comprise of multifaceted aspects of any building or a complex in the final stage of construction. This shall put under following heads:

1. Design Concept	2. Space Usage	3. Circulation
4. Climate responsiveness	5. Façade Treatment & Architectural Expression	
6. Built in Furniture	7. Services	8. Construction Techniques
9. Materials used etc.	10. Conclusions	

Viva Voce:
The following work done by students during the office hours must be submitted:
Drafting, Tracing, Perspectives, Models, Submission Drawings, Working drawings, drawings and details.

Note:
i. The maximum number of blue prints to be submitted at the time of viva–voce is restricted to 16. Such prints shall be attested by the employer. The prints should cover the important projects done during the training.
ii. At least one complete project of any nature should form part of submission, the drawings and site supervision of which should have been handled by the students.
iii. The final viva voce will be conducted by the jury consists of the Head of the department/nominee of the Head and external examiner/s outside the department.

B.ARCHITECTURE (Semester – VIII)
(Under Credit Based Continuous Evaluation Grading System)

ARL–451: Housing **Duration of Examination: 3 Hrs.**
Credits : 03 (L=2,T=01,U=0)

Course Contents:

PART I

- Definition of house and housing, housing typology – detached, semi–detached, row housing, walk up apartments, multi–storied housing, plotted and flatted development; housing density– gross and net density, role of density indices and measures in housing layout. Role of design controls, Density, FAR, Ground coverage etc.

PART II

- Housing as a major component of a settlement, neighborhood concept–definition, Radburn layout, Clarence Perry's principles of layout, physical elements, community facilities, design criteria, selection of housing types, circulation etc.
- Housing standards and policies – meaning, purpose & criteria, standards prescribed by HUDCO, NBC etc.

PART III

- Problems of slums and housing for the poor–definition of slums, factors responsible for creation, features, Govt. schemes for improvement; low cost housing–meaning and role for housing the poor, low cost materials and techniques, use of local materials, Approach of Laurie Baker, HUDCO (Building Centres), CBRI and others.
- Techniques of appraisal of housing enclaves, physical, social, economic and environmental components; surveys – definitions, importance, types, advantages, disadvantages, sample, sampling, preparation of questionnaire–types, sequence and format of questions

Suggested Readings:

1. Rangwala, S.C. “Town Planning”, Charotar Publishing House, New Delhi, 2009.
2. Gallion, A.B. & Eisner, S. “Urban Pattern: City Planning and Design”, Van Nostrand, New York, 1975.
3. Christoper, Alexander, “A Pattern Language”, Oxford University Press, New York, 1977.
4. Lynch, Kevin. “City Sense and City Design”, MIT Press 1990.
5. Unterman, Richard & Small, Robert. “Site Planning for Cluster Housing”, Van Nostrand Publishers, New York, 1977.
6. Schoenauer, Norbert. “6000 Years of Housing”, W.W. Norton & Company, New York, 2000.

B.ARCHITECTURE (Semester – VIII)
(Under Credit Based Continuous Evaluation Grading System)

ARL–452: Urban Design and Conservation **Duration of Examination: 3 Hrs.**
Credits: 03 (L=2,T=1,U=0)

Course Contents:

PART – I

Introduction to Urban Design theory, raw material of urban design i.e. districts, nodes, landmarks, edges and paths. Determinants of Urban Form – Scale, texture, grain and activity patterns. Building typology and its impact on urban forms and merging boundaries of Architecture and urban design.

PART – II

The role of urban conservation and relevance of historic areas in present concept, issues related with physical deterioration of built heritage and its preservation, concepts and policies of conservation of built environment, the role of various international and national agencies. An Urban design study of built environment of historical/ new developments covering various aspects such as imageability, morphology and legislation etc.

PART – III

The shape and structure of cities- pattern, styles and trends in history urban design tools- policy design and legislative tools, bye laws concepts and practices understanding urban design models.

Suggested Readings:

1. Bacon, Edmund N., "Design of Cities", Thames and Hudson, London, 1967.
2. Broadbent, G; "Emerging Concepts in Urban Space Design", Van Nostrand Reinhold, London, New York, 1990.
3. Krier, Rob; "Urban Space", Academy Editions, London, 1979.
4. Lynch, Kevein; "The image of the City", MIT Press, Cambridge, Massachusetts and London, 1960.
5. Lynch, Kevein; "Good City Form", MIT Press, Cambridge, Massachusetts, 1982.
6. Mumford, Lewis, "The City in History", Secker and Warburg, London, 1961.
7. Spiregen, Paul D; "Urban Design: The Architecture of Town and Cities", McGraw Hill, New York, 1965.
8. J. Larkham, Peter; "Conservation and the City"; Rout Ledge. London and New York, 1st Edition 1996.
9. Feilden, Bernard M.; "Conservation of Historic Buildings", Architectural Press; 3rd Edition, 2003.
10. Menon, A.G.K. & Thapar, B.K.; "Historic Towns and Heritage Zones", INTACH, Edition 2002
11. Parajuli, Yogeshwar K.; "Bhaktapur Development Project – Experience in Preservation and Restoration in a Medieval Town", Edition, 1974-85.

B.ARCHITECTURE (Semester – VIII)
(Under Credit Based Continuous Evaluation Grading System)

ARU–454: Building Construction – VII **Duration of Examination: 4 Hrs.**
Credits: 05 (L=1,T=0,U=4)

Course Contents:

- Details of lift slab and slip form method of construction
- Detailing of curtain walls and wall claddings.
- Construction details of prefabricated and precast building components
- Construction details for earth quake resistant structures (low rise)
- Different types of foundations for buildings
- Swimming pool details types/materials/construction techniques/services

Suggested Reading:

1. Watson, Don A; "Construction Materials and Processes", McGraw Hill Co., University of Michigan, 1972.
2. Mckay, W.B. "Building Construction", Vol.1, 2, 3 Longmans, U.K. 1981.
3. Alanwerth, "Materials", The Mitchell Pub. Co. Ltd., London, 1986.
4. Chudley, R; "Building Construction Handbook‴", British Library Cataloguing in Publication Data, London, 1990.
5. Barry, R.; "Building Construction", East west press, New Delhi, 1999.

B.ARCHITECTURE (Semester – VIII)
(Under Credit Based Continuous Evaluation Grading System)

ARU–455: Architectural Design – VII **Duration of Examination: Viva Voce**
Credits: 8 (L=2,T=0,U=06)

Course Contents:

Studio Project would put emphasis on learning methodology to study the historic places by practicing a systematic approach to prepare inventory and doing documentation of a historic site & structure to understand the spatial form, architecture and traditional construction techniques employed in the historic structure.

The project would incorporate assessment of values and present state of conservation to prepare proposals/recommendations for the conservation of selected historic site/structure.

Suggested Readings:

1. Chiara, Joseph De; “Time Saver Standards for Building Types”, McGraw–Hill Professional Publishing, 2001.
2. Neufert, Ernst; “Architect’s Data”, 3rd Edition, Wiley–Blackwell, 2002.
3. Kanvinde Achyut P. & Miller H James; “Campus Design in India: Experience of a Developing Nation”, Jostens / American Yearbook Co., United States, 1969.

B.ARCHITECTURE (Semester – VIII)
(Under Credit Based Continuous Evaluation Grading System)

ARL–456: Maintenance and Adaptation of Buildings **Duration of Examination: 3 Hrs.**
Credits: 03 (L=2,T=1,U=0)

Course Contents:

PART I

- Introduction, Operation, maintenance and Repair of Buildings, Distress in structures, Causes of distress, defects and decay, Damage and detection of damage. Classification of maintenance works, Annual Budgetary provision. Determination of approximate age of buildings. Determination of strength of a member of a Building. Economics of Building-cost in use.
- Maintenance of foundation - Repair, settlement- causes, Grillage foundation, Excavation of existing foundation to check its capacity and how to strengthen it. Anti-termite treatment.
- Maintenance of walls: Dampness, causes, effects and remedies. - Efflorescence : causes, effect and remedies

PART II

- Use of concrete in building structures. Factors affecting durability of concrete. Maintenance and rehabilitation and repair of concrete structure. Physical examination of common defects and damages. Inspection of cracks, causes of failure of R.C.C. structure. Strengthening of R.C.C. balconies and beams. Maintenance of steel structures - maintenance procedure and surface protection - welding and crack repairs. Merits and demerits of R.C.C. and steel structures.
- Cracks in structure, surface investigation. Remedial and preventive measures. Prevention while repairing load bearing walls. Repair to plaster, Bond between old and new brick wall.

PART III

- Maintenance of Roof: Precaution to be taken during construction of R.C.C. roof or masonry wall. Waterproofing of R.C.C. roof. Leakage in R.C.C. roof, Remedial measures. Advantages of lime concrete terracing, maintenance of Pitched roof. Expansion Joints in roof.
- Maintenance of Housing Estate, particulars and information, complaint book, Supervision of maintenance work. Maintenance funds. Maintenance planning - Importance of maintenance. Agency and role of maintenance manager. Importance of check list/ inspection test. Special commercial products used for maintenance and remedy of defects.

Suggested Readings:

1. Panchdhari AC; “Maintenance of buildings”, New Age International (P) Limited, Publishers, New Delhi, 2003.
2. “Maintenance Manual of CPWD”, Director General (Works) CPWD, Nirman Bhawan, New Delhi, 2003
3. Chudley R.; “The Maintenance and Adaptation of Buildings”, Longman Technical Services, London, 1981.
4. Ransom W.H.; “Building Failures: Diagnosis and Avoidance”, E. & F.N. Spon, London, 1987.
5. Panchdhari AC, “Water & Sanitary Installation”, New Age International (P) Limited, Publishers, New Delhi, 2005.
6. Hutchinson, Barton and Ellis, “Maintenance & Repair of Buildings”, Butterworth & Co. (Publishers) Ltd., UK, 1975.

B.ARCHITECTURE (Semester – VIII)
(Under Credit Based Continuous Evaluation Grading System)

ARL–453: Vernacular Architecture **Duration of Examination: 3 Hrs.**
Credits: 03 (L=2,T=01,U=0)

PART I

Introduction to Vernacular Architecture: Meaning and nature of Vernacular Architecture, Evolution of shelter forms in the varied geographical contexts, Natural and manmade determinants of form: geographical, climatic, historical, anthropological, aesthetic, spatial, folkloristic etc. Relevance in the modern context.

PART II

Vernacular Architecture in the Plains of Northern India: Building typologies, construction materials and techniques, architectural elements and art forms, functional and aesthetic aspects of vernacular dwellings and the settlement pattern in the plains of Punjab and Rajasthan.
Vernacular Architecture in the Hills of Northern India: Building typologies, construction materials and techniques, architectural elements and art forms, functional and aesthetic aspects of vernacular dwellings and the settlement pattern in the Hills of Northern India.

PART III

Relevance and interpretation of vernacular architecture in today's context. Approach and works of architects Laurie Baker, Hassan Fathy. Role of Building centers (HUDCO), 'Appropriate' building materials and technology.
Settlement pattern, building material/ technology and socio–economic structure in a village of Punjab, Study and analysis of spatial organization, building material/technology, public places, housing, aesthetics of a village in Punjab.

Suggested Readings:

1. Langenbach, Randolph & Yang, Minja; "Don't Tear It Down! Preserving the Earthquake Resistant Vernacular Architecture of Kashmir", Oinfroin Media, 2009.
2. Schoenauer, Norbert; "6000 Thousand Years of Housing", W.W. Norton, New York, 2000.
3. Thomas Carter, Elizabeth Collins Cromle; "Invitation to Vernacular Architecture: A Guide to the Study of Ordinary Buildings and Landscapes", University Of Tennessee Press, 2005.
4. Oliver, Paul; "Dwellings: The Vernacular House World Wide", Phaidon press, 2003.
5. Udamale, Sanjay; "Architecture for Kutch", English Edition, Mumbai, 2003.
6. L. Asquith, Lindsay Asquith (Editor), Marcel Vellinga (Editor); "Vernacular Architecture in the 21st Century: Theory, Education and Practice", Publisher: Taylor & Francis Group, UK, 2006.
7. Oliver, Paul; "Built to Needs", Architectural Press (2006)
8. Jain, Kulbushan & Jain, Meenakshi; "Architecture of the Indian Desert", Aadi Centre, Ahmedabad, 2000.
9. Oliver, Paul; "Encyclopedia of Vernacular Architecture of The World", Cambridge University Press, 1997.
10. Pramar, V.S. Haveli; "Wooden Houses & Mansions of Gujarat", Mapin Publishing Pvt. Ltd., Ahmedabad, 1989.
11. Tillotsum, G.H.R.; "The Tradition of Indian Architecture - Continuity & Controversy - Change since 1850", Oxford University Press.
12. Kagal, Carmen; "Vistara – The Architecture of India", The Festival of India, 1986.
13. Rappoport, Amos; "House, Form & Culture", Prentice Hall Inc, University of Michigan, 1989.

B.ARCHITECTURE (Semester – VIII)
(Under Credit Based Continuous Evaluation Grading System)

ARL – 457: Hospital Architecture **Duration of Examination: 3 Hrs.**
Credits: 03 (L=2, T=1, U=0)

Course Contents:

PART I

- A principled approach to hospital planning:
- Functional Planning
- General Principles
- Grouping of Elements
- Circulation
- Environment
- Aesthetics, Lighting, Colour, Ambience

Types and Levels of Health Services:

- Super Specialty
- Nursing Homes
- Rural Dispensary
- Ayurveda & Nature Cure

PART II

Planning and Designing Medical Services – Outpatient services, Emergency services, clinical laboratories, radiologic services, diagnostic radiology, radiation therapy department, nuclear medicine, surgical department and new concepts for O.T., labour and delivery suites, physical medicine and rehabilitation, nursing units and intensive care units, Mortuary.

PART III

Planning and designing supportive services and engineering services. Admitting department, central sterilization and supply department, pharmacy, food service department, laundry and linen services, engineering department, electrical system, air conditioning system, water supply and sanitary system, centralised medical gas system, fire safety. Medical Education Complexes

Suggested Readings:

1. Kunders, G.D., Gopinath, S. & Katakam, Asoka, “Hospitals – Planning Design and Management”, Tata MC Graw Hill Publishing Company Ltd., New Delhi, 2001.
2. Rosenfield, Isadore; “Hospital Architecture and Beyond”, Van Nostrand Reinhold Company, New York.
3. Rotterdam, Bouwcentrum; “General Hospitals”, Elsevier Publishing Company, Amsterdam.

B.ARCHITECTURE (Semester – VIII)
(Under Credit Based Continuous Evaluation Grading System)

ARL – 458: Disaster Management **Duration of Examination: 3 Hrs.**
Credits: 03 (L=2, T=1, U=0)

Course Objective:
The course would focus on types of Environmental hazards and Disasters. The main objective is to study the emerging approaches in Disaster Reduction and Management. The emphasis will be on programmes of National and International organizations for Disaster preparedness, mitigation and awareness.

Course Contents:

PART - I

Natural Disasters – meaning and nature of natural disasters, their types and effects. Floods, droughts, cyclones, earthquakes, landslides, avalanches, volcanic eruptions, heat and cold waves, Climatic change: global warming, sea level rise, ozone depletion.
Man made disasters – Nuclear disasters, chemical disasters, biological disasters, building fire, coal fire, forest fire, oil fire, air pollution, water pollution, deforestation, industrial waste water pollution, road accidents, rail accidents, air accidents, sea accidents.

PART - II

Disaster management – Effect to mitigate natural disaster at national and global levels, international strategy for disaster reduction. Concept of disaster management, national disaster management framework; financial arrangements; role of NGOs, community based organizations and media. Central, state, district and local administration; Armed forces in disaster response; Disaster response; Police and other organizations. Meaning of environmental hazards, Environmental Disasters and Environmental stress, concept of Environmental hazards, environmental stress and Environmental Disasters.

PART - III

Earthquake hazards/disasters – Engineering seismology, plate tectonics, seismic waves, earthquake size and various scales, local site effects, causes of Earthquakes, hazardous effects of earthquakes, Indian seismicity, seismic zones of India, Earthquake hazards in India, Human adjustment, perception and mitigation of Earthquake.

Seismic design concepts, EQ load on simple buildings – load path – floor and roof diaphragms – seismic resistant building architecture – plan configuration – vertical configuration – pounding effects – mass and stiffness irregularities – torsion in structures.

Suggested Readings:

1. Srivastava, H.N. & Gupta, G.D.; Management of Natural Disasters in Developing Countries; Daya Publishing House, New Delhi, 2006.
2. Lusted, Marcia Amidon; Natural Disasters, ABDO Publishing Company, U.S.A. 2011.
3. Roxanna Mcdonald; Introduction to Man-made and Natural Disasters and Their Effects on Buildings, Taylor & Francis, 2003.
4. Ramroth, William G. Jr.; Planning for Disaster – How Natural & Man-made Disasters Shape The Built Environment; Kaplan Publishing, USA, 2007.
5. Donovan, Jenny; Designing to Heal: Planning and Urban Designing Response to Disaster and Conflict; CSIRO Publishing, Australia, 2013.
6. Pauw, C. De & Lauritzen, E.K.; Disaster Planning, Structural Assessment, Demolition and Recycling, Taylor & Francis, UK, 2005.

B.ARCHITECTURE (Semester – IX)
(Under Credit Based Continuous Evaluation Grading System)

ARL – 501: Town Planning **Duration of Examination: 3 Hrs.**
Credits: 03 (L=2, T=1, U=0)

Course Contents:

PART I

History of Town Planning: Historical perspective of urban growth & form in ancient societies (special emphasis on India), Classic cities of the Greek & Roman periods, An overview of urban pattern of medieval town, the renaissance & neo classic city, the industrial revolution & factory towns, Salient features of the ideas & concepts of Ebenezer Howard & Sir Pattrick Geddes

PART II

Introduction to town planning: Concept of a town/ city/ urban area, town classification, town as a physical, social and political entity, Town vs. Regional Planning, Concept of planning; meaning, importance and scope of planning process; planning as a continuous process, Theories of urban structure: Concentric zone, Sector and Multiple nuclei theory

Preparation of Plans: Master Plan and its components, Concept of Perspective, Development and Annual plans, Planning at city level: Concept of zoning (use, height and density zoning); landuse planning (residential, commercial, industrial, etc.); urban aesthetics, Site Planning: General guidelines and basic principles of site planning

PART III

Planning surveys: Process, various categories of surveys such as physical, socio-economic, traffic, etc., planning data, its presentation & analysis. New towns: Planning considerations & application of spatial standards, Case study of Chandigarh city (planning considerations & planning concept)

Implementation & Administration: Broad provisions of the Acts related to city planning - Punjab Regional and Town Planning and Development Act, 1995, Land Acquisition Act, 1984 and 74th Constitutional (Amendment) Act, 1992. Role of various planning and development authorities - Municipal Corporation, Improvement Trust, Punjab Urban Development Authority, TCPO and HUDCO

Suggested Readings:

1. Catanese, A.J. and Snyder, J.C. (1979), 'Introduction to Urban Planning', McGraw-Hill Inc., New York.
2. Das, A.K. (2007), 'Urban Planning in India', Rawat Publications, Jaipur.
3. Gallion, A.B. and Eisner, S. (1983), 'The Urban Pattern: City Planning and Design', D. Van Nostrand Company, New York.
4. Greed, Clara (2004), 'Introducing Planning: Introducing Planning', Continuum, London.
5. Keeble L. (1972), 'Principles & Practice of Town and Country Planning', The Estates Gazette Ltd., London.
6. Kopardekar & Diwan (1994), 'Urban and Regional Planning–Principles, Practice and Law', S.H. Kopardekar, Talegaon – Dabhade.
7. Kulshrestha, S.K (ed) (2006), 'Dictionary of Urban and Regional Planning', Kalpaz Publications, Delhi.
8. Ministry of Urban Affairs & Employment (G.O.I.), (1996), 'Urban Development Plans Formulation and Implementation Guidelines', ITPI, New Delhi.
9. Saini and Mahavir, (1985), 'Urban Development Planning Strategies and Techniques', Central Electric Press, Delhi.
10. Thooyavan, K.R. (2005), 'Human Settlements – A Planning Guide to Beginners', MA Publication, Chennai.
11. Whittick A. (1974), 'Encyclopedia of Urban Planning', McGraw-Hill, New York.

B.ARCHITECTURE (Semester – IX)
(Under Credit Based Continuous Evaluation Grading System)

ARL – 502: Construction Management **Duration of Examination: 3 Hrs.**
Credits: 03 (L=2, T=1, U=0)

Course Contents:

PART I

Introduction to construction management, its significance, objectives and functions, construction planning and scheduling using bar charts and network techniques, development and analysis of CPM networks. Modular co-ordination, its objectives, basic planning and structure modules.

PART II

Cost time analysis in network planning, basic terms, concept of optimized cost, procedure of cost time optimization in network planning, exercising shall networks to determine the optimum duration & cost.

PART III

Inspection and quality control its need on work sites, principles of inspection, stages of inspection and quality control for –Masonry R.C.C and earth work, various method of testing of structures, importance of safety on construction sites.

Equipments used in building industry like earthmoving equipments, compaction equipments, excavating equipments hauling equipment. Mixing equipment, Hoisting equipment.

Suggested Readings:

1. Punmia, B.C. & Khandelwal K.K., "Project Planning and Control with PERT\CPM", Laxmi Publications, New Delhi, 2009.
2. Mukhopadyay, S.P.; "Project Management for Architects and Civil Engineers", IIT, Kharagpur, 1974.
3. Wiest, Jerome D. & Levy, Ferdinand K.; "A Management Guide to PERT/CPM", Prentice Hall of Indian Pub.Ltd. New Delhi, 1982.
4. Burgess, SR.A. & White, G.; "Building Production and Project Management", The Construction Press, London 1979.
5. Dr. P. N. Modi; "PERT and CPM", Standard Book House, New Delhi, 2009.

B.ARCHITECTURE (Semester – IX)
(Under Credit Based Continuous Evaluation Grading System)

ARL – 503: Green Buildings **Duration of Examination: 3 Hrs.**
Credits: 03 (L=2, T=1, U=0

Course Contents:

PART I

Introduction to concept of green buildings, efficient use of energy, water and other resources. Protecting occupant health and improving employee productivity. Reduction in waste, pollution and environment degradation. Sustainable design to achieve environmental, economic and social benefits. Concept of L.C.A (life cycle assessment)

PART II

Energy Efficiency – active and passive techniques. Importance of passive techniques. Role of orientation, shading and vegetation. Solar gain for winters. Optimization of daylight. Solar water heating. Solar, wind, hydro and biomass power generation and use.

PART III

Operation and maintenance optimization, waste reduction and recycling.
Overview of various rating systems such as – BREEAM (U.K), LEED (U.S.A, Canada), CASBEE (Japan), Indian Green Building Council (IGBC), GRIHA.

Case studies of relevant green buildings with certifications and rating in India and Abroad.
Seminar Presentation with report.

Suggested Readings:

1. Moore, Fuller; “Environmental Control Systems”, McGraw Hill, Inc., New Delhi, 1993.
2. Konya, A.; “Design Primer for Hot Climates”, Architectural Press, London, 1980.
3. “Climatically Responsive Energy Architecture”, Efficient PLEA/SPA, New Delhi - 1995.
4. Bansal, Sudha; N.K. & Malik, M.A.S.; “Solar Passive Building”, Pergamon Press.
5. Gupta, V.; Energy and Habitat - Wiley Eastern Limited, New Delhi.
6. Konya, A.; “Design Primer for Hot Climates”, Architectural Press, London, 1980.
7. “Energy Efficient Buildings in India” , Published by TERI – 2001

B.ARCHITECTURE (Semester – IX)
(Under Credit Based Continuous Evaluation Grading System)

ARU–505: Building Construction – VIII **Duration of Examination: Viva Voce**
Credits: 5 (L=1,T=0,U=04)

Course Contents:
Production of set of detailed working drawings along with project report including

- Estimates
- Water supply and sanitation drawings
- Specifications
- Schedules using network techniques

Suggested Readings:

1. Watson, Don A., "Construction Materials and Processes", McGraw Hill Co., 1972.
2. Mckay, W.B., "Building Construction", Vol.1, 2, 3, Longmans, U.K. 1981.
3. Alanwerth, "Materials", The Mitchell Pub. Co. Ltd., London, 1986.
4. Chudley, R., "Building Construction Handbook", Addison Wesley, Longman Group, England, London, 3rd ed. 1999.
5. Barry, R., "Building Construction", East West Press, New Delhi, 1999.
6. Ching, Francis D. K. ; "Building Construction Illustrated", Wiley
7. Arora, S.P. & Bindra, S.P.; "A Text Book of Building Construction", Dhanpat Rai & Sons, New Delhi.
8. Chudley, R., "Construction Technology", Vol. I, II, III, IV, Longman Group Limited, London, Ist Edition, 1977.
9. Ataev, S.S; "Construction Technology", Mir Publishers, Moscow, 1985.

B.ARCHITECTURE (Semester – IX)
(Under Credit Based Continuous Evaluation Grading System)

ARU–506: Architectural Design – VIII **Duration of Examination: Viva Voce**
Credits: 8 (L=2,T=0,U=06)

Course Contents:

- Hospital
- District Centre
- Industrial Complex
- Five Star Hotel.

Suggested Readings:

1. Chiara, Joseph De; "Time Saver Standards for Building Types", McGraw–Hill Professional Publishing. 2001
2. Neufert, Ernst; "Architect's Data" 3rd Edition, Wiley–Blackwell, UK, 2002.
3. Christine Nickl-Weller, Hans Nickl, Verlagshaus Braun; "Hospital Architecture", 2009.
4. National Building Code of India, Bureau of Indian Standards, New Delhi, 2005.
5. Watt D., Surveying Historical Buildings, Donhead Publishing Limited, 2011.

B.ARCHITECTURE (Semester – IX)
(Under Credit Based Continuous Evaluation Grading System)

ARL – 507: **Duration of Examination: 3 Hrs**
Professional Practice & Building Bys Laws **Credits : 03 (L=2,T=01,U=0)**

Course Contents:

PART I

Definition and aspects of the architectural profession, Role of the Architect: Relationship with the clients and contractor, duties, legal responsibilities. Indian Institutes of Architects: Aims objectives, conditions for engagement and scale of Professional charges, code of professional conduct. Council of Architecture: Its role of regulating the profession and education in Architecture.

PART II

Valuation: Classification of value and ownership, purpose of valuation.
Easements: Characteristics, continuous and discontinuous, easements, modes of acquiring easements.
Competitions: Its purpose and guidelines, Nature and type of competitions, Registration procedure, conditions for conducting architectural competitions, Board of Assessors, Advisors, Prize money and Honorarium.

PART III

Building Bye–Laws: Role in the healthy development of Architecture.
Development Control Rules & General Building requirements as per NBC – Terminology, Requirements of Plots, classification of Buildings, open spaces, Area & height limitations, off street – parking spaces, requirements of parts of buildings.
Study of local building bye–laws
Points of general interest in bye laws of Chandigarh

Suggested Readings:

1. Namavati, Dr.Roshan.H., Professional Practice With Elements Of Estimating, published by- Anup Lakhani, Mumbai
2. Shah, Charanjit Singh; Architect's Handbook Ready Reckner; Published by – Galgotia Publishing Company, New Delhi.
3. National Building Code-2005; Published By- Bureau of Indian Standards.

B.ARCHITECTURE (Semester – X)
(Under Credit Based Continuous Evaluation Grading System)

ARL–551: Architectural Conservation **Duration of Examination: 3 Hrs.**
Credits: 03 (L=2,T=01,U=0)

Course Contents:

PART - I

Introduction to Conservation:
Conservation, History of Conservation movement in West and India, Understanding various conservation Philosophies, Approaches and Principles, Understanding of various definitions and terminology such as Historicity, Heritage, Culture, Authenticity, Values, Transformations, Regeneration, Revitalization, Redevelopment, Integrated Conservation etc.

Inventories and Documentation:
Introduction to Fundamental approaches and procedures for the inventories, Understanding process of identification and listing, Introduction to methods of documenting historic sites and structures through site sketches and measured drawings.

PART - II

Role of Charters and Various Agencies in Conservation Practice:
Understanding the Concepts and policies of conservation of built environment with the relevance of Charters as a code of practice in conservation, the role of various international and national agencies (Archaeological Survey of India, Indian National Trust of Art & Cultural Heritage, International Council of Monuments & sites, World Heritage Committee, UNESCO) engaged in conservation practice and policy making.

PART - III

Assessment for State of Conservation of Historic Buildings:
Issues related with physical deterioration of built heritage and its conservation, various types of defects/decays, its causes and classification of different agents of deterioration.

Role of Historic Building/Area/City in Present Context:
Understanding Historic City by doing a study of its Heritage Components, various aspects for spatial Planning, the role of conservation and relevance of historic buildings/areas in present context

Suggested Readings:

1. Feilden, Bernard M.; "Conservation of Historic Buildings", *Architectural Press; 3rd Edition, 2003.*
2. Latham, Derek; "Creative Re-use of Buildings", *Donhead, Edition 2007*
3. Menon, A.G.K. & Thapar, B.K.; "Historic Towns and Heritage Zones", *INTACH, Edition 2002.*
4. "International Charters for Conservation and Restoration" *(ICOMOS)*
5. Parajuli, Yogeshwar K.; "Bhaktapur Development Project – Experience in Preservation and Restoration in a Medieval Town", *Edition 1974-85.*
6. Gupta, Divay, "Identification and Documentation of Built Heritage in India", INTACH, *Edition 2007.*
7. Petruccioli, Attilio; "After Amnesia – Learning from The Islamic Mediterranean Urban Fabric", *ICAR, Edition 2009.*

B.ARCHITECTURE (Semester – X)
(Under Credit Based Continuous Evaluation Grading System)

ARL – 552: Interior Design **Duration of Examination: 3 Hrs.**
Credits: 03 (L=2, T=1, U=0)

Course Content:

PART I

Introduction to Interior Design Definition of Interior Design, Interior Design and architecture, Interior Design Process, themes and Concepts.

A Brief historical perspective of Interior Design in various periods -Renaissance, Baroque period, modern design

PART II

Elements of Interior Design – Enclosing Elements: Introduction to various elements in interiors like floors, ceiling walls, staircases, opening, etc. Use of materials and various methods of their treatment to obtain certain specific, functional, aesthetic and psychological effects.

Other elements of interiors like accessories used for enhancement of interiors – paintings, objects de art, furnishing i.e. shades, blends, curtains etc.

Lighting & Color in Interiors: Study of interior lighting – different types of lighting, their effects, types of lighting fixtures.

Colour – psychological impact, Colour Schemes, Specials Effects of Colour.

PART III

Furniture Design: Furniture selection in relation to human comforts, functions – materials, methods of construction, upholstery**.**

Layouts of various rooms – offices, children rooms, bedrooms, lounges etc.

Suggested Readings:

1. Steport- De- Van Kness, Logan and Szebely*; "Introduction To Interior Design"*; MacMillan Publishing Company, New York, 1980
2. Ching, Francis.D.K.; "*Interior Design Illustrated"*; V.N.R. Publisher, New York, 1987
3. Evans, Helen Maries; "*An Invitation Of Design"*; MacMillan Publishing Company, New York, 1982
4. Penero, Julius and Zelnik, Martin; "*Human Dimension and Interior Space"*; Whitney Library of Design, New York, 1979
5. Karthryn, B. Hiesinger and George H. Marcus; "*Landmarks of 20th Century Design"*, Abbey Villey Press, 1993
6. Syanne Slesin and Stafford Ceiff, "*Indian Style 3"*, Clarkson N. Potter, New York, 1990
7. Karl J Neilson, David A Taylor; "*Interiors- An Introduction"*; McGraw Hill Higher Education, USA, 2010.
8. Allien Tate, C Ray Smith; "*Interior Design in 20th Century"*; Harper and Row, New York, 1986.
9. Riggs, J Rosemary; "*Materials and Components of Interior Architecture"*; Prentice Hall, 1998.

B.ARCHITECTURE (Semester – X)
(Under Credit Based Continuous Evaluation Grading System)

ARL – 553: Multistoried Buildings **Duration of Examination: 3 Hrs.**
Credits: 03 (L=2, T=1, U=0)

Course Contents:

PART I

- Development of High-rise buildings in the course of History, Technology and the environment, Infrastructural, Economical, Social and ecological aspects of high-rise development
- The need for effective conceptual Multi-storied design process, Design criteria for Multi-storied buildings, Need for Multi storied development
- A Study of reasons for and methods of high rise developments in our urban centers.
- Siting of multi storied buildings.
- Form of multi storied buildings and their effect of urban-scape psychological implication of using such spatial organizations, consequences of multi-storied building development.

PART II

Load action on High rise building, various structural systems and construction methods, Introduction to various types of Foundations, Design of various building components

PART III

Services in multi storied buildings such as Plumbing System, HVAC, Electricity, Sewerage system, Fire fighting, Vertical Circulation System and Efficient evacuation methods.

Note: The above course contents should be supported with live built examples.

Suggested Readings:

1. Viswanath H.R., Tolloczko J., Clarke J.N., "Multi-purpose High-rise Towers and Tall Buildings", Spon Press, London, 1998.
2. Engel H., "Structure Systems", Van Nostrand Reinhold Company, 1981.
3. Kowalczyk R.M., Sinn R, Bennetts I.D., Kilmister M.B., "Structural Systems for Tall Buildings", McGraw-Hill, 1995.
4. Armstrong P. J.; "Architecture of Tall Buildings", McGraw-Hill, 1995
5. Aoyama, H; "Design of Modern High-rise Reinforced Concrete Structures", Imperial College Press, 2001.
6. Taranath, B.S.; "Reinforced Concrete Design of Tall Buildings", CRC Press, USA, 2009.
7. Mittal, A K; "Electrical and Mechanical Services in High Rise Buildings", CBS, 2007.

B.ARCHITECTURE (Semester – X)
(Under Credit Based Continuous Evaluation Grading System)

ARD – 554: Architectural Thesis Project **Duration of Examination: Viva–Voce**
Credits: 20 (L=0, T=0, U=20)
(Weightage of Final/External Jury = 50%)

Brief Course Contents:

1. **Thesis:** Architectural thesis project represents the culmination point of the academic under graduate program; and offers an opportunity to the students to showcase their knowledge, expertise and skills in architecture acquired during the course of study. Each student, in consultation with the faculty, is expected to demonstrate his/her vision for bringing in positive changes to our built environment.

2. **Subject of Thesis*:*** Each student, within a specified time period, shall submit the subject of the thesis project he/ she proposes to work upon. The project may be live or hypothetical or conceptual one related to architecture; and must reflect its relevance to the trends in architecture across the globe. The students may commence their work on the subjects so proposed only after the approval of the Board of Control.

3. **Contents of Thesis*:*** An architectural thesis project shall comprise of the following:

   a) A well formatted and neatly typed report illustrated through drawings, sketches, photographs, tables and diagrams; which should include Introduction to the Project (Project Brief, Validity, Aims and Objectives and Methodology), Literature Review, Prototype/ Case Studies, Site Analysis, Architect's Brief and Design Criteria, Conclusions and the Design Proposals.

   b) Presentation Drawings and Model for the fully worked-out Design Proposal.

4. **Reviews and Internal Evaluations:** Each student will be assigned to a panel of thesis supervisors (hereafter referred to as panel) comprising of 3-4 members based on the norm of having one member for three/four students. The panel will be responsible for supervising and monitoring the progress as well as evaluating various stages of the thesis project as mentioned below:

B.ARCHITECTURE (Semester – X)
(Under Credit Based Continuous Evaluation Grading System)

Sr. No.	Stages	Max. Marks (% of total)	Details
1	Synopsis	5%	Project Brief, Validity/Need-Identification, Aims and Objectives Introduction to the Site and Methodology
2	Rough Report	15%	40-60 pages, A4 size, landscape format, font: times new roman, font size: 16, 14, 12, line spacing 1.5; margin 4 cm on left and 2.5 cm on the other sides
3	Preliminary Design Submission (Stage-1)	15%	The Basic Design Development, Worked out site plan and floor plans, architectural forms & expression, model/s etc.
4	Preliminary Design Submission (Stage-2)	15%	Detailed worked out Site Plan and Floor Plans, Sections, Elevations, Models etc.

5. **Final Submission:** Each student shall submit the final report, presentation drawings and model/s as part of the final submission which shall eventually be returned after the final evaluation process is over. In addition, each student shall also submit two identical copies of the final report along with a soft copy, complete in all respects, along with one hard copy for each member of the panel. The copies of the final report must also include A-3 size copies of all final drawings and at least two photographs of the final model/s.
6. **External Evaluation:** The Final Jury shall comprise of the Head of the department/his nominee and the external examiner/s. Weightage of marks assigned for external evaluation shall be 50% of the total marks. The final grades will be awarded by the Board of Control with all supervisors to be invited as special invitee, if they are not members of the Board of Control