



Re-Accredited 'B++' 2.86 CGPA by NAAC

VEER NARMAD SOUTH GUJARAT UNIVERSITY

University Campus, Udhna-Magdalla Road, SURAT - 395 007, Gujarat, India.

વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી

યુનિવર્સિટી કેમ્પસ, ઉદ્ધના-મગદલ્લા રોડ, સુરત - ૩૯૫ ૦૦૭, ગુજરાત, ભારત.

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ક્રમાંક : એસ./પરિપત્ર/૧૦૪૭૦/૨૪

તા. ૧૭/૦૫/૨૦૨૪


પ્રતિ,
આચાર્યશ્રી,
શ્રી જી.સી.પટેલ ઈન્સ્ટીટ્યૂટ ઓફ આર્કિટેક્ચર,
ઈન્ટીરીયર ડિઝાઇન એન્ડ ફાઇન આર્ટ્સ
વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી,
સુરત.

વિષય:- Diploma in Architecture (3 Year Diploma) નાં અભ્યાસક્રમ અંગે.

સુજ્ઞશ્રી,

સવિનય જણાવવાનું કે, આર્કિટેક્ચર એન્ડ ડીઝાઇન ફેકલ્ટીમાં શૈક્ષણિક વર્ષ ૨૦૨૪-૨૫ થી અમલમાં આવનાર ડિપ્લોમાં ઈન આર્કિટેક્ચરનો અભ્યાસક્રમ આર્કિટેક્ચર અભ્યાસ સમિતિનાં ચેરમેનશ્રીએ બોર્ડવતી અને આર્કિટેક્ચર એન્ડ ડીઝાઇન વિદ્યાશાખાનાં અધ્યક્ષશ્રીએ વિદ્યાશાખા વતી મંજૂર કરી એકેડેમિક કાઉન્સિલને કરેલ ભલામણને એકેડેમિક કાઉન્સિલની તા.૦૧/૦૩/૨૦૨૪ ની સભાનાં ઠરાવ ક્રમાંક:૧૦૪ અન્વયે માન.કુલપતિશ્રીને આપેલ સત્તા અંતર્ગત માનનીય ઈ.ચા.કુલપતિશ્રી દ્વારા મંજૂર કરેલ છે. જેની આથી જાણ કરવામાં આવે છે, તેની જાણ સંબંધકર્તા શિક્ષકો અને વિદ્યાર્થીઓને કરવી, તદ્દઉપરાંત તેનો અમલ કરવો.

બિડાણ : ઉપર મુજબ


કુલસચિવ

પ્રતિ,

- ૧) અધ્યક્ષશ્રી, આર્કિટેક્ચર વિદ્યાશાખા,
- ૨) પરીક્ષા નિયામકશ્રી, પરીક્ષા વિભાગ, વીર નર્મદ દ. ગુ. યુનિવર્સિટી, સુરત.
- ૩) પી.જી. વિભાગ, વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી, સુરત.
- ૪) એકેડેમિક વિભાગ, વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી, સુરત.

...તરફ જાણ તેમજ અમલ સારૂ.

Detailed Project Report(DPR)

1. Name of Course: Diploma in Architecture

2. Year of Commencement: 2024-2025

3. Intake: (Approval received for the intake of 40 seats.)

4. Fees: 50,000 (2024-25 onwards) Per Annum

| Sr.No. | Year | No. of Students | Income per annum (Rs.) | Total (Rs.) |
|--------|-------------|-----------------|------------------------|-------------|
| 1 | 2024 - 2025 | 40 | 20,00,000 | 20,00,000 |
| 2 | 2025 - 2026 | 80 | 40,00,000 | 40,00,000 |
| 3 | 2026 - 2027 | 120 | 60,00,000 | 60,00,000 |

6. Expenditure:

1. Faculty requirements*
2. Non-Teaching Staff Requirements

| Sr.No. | Year | No. of Student | Salaries Regular faculties per annum (Rs) | Salaries for visiting and Adhoc faculties per annum (Rs.) | Approval of CoA | Equipment and Books (Rs.) | Miscellaneous (Rs.) | Net Expenditure per annum (Rs.) |
|--------|-----------|----------------|---|---|-----------------|---------------------------|---------------------|---------------------------------|
| 1 | 2024 - 25 | 40 | - | 5,50,000 | - | 20,000 | 25,000 | 5,95,000 |
| 2 | 2025 - 26 | 80 | - | 11,00,000 | - | 20,000 | 25,000 | 11,45,000 |
| 3 | 2026 - 27 | 120 | - | 16,50,000 | - | 20,000 | 25,000 | 16,95,000 |

Note*:

1. Faculties

a. Permanent: 1-Head, 1-Professor, 3-Associate Professor, 4-Assistant Professor
Adhoc: 1- Teaching Assistant

*These faculties will also share teaching load with other programs: B.Arch., M.Plan., D.Design, Ph.D.

b. Visiting faculties

Experts from the field will be invited from the industry as Visiting and guest teachers for 25% teaching load as per CoA norms and actual requirements.

c. Non-teaching staff

Entire non-teaching staff shall be counted towards this course but it will be shared.

2. Salaries counted as per 6th Pay Commission for the Year 2023-24 thereafter it is calculated considering 7th Pay commission and assumed that no expenditure for permanent teachers will be changed. Increments shall be nullified with incremental increase of the fees.
3. 20% of the fees payment to the University is not counted as of now.
4. Expenditure related to infrastructure development is not counted as of now.

7. Profit Statement:

| Sr.No. | Year | No. of Students | Net Income per annum (Rs.) | Net Expenditure per annum (Rs.) | Net Profit per annum (Rs.) |
|--------|-----------|-----------------|----------------------------|---------------------------------|----------------------------|
| 1 | 2024 - 25 | 40 | 20,00,000 | 5,95,000 | 14,05,000 |
| 2 | 2025 - 26 | 80 | 40,00,000 | 11,45,000 | 28,55,000 |
| 3 | 2026 - 27 | 120 | 60,00,000 | 16,95,000 | 43,05,000 |

8. Benefits:

Direct:

Diploma students can directly enroll for B.Arch. degree program at our institute.

Indirect:

To elaborate the external linkages envisaged partnership with other Institutes, Industry, Local Authorities, etc. for the wholesome growth of students as well as for contribution of the Institute to the Society at large.

1. Value addition and cross learning with other diploma and degree courses run by our institute.
2. Linkages with Practicing Consultants and Industry for employment.
3. Linkages with the Society.

9. Risk and Assumptions:

Assumptions:

1. There is need of Architects and Assistant Architects in the society who are qualified and trained manpower that can work for them, and this demand will be retained, rather increased in future.

2. Architecture, which relates to physical development, has great potential to develop as a constant need of the society for long run.
3. Retention of student's population number will be 100 %.
4. Strategic partnership and collaborations with Practicing Consultants.

Risks:

1. Council of Architecture may put on stringent rules.
2. Nep 2020 may prescribe different mechanism to run the course.

10. Admission Eligibility Criteria:

| Sr.No. | Year | Entry |
|--------|----------------------|--------------------------------|
| 1 | 1 st Year | Standard-10 with (Mathematics) |

Signature


वास्तुकला परिषद
Council of Architecture

(वास्तुविद् अधिनियम, 1972 के अंतर्गत भारत सरकार का एक स्वायत्त सांविधिक निकाय)
(An Autonomous Statutory Body of Government of India, under the Architects Act, 1972)

APPROVAL LETTER

Ref.No.CA/5/Academic/GJ09-D
May 14, 2024

The Principal
Shri Gijubhai Chhaganbhai Patel Institute of Architecture,
Interior Design and Fine Arts
Veer Narmad South Gujarat University
University Campus, Udhna-Magadalla Road
Surat- 395 007 (Gujarat)
Email: gcpiaif@gmail.com, arrdmehta@gmail.com

Sub: Approval for introduction of **3-year full-time Diploma in Architecture** from the academic session 2024-2025 onwards - reg.

Dear Sir/Madam,

I am directed to state that the Executive Committee of the Council of Architecture (COA) at its 259th meeting considered the application form submitted by your Institution, together with the information provided, for introduction of 3-year full-time Diploma in Architecture was considered by the Council from the academic session 2024-2025.

The Executive Committee, after consideration of the same, has decided to grant approval for introduction of **3-year Full-time Diploma Course** as under:

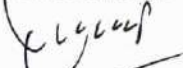
| DETAILS OF THE COURSE | INTAKE | PERIOD OF APPROVAL |
|--|--------|--------------------|
| 3-year full-time Diploma in Architecture | 40 | 2024-2025 |

The approval accorded by the Council to your institution is subject to the following.

- The approval accorded to your institution shall be subject to appointment of adequate Faculty of Architecture and maintenance of physical infrastructure & facilities at your institution, in terms of the Council of Architecture (Minimum Standards of Architectural Education) Guidelines for Diploma Courses, 2022, prescribed by the Council. The same are also available at the website of the Council.
- The institution should follow the course curriculum i.e. courses, periods of study and subjects of examination for the Diploma course as well as the eligibility criteria for admission to the course as prescribed by the Council in the said Guidelines.
- The institution shall be required to appoint faculty to fill up any vacancy, as may be required, within 15 days in case of any faculty leaving the institution.

The Council shall be at liberty to inspect the Institution at any point of time to verify the compliance made by the institution and to ascertain that the institution is imparting diploma course as per the Norms prescribed by the Council, from time to time. In case any discrepancy in regard to the information supplied by the institution is found at any stage, Council may initiate appropriate action against the institution.

Yours faithfully,



R. K. Oberoi
Registrar

1



Copy to, for information, please:

The Principal Secretary
Higher & Technical Education
Department of Education
Govt. of Gujarat
Block No.5, 9th Floor, New Sachivalaya Complex
GandhiNagar-382 010, Gujarat
Tel.(O): 29244, 079-6423231

The Director
Directorate of Technical Education
Govt. of Gujarat
BlockNo.2, 2nd Floor
Dr. Jivraj Mehta Bhavan
GandhiNagar-382 010, Gujarat
Email:dire-dte@gujarat.gov.in

| Sr. No | SubjectName | Category | Sem | Hours | | | | Credit | Internal | | External | | |
|--------|---|-------------------|-----|-------|---|---|-------|--------|----------|-------------------------|----------|-----------------|-------|
| | | | | L | T | P | Total | | Exam | Continous/ Viva/Jury | Exam | Viva/ On Job | Total |
| 1 | Architectural Design Studio - I | professional Core | 1 | 0 | 0 | 8 | 8 | 4 | 0 | 50 | 0 | 50 | 100 |
| 2 | Technical representation of drawing - I | SEC | 1 | 2 | 0 | 3 | 6 | 3 | 0 | 50 | 50 | 0 | 100 |
| 3 | Building Materials | BS & AE | 1 | 2 | 0 | 0 | 2 | 2 | 20 | 30 | 50 | 0 | 100 |
| 4 | Basic Design-I | professional Core | 1 | 2 | 0 | 4 | 6 | 4 | 0 | 50 | 0 | 50 | 100 |
| 5 | Mathematics-I | BS & AE | 1 | 3 | 1 | 0 | 4 | 4 | 20 | 30 | 50 | 0 | 100 |
| 6 | Communication Skills-I | SEC | 1 | 2 | 0 | 2 | 4 | 3 | 20 | 30 | 50 | 0 | 100 |
| | | | | | | | 30 | 20 | | | | | |

*L=Lectures,T=tutorial,P=Practical,E=TheoryExternal,M=TheoryInternal,I=Practical Internal,V=Practical External,On Job Training(OJT) is equivalent to Practical

DIPLOMA IN ARCHITECTURE

SEMESTER-II

| Sr. No | SubjectName | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|--------|--|-------------------|-----|-------|---|---|-------|--------|----------|---------------------|----------|---------------|-------|
| | | | | L | T | P | Total | | Exam | Continous/ Viva/ | Exam | Viva/ Jury | |
| 1 | Architectural Design Studio - II | Professional Core | 2 | 0 | 0 | 8 | 8 | 4 | 0 | 50 | 0 | 50 | 100 |
| 2 | Technical representation of drawing - II | SEC | 2 | 3 | 0 | 3 | 6 | 3 | 0 | 50 | 50 | 0 | 100 |
| 3 | Building Materials & Constructions | BS & AE | 2 | 2 | 0 | 2 | 4 | 3 | 20 | 30 | 50 | 0 | 100 |
| 4 | Basic Design-II | Professional Core | 2 | 2 | 0 | 4 | 6 | 4 | 0 | 50 | 0 | 50 | 100 |
| 5 | Indian Arts, Culture & Architecture | Professional Core | 2 | 2 | 0 | 0 | 2 | 2 | 20 | 30 | 50 | 0 | 100 |
| 6 | Mathematics-II | BS & AE | 2 | 2 | 1 | 0 | 2 | 2 | 20 | 30 | 50 | 0 | 100 |
| 7 | Communication Skills-II | SEC | 2 | 2 | 0 | 0 | 2 | 2 | 20 | 30 | 50 | 0 | 100 |

*L=lectures,T=tutorial,P=Practical,E=TheoryExternal,M=TheoryInternal,I=Practical Internal,V=Practical External,On Job Training(OJT) is equivalent to Practical

20

| | | |
|--|----|---|
| PC- professional Co | 10 | 0 |
| BS & AE - Bldg. Scie | 6 | 0 |
| EC- Elective Course | 0 | 0 |
| PE- Professional Ele | 0 | 0 |
| OE- Open Elective | 0 | 0 |
| PAEC- Professional Ability Enhancement Courses | 0 | 0 |
| SEC - Skill Enhancer | 6 | 0 |

DIPLOMA IN ARCHITECTURE

SEMESTER-III

| Sr. No | SubjectName | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|--------|-----------------------------------|-------------------|-----|-------|---|----|-------|--------|----------|-------------------------|----------|---------------|-------|
| | | | | L | T | P | Total | | Exam | Continous/ Viva/Jury | Exam | Viva/ Jury | |
| 1 | Architectural Design Studio - III | Professional Core | 3 | 0 | 0 | 10 | 10 | 6 | 0 | 50 | 0 | 50 | 100 |
| 2 | Building Constructions - I | BS & AE | 3 | 2 | 0 | 4 | 6 | 4 | 20 | 30 | 50 | 0 | 100 |
| 3 | Structure - I | BS & AE | 3 | 2 | | 2 | 4 | 4 | 20 | 30 | 50 | 0 | 100 |
| 4 | History of Architecture-I | Professional Core | 3 | 2 | 0 | 0 | 2 | 2 | 20 | 30 | 50 | 0 | 100 |
| 5 | Surveying and Levelling | BS & AE | 3 | 2 | 0 | 2 | 4 | 2 | 20 | 30 | 20 | 30 | 100 |
| 6 | Computer Skills-I | SEC | 3 | 0 | 0 | 4 | 4 | 2 | 20 | 30 | 50 | 0 | 100 |

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20

| | | |
|--|----|---|
| PC- professional Core, | 10 | 0 |
| BS & AE - Bldg. Science & Engg. | 10 | 0 |
| EC- Elective Course | 0 | 0 |
| PE- Professional Elective | 0 | 0 |
| OE- Open Elective | 0 | 0 |
| PAEC- Professional Ability Enhancement Courses | | |
| | 0 | 0 |
| SEC - Skill Enhancement | 2 | 0 |

DIPLOMA IN ARCHITECTURE

SEMESTER-IV

| Sr.No. | SubjectName | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|--------|--|---------------------------|-----|-------|---|----|-------|--------|----------|---------------------|----------|-----------|-------|
| | | | | L | T | P | Total | | Exam | Continous/Viva/Jury | Exam | Viva/Jury | |
| 1 | Architectural Design Studio-IV | Professional Core | 4 | 0 | 0 | 10 | 10 | 6 | 0 | 50 | 0 | 50 | 100 |
| 2 | Building Services | BS & AE | 4 | 2 | 0 | 4 | 6 | 3 | 20 | 30 | 50 | 0 | 100 |
| 3 | Structure - II | BS & AE | 4 | 2 | 0 | 2 | 4 | 3 | 20 | 30 | 50 | 0 | 100 |
| 4 | Environmental science | BS & AE | 4 | 2 | 0 | 0 | 2 | 2 | 20 | 30 | 50 | 0 | 100 |
| 5 | History of Architecture-II | Professional Core | 4 | 2 | 0 | 2 | 4 | 2 | 20 | 30 | 50 | 0 | 100 |
| 6 | Computer Skills-II | SEC | 4 | 0 | 0 | 4 | 4 | 2 | 20 | 30 | 50 | 0 | 100 |
| 7 | Bldg. Bye Laws & professional practice | Professional Core | 4 | 2 | 3 | 0 | 2 | 2 | 20 | 30 | 50 | 0 | 100 |
| 8 | Indian Knowledge System & Tradition | PAEC-Elective 1 (Any One) | 4 | 2 | 0 | 0 | 2 | 2 | 20 | 30 | 25 | 25 | 100 |
| 9 | Personality Development Course | PAEC-Elective 1 (Any One) | 4 | 2 | 0 | 0 | 2 | 2 | 20 | 30 | 25 | 25 | 100 |

*L=lectures,T=tutorial,P=Practical,E=TheoryExternal,M=TheoryInternal,I=Practical Internal,V=Practical External,On Job Training(OJT) is equivalent to Practical

22

| | | |
|--|----|---|
| PC- professional Core, | 10 | 0 |
| BS & AE - Bldg. Science & App | 10 | 0 |
| EC- Elective Course | 0 | 0 |
| PE- Professional Elective | 0 | 0 |
| OE- Open Elective | 0 | 0 |
| PAEC- Professional Ability Enhancement Courses | 0 | 0 |
| SEC - Skill Enhancement Cour | 2 | 0 |

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| Extra | Subcode | Month code | Eff. from | Subject Name | Category | Sem | Hours | | | | Credit | Max Marks | | | |
|-------|---------|------------|------------|---|-------------------|-----|-------|---|----|-------|--------|-----------|-----|-----|-----|
| | | | | | | | L | T | P | Total | | E | M | I | V |
| ☑ | 4340001 | 50 | March-2023 | Essence of Indian Knowledge and Tradition | Elective(Any one) | 4 | 2 | 0 | 0 | 2 | 70 | 30 | 25 | 25 | 150 |
| ☑ | 4340002 | 50 | March-2023 | Contributor Personality Development | Elective(Any one) | 4 | 2 | 0 | 0 | 2 | 70 | 30 | 25 | 25 | 150 |
| ☑ | 4340003 | 50 | March-2023 | Integrated Personality Development Course | Elective(Any one) | 4 | 2 | 0 | 0 | 2 | 70 | 30 | 25 | 25 | 150 |
| ☑ | 4345001 | 50 | March-2023 | Architectural Design -4 (Housing) | Compulsory | 4 | 0 | 0 | 12 | 6 | 0 | 0 | 100 | 100 | 200 |
| ☑ | 4345002 | 50 | March-2023 | Interior Design & Detailing | Compulsory | 4 | 0 | 0 | 6 | 3 | 0 | 0 | 50 | 50 | 100 |
| ☑ | 4345003 | 50 | March-2023 | Town Planning | Compulsory | 4 | 2 | 0 | 0 | 2 | 70 | 30 | 0 | 0 | 100 |
| ☑ | 4345004 | 50 | March-2023 | Building Services | Compulsory | 4 | 3 | 0 | 2 | 4 | 70 | 30 | 25 | 25 | 150 |
| ☑ | 4345005 | 50 | March-2023 | Structure | Compulsory | 4 | 3 | 0 | 0 | 3 | 70 | 30 | 0 | 0 | 100 |

DIPLOMA IN ARCHITECTURE

SEMESTER-V

| Sr.No | SubjectName | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|-------|---------------------------------|------------------------------|-----|-------|---|----|-------|--------|----------|-------------------------|----------|-----------|-------|
| | | | | L | T | P | Total | | Exam | Continous/ Viva/Jury | Exam | Viva/Jury | |
| 1 | Architectural Design Studio-V | Professional Core | 5 | 0 | 0 | 12 | 12 | 6 | 0 | 50 | 0 | 50 | 100 |
| 2 | Site Planning and Services | BS & AE | 5 | 0 | 0 | 6 | 6 | 4 | 20 | 30 | 50 | 0 | 100 |
| 3 | Ekistics | PE | 5 | 2 | 0 | 2 | 4 | 2 | 20 | 30 | 50 | 0 | 100 |
| 4 | Environmental Science-II | BS & AE | 5 | 2 | 0 | 0 | 2 | 2 | 20 | 30 | 50 | 0 | 100 |
| 5 | Art Appreciation and Aesthetics | PE | 5 | 2 | 0 | 2 | 4 | 2 | 20 | 30 | 20 | 30 | 100 |
| 6 | Estimation and Costing | Professional Core | 5 | 2 | 0 | 0 | 2 | 2 | 20 | 30 | 50 | 0 | 100 |
| 7 | Landscape Design | PAEC-Elective 1 (Any One) | 5 | 2 | 0 | 2 | 4 | 2 | 0 | 25 | 0 | 25 | 50 |
| 8 | Sustainable & Green Building | PAEC-Elective 1 (Any One) | 5 | 2 | 0 | 2 | 4 | 2 | 0 | 25 | 0 | 25 | 50 |
| 9 | Product Design | PAEC-Elective 2 (Any One) | 5 | 2 | 0 | 2 | 4 | 2 | 0 | 25 | 0 | 25 | 50 |
| 10 | Furniture Design | PAEC-Elective 2 (Any One) | 5 | 2 | 0 | 2 | 4 | 2 | 0 | 25 | 0 | 25 | 50 |

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22

| | | |
|---|----|---|
| PC- professional Core, | 12 | 0 |
| BS & AE - Bldg. Science & Applied Er | 6 | 0 |
| EC- Elective Course | 0 | 0 |
| PE- Professional Elective | 4 | 0 |
| OE- Open Elective | 0 | 0 |
| PAEC- Professional Ability Enhancement Courses | 0 | 0 |
| SEC - Skill Enhancement Courses | 0 | 0 |

*L=Lectures,T=tutorial,P=Practical,E=TheoryExternal,M=TheoryInternal,I=Practical Internal,V=Practical External,On Job Training(OJT) is equivalent to Practical

| Exp. | Subcode | Branch code | Sem. from | SubjectName | Category | Sem. Year | Hours | | | | Total | Max Marks | | | |
|------|---------|-------------|-----------|-------------------------------------|--------------------|-----------|-------|---|----|-------|-------|-----------|----|----|-----|
| | | | | | | | L | T | P | Total | | E | M | I | V |
| 62 | 4300021 | 50 | July-2023 | Entrepreneurship and Start-ups. | compulsory | 5 | 3 | 0 | 0 | 3 | 70 | 30 | 0 | 0 | 100 |
| 62 | 4355001 | 50 | July-2023 | Working Drawings | Compulsory | 5 | 0 | 0 | 12 | 6 | 0 | 0 | 50 | 50 | 100 |
| 62 | 4355002 | 50 | July-2023 | Architectural Practice & Management | Compulsory | 5 | 3 | 0 | 0 | 3 | 70 | 30 | 0 | 0 | 100 |
| 62 | 4355003 | 50 | July-2023 | Estimating & Costing | Compulsory | 5 | 2 | 0 | 2 | 3 | 70 | 30 | 25 | 25 | 150 |
| 62 | 4355004 | 50 | July-2023 | Product Design | Elective1(Any one) | 5 | 0 | 0 | 4 | 2 | 0 | 0 | 25 | 25 | 50 |
| 62 | 4355005 | 50 | July-2023 | Furniture Design | Elective1(Any one) | 5 | 0 | 0 | 4 | 2 | 0 | 0 | 25 | 25 | 50 |
| 62 | 4355006 | 50 | July-2023 | Landscape Architecture | Elective2(Any one) | 5 | 0 | 0 | 4 | 2 | 0 | 0 | 25 | 25 | 50 |
| 62 | 4355007 | 50 | July-2023 | Sustainable and Green Buildings | Elective2(Any one) | 5 | 0 | 0 | 4 | 2 | 0 | 0 | 25 | 25 | 50 |

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| Exp. | Subcode | Branch code | Sem. from | SubjectName | Category | Sem. Year | Hours | | | | Total | Max Marks | | | |
|------|---------|-------------|-----------|-----------------------------|----------|-----------|-------|---|----|-------|-------|-----------|----|----|----|
| | | | | | | | L | T | P | Total | | E | M | I | V |
| 62 | 3356201 | 62 | Jan 2019 | Design Studio-V | | 5 | 0 | 0 | 12 | 12 | 0 | 0 | 60 | 40 | 10 |
| 62 | 3356202 | 62 | Jan 2019 | Site Planning and Community | | 5 | 0 | 0 | 6 | 6 | 0 | 0 | 50 | 50 | 10 |

| | | | | | | | | | | | | | | |
|---------|----|----------|-----------------------------------|--|---|---|---|---|---|----|----|----|----|----|
| 3356203 | 62 | Jan 2019 | Architectural Programming | | 5 | 0 | 0 | 3 | 3 | 0 | 0 | 50 | 50 | 10 |
| 3356204 | 62 | Jan 2019 | Environmental Science and Ecology | | 5 | 2 | 0 | 1 | 3 | 50 | 30 | 20 | 0 | 10 |
| 3356205 | 62 | Jan 2019 | Art Appreciation and Aesthetics | | 5 | 0 | 0 | 3 | 3 | 0 | 0 | 50 | 50 | 10 |
| 3356206 | 62 | Jan 2019 | Estimation and Costing | | 5 | 2 | 0 | 1 | 3 | 50 | 30 | 20 | 0 | 10 |

DIPLOMA IN ARCHITECTURE

SEMESTER-VI

| Sr.No | SubjectName | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|-------|--------------------------|-------------------|-----|-------|---|----|-------|--------|----------|---------------------|----------|-----------|-------|
| | | | | L | T | P | Total | | Exam | Continous/Viva/Jury | Exam | Viva/Jury | |
| 1 | Architectural Internship | Professional Core | 6 | 0 | 0 | 36 | 36 | 16 | 0 | 50 | 0 | 50 | 100 |

*L=Lectures,T=tutorial,P=Practical,E=TheoryExternal,M=TheoryInternal,I=Practical Internal,V=Practical External,On Job Training(OJT) is equivalent to Practical

| | | |
|--|----|---|
| PC- professional Corri | 15 | 0 |
| BS & AE - Bldg. Scien | 0 | 0 |
| EC- Elective Course | 0 | 0 |
| PE- Professional Elec | 7 | 0 |
| OE- Open Elective | 0 | 0 |
| PAEC- Professional Ability Enhancement Courses | 0 | 0 |
| SEC - Skill Enhancem | 0 | 0 |

*L=Lectures,T=tutorial,P=Practical,E=TheoryExternal,M=TheoryInternal,I=Practical Internal,V=Practical External,On Job Training(OJT) is equivalent to Practical

| Exp. | Subcode | Branch code | Eff from | SubjectName | Category | Sem /Year | Hours | | | Total | Credit | | | | Total |
|------|---------|-------------|----------|------------------------------|--------------|-----------|-------|---|----|-------|--------|---|-----|-----|-------|
| | | | | | | | L | T | P | | E | M | I | V | |
| 5 | 4365001 | 50 | Jan-2024 | Architectural Apprenticeship | Program Core | 6 | 0 | 0 | 36 | 18 | 0 | 0 | 500 | 300 | 800 |

*L=Lectures,T=tutorial,P=Practical,E=TheoryExternal,M=TheoryInternal,I=Practical Internal,V=Practical External,On Job Training(OJT) is equivalent to Practical

| Exp. | Subcode | Branch code | Eff from | SubjectName | Category | Sem /Year | Hours | | | Total | Credit | | | | Total |
|------|---------|-------------|----------|---|----------|-----------|-------|---|----|-------|--------|----|----|----|-------|
| | | | | | | | L | T | P | | E | M | I | V | |
| 5 | 3366201 | 62 | Jan 2019 | Design Studio-VI | | 6 | 0 | 0 | 12 | 12 | 0 | 0 | 60 | 40 | 100 |
| 5 | 3366202 | 62 | Jan 2019 | Interior Architecture | | 6 | 0 | 0 | 6 | 6 | 0 | 0 | 50 | 50 | 100 |
| 5 | 3366203 | 62 | Jan 2019 | Theory of Urban Design and Planning | | 6 | 0 | 0 | 3 | 3 | 50 | 30 | 20 | 0 | 100 |
| 5 | 3366204 | 62 | Jan 2019 | Heritage Conservation and Preservation | | 6 | 0 | 3 | 0 | 3 | 0 | 0 | 50 | 50 | 100 |
| 5 | 3366205 | 62 | Jan 2019 | Building Bye-laws and Professional Practice | | 6 | 0 | 3 | 0 | 3 | 50 | 30 | 20 | 0 | 100 |
| 5 | 3366206 | 62 | Jan 2019 | Post Occupancy Evaluation | | 6 | 0 | 0 | 3 | 3 | 0 | 0 | 50 | 50 | 100 |

| Sr. No | Subject | Semester | Faculty name |
|--------|-------------------------------------|----------|-------------------------|
| 1 | Architectural Design Studio | I To VI | Ar. Nirva shah |
| | | | Ar. Birva Gandhi |
| 2 | Technical representation of drawing | I & II | Ar. Himani |
| 3 | Building Materials | I | Dr. Aditya C. |
| | | | Ar. Darsin P |
| 4 | Building Materials & Constructions | II | Ar. Darsin P |
| 5 | Building Constructions | III & IV | Ar. Darsin P |
| 6 | Basic Design | I & II | Ar. Heta Patel |
| 7 | Mathematics | I & II | Ar. Rajesh Mehta |
| 8 | Communication Skills | I & II | Ar. Heta Patel |
| 9 | Indian Arts, Culture & Architecture | II | Ar. Rajesh Mehta |
| 10 | History of Architecture | III & IV | Ar. Himani Vashi |
| 11 | Structure | III & IV | Dr. Aditya C. |
| 12 | Surveying and Levelling | III | Dr. Aditya C. |
| 13 | Computer Skills | III & IV | Ar. Harsh Patel |
| 14 | Environmental science | IV & V | Ar. Bharat Prajapati |
| 15 | Site Planning and Services-I | V | Ar. Anand Kapdia |
| 16 | Ekistics | V | Ar. Bharat Prajapati |
| 17 | Urban Planning | VI | Ar. Anand Kapdia |
| 18 | Art Appreciation and Aesthetics | V | Miss. Kruti (Fine Arts) |
| 19 | Interior Design | VI | Ar. Heta Patel |
| 20 | Estimation and Costing | V | Dr. Aditya C. |
| 21 | Building Byelaws | VI | Ar. Pradeep Chokshi |
| 22 | Landscape Design | VI | Ar. Nirav Shah |

VEER NARMAD SOUTH GUJARAT UNIVERSITY

DIPLOMA IN ARCHITECTURE

Diploma in Architecture is a Diploma level Architecture course. Building specialists assume a basic job in the interdisciplinary plan groups of the present assembled condition division and thus rank among the most generously compensated manufactured condition experts. The program considers low carbon building structure and the coordination of sustainable power source frameworks into structures. It manages administrations building issues, fabricating the aptitudes required to adapt to the difficulties in administration structure and usage which will be knowledgeable about the workplace, and gives understudies the best establishment for propelling or quickening a vocation as a design engineer.

Course Suitability

- o The course is appropriate for the individuals who are keen on specialized perspectives can take up the course in different establishments that have Architectural Engineering.
- o The course additionally helps those candidates the individuals who need to set up a business.
- o They can likewise get utilized by businesses or private design firms.
- o They can function as specialists and land creating firms.



VEER NARMAD SOUTH GUJARAT UNIVERSITY
DIPLOMA IN ARCHITECTURE
SCHEME OF TEACHING AND EXAMINATION

SEMESTER-I

| Sr. No | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|--------|---|-------------------|-----|-------|---|---|-------|--------|----------|------------------------------|----------|---------------|-------|
| | | | | L | T | P | Total | | Exam | Continuous/ Viva/ Jury | Exam | Viva/ Jury | |
| 1 | Architectural Design Studio - I | professional Core | 1 | 0 | 0 | 8 | 8 | 4 | 0 | 50 | 0 | 50 | 100 |
| 2 | Technical representation of drawing - I | SEC | 1 | 2 | 0 | 3 | 6 | 3 | 0 | 50 | 50 | 0 | 100 |
| 3 | Building Materials | BS & AE | 1 | 2 | 0 | 0 | 2 | 2 | 20 | 30 | 50 | 0 | 100 |
| 4 | Basic Design-I | professional Core | 1 | 2 | 0 | 4 | 6 | 4 | 0 | 50 | 0 | 50 | 100 |
| 5 | Mathematics-I | BS & AE | 1 | 3 | 1 | 0 | 4 | 4 | 20 | 30 | 50 | 0 | 100 |
| 6 | Communication Skills-I | SEC | 1 | 2 | 0 | 2 | 4 | 3 | 20 | 30 | 50 | 0 | 100 |
| | | | | | | | 30 | 20 | | | | | |

SEMESTER-II

| Sr. No | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|--------|--|-------------------|-----|-------|---|---|-------|--------|----------|------------------------------|----------|---------------|-------|
| | | | | L | T | P | Total | | Exam | Continuous/ Viva/ Jury | Exam | Viva/ Jury | |
| 1 | Architectural Design Studio - II | Professional Core | 2 | 0 | 0 | 8 | 8 | 4 | 0 | 50 | 0 | 50 | 100 |
| 2 | Technical representation of drawing - II | SEC | 2 | 3 | 0 | 3 | 6 | 3 | 0 | 50 | 50 | 0 | 100 |
| 3 | Building Materials & Constructions | BS & AE | 2 | 2 | 0 | 2 | 4 | 3 | 20 | 30 | 50 | 0 | 100 |
| 4 | Basic Design-II | Professional Core | 2 | 2 | 0 | 4 | 6 | 4 | 0 | 50 | 0 | 50 | 100 |
| 5 | Indian Arts, Culture & Architecture | Professional Core | 2 | 2 | 0 | 0 | 2 | 2 | 20 | 30 | 50 | 0 | 100 |
| 6 | Mathematics-II | BS & AE | 2 | 2 | 1 | 0 | 2 | 2 | 20 | 30 | 50 | 0 | 100 |
| 7 | Communication Skills-II | SEC | 2 | 2 | 0 | 0 | 2 | 2 | 20 | 30 | 50 | 0 | 100 |
| | | | | | | | 30 | 20 | | | | | |

SEMESTER-III

| Sr. No | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|--------|-----------------------------------|-----------------------|-----|-------|---|----|-------|--------|----------|--------------------------|----------|-----------|-------|
| | | | | L | T | P | Total | | Exam | Continuous/ Viva/Jury | Exam | Viva/Jury | |
| 1 | Architectural Design Studio - III | professiona l Core | 3 | 0 | 0 | 10 | 10 | 6 | 0 | 50 | 0 | 50 | 100 |
| 2 | Building Construction - I | BS & AE | 3 | 2 | 0 | 4 | 6 | 4 | 20 | 30 | 50 | 0 | 100 |
| 3 | Structure - I | BS & AE | 3 | 2 | 0 | 2 | 4 | 4 | 20 | 30 | 50 | 0 | 100 |
| 4 | History of Architecture- I | professiona l Core | 3 | 2 | 0 | 0 | 2 | 2 | 20 | 30 | 50 | 0 | 100 |
| 5 | Surveying and Levelling | BS & AE | 3 | 2 | 0 | 2 | 4 | 2 | 20 | 30 | 20 | 30 | 100 |
| 6 | Computer Skills - I | SEC | 3 | 0 | 0 | 4 | 4 | 2 | 20 | 30 | 50 | 0 | 100 |
| | | | | | | | 30 | 20 | | | | | |

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training(OJT) is equivalent to Practical

Semester – IV

| Sr. No. | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|---------|--|----------------------------------|-----|-------|---|----|-------|--------|----------|----------------------------------|----------|---------------|-------|
| | | | | L | T | P | Total | | Exam | Cont inuous/ Viva /Jury | Exam | Viva/ Jury | |
| 1 | Architectural Design Studio-IV | Professional Core | 4 | 0 | 0 | 10 | 10 | 6 | 0 | 50 | 0 | 50 | 100 |
| 2 | Building Services | BS & AE | 4 | 2 | 0 | 4 | 6 | 3 | 20 | 30 | 50 | 0 | 100 |
| 3 | Structure - II | BS & AE | 4 | 2 | 0 | 2 | 4 | 3 | 20 | 30 | 50 | 0 | 100 |
| 4 | Environmental science | BS & AE | 4 | 2 | 0 | 0 | 2 | 2 | 20 | 30 | 50 | 0 | 100 |
| 5 | History of Architecture-II | Professional Core | 4 | 2 | 0 | 2 | 4 | 2 | 20 | 30 | 50 | 0 | 100 |
| 6 | Computer Skills-II | SEC | 4 | 0 | 0 | 4 | 4 | 2 | 20 | 30 | 50 | 0 | 100 |
| 7 | Bldg. Bye Laws & professional practice | Professional Core | 4 | 2 | 3 | 0 | 2 | 2 | 20 | 30 | 50 | 0 | 100 |
| 8 | Indian Knowledge System & Tradition | PAEC- Elective 1 (Any One) | 4 | 2 | 0 | 0 | 2 | 2 | 20 | 30 | 25 | 25 | 100 |
| 9 | Personality Development Course | PAEC- Elective 1 (Any One) | 4 | 2 | 0 | 0 | 2 | 2 | 20 | 30 | 25 | 25 | 100 |
| | | | | | | | 34 | 22 | | | | | |

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training(OJT) is equivalent to Practical

Semester – V

| Sr. No | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|--------|---------------------------------|---------------------------|-----|-------|---|----|-------|--------|----------|-----------------------------|----------|---------------|-------|
| | | | | L | T | P | Total | | Exam | Continous/ Viva/ Jury | Exam | Viva/ Jury | |
| 1 | Architectural Design Studio-V | Professional Core | 5 | 0 | 0 | 12 | 12 | 06 | 0 | 50 | 0 | 50 | 100 |
| 2 | Site Planning and Services | BS & AE | 5 | 0 | 0 | 6 | 6 | 4 | 20 | 30 | 50 | 0 | 100 |
| 3 | Ekistics | SEC | 5 | 2 | 0 | 2 | 4 | 2 | 20 | 30 | 50 | 0 | 100 |
| 4 | Environmental Science-II | BS & AE | 5 | 2 | 0 | 0 | 2 | 2 | 20 | 30 | 50 | 0 | 100 |
| 5 | Art Appreciation and Aesthetics | SEC | 5 | 2 | 0 | 2 | 4 | 2 | 20 | 30 | 20 | 30 | 100 |
| 6 | Estimation and Costing | Professional Core | 5 | 2 | 0 | 0 | 2 | 2 | 20 | 30 | 50 | 0 | 100 |
| 7 | Landscape Design | PAEC-Elective 1 (Any One) | 5 | 2 | 0 | 2 | 4 | 2 | 0 | 25 | 0 | 25 | 50 |
| 8 | Sustainable & Green Building | PAEC-Elective 1 (Any One) | 5 | 2 | 0 | 2 | 4 | 2 | 0 | 25 | 0 | 25 | 50 |
| 9 | Product Design | PAEC-Elective 2 (Any One) | 5 | 2 | 0 | 2 | 4 | 2 | 0 | 25 | 0 | 25 | 50 |
| 10 | Furniture Design | PAEC-Elective 2 (Any One) | 5 | 2 | 0 | 2 | 4 | 2 | 0 | 25 | 0 | 25 | 50 |
| | | | | | | | 38 | 22 | | | | | |

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical

Semester – VI

| Sr. No | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|--------|--------------------------|-------------------|-----|-------|---|----|-------|--------|----------|-----------------------------|----------|---------------|-------|
| | | | | L | T | P | Total | | Exam | Continous/ Viva/ Jury | Exam | Viva/ Jury | |
| 1 | Architectural Internship | Professional Core | 6 | 0 | 0 | 14 | 14 | 12 | 0 | 50 | 0 | 50 | 100 |

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical

PC- Professional Core,

BS & AE - Bldg. Science & Applied Engg.

EC- Elective Course

PE- Professional Elective

OE- Open Elective

PAEC- Professional Ability Enhancement Courses

SEC - Skill Enhancement Courses

VEER NARMAD SOUTH GUJARAT UNIVERSITY

DIPLOMA IN ARCHITECTURE

Semester -I

TEACHING AND EXAMINATION SCHEME

| Sr. No | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|--------|---|-------------------|-----|-------|---|---|-------|--------|----------|--------------------------|----------|-----------|-------|
| | | | | L | T | P | Total | | Exam | Continuou s/Viva/Jury | Exam | Viva/Jury | |
| 1 | Architectural Design Studio - I | professional Core | 1 | 0 | 0 | 8 | 8 | 4 | 0 | 50 | 0 | 50 | 100 |
| 2 | Technical representation of drawing - I | SEC | 1 | 2 | 0 | 3 | 6 | 3 | 0 | 50 | 50 | 0 | 100 |
| 3 | Building Materials | BS & AE | 1 | 2 | 0 | 0 | 2 | 2 | 20 | 30 | 50 | 0 | 100 |
| 4 | Basic Design-I | professional Core | 1 | 2 | 0 | 4 | 6 | 4 | 0 | 50 | 0 | 50 | 100 |
| 5 | Mathematics-I | BS & AE | 1 | 3 | 1 | 0 | 4 | 4 | 20 | 30 | 50 | 0 | 100 |
| 6 | Communication Skills-I | SEC | 1 | 2 | 0 | 2 | 4 | 3 | 20 | 30 | 50 | 0 | 100 |
| | | | | | | | 30 | 20 | | | | | |

*L=lectures,T=tutorial,P=Practical,E=TheoryExternal,M=TheoryInternal,I=Practical Internal,V=Practical External,On Job Training(OJT) is equivalent to Practical

Course Title: Architectural Design Studio – I

Semester –I

TEACHING AND EXAMINATION SCHEME

| Subject Name | Category | Sem | Hours | | | | Credit Total | Internal | | External | | Total |
|---------------------------------|--------------|-----|-------|---|---|-------|--------------|----------|-----------------------|----------|-------------|-------|
| | | | L | T | P | Total | | Exam | Continuous /Viva/Jury | Exam | Viva / Jury | |
| Architectural Design Studio - I | Program Core | 1 | 0 | 0 | 8 | 8 | 4 | 0 | 50 | 0 | 50 | 100 |

*L=Lectures,T=tutorial,P=Practical,E=Theory External,M=Theory Internal,I=Practical Internal,V=Practical External,On Job Training(OJT) is equivalent to Practical

1. EMPHASIZE

Through a wide range of teaching and learning experiences, the objective of this course is to assist the student in acquiring the following industry-recognized capabilities:

- Prepare architectural design for a single volume building having approximately volume of 150-300 cu.mts, including with presentation drawings and models.

2. INTENTION OF THIS SUBJECT

The program's foundational class is architectural design. This course includes a component that introduces students to various architectural components and their measurements so that they can learn the necessary drawing abilities to create plans, elevations, and sections of both buildings as well as layouts of the furnishings within, all while utilizing the proper scale. The course essentially prepares students for the conceptual drawings, presentation drawings, working drawings, etc. that are a part of the architectural design subject covered in later semesters of the programme.

Thus, in order to design a single volume building and be able to grasp and apply the complex concepts of anthropometry by creating a model in line with the furniture layout, the learner must imagine various types of forms.

This course has been introduced with its genesis as a contemporary technique. The goal of this exercise is to improve each learner's unique skill set so they can tackle future design challenges strategically and improve their ability to articulate ideas in architecture.

3. COURSE OUTCOMES (COs)

The following COs must be attained by the student in order to build the appropriate soft skills, foundational knowledge, and practical exercises for the indicated competency:

- a) Create scaled drawings of things and the human body using measurements.
- b) Examine the primary and secondary data gathered for a single volume building in light of the specified design project requirements.
- c) Create an architectural design to scale for the project that has been granted a single volume.
- d) Create a set of architectural presentation drawings and a model of the designed single volume building at the proper scale.

4. SUGGESTED PRACTICAL/STUDIO EXERCISES

The COs' sub-components are the subsequent practical outcomes (PrOs). They are essential for that specific CO at the 'Precision Level' of Dave's Taxonomy in the 'Psychomotor Domain'.

| S. No. | Practical Outcomes (PrOs) | Unit No. | Approx. Hrs. required |
|--------|---|----------|-----------------------|
| 1 | Draw front view and top view of any given object/s to the given scales. (1:1, 1:2, 1:5, 1:10, etc.) | I | 08 |
| 2 | Draw various anthropometric figures in different postures to a given scale | I | 08 |
| 3 | Collect Primary Data: Prepare a set of measured drawings of a designed single volume building which include its plan, sections, elevations and furniture layout with human figures to an appropriate scale (E.g. a watchman's cabin, milk booth, food kiosk, BRTS bus-stand, construction site office etc.) | II | 32 |
| 4 | Collect Secondary Data: Comparison of similar single volume building with respect to all architectural design parameters from various secondary sources like internet, books, journals, magazines, etc. | II | 08 |
| 5 | Prepare a conceptual layout by formulating design requirements for a given single volume design project. | III | 08 |
| 6 | Prepare preliminary sketch designs of the given design project to the scale using anthropometric requirements | III | 16 |
| 7 | Prepare a set of final presentation drawings including plans, sections, elevations and views for the designed building | IV | 16 |
| 8 | Draw 3 dimensional view of the designed building | IV | 08 |
| 9 | Make a model of the designed project to scale | IV | 08 |
| | Total Hrs. | | 112 |

Note:

- The teacher of the relevant course may design and provide additional practical exercises to help students achieve the COs by enhancing their industry-related skills and outcomes. Just a suggested list, the table above.
- Due to the fact that this is a first-year study report, caution must be given when assigning and grading it. A group assignment is required for the study report, data collection report, and analytic report. Before the group begins their market research, the teacher must discuss the types of data (which and why).
- The following are a few examples of "Process" and "Product" related skills that are present in the above-mentioned Practical Exercises of this course and are ultimately incorporated into the COs and the competency (more may be added or omitted depending on the course).

| S. No. | Examples of Performance Measures for PrOs | Weightage in % |
|--------------|---|----------------|
| 1 | Accurate measurement and graphical representation of data collection for the given design project | 20 |
| 2 | Ability to analyze the form and functional clarity of the studied buildings. | 10 |
| 3 | Prepare bubble diagram showing inter-relationships and circulation | 10 |
| 4 | Concept development with originality of idea | 20 |
| 5 | Apply the inferences from the studied buildings in the design process | 20 |
| 6 | Final presentation drawings and model | 10 |
| 7 | Adherence to deadlines | 10 |
| Total | | 100 |

5. AFFECTIVE DOMAIN OUTCOMES

The following *sample* Affective Domain Outcomes (ADOs) are embedded in many of the above mentioned COs and PrOs. More could be added to fulfil the development of this competency.

- a) Work as a leader/a team member.
- b) Follow ethical practices.
- c) Practice environmental friendly methods and processes. (Environment related)

6. CONTENT:

The primary theory is shown below and is based on the higher level UOs of the Revised Bloom's taxonomy that are developed for the growth of the COs and competencies. The course instructor may add more of these UOs if necessary to emphasize proficiency and the achievement of COs.

| Unit | Unit Outcomes (UOs) (4 to 6 UOs at different levels) | Topics and Sub-topics |
|---|---|---|
| Unit – I Measured drawings of objects and human body in different postures | 1a Draw front view and top view of any given object/s to the given scale/s. 1b Draw the anthropometric figures for the given postures to a given scale | 1.1 Introduction to scale : Graphical two dimensional representation of a given object/s 1.2 Introduction to Anthropometry: Importance of study of anthropometry and its need for architectural design |

| | | |
|---|---|---|
| <p>Unit –II</p> <p>Primary and Secondary Data collection</p> | <p>2a Prepare a set of measured drawings of a designed single volume building including plan, sections, elevations and furniture layout along with human figures to an appropriate scale (E.g. a watchman's cabin, milk booth, food kiosk, BRTS bus-stand, etc.)</p> <p>2b Compare the different single volume building with respect to all architectural design parameters using secondary sources like internet, books, journals, magazines, etc.</p> | <p>3.1 Primary Data Collection: Explanation and methodology of taking measurements on site and maintenance of observations in graphical form (sketching, measuring, photography, videography, etc.)</p> <p>3.2 Secondary Data Collection: Collection of data from books, magazines, internet, etc.</p> |
| <p>Unit– III</p> <p>Architectural design of the given design project</p> | <p>3a. Formulate design requirements for a given single volume design project</p> <p>3b. Prepare conceptual design to scale for a given single volume design project using anthropometric considerations</p> | <p>3.1. Design Requirements : Application of inferences from primary and secondary data collection</p> <p>3.2. Conceptual Design : Graphical representation of functional co-relationships between given</p> |
| <p>project</p> | <p>3c. Prepare preliminary sketch designs for a given single volume design project to the scale</p> | <p>requirements – Bubble Diagram</p> <p>3.3 Derivation of Form : Derivation of a form with regard to functional requirements by developing activity-space relationship</p> <p>3.4 Two Dimensional Graphical Representation: Development of plan, sections, elevations and spatial relationships at an appropriate scale</p> <p>3.5 Materials and Finishes: Development of elevations and sections with consideration of levels as well as building materials</p> |
| <p>Unit– IV</p> <p>Final presentation drawings and model of designed single volume building</p> | <p>4a Prepare a set of final presentation drawings for the designed single volume building to appropriate scale</p> <p>4b Prepare a three-dimensional view of the designed single volume building to scale</p> <p>4c Make a model of the designed project to appropriate scale</p> | <p>4.1 Preparation of presentation drawings : Draw plans, sections and elevations of designed building with rendering</p> <p>4.2 3D Drawings : Draw a three-dimensional graphical representation of the designed building</p> <p>4.3 Preparation of a model : Make a model of the designed building to scale</p> |

7. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

| Unit No. | Unit Title | Teaching Hours | Distribution of Theory Marks | | | |
|--------------|--|----------------|------------------------------|---------|---------|-------------|
| | | | R Level | U Level | A Level | Total Marks |
| I | Measured drawings of objects and human body in different postures | | Not Applicable | | | |
| II | Primary and Secondary Data collection | | | | | |
| III | Architectural design of the given design project | | | | | |
| IV | Final presentation drawings and model of designed single volume building | | | | | |
| Total | | | | | | |

Legends: R=Remember, U=Understand, A=Apply and above (Revised Bloom's taxonomy)

Note: This specification table provides general guidelines to assist students for their learning and to teachers to teach and question paper designers/setters to formulate test

items/questions to assess the attainment of the UOs. The actual distribution of marks at different taxonomy levels (of R, U and A) in the question paper may slightly vary from above table.

8. SUGGESTED STUDENT ACTIVITIES

Other than the classroom and laboratory learning, following are the suggested student-related **co-curricular** activities which can be undertaken to accelerate the attainment of the various outcomes in this course: Students should perform following activities in group and prepare reports of about 5 pages for each activity. They should also collect/record physical evidences for their (student's) portfolio which may be useful for their placement interviews:

- a) Undertake periodic site visits to relate to the present architectural practices.
- b) Identify and explore the design parameters for the locally available single volume buildings.
- c) Attend Interactive sketching workshops.
- d) Visit and explore art exhibitions and libraries
- e) Give seminar on the relevant topic under consideration.
- f) Prepare portfolio of Architectural Design Fundamentals
- g) Participate in model making workshops

9. SUGGESTED LEARNING RESOURCES

| S. No. | Title of Book | Author | Publication with place, year and ISBN |
|--------|--------------------|-------------------|--|
| 1 | Form Space & Order | Francis D.K.Ching | John Wiley & Sons, United States. ISBN-10 : 9781118745083 ISBN-13 : 978-1118745083 , 4 th Edition (September 2014) |

| | | | |
|---|-----------------------------------|-------------------|--|
| 2 | Building Construction | Rangwala S.C. | Charotar Publishing House, Anand, Gujarat. ISBN-10 : 9385039040 ISBN-13 : 978-9385039041, 33rd Edition (1 January 2016) |
| 3 | Building Drawing | Shah, Kale, Patki | Tata Mcgraw Hill Publishing, India. ISBN-10 : 9389538122 ISBN-13 : 978-9389538120, Sixth edition (28 October 2019) |
| 4 | Visual Dictionary of Architecture | Francis D.K.Ching | John Wiley & Sons, United States ISBN-10 : 8126535644 ISBN-13 : 978-8126535644, Second edition (23 April 2012) |
| 5 | Neufert, Architects' Data | Ernst Neufert | Wiley-Blackwell, United Kingdom ISBN-10 : 111928435X ISBN-13 : 978-1119284352, 5th edition (12 July 2019) |
| 6 | Architecture + Design | Journal/Magazine | Burda Media India ISSN: 0970-2369 |
| 7 | Inside Outside | Journal/Magazine | Business India Group ISSN: 0970-1761 |
| 8 | Indian Architect and Builder | Journal/Magazine | Jasubhai Media Pvt. Ltd. ISSN:0971-5509 |

10. SOFTWARE/LEARNING WEBSITES

- www.greatbuildings.com
- www.architecturalrecord.com
- www.archdaily.com
- www.dezeen.com
- www.archpaper.com
- www.architectmagazine.com
- www.archello.com
- www.designboom.com

11. PO-COMPETENCY-CO MAPPING

| Semester I | Architectural Design Fundamentals (Course Code: 1016301) | | | | | | | | |
|---|--|--------------------------|---|--|---|----------------------------|----------------------------|------------------------------|---------------------|
| | POs and PSOs | | | | | | | | |
| Competency & Course Outcomes | PO 1 Basic & Discipline specific knowledge | PO 2 Problem Analysis | PO 3 Design/development of solutions | PO 4 Engineering Tools, Experimentation & Testing | PO 5 Engineering practices for society, sustainability & environment | PO 6 Project Management | PO 7 Life-long learning | * PSO 1 Planning & Design | #PSO 2 Execution |
| Competency | Prepare architectural design for a single volume building, its presentation drawings and models | | | | | | | | |
| <u>Course Outcomes</u> | | | | | | | | | |
| a) Prepare measured drawings of objects and human body in different postures to a given scale | 3 | - | - | 2 | - | - | 1 | 1 | 1 |
| b) Analyze the collected primary and secondary data of a single volume building considering the given design project requirements | 3 | 2 | - | - | - | 1 | 1 | 2 | 2 |
| c) Prepare architectural design for the given single volume design project to the scale | 3 | - | 3 | 2 | 1 | 2 | 2 | 3 | 2 |
| d) Prepare a set of architectural presentation drawings for the designed single volume building along with its model to appropriate scale | 3 | - | 3 | 2 | 1 | 1 | 2 | 3 | 2 |

Legend: '3' for high, '2' for medium, '1' for low and '-' for no correlation of each CO with PO/PSO.

***PSO 1: Planning and Design:** Prepare architectural designs and all types of drawings with appropriate material specifications and application techniques as per specific requirements of the project.

#PSO 2: Execution: Work competently as assistants in architectural firms so as to contribute and coordinate both office work and execution on site.

Course Title: Technical representation of drawing – I

Semester –I

TEACHING AND EXAMINATION SCHEME

| Subject Name | Category | Sem | Hours | | | | Credit Total | Internal | | External | | Total |
|---|----------|-----|-------|---|---|-------|--------------|----------|------------------------|----------|--------------|-------|
| | | | L | T | P | Total | | Exam | Continuou s/Viva/Jur y | Exa m | Viv a/ Jur y | |
| Technical representation of drawing - I | SEC | 1 | 2 | 0 | 3 | 6 | 3 | 0 | 50 | 50 | 0 | 100 |

FOCUS:

Architectural drawing is designed to impart fundamental knowledge of using drawing instruments, essential for all the drawing-oriented subjects. It also helps in imparting knowledge and skill of using various types of Architectural letters, Lines etc. to create understanding of geometric used at various levels in drawing plans, elevations and sections of the building.

CONTENTS:

- Practice drafting techniques by using the drafting instruments like drawing board, parallel scale, adjustable setsquares, compass, different grade of pencils, rubber, clips, clutch pencils, scales, stencils, inking pens, circle templates, French curves etc.
- Carry out geometrical constructions using drafting tools and techniques.
- Types of lines and intensities of lines. Types of Lettering.
- Dimensioning terms and annotations, placing of dimension and unit of dimensions in drawings.
- Orthographic projection of point, lines, plans and solids. Sections of solids
- Isometric and Axonometric views of geometrical forms, building components and furniture.
- basics of 2D commands to develop architectural drawings in CAD.

Suggested Books:

1. Engineering drawing - N.D.Bhatt
2. Text book of Engineering Drawing – P.J. Shah
3. Engineering Drawing - M.B. Shah, B.C.Rana , Basant Agrawal, C.M. Agrawal

Course Title: Building Materials

Semester –I

TEACHING AND EXAMINATION SCHEME

| Subject Name | Category | Sem | Hours | | | | Total | Credit | Internal | | External | | Total |
|-----------------------|----------|-----|-------|---|---|-------|-------|--------|----------|------------------------------|----------|-----------------------|-------|
| | | | L | T | P | Total | | | Exam | Continuou s/Viva/Jur y | Exa m | Viv a/ Jur y | |
| Building Materials | BS & AE | 1 | 2 | 0 | 0 | 2 | 2 | 20 | 30 | 50 | 0 | 100 | |

FOCUS

This course introduces the learners to the basic building materials used in the construction industry. Building material is an integral part of the architectural field. The site condition, as well as the nature of its surroundings, determines the building type, and choice of building materials to be used. The type and form of structure is determined by the type of material used. The proper choice of building material is very important as it glorifies the endurance and visual aspects of design. It also helps in enhancing the aesthetic quality of a building—*venustas* (beauty) and *firmitas* (structure). This course gives a brief description about different types of materials used in building construction projects. Properties of various construction materials and their uses are discussed in this subject. This course will not only help diploma students in identifying suitable building material as per the type of building but also maintain its aesthetic aspects.

COURSE OUTCOMES(COs)

The practical exercises, the underpinning knowledge and the relevant soft skills associated with the identified competency are to be developed in the student for the achievement of the following COs:

- Classify the various building materials
- Select the relevant man-made materials like bricks, cement, concrete, artificial stone, etc. as per architectural project requirements
- Select the relevant natural materials like stone/rock, timber, lime, etc. as per architectural project requirements
- Differentiate between various types of binding materials in a given situation.

CONTENT.

| Unit | Unit Outcomes (UOs) (4 to 6 UOs at different levels) | Topics and Sub-topics |
|---------------------------------|---|--|
| Unit – I Introduction | 1a. Classify the building materials. 1b. Explain the Characteristics of the given building material. 1c. Explain properties of the given building materials. 1d. Identify factors affecting the selection of material. | 1.1 Definition and Classifications of building materials. 1.2 Characteristics of Building Materials and their application in architecture 1.3 Properties of the given building materials 1.4 Factors affecting the selection of material |
| Unit – II Bricks | 2a. Describe composition of bricks 2b. Describe the manufacturing process of bricks 2c. Classify bricks Select the bricks of good quality (To be written properly) 2d. Explain special types of bricks 2e. Conduct given field tests for bricks 2f. Compare the bricks of different grades 2g. Explain size and weight of different types of bricks | 2.1. Composition of Bricks: Constituents of good brick earth 2.2. Manufacture of Bricks: Preparation of Clay, Moulding, Drying, Burning. 2.3. Classification of Bricks 2.4. Qualities of Good Brick 2.5. Special Types of Bricks 2.6. Tests for Bricks 2.7. Grading of Bricks 2.8. Size and weight of bricks |
| Unit – III Stones | 3a. Classify different types of rocks 3b. Describe qualities of a good building stone 3c. Explain characteristics of different stones 3d. Explain the term, “artificial stones”. 3e. Enlist advantages of artificial stones 3f. Differentiate between fine and coarse aggregates 3g. Segregate the given aggregates as per relevant grades | 3.1 Classification of Rocks: Geological, Physical, Chemical 3.2 Qualities of a good building stone 3.3 Characteristics of different stones: e.g., Granite, Ballast, Sand Stone, Lime Stone, Marble, Slate, etc. 3.4 Artificial Stones: Cement Concrete, Mosaictiles, Terrazzo, etc. 3.5 Advantages of artificial stones 3.6 Aggregates: Fine Aggregates, Coarse Aggregates 3.7 Grading of Aggregates |
| Unit – IV | 4a. Explain the uses of timber 4b. Classify the trees with relevant examples | 4.1 Uses of Timber 4.2 Classification of trees: Endogenous trees, Exogenous trees |

| | | |
|--------|--|--|
| Timber | | |
|--------|--|--|

| Unit | Unit Outcomes (UOs) (4 to 6 UOs at different levels) | Topics and Sub-topics |
|-------------------------------------|--|---|
| | 4c. Compares softwood with hardwood 4d. Draw the structure of a green tree 4e. Identify the defects in timbers 4f. Identify various wood-based products 4g. Enlist characteristics of good timber 4h. Explain the term, "Seasoning of timber" along with its importance | 4.3 Comparison of Softwood and Hardwood 4.4 Structure of tree: Macrostructure, Microstructure 4.5 Defects in Timber: Defects due to conversion, Defects due to fungi, Defects due to insects, Defects due to natural forces, etc. 4.6 Wood based products: Veneers, Plywood, Fibre boards, Impregnated timbers, Compregnated (Please check) timbers 4.7 Characteristics of good timbers 4.8 Seasoning of Timber and its importance |
| Unit-V Lime, Cement and Sand | 5a. Classify lime according to their uses and properties 5b. Compare different types of lime with respect to its properties (Same as 5a) 5c. Describe proportions and properties of lime mortar 5d. Explain process of storing lime 5e. Discuss ingredients of cement and their functions 5f. Explain proportion and use of cement mortar 5g. Enlist the uses of admixtures 5h. Describe the sources, characteristics, grading and bulking of sand. | 5.1 Lime: Types, Properties & Uses 5.2 Comparison among properties of different types of lime 5.3 Lime mortar, different proportions, Properties of good mortar 5.4 Storing & slaking of lime 5.5 Cement: Ingredients and Functions 5.6 Types of cement 5.7 Uses of cement 5.8 Cement Mortar: Proportion and Use 5.9 Admixtures – Uses 5.10 Sand: Sources, Characteristics, Grading of sand, Bulking of sand |

| | | |
|-------------------------|---|---|
| Unit- VI Concrete | 6a. Explain the constituents and requirements of concrete | 8.1 Concrete – Constituents, Requirements |
| | 6b. Justify the necessity of water in concrete | 8.2 Function of water |
| | 6c. Explain the process of various types of concrete mix | 8.3 Uses of Concrete |
| | 6d. Explain the methods of compaction of concrete | 8.4 Types of Concrete |
| | 6e. Enumerate the importance of curing of concrete | 8.5 Preparation of concrete mix: Handmixing, Machine mixing |
| | | 8.6 Compaction – Methods: Handcompaction, Mechanical compaction |
| | | 8.7 Curing of concrete |

References:

| S. No. | Title of Book | Author | Publication with place, year and ISBN |
|--------|--|---|--|
| 1 | Engineering Materials (Material Science) | Rangwala | Charotar Publishing House Pvt. Ltd., Anand, ISBN: 9789385039171 |
| 2 | Building Construction | Sushil Kumar | Standard Publishers Distributors, ISBN 13: 9788180141683 |
| 3 | The text book of Building Construction | S. P. Arora, S. P. Bindra | Dhanpat Rai Publications, ISBN 13: 9788189928803 |
| 4 | A text book of Building Construction | Dr. B. C. Punmia, Ashok Kumar Jain, Arun Kumar Jain | Laxmi Publications (P) Ltd., ISBN: 81-7008-053-3 |
| 5 | Building Materials | S. K. Duggal | New Age International (P) Limited, Publishers ISBN (13): 978-81-224-2975-6 |
| 6 | Building Construction | Dr. Janardan Jha, Prof. S. K. Sinha | Kanna Publisher, ISBN-10: 978817409263 2 |
| 7 | Building Materials in Civil Engineering | H. Zhang | (Woodhead Publishing, 2011) ISBN: 978-1-84569-955-0 (print) |

Course Title: Basic Design - I

Semester –I

TEACHING AND EXAMINATION SCHEME

| Subject Name | Category | Sem | Hours | | | | Total | Credit | Internal | | External | | Total |
|----------------|-----------------------|-----|-------|---|---|-------|-------|--------|----------|------------------------------|----------|-----------------------|-------|
| | | | L | T | P | Total | | | Exam | Continuou s/Viva/Jur y | Exa m | Viv a/ Jur y | |
| Basic Design-I | profession al Core | 1 | 2 | 0 | 4 | 6 | 4 | 0 | 50 | 0 | 50 | 100 | |

FOCUS:

To develop the learning style and cognitive skills with respect to fundamental principles of design. To develop creative ideas for better visual concepts in the discipline of architectural design. The course also forms the basis for free-hand drawing of object and building with application of principles of design.

CONTENTS:

| Unit | UnitOutcomes(UOs) (4to6UOs atdifferent levels) | TopicsandSub-topics |
|---|--|--|
| Unit-I Introduction to Basics ofsketching with varioustools andmaterial s | 1a. Carryout free hand sketchingusing different tools andtechniques. | Introduction to sketching toolsand materials - Drawing andsketching tools and materialssuch as Pencil, Pen, Ink pen,Pencil colours, Sketch pen, Felttip pen, Markers, Water colour,Pastel colour, Acrylic colour,Charcoal pencil/chalk, Brush,Crayonwax,Drawingsheets/pa per, Drawing book,Drawingboard,etc. Sketching Techniques – Stippling,Scribbling,Circling,Smooth Shading & Blending, CreatingHighlightsandRender ing |

| | | |
|---|--|--|
| <p>Unit-II Elements of Design</p> | <p>2a. Draw the given types of point elements and linear elements 2b. Draw the given types of Planar and volumetric elements 2c. Analyze architectural Form in given examples through sketch (pl check) 2d. Prepare sketches using relevant types of form and transformation of the given form (pl check) 2e. Prepare colour wheel, colour texture and colour schemes for a given situation.</p> | <p>Point elements-Dots Line elements-Line: Definition of line, Different types of line, Aspects of line, its physical and psychological effects on human figure. (Horizontal, Vertical, Diagonal, Curved, Zigzag) Planar elements- Primary shapes, Regular and irregular Volumetric elements - Properties of Form, Types of form: Centralized, Linear, Radial, clustered, grid form, Transformation of form Colour and Texture - Colour wheel, colour schemes, Texture etc. (etc. should not be there)</p> |
| <p>Unit-III Principles of Design and 2D Composition</p> | <p>3a. Explain Design and ordering principles. 3b. Create 2D geometrical composition using elements and principle of design</p> | <p>Design Principles - Representation techniques focusing on Axis, Symmetry, Hierarchy, Harmony, Balance, Emphasis, Rhythm, Scale, Proportion, Repetition, etc. 2D Geometrical Composition using elements and principles of</p> |
| <p>Unit</p> | <p>Unit Outcomes (UOs) (4 to 6 UOs at different levels)</p> | <p>Topics and Sub-topics</p> |
| | | <p>design with tone & texture, figure & ground, colour and shading, etc.</p> |
| <p>Unit-IV Freehand sketching</p> | <p>4a. Draw freehand sketches of given furniture and building elements 4b. Draw the freehand sketches from memory 4c. Prepare sketches of interior spaces 4d. Prepare sketches of built forms</p> | <p>Live Object Drawing- Furniture, Part of Building i.e Door, Windows, Gate, Arch, Dome etc. Freehand sketches from memory - Memory Sketching Indoor & Outdoor sketching - Basic free-hand Perspective drawing for interior of rooms-Foyer, Living Room, Kitchen, Bedroom, View from balcony, Garden, Campus, Worm's Eye View, Bird's Eye View, etc.</p> |

| | | |
|--|--|--|
| Unit-V | 5a. Prepare models of a given geometrical object using different types of materials such as clay, cardboard etc. | Models of geometrical objects using Clay, Thermocole sheet, Card board, Paper, Wire, Wood, etc. |
| Model Making and 3D Composition | 5b. Prepare models of 3D geometrical compositions using elements of design | Composition of Models - 3D Geometrical Composition using elements of design and sketch with light & shade, figure & ground, colour and shading, etc. |
| | 5c. Prepare sketches from various angles | |

Suggested Books:

| S. No. | Title of Book | Author | Publication with place, year and ISBN |
|--------|---|---|--|
| 1 | Architecture: Form, Space and Order | Francis D. K. Ching | John Wiley & Sons, Inc. New York ISBN: 0471286168 ISBN: 978-1-118-74508-3 (4 th Edition, 2014) |
| 2 | Architecture in Pen and Ink | John Chen | McGraw-Hill, Inc. New York, October 1994 Edition. ISBN-13: 978-0070110793 ISBN-10: 0070110794 |
| 3 | Rendering with Pen & Ink | Frank Allison Hays | Architecture Book Pub. Co./latest ISBN-10: 1274236975 ISBN-13: 978-1274236975 |
| 4 | A Visual Dictionary of Architecture | Francis D. K. Ching | John Wiley & Sons, Inc. New York ISBN: 0471286168 ISBN-10: 111816495 |
| 5 | Design Drawing | Francis D. K. Ching with Steven P. Juroszek | John Wiley & Sons, Inc. New York ISBN: 1119508592, 9781119508595 |
| 6 | How to Draw: Drawing and Sketching Objects and Environments from Your Imagination | Scott Robertson, Thomas Bertling | Design Studio Press ISBN: 9781933492735, 1933492732 |

Course Title: Mathematics - I

Semester –I

TEACHING AND EXAMINATION SCHEME

| Subject Name | Category | Sem | Hours | | | | Total | Credit | Internal | | External | | Total |
|---------------|----------|-----|-------|---|---|-------|-------|--------|----------|------------------------------|----------|-----------------------|-------|
| | | | L | T | P | Total | | | Exam | Continuou s/Viva/Jur y | Exa m | Viv a/ Jur y | |
| Mathematics-I | BS & AE | 1 | 3 | 1 | 0 | 4 | 4 | 20 | 30 | 50 | 0 | 100 | |

FOCUS:

Components of Mathematics like Algebra, Geometry, Calculus, Computer computation work as a tool to describe physical phenomena and to evaluate the merit of different possible solutions. This course is an attempt to initiate the multi-dimensional logical thinking and reasoning capabilities. It will help the students to apply the basic principles of Mathematics to solve related technology problems.

CONTENTS:

| Unit | Unit Out comes(UOs) (4to6UOsatdifferentlevels) | TopicsandSub-topics |
|---------------------------------|--|---|
| Determinant and Function | 1a. Solve simple problems of Determinant upto order 3*3. 1b. Explain graphically the given functions. 1c. Solve simple problems using concepts of Logarithms | Determinant and its value upto 3rd order (Without properties) Function and simple examples. Logarithm as a function Laws of Logarithm and related Simple examples |
| Trigonometry | 2a. Apply the concept of Compound angle, Allied angle, and Multiple angles to solve the given simple engineering problem(s) 2b. Explain the concept of Sub-Multiple and solve related problem(s). 2c. Invoke the concept of Sum and Factor formulae to solve the given simple problem(s) 2d. Investigate given simple problems using inverse Trigonometric functions. | Units of Angles (degree and radian) Trigonometric Functions Allied & Compound Angles , Multiple-Sub multiple s angles Graph of Sine and Cosine, Periodic Trigonometric function Sum and factor formulae Inverse Trigonometric function |

| | | |
|----------------------------|---|--|
| Vectors | <p>3a. Apply the concept of algebraic operations of Vectors to solve given simple engineering problem(s)</p> <p>3b. Apply the concept of Scalar and Vector product to solve specified simple problem(s)</p> <p>3c. Solve problems of work done and moment of force using the concept of Vectors.</p> | <p>Vector, Addition, Subtraction, Magnitude and direction.</p> <p>Scalar and Vector Product and it's properties</p> <p>Angle between two Vectors</p> <p>Applications of Scalar and Vector Product (Work Done and Moment of Force)</p> |
| Coordinate Geometry | <p>4a. Employ the equation of straight line to solve given simple problems.</p> <p>4b. Apply the concept of slope and its consequences to</p> | <p>Straight line (Two-point form) and slope of straight line</p> <p>Slope point form, Intercept form ,General form of line</p> <p>Condition of parallel and</p> |
| | <p>Solve the given problems.</p> <p>4c. Find the angle between two lines using the concept of Parallel and Perpendicular lines.</p> <p>4d. Apply the concept of equation of circle with center and radius to solve the given problems.</p> <p>4e. Solve problems related to general equation of circle based on tangent and normal.</p> | <p>Perpendicular lines</p> <p>Equations of Parallel lines and Perpendicular lines to the given lines</p> <p>Angle between two lines.</p> <p>Equation of circle with center and Radius.</p> <p>General equation of circle.</p> <p>Tangent and normal to a circle.</p> |
| Limit | <p>5a. Analyse the characteristic of functions using the concept of Limit.</p> <p>5b. Solve the given problems using standard formulae of Limit</p> | <p>Limit of a Function.</p> <p>Standard formulae of Limit and related simple examples.</p> |

Reference :

| S. No. | Title of Book | Author | Publication with place, year and ISBN |
|--------|--|-------------------------------|---|
| 1 | Engineering Mathematics (Third edition). | Croft, Anthony | Pearson Education, New Delhi, 2014. ISBN 978-81-317-2605-1 |
| 2 | A Text Book of Vector Analysis | Narayan Shanti and Mittal P.K | S. Chand Publication, ISBN 978-8121922432 |
| 3 | Calculus and Analytic Geometry | G.B. Thomas, R. L. Finney | Addison Wesley, 9th Edition, 1995. ISBN 978-8174906168 |
| 4 | Understanding Engineering Mathematics | John Bird | Routledge; 1st edition ISBN 978-0415662840 |
| 5 | Advanced Engineering Mathematics | Krezig, Ervin | Wiley Publ., New Delhi, 2014, ISBN: 978-0-470-45836-5 |

Course Title: Communication Skills - I

Semester -I

TEACHING AND EXAMINATION SCHEME

| Subject Name | Category | Sem | Hours | | | | Total | Credit | Internal | | External | | Total |
|------------------------|----------|-----|-------|---|---|-------|-------|--------|----------|------------------------------|----------|-----------------------|-------|
| | | | L | T | P | Total | | | Exam | Continuou s/Viva/Jur y | Exa m | Viv a/ Jur y | |
| Communication Skills-I | SEC | 1 | 2 | 0 | 2 | 4 | 3 | 20 | 30 | 50 | 0 | 100 | |

FOCUS:

To develop the Basic English skills- listening, speaking, reading and writing. To develop comprehension skills, improve vocabulary, use proper grammar, acquire writing skills, correspond with others and enhance skills in spoken English.

CONTENTS:

| Unit | Unit Outcomes (UOs) (4 to 6 UOs at different levels) | | Topics and Subtopics |
|---|--|-----------------------------|---|
| | Writing Skills | Speaking Skills | |
| Unit 1 Theory of Communication | 1a. Define the theory of communication 1b. State different types of communication. 1c. Explain barriers in communication | 1d. Communicate effectively | Concept of effective communication and communication skills Basic communication model (S+M+C+R+F) Types of communication Barriers of effective communication |

| | | | |
|-------------------------------------|---|--|--|
| Unit 2 Grammar | 2a. Identify different parts of speech and their usage in the sentence. | 2f. Choose appropriate parts of speech for day to day communication. | 2.1 Parts of Speech Noun, Pronoun, Verb, Adjective, Adverb and Interjection- Meaning and Examples (Recapitulation) Prepositions- In, into, On, At, for, Since, between, among, to, towards Connectors - If, Unless, Otherwise, Because, Therefore, Who, Which, Where, When, Why. |
| | 2b. Apply correct verbs in the given sentence | 2g. Use grammatically correct sentence in day to day communication | Tenses Present Tense (Simple, Continuous, Perfect, Perfect Continuous) Past Tense (Simple, Continuous, Perfect) Future Tense (Simple) |
| | 2c. Use appropriate Modal Auxiliaries in a given expression. | 2h. Choose appropriate Modals in situations where different modes of expressions are used. | 2.3 Modal Auxiliaries (Can, Could, May, Might, Shall, Should, Will, Would, Must, Have to, Ought to) |
| Unit | Unit Outcomes (UOs) (4 to 6 UOs at different levels) | | Topics and Subtopics |
| | Writing Skills | Speaking Skills | |
| | 2d. Choose the correct verb for the given subject. | 2i. Use the correct verb depending on the subject in a sentence. | 2.4 Subject- Verb Agreement |

| | | | |
|--|--|--|--|
| | 2e. Identify basic sentence patterns of English and form sentences in correct word order. | 2j. Use correct word order in their speech. | Basic Sentence Patterns of English (Explanation of S, V, O, A, C) S-Subject, V-Verb, O-Object, A-Adverbial and C- Complement Four Basic Sentence Patterns <ul style="list-style-type: none"> • S+V • S+V+O • S+V+A • S+V+C |
| Unit 3 Prose and Poetry | 3a. Realise the central idea of the literary piece. 3b. Formulate sentences using new words. 3c. Enrich Vocabulary through reading. 3d. Write short as well as long answers to questions. 3e. Express ideas in English in written form effectively | 3f. Explain the content of the passage/story in the class. 3g. Ask appropriate questions as well to answer them. 3h. Follow oral instructions and interpret them to others. 3i. Present topics effectively and clearly. 3j. Use dictionary, thesaurus and other reference books. 3k. Describe an object or product. 3l. Use correct pronunciation and intonation. 3m. Give instructions orally. | Prose The Leopard- Ruskin Bond Short Story After Twenty Years- O Henry Poetry <ul style="list-style-type: none"> • Stopping by Woods on Snowy Evening- Robert Frost • Where the Mind is Without Fear- Rabindranath Tagore 3.4 Language components: Language components should be integrated with: <ul style="list-style-type: none"> • Passages from textbook/Workbook. • Unseen passages Reading with correct pronunciation. |

VEER NARMAD SOUTH GUJARAT UNIVERSITY

DIPLOMA IN ARCHITCTURE

Semester –II

| Sr. No | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|--------|---|-------------------|-----|-------|---|---|-------|--------|----------|--------------------------|----------|-----------|-------|
| | | | | L | T | P | Total | | Exam | Continuous/ Viva/Jury | Exam | Viva/Jury | |
| 1 | Architectural Design Studio - II | professional Core | 2 | 0 | 0 | 8 | 8 | 4 | 0 | 50 | 0 | 50 | 100 |
| 2 | Technical representation of drawing - II | SEC | 2 | 3 | 0 | 3 | 6 | 3 | 0 | 50 | 50 | 0 | 100 |
| 3 | Building Materials & Construction | BS & AE | 2 | 2 | 0 | 2 | 4 | 3 | 20 | 30 | 50 | 0 | 100 |
| 4 | Basic Design-II | professional Core | 2 | 2 | 0 | 4 | 6 | 4 | 0 | 50 | 0 | 50 | 100 |
| 5 | India Indian Arts, Culture & Architecture | professional Core | 2 | 2 | 0 | 0 | 2 | 2 | 20 | 30 | 50 | 0 | 100 |
| 6 | Mathematics-II | BS & AE | 2 | 2 | 1 | 0 | 2 | 2 | 20 | 30 | 50 | 0 | 100 |
| 7 | Communication Skills-II | SEC | 2 | 2 | 0 | 0 | 2 | 2 | 20 | 30 | 50 | 0 | 100 |
| | | | | | | | 30 | 20 | | | | | |

*L=lectures,T=tutorial,P=Practical,E=TheoryExternal,M=TheoryInternal,I=Practical Internal,V=Practical External,On Job Training(OJT) is equivalent to Practical

Course Title: Architectural Design Studio – II

Semester –II

TEACHING AND EXAMINATION SCHEME

| Subject Name | Category | Sem | Hours | | | | Credit Total | Internal | | External | | Total |
|----------------------------------|--------------|-----|-------|---|---|-------|--------------|----------|-----------------------|----------|-------------|-------|
| | | | L | T | P | Total | | Exam | Continuous /Viva/Jury | Exam | Viva / Jury | |
| Architectural Design Studio - II | Program Core | 2 | 0 | 0 | 8 | 8 | 4 | 0 | 50 | 0 | 50 | 100 |

*L=lectures,T=tutorial,P=Practical,E=TheoryExternal,M=TheoryInternal,I=Practical Internal,V=Practical External,On Job Training(OJT) is equivalent to Practical

1. EMPHASIZE

Through a wide range of teaching and learning experiences, the objective of this course is to assist the student in acquiring the following industry-recognized capabilities:

- Create an architectural design for a residential unit not more than 40 sq.mts, in accordance with the provided specifications, and create presentation drawings and a model of it.

2. INTENTION OF THIS SUBJECT

Students can design a building with numerous volumes, such as a specific residential unit, in connection to a specific site scenario by studying, learning, and applying the connection between form & space in this course. They can design functional hierarchies of spaces within the intended form for dwellings by having knowledge of the built and open aspects of architectural spaces and how they are used. Selecting the best structural system for his design for a residential structure is made easier by the learner's understanding of suitable structural systems as applicable to various types of buildings.

The construction and evolution of architectural form requires a student to build architectural space and form while taking into account factors like anthropometry, light, movement, transformation, scale, structure, and skin. The basics of local building codes and space standards must be understood by the learners. Models and sketches should be used to conceptualise design suggestions. The size of the project should be determined by integrating the numerous space-making components that were covered during the previous semester's instruction. The goal of this exercise is to improve each learner's unique skill set so they can tackle future design challenges strategically and improve their ability to articulate ideas in architecture. The general form and function of projects are easier to visualise and comprehend when using presentation drawings and model.

3. COURSE OUTCOMES (COs)

The following COs must be attained by the student in order to develop their practical exercises, underlying knowledge, and pertinent soft skills related to the recognised competency:

- Taking into account the specified parameters, analyse the main and secondary data gathered about existing residential bungalows.
- Create an architectural plan for the residential bungalow in accordance with the specifications.
- Create a scale-appropriate model of the intended residential bungalow and a set of architectural presentation drawings for it.

4. SUGGESTED PRACTICAL/STUDIO EXERCISES

The COs' sub-components are the subsequent practical outcomes (PrOs). They are essential for that specific CO at the 'Precision Level' of Dave's Taxonomy in the 'Psychomotor Domain'.

| S. No. | Practical Outcomes (PrOs) | Unit No. | Approx. Hrs. Required |
|--------|---|----------|-----------------------|
| 1 | Collect Primary Data: Collect/Prepare data of existing Residential buildings which includes circulation plan, floor plans, sections, elevations, furniture layout and related drawings. Collect Secondary Data: Collect/Prepare similar data of an existing Residential building From books, journals, magazines, internet, etc. | I | 08 |
| 2 | Graphically analyze collected data of existing residential bungalows with respect to all architectural design parameters like area, lighting & ventilation, form, space design, circulation, structure, façade and inter-connectivity. | I | 08 |
| 3 | Prepare conceptual drawings and models on the basis of given requirements. | II | 16 |
| 4 | Prepare a set of preliminary architectural presentation drawings. | III | 16 |
| 5 | Prepare a site layout with all necessary components. | III | 08 |
| 6 | Prepare a furniture layout for the designed building. | III | 08 |
| 7 | Prepare a set of final presentation drawings including plans, sections and elevations. | IV | 32 |
| 8 | Draw an axonometric/isometric/perspective view of the designed building. | IV | 08 |
| 9 | Make a model of the designed project to scale. | IV | 08 |
| | Total Hrs. | | 112 |

Note

- More Practical Exercises can be designed and offered by the respective course teacher to develop the industry relevant skills/outcomes to match the COs. The above table is only a suggestive list.
- Care must be taken in assigning and assessing study report as it is a first year study report. Study report, data collection and analysis report must be assigned in a group. Teacher has to discuss about type of data (which and why) before group start their data collection.
- The following are some **sample** 'Process' and 'Product' related skills (more may be added/deleted depending on the course) that occur in the above listed Practical Exercises of this course required which are embedded in the COs and ultimately the competency.

| Sr. No. | Sample Performance Indicators for the PrOs | Weightage in % |
|---|--|----------------|
| Assessment should be done on the basis of demonstration of, | | |
| 1 | Skills | 25 |
| 2 | Learning Process | 25 |
| 3 | Communication | 25 |
| 4 | Learning Attitude | 25 |
| Total | | 100 |

5. AFFECTIVE DOMAIN OUTCOMES

The following *sample* Affective Domain Outcomes (ADOs) are embedded in many of the above mentioned COs and PrOs. More could be added to fulfill the development of this competency.

- Work as a leader/a team member.
- Follow ethical practices.
- Follow the Social and Functional aspects in design.
- Participates in class discussions and present the design effectively.
- Practice environmental friendly methods and processes. (Environment related).

6. CONTENT:

The primary theory is shown below and is based on the higher level UOs of the Revised Bloom's taxonomy that are developed for the growth of the COs and competencies. The course instructor may add more of these UOs if necessary to emphasize proficiency and the achievement of COs.

| Unit | Unit Outcomes (UOs) | Topics and Sub-topics |
|--|---|--|
| Unit –I Primary and Secondary Data collection | <p>Collect/Prepare primary of existing residential buildings like circulation plan, floor plans, sections, elevations, furniture layout and related drawings while secondary data from books, journals, magazines, internet, etc.</p> <p>Graphically analyze collected data of existing residential bungalows with respect to all architectural design parameters like area, lighting & ventilation, form, space design, circulation, structure, façade and inter- connectivity.</p> <p>Formulate design requirements for the given design project.</p> | <p>Introduction to existing residential Bungalow designed for some professionals/characters like Doctor, Actors, Politician, Musician, etc. (Concerned faculty is free to decide on any other appropriate character apart from the above).</p> <p>Primary data collection: With the help of site visit/visits, existing drawings, measurements and prepared drawings, photos, sketches, etc.</p> <p>Secondary Data Collection: Collection of data from books, magazines, internet, etc.</p> <p>Formulation of requirements</p> |

| | | |
|--|---|--|
| <p>Unit– II Develop- ment of Concept</p> | <p>Prepare conceptual design alternatives considering various architectural design parameters for further design development of bungalow. Develop the conceptual alternatives with functional land-building relationship interrelationship drawing/s based on given requirements.</p> | <p>Various design development parameters Design Requirements: Application of inferences derived from primary and secondary data collection. Conceptual Design: Graphical representation of functional co-relationships between given requirements. Derivation of Form: Derivation of a form with regard to functional requirements by developing activity-space relationship. Building orientation on site with respect to - Form & Space, Margins, Wind direction, Natural light & ventilation, Openings, Qualities of architectural space, Structural system, landscaping, parking, etc. Land-building relationship – Understanding and application of various principles of design like creating a hierarchy of spaces with reference to site topography, site surroundings, climatic considerations, etc.</p> |
| <p>Unit – III Preparing Sketch Design</p> | <p>Use spatial ordering principles for the given building project Prepare improved sketch design with respect to light, space and form</p> | <p>Order of spaces based on organizing principles like Axial, Symmetrical, Clustered, Grid, Centralized, Linear, any other, etc. Two Dimensional Graphical Representation: Development of plan, sections, elevations in sketch form with spatial relationships Light, space and form as essentials of architecture Materials and Finishes: Development of elevations and sections with consideration of levels as well as building materials</p> |

| | | |
|---|--|---|
| Unit – IV Design & Develop- ment of Drawings | Develop the sketches to appropriate scale as per requirements of building Develop the sketch showing elevations, massing in relationship to exterior spaces Draw the necessary 3D building drawings to scale Prepare a block study model of the designed house as well as the site layout | Development of floor plans, sections, elevations and spatial relationships at appropriate scale Development of sections and elevations with respect to building finishes fenestrations and levels Development of site layout with road network and landscaping Axonometric/isometric view of the designed building as well as of the site layout |
| Unit – V Space – Activity Relations- hip | Prepare furniture layout drawings for the designed units Prepare complete site layout drawings with unit locations, roads, common spaces and amenities, parking and landscaping | Furniture Layout drawings for various activities / functions of the house based on given requirements Site layout drawing for various activities/functions based on given requirements |

| Unit | Unit Outcomes (UOs) | Topics and Sub-topics |
|--|--|--|
| Unit – VI Final Presentat- ion of Drawings and Models | Prepare a set of final presentation drawings including all of the above. Make a model of the designed project to a suitable scale with details of site development. | Final presentation drawings with rendering Preparation of a model/s |

7. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

| Unit No. | Unit Title | Teaching Hours | Distribution of Theory Marks | | | |
|--------------|---|-----------------------|------------------------------|---------|---------|-------------|
| | | | R Level | U Level | A Level | Total Marks |
| I | Primary and Secondary Data collection | Not Applicable | | | | |
| II | Development of Concept | | | | | |
| III | Preparing Sketch Design | | | | | |
| IV | Design & Development of Drawings | | | | | |
| V | Space – Activity Relationship | | | | | |
| VI | Final Presentation of Drawings and Models | | | | | |
| Total | | | | | | |

Legends: R=Remember, U=Understand, A=Apply and above (Revised Bloom's taxonomy)

Note: This specification table provides general guidelines to assist students for their learning and to teachers to teach and question paper designers/setters to formulate test items/questions to assess the attainment of the UOs. The actual distribution of marks at different taxonomy levels (of R, U and A) in the question paper may slightly vary from above table.

8. SUGGESTED STUDENT ACTIVITIES

Other than the classroom and laboratory learning, following are the suggested student- related **co-curricular** activities which can be undertaken to accelerate the attainment of the various outcomes in this course: Students should perform following activities in group and prepare reports of about 5 pages for each activity. They should also collect/record physical evidences for their (student's) portfolio which may be useful for their placement interviews:

- a) Undertake periodic site visits to relate to the present architectural practices
- b) Identify and explore the design parameters of an architect-designed residential bungalow/s
- c) Attend Interactive sketching workshops and design juries in other architecture degree institutes
- d) Visit and explore art exhibitions and libraries
- e) Give seminars on the relevant topic under consideration
- f) Prepare portfolio of given Advanced Architectural Design Project
- g) Participate in model making workshops

9. SUGGESTED LEARNING RESOURCES

| S. No. | Title of Book | Author | Publication with place, year and ISBN |
|--------|---|--------------------------------|---|
| 1 | Principles of three Dimensional Design | Wucius Wong | New York, Van Nostrand Reinhold Co., 1977. ISBN :0442295618 9780442295615 1 March 1977 |
| 2 | Time Saver Standards for Architectural Design | Michael Crosbie, Donald Watson | McGraw Hill Education India, December 2011; ISBN-10 7981257002872 : ISBN-13 12570028-798 : 92 |
| 3 | Daylighting – Natural light in Architecture | Derek phillips | Architectural press An Imprint of Elsevier, Burlington ISBN 0750663235 First Publication 20041 |
| 4 | Visual Dictionary of Architecture | Francis D.K.Ching | John Wiley & Sons, United States ISBN-10 : 8126535644 ISBN-13 : 978-8126535644, Second edition (23 April 2012) |
| 5 | Neufert, Architects' Data | Ernst Neufert | Wiley-Blackwell, United Kingdom ISBN-10 : 111928435X ISBN-13 : 978-1119284352, 5th edition (12 July 2019) |
| 6 | Architecture + Design | Journal/Magazine | Burda Media India ISSN: 0970-2369 |

| | | | |
|---|------------------------------|------------------|--|
| 7 | Inside Outside | Journal/Magazine | Business India Group ISSN: 0970-1761 |
| 8 | Indian Architect and Builder | Journal/Magazine | Jasubhai Media Pvt. Ltd. ISSN:0971-5509 |

10. **SOFTWARE/LEARNING WEBSITES**

- www.greatbuildings.com
- www.architecturalrecord.com
- www.archdaily.com
- www.dezeen.com
- www.archpaper.com
- www.architectmagazine.com
- www.archello.com
- www.designboom.com

| Semester II | Architectural Design Fundamentals(Course Code:4315001) | | | | | | | | | |
|--|---|--------------------------|---|--|---|----------------------------|----------------------------|------------------------------|--------------------|--|
| | POs and PSOs | | | | | | | | | |
| Competency & Course Outcomes | PO 1 Basic & Discipline specific knowledge | PO 2 Problem Analysis | PO 3 Design/development of solutions | PO 4 Engineering Tools, Experimentation & Testing | PO 5 Engineering practices for society, sustainability & environment | PO 6 Project Management | PO 7 Life-long learning | * PSO 1 Planning & Design | #PSO2 Execution | |
| Competency | Prepare architectural design for a single volume building, its presentation drawings and models | | | | | | | | | |
| Course Outcomes | | | | | | | | | | |
| Analyze the collected primary and secondary data of existing residential bungalows considering the given parameters | 3 | 3 | - | 1 | - | 2 | 2 | 1 | - | |
| Prepare architectural design for the residential bungalow as per given requirements | 3 | 3 | 3 | 1 | 2 | 1 | 3 | 2 | 1 | |
| Prepare a set of architectural presentation drawings for the designed residential bungalow along with its model to appropriate scale | 3 | 1 | 3 | 1 | 1 | 2 | 3 | 3 | 1 | |

Legend: '3' for high, '2' for medium, '1' for low and '-' for no correlation of each CO with PO/PSO.

***PSO 1: Planning and Design:** Prepare architectural designs and all types of drawings with appropriate material specifications and application techniques as per specific requirements of the project.

#PSO 2: Execution: Work competently as assistants in architectural firms so as to contribute and coordinate both office work and execution on site

Course Title: Technical Representation of drawing – II

Semester –II

TEACHING AND EXAMINATION SCHEME

| Subject Name | Category | Sem | Hours | | | | Credit Total | Internal | | External | | Total |
|--|----------|-----|-------|---|---|-------|--------------|----------|-----------------------------------|----------|-------------------|-------|
| | | | L | T | P | Total | | Exam | Continu- ous/ Viva/ Jury | Exam | Viva / Jury | |
| Technical representation of drawing - II | SEC | 2 | 3 | 0 | 3 | 6 | 3 | 0 | 50 | 50 | 0 | 100 |

FOCUS:

To develop power of visualization of an object in third dimension by studying it's given plan, elevation and side elevation and thus will enable the learner to generate architectural drawings. To develop perspective drawing skills. to develop necessary skills for preparing technically correct Architectural Presentation Drawings.

CONTENTS:

| Unit | Unit Outcomes (UOs) | Topics and Sub-topics |
|---------------------------------|--|---|
| Unit-I Projections of Solids | <p>Draw projections of different types of solids in vertical/horizontal position.</p> <p>Draw projections of different types of solids inclined to one plane only.</p> | <p>Different types of solids like cube, prism, pyramids, cone and cylinder.</p> <p>Different terms like apex, axis, slant edge, meaning and identification of the true length of the base side, true length of the slant edge, and true shape of triangular face of pyramids, etc.</p> <p>Procedure for drawing various positions of solids relative to the reference planes, projections of solids:</p> <p>Vertical/horizontal Position Inclined to one plane only</p> |

| | | |
|--|---|---|
| Unit: II Sections of Solids | Draw projections of different types of sections of solids for different positions of the cutting plane. | Introduction of cutting planes, auxiliary planes, true shape, full section, half section. Procedure for drawing the projections of solid sections such as cube, prism, pyramid, |
| Unit | Unit Outcomes (UOs) | Topics and Sub-topics |
| | | cone and cylinder for the given position of the cutting plane |
| Unit: III Development of Surfaces | Draw the development of surface of different types of simple solids. 3b. Draw the development of Surface of different types of truncated solids. | Development of simple and truncated geometrical solids such as cube, prisms, pyramids, cylinder and cone |
| Unit: IV Perspective Views | Draw perspective drawings of given problems with respect to:- Simple objects placed in relation with picture plane and station point like: i) Object touching the picture plane Object in front of picture plane Object behind picture plane ii) Simple object keeping eye level at different levels: Eye level above object. ii) Eye Level below than the given object. | Important Terms-Picture Plane, Station point, Vanishing point, Eye level, Ground level, Central visual ray, etc. Perspective drawings, • One Point Perspective • Two Point Perspective |
| Unit-V Architectural Rendering Techniques | Prepare architectural presentation drawings with rendering, both manually as well as with CAD software | Different Rendering Techniques: Different types of rendering techniques showing various rendering patterns, human figures, vehicles, furniture, trees etc. |

Reference:

| S. No. | Title of Book | Author | Publication with place, year and ISBN |
|--------|---------------------|------------|--|
| 1 | Engineering Drawing | N.D. Bhatt | Charotar Publishing House; Anand, 2014. ISBN: 9789380358963 |

| | | | |
|---|---|--------------------------------|--|
| 2 | TextbookofEngineering Drawing | P.J. Shah | S.Chand,NewDelhi.2013 ISBN:9788121941822 |
| 3 | EngineeringDrawing | M.B.Shah,B.C. Rana | Pearsons.2009 ISBN:9788131759714 |
| 4 | EngineeringDrawing | BasantAgrawal, C.M. Agrawal | McGraw-Hill,2019 ISBN:9789353167448 |
| 5 | AutoCAD2020:A ProblemSolving Approach, Basic andIntermediate | ShamTickoo | 26th Edition, CADCIMTechnologies, 2019 |
| 6 | AutoCAD2013,Command ReferenceGuide | AutodeskInc. | AutodeskInc. |

Course Title: Building Materials & Construction

Semester –II

TEACHING AND EXAMINATION SCHEME

| Subject Name | Category | Sem | Hours | | | | Credit Total | Internal | | External | | Total |
|-----------------------------------|----------|-----|-------|---|---|-------|--------------|----------|-----------------------|----------|-------------|-------|
| | | | L | T | P | Total | | Exam | Continuous /Viva/Jury | Exam | Viva / Jury | |
| Building Materials & Construction | BS & AE | 2 | 2 | 0 | 2 | 4 | 3 | 20 | 30 | 50 | 0 | 100 |

FOCUS:

This course essentially imparts the knowledge of construction of buildings and its components; at an introductory level. This course further introduces the learners to interpret the drawings and get familiar with the functions and requirements of various building components. The learners will get an exposure to the general construction practices by undertaking site visits.

Content :

The practical exercises, the underpinning knowledge and the relevant soft skills associated with the identified competency are to be developed in the learner for the achievement of the following COs:

- a) Comprehend basics of building components and explain various types of building foundations.
- b) Describe general principles of masonry construction.
- c) Select suitable type of openings and staircase for a given building as per the requirements.
- d) Describe the R.C.C .construction.
- e) Classify various sloping roofs as per requirement.

| Unit | Unit Outcomes (UOs) (4 to 6 UOs at different levels) | Topics and Sub-topics |
|------------------------|---|--|
| Unit – Introduction | Explain types of building based on structure: Load bearing, Framed & Composite Describe concept of various types of components of building | Principles of Load bearing, Framed & Composite structures; their merits and demerits Components of Building: Section of a typical wall showing all major Components of a building |

| | | |
|-------------------|--|--|
| Unit-II | Explain the concept and principle of foundation | Definition of foundation Purpose of foundation |
| Foundation | Compare Shallow Foundation and Deep foundation Prepare the sketches of different types of foundation. | Bearing capacity of soil and its relevance to foundation Types of foundation: Shallow, Deep Various types of Shallow Foundation with sketches: Spread footing, stepped footing, Isolated |

Reference:

| S. No. | Title of Book | Author | Publication with place, year and ISBN |
|--------|---|---|---|
| 1 | The text book of Building Construction | S. P. Arora, S. P. Bindra | Dhanpat Rai Publications (P) Limited ISBN: 978-81-89928-80-3 |
| 2 | The Construction of Buildings (Vol. 1 to 5) | R. Barry | Wiley Publications, ISBN: 978-1-118-97721-7 |
| 3 | Building Construction | Dr. B. C. Punmia, Er. Ashok K. Jain, Dr. Arun K. Jain | Laxmi Publication (P) Limited, Eleventh Edition (2016), ISBN: 978-81-318-0428-5 |
| 4 | Building Construction (Vol. 1 to 4) | W. B. McKay | Orient Longman Limited |
| 5 | Building Construction | Rangwala | Charotar Publishing House (P) Limited ISBN: 978-93-85039-04-1 |
| 6 | Building Construction and Materials | Gurcharan Singh | Standard Book House, ISBN-13: 9788189401214 |

Course Title: Basic Design-II

Semester –II

TEACHING AND EXAMINATION SCHEME

| Subject Name | Category | Sem | Hours | | | | Credit Total | Internal | | External | | Total |
|-----------------|-------------------|-----|-------|---|---|-------|-----------------|----------|--------------------------|----------|----------------|-------|
| | | | L | T | P | Total | | Exam | Continuous /Viva/Jury | Exam | Viva / Jury | |
| Basic Design-II | professional Core | 2 | 2 | 0 | 4 | 6 | 4 | 0 | 50 | 0 | 50 | 100 |

FOCUS: Understanding and analyzing spatial configuration. To understand the character and component of elements of space/ void as spatial composition. Development of basic design abilities, and learning the Fundamentals of Visual perception and Expressional skills.

CONTENTS:

Study of various textures and colors with its inherent expressions and effects.

- Study of natural forms like leaf, shell, tomato etc.,
- Application of various materials like Clay, Paper Mache, Timber, Steel etc.
- Application of various graphic techniques and development of abstract reasoning.
- Understanding Principles of visual compositions i.e., Unity, Harmony, Rhythm, Balances etc., scales
- proportions Introduction to volume, understanding the character of solids and void, 3 dimensional compositions•

SUGGESTED BOOKS

Meaning of Art: Herbert Read by Faber• & Faber
Art in everyday life by Hetta Gol'stir•
Art• & Visual Perception by Rudocy Arhhim
Free Hand Drawing• & Self Taught by Arthur Guptill
Pencil Sketching by Thomas Waug. •
Drawing• & Painting Course by Hashmi A.H.
Form, Space and Order by Ching, Francis D. K. –•
Ways of Seeing by Berger, John•
Rendering with pen and ink by Gill, Rober•

Course Title: Indian Arts, Culture & Architecture

Semester –II

TEACHING AND EXAMINATION SCHEME

| Subject Name | Category | Sem | Hours | | | | Credit Total | Internal | | External | | Total |
|---|-------------------|-----|-------|---|---|-------|-----------------|----------|--------------------------|----------|-------------------|-------|
| | | | L | T | P | Total | | Exam | Continuous /Viva/Jury | Exam | Viva / Jury | |
| India Indian Arts, Culture & Architecture | professional Core | 2 | 2 | 0 | 0 | 2 | 2 | 20 | 30 | 50 | 0 | 100 |

FOCUS:

A global survey and comparative exploration of art, architecture, and design from the historical origins of civilization to contemporary manifestations of art practice. Emphasis will be placed on the artist's role in society and how social factors give rise to various art forms. Students will evaluate and examine contextual and cultural factors and their influence on the patronage and production of formal and stylistic visual languages that arises out of a specific time, place, and culture. Art appreciation requires the acquisition of a critical and formal language in which students come to identify, describe, analyze and compare the visual characteristics of various works using the correct art historical terminology and vocabulary. Art appreciation cultivates a deeper and more expansive awareness of Art, images, and the vast cultural histories we have inherited. In addition to this course, the student should realize the importance of Aesthetics as one dimension of Quality in Business Products and Services.

CONTENTS:

- Identify the purposes and functions of art in human society and arrive at a coherent definition of what is meant by "art" as a cultural endeavor.
- Define basic art terms and processes; develop a knowledge of and an ability to recognize design principles and elements in selected works of art.
- Identify by artist, title, or style, major selected art works from various historical and global contexts in a variety of media.
- Understand the highlights of the biographies of a variety of artists as they relate to the meaning of their works.
- Study of different artisms such as Abstract Art, Dadaism, Brutalism, and Impressionism.
- Recognize major periods of world art history.
- Describe the techniques used in a variety of art media.
- Develop a formal analysis of a work of art.
- Evaluate the relationship of form to content and context.
- Understand and identify the symbols used in iconographic artworks.
- Demonstrate an understanding of art criticism including the description, analysis, interpretation, and evaluation of a given

work.

- Develop a deeper understanding of the culture that we are currently immersed in, and the ability to think critically with regards to the images and visual forms that engage us.
- ARTS IN TIME: Prehistoric, Egyptian, Greek, Roman, Medieval, Renaissance, Baroque, Rococo, Nineteenth Century, Twentieth Century, Art Since 1945
- AESTHETICS AND QUALITY: Dimensions of Quality, Products and Service Design, The Value of Aesthetics in Business

SUGGESTED BOOKS

- Introduction to Art Appreciation and Aesthetics by Panizo, Rustia, Rex Bookstore, Inc.
- Aesthetics and the Environment: The Appreciation of Nature, Art and Architecture by Allen Carlson, Routledge, 2000
- Art and Ideas by William Fleming
- Aesthetics by Yuri Borev
- The Story of Modern Art by Sheldon Cheney

Course Title: Mathematics - II

Semester –II

TEACHING AND EXAMINATION SCHEME

| Subject Name | Category | Sem | Hours | | | | Total | Credit | Internal | | External | | Total |
|----------------|------------|-----|-------|---|---|-------|-------|--------|----------|------------------------------|----------|-------------------|-------|
| | | | L | T | P | Total | | | Exam | Continuou s/Viva/Jur y | Exa m | Viv a/ Jury | |
| Mathematics-II | BS & AE | 1 | 3 | 1 | 0 | 4 | 4 | 20 | 30 | 50 | 0 | 100 | |

Content :

A preparatory program aimed imparting necessary knowledge, skills and competence to study Architectural courses which have a mathematical component. The content is based on current CBSE XI & XII standard schooling curriculum for Mathematics. The program contents should include : (1) Limits and Derivates - Derivative introduced as rate of change both as that of distance function and geometrically. Applications of derivatives: rate of change, increasing/decreasing functions, tangents & normal, approximation, maxima and minima (2) Integrals : Integration as inverse process of differentiation. Basic properties of definite integrals and evaluation of definite integrals. Applications in finding the area under simple curves. (3) Differential Equations : Definition, order and degree, general and particular solutions of a differential equation. (4) Vectors and Three-Dimensional Geometry : Vectors and scalars, magnitude and direction of a vector. Direction cosines/ratios of vectors. Types of vectors, components of a vector, addition of vectors, multiplication of a vector by a scalar, position vector of a point dividing a line segment in a given ratio.

Course Title: Communication Skills - II

Semester –II

TEACHING AND EXAMINATION SCHEME

| Subject Name | Category | Sem | Hours | | | | Total | Credit | Internal | | External | | Total |
|-------------------------|----------|-----|-------|---|---|-------|-------|--------|----------|------------------------------|----------|-----------------------|-------|
| | | | L | T | P | Total | | | Exam | Continuou s/Viva/Jur y | Exa m | Viv a/ Jur y | |
| Communication Skills-II | SEC | 1 | 2 | 0 | 2 | 4 | 3 | 20 | 30 | 50 | 0 | 100 | |

FOCUS:

To develop the Basic English skills- listening, speaking, reading and writing. To develop comprehension skills, improve vocabulary, use proper grammar, acquire writing skills, correspond with others and enhance skills in spoken English.

CONTENTS:

| Unit | Unit Outcomes (UOs) (4 to 6 UOs at different levels) | | Topics and Subtopics |
|------|---|-----------------|---|
| | Writing Skills | Speaking Skills | |
| | | | Vocabulary Items: Matching items (Word and its Meaning) One-Word Substitution Phrases and Idioms Synonyms and Antonyms |

| | | | |
|--|---|---|---|
| <p>Unit4 Techniques of Writing</p> | <p>4a. Compose e mails on given topics/situations. 4b. Write a paragraph in words with synchronized sentence structure on the given situation /topic. 4c. Answer the questions on the given unseen passage. 4d. Summarize the given unseen passage.</p> | <p>4e. Face oral examinations and interviews. 4f. Grasp the main idea of any conversation and communicate accordingly.</p> | <p>Email Writing (Business) Format and Sample Enquiry, Orders and complaints Examples for Practice Letter writing Types of letters, Formats of Letters Qualities of a good letter Sample letters such as: Job applications/Cover Letter Leave applications, Complaints, Purchase orders, Enquiries replies etc.</p> |
| <p>Unit5 Mechanics of Speaking</p> | <p>5a. Develop a welcome and farewell speech for the given theme/situation. 5b. Prepare a speech for introducing a guest in the given situation. 5c. Make a weather report for the given condition.</p> | <p>5d. Introduce oneself with correct pronunciation, intonation, using verbal and non-verbal gestures. 5e. Speak in specified formal situations with correct pronunciation. 5f. Speaking specified informal correct</p> | <p>5.1 Public speaking Basics of Speaking Importance of public speaking Characteristics of good speech 5.2 Samples for Practice: Welcome speech Farewell speech Introducing oneself and another.</p> |

VEER NARMAD SOUTH GUJARAT UNIVERSITY
DIPLOMA IN ARCHITECTURE

Semester –III

TEACHING AND EXAMINATION SCHEME

| Sr. No | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|--------|-----------------------------------|-----------------------|-----|-------|---|----|-------|--------|----------|--------------------------|----------|-----------|-------|
| | | | | L | T | P | Total | | Exam | Continuou s/Viva/Jury | Exam | Viva/Jury | |
| 1 | Architectural Design Studio - III | profession al Core | 3 | 0 | 0 | 10 | 10 | 6 | 0 | 50 | 0 | 50 | 100 |
| 2 | Building Construction - I | BS & AE | 3 | 2 | 0 | 4 | 6 | 4 | 20 | 30 | 50 | 0 | 100 |
| 3 | Structure - I | BS & AE | 3 | 2 | 0 | 2 | 4 | 4 | 20 | 30 | 50 | 0 | 100 |
| 4 | History of Architecture- I | profession al Core | 3 | 2 | 0 | 0 | 2 | 2 | 20 | 30 | 50 | 0 | 100 |
| 5 | Surveying and Levelling | BS & AE | 3 | 2 | 0 | 2 | 4 | 2 | 20 | 30 | 20 | 30 | 100 |
| 6 | Computer Skills - I | SEC | 3 | 0 | 0 | 4 | 4 | 2 | 20 | 30 | 50 | 0 | 100 |
| | | | | | | | 30 | 20 | | | | | |

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training(OJT) is equivalent to Practical

Course Title: Architectural Design Studio – III

Semester –III

TEACHING AND EXAMINATION SCHEME

| Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|-----------------------------------|--------------|-----|-------|---|----|-------|--------|----------|--------------------------|----------|----------------|-------|
| | | | L | T | P | Total | | Exam | Continuous/ Viva/Jury | Exam | Viva / Jury | |
| Architectural Design Studio - III | Program Core | 3 | 0 | 0 | 10 | 10 | 6 | 0 | 50 | 0 | 50 | 100 |

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training(OJT) is equivalent to Practical

1. EMPHASIZE

Through a wide range of teaching and learning experiences, the objective of this course is to assist the student in acquiring the following industry-recognized capabilities:

- Create an architectural design for a residential unit not more than 80-200 sq.mts, in accordance with the provided specifications, and create presentation drawings

and a model of it.

2. **INTENTION OF THIS SUBJECT**

Students can design a building with numerous volumes, such as a specific residential unit, in connection to a specific site scenario by studying, learning, and applying the connection between form & space in this course. They can design functional hierarchies of spaces within the intended form for dwellings by having knowledge of the built and open aspects of architectural spaces and how they are used. Selecting the best structural system for his design for a residential structure is made easier by the learner's understanding of suitable structural systems as applicable to various types of buildings.

The construction and evolution of architectural form requires a student to build architectural space and form while taking into account factors like anthropometry, light, movement, transformation, scale, structure, and skin. The basics of local building codes and space standards must be understood by the learners. Models and sketches should be used to conceptualise design suggestions. The size of the project should be determined by integrating the numerous space-making components that were covered during the previous semester's instruction. The goal of this exercise is to improve each learner's unique skill set so they can tackle future design challenges strategically and improve their ability to articulate ideas in architecture. The general form and function of projects are easier to visualise and comprehend when using presentation drawings and model.

3. COURSE OUTCOMES (COs)

The following COs must be attained by the student in order to develop their practical exercises, underlying knowledge, and pertinent soft skills related to the recognised competency:

- a) Taking into account the specified parameters, analyse the main and secondary data gathered about existing residential bungalows.
- b) Create an architectural plan for the residential bungalow in accordance with the specifications.
- c) Create a scale-appropriate model of the intended residential bungalow and a set of architectural presentation drawings for it.

4. SUGGESTED PRACTICAL/STUDIO EXERCISES

The COs' sub-components are the subsequent practical outcomes (PrOs). They are essential for that specific CO at the 'Precision Level' of Dave's Taxonomy in the 'Psychomotor Domain'.

| S. No. | Practical Outcomes (PrOs) | Unit No. | Approx. Hrs. Required |
|--------|---|----------|-----------------------|
| 1 | Collect Primary Data: Collect/Prepare data of existing Residential buildings which includes circulation plan, floor plans, sections, elevations, furniture layout and related drawings. Collect Secondary Data: Collect/Prepare similar data of an existing Residential building From books, journals, magazines, internet, etc. | I | 08 |
| 2 | Graphically analyze collected data of existing residential bungalows with respect to all architectural design parameters like area, lighting & ventilation, form, space design, circulation, structure, façade and inter-connectivity. | I | 08 |
| 3 | Prepare conceptual drawings and models on the basis of given requirements. | II | 16 |
| 4 | Prepare a set of preliminary architectural presentation drawings. | III | 16 |
| 5 | Prepare a site layout with all necessary components. | III | 08 |
| 6 | Prepare a furniture layout for the designed building. | III | 08 |
| 7 | Prepare a set of final presentation drawings including plans, sections and elevations. | IV | 32 |
| 8 | Draw an axonometric/isometric/perspective view of the designed building. | IV | 08 |
| 9 | Make a model of the designed project to scale. | IV | 08 |
| | Total Hrs. | | 112 |

Note

- i. More Practical Exercises can be designed and offered by the respective course teacher to develop the industry relevant skills/outcomes to match the COs. The above table is only a suggestive list.

- ii. Care must be taken in assigning and assessing study report as it is a first year study report. Study report, data collection and analysis report must be assigned in a group. Teacher has to discuss about type of data (which and why) before group start their data collection.
- iii. The following are some **sample** 'Process' and 'Product' related skills (more may be added/deleted depending on the course) that occur in the above listed **Practical Exercises** of this course required which are embedded in the COs and ultimately the competency.

| Sr. No. | Sample Performance Indicators for the PrOs | Weightage in % |
|---|--|----------------|
| Assessment should be done on the basis of demonstration of, | | |
| 1 | Skills | 25 |
| 2 | Learning Process | 25 |
| 3 | Communication | 25 |
| 4 | Learning Attitude | 25 |
| Total | | 100 |

5. AFFECTIVE DOMAIN OUTCOMES

The following **sample** Affective Domain Outcomes (ADOs) are embedded in many of the above mentioned COs and PrOs. More could be added to fulfill the development of this competency.

- a) Work as a leader/a team member.
- b) Follow ethical practices.
- c) Follow the Social and Functional aspects in design.
- d) Participates in class discussions and present the design effectively.
- e) Practice environmental friendly methods and processes. (Environment related).

6. CONTENT:

The primary theory is shown below and is based on the higher level UOs of the Revised Bloom's taxonomy that are developed for the growth of the COs and competencies. The course instructor may add more of these UOs if necessary to emphasize proficiency and the achievement of COs.

| Unit | Unit Outcomes (UOs) | Topics and Sub-topics |
|------|---------------------|-----------------------|
|------|---------------------|-----------------------|

| | | |
|---|--|---|
| <p>Unit –I Primary and Secondary Data collection</p> | <p>1a. Collect/Prepare primary of existing residential buildings like circulation plan, floor plans, sections, elevations, furniture layout and related drawings while secondary data from books, journals, magazines, internet, etc.</p> <p>1b. Graphically analyze collected data of existing residential bungalows with respect to all architectural design parameters like area, lighting & ventilation, form, space design, circulation, structure, façade and inter-connectivity.</p> <p>1c. Formulate design requirements for the given design project.</p> | <p>1.1 Introduction to existing residential Bungalow designed for some professionals/characters like Doctor, Actors, Politician, Musician, etc. (Concerned faculty is free to decide on any other appropriate character apart from the above).</p> <ul style="list-style-type: none"> • Primary data collection: With the help of site visit/visits, existing drawings, measurements and prepared drawings, photos, sketches, etc. • Secondary Data Collection: Collection of data from books, magazines, internet, etc. <p>1.2 Formulation of requirements</p> |
| <p>Unit– II Develop-ment of Concept</p> | <p>2a. Prepare conceptual design alternatives considering various architectural design parameters for further design development of bungalow.</p> <p>2b. Develop the conceptual alternatives with functional land-building relationship interrelationship drawing/s based on given requirements.</p> | <p>Various design development parameters</p> <p>2.1. Design Requirements: Application of inferences derived from primary and secondary data collection.</p> <p>2.2. Conceptual Design: Graphical representation of functional co-relationships between given requirements.</p> <p>2.3. Derivation of Form: Derivation of a form with regard to functional requirements by developing activity-space relationship.</p> <p>2.4. Building orientation on site with respect to - Form & Space, Margins, Wind direction, Natural light & ventilation, Openings, Qualities of architectural space, Structural system, landscaping, parking, etc.</p> <p>2.5 Land-building relationship – Understanding and application of various principles of design like creating a hierarchy of spaces with reference to site topography, site surroundings, climatic considerations, etc.</p> |

| <p>Unit – III Preparing Sketch Design</p> | <p>3a. Use spatial ordering principles for the given building project 3b. Prepare improved sketch design with respect to light, space and form</p> | <p>3.1 Order of spaces based on organizing principles like Axial, Symmetrical, Clustered, Grid, Centralized, Linear, any other, etc. 3.2 Two Dimensional Graphical Representation: Development of plan, sections, elevations in sketch form with spatial relationships 3.3 Light, space and form as essentials of architecture 3.4 Materials and Finishes: Development of elevations and sections with consideration of levels as well as building materials</p> |
|---|---|---|
| <p>Unit – IV Design & Development of Drawings</p> | <p>4a. Develop the sketches to appropriate scale as per requirements of building 4b. Develop the sketch showing elevations, massing in relationship to exterior spaces 4c. Draw the necessary 3D building drawings to scale 4d. Prepare a block study model of the designed house as well as the site layout</p> | <p>4.1 Development of floor plans, sections, elevations and spatial relationships at appropriate scale 4.2 Development of sections and elevations with respect to building finishes fenestrations and levels 4.3 Development of site layout with road network and landscaping 4.4 Axonometric/isometric view of the designed building as well as of the site layout</p> |
| <p>Unit – V Space – Activity Relationship</p> | <p>5a. Prepare furniture layout drawings for the designed units 5b. Prepare complete site layout drawings with unit locations, roads, common spaces and amenities, parking and landscaping</p> | <p>5.1 Furniture Layout drawings for various activities / functions of the house based on given requirements 5.2 Site layout drawing for various activities/functions based on given requirements</p> |
| <p>Unit</p> | <p>Unit Outcomes (UOs)</p> | <p>Topics and Sub-topics</p> |
| <p>Unit – VI Final Presentation of Drawings and Models</p> | <p>6a. Prepare a set of final presentation drawings including all of the above. 6b. Make a model of the designed project to a suitable scale with details of site development.</p> | <p>6.1 Final presentation drawings with rendering 6.2 Preparation of a model/s</p> |

7. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

| Unit No. | Unit Title | Teaching Hours | Distribution of Theory Marks | | | |
|--------------|---|----------------|------------------------------|---------|---------|-------------|
| | | | R Level | U Level | A Level | Total Marks |
| I | Primary and Secondary Data collection | | Not Applicable | | | |
| II | Development of Concept | | | | | |
| III | Preparing Sketch Design | | | | | |
| IV | Design & Development of Drawings | | | | | |
| V | Space – Activity Relationship | | | | | |
| VI | Final Presentation of Drawings and Models | | | | | |
| Total | | | | | | |

Legends: R=Remember, U=Understand, A=Apply and above (Revised Bloom's taxonomy)

Note: This specification table provides general guidelines to assist students for their learning and to teachers to teach and question paper designers/setters to formulate test items/questions to assess the attainment of the UOs. The actual distribution of marks at different taxonomy levels (of R, U and A) in the question paper may slightly vary from above table.

8. SUGGESTED STUDENT ACTIVITIES

Other than the classroom and laboratory learning, following are the suggested student- related **co-curricular** activities which can be undertaken to accelerate the attainment of the various outcomes in this course: Students should perform following activities in group and prepare reports of about 5 pages for each activity. They should also collect/record physical evidences for their (student's) portfolio which may be useful for their placement interviews:

- a) Undertake periodic site visits to relate to the present architectural practices
- b) Identify and explore the design parameters of an architect-designed residential bungalow/s
- c) Attend Interactive sketching workshops and design juries in other architecture degree institutes
- d) Visit and explore art exhibitions and libraries
- e) Give seminars on the relevant topic under consideration
- f) Prepare portfolio of given Advanced Architectural Design Project
- g) Participate in model making workshops

9. SUGGESTED LEARNING RESOURCES

| S. No. | Title of Book | Author | Publication with place, year and ISBN |
|--------|--|-------------|--|
| 1 | Principles of three Dimensional Design | Wucius Wong | New York, Van Nostrand Reinhold Co., 1977. ISBN :0442295618 9780442295615 1 March 1977 |

| | | | |
|---|---|--------------------------------|--|
| 2 | Time Saver Standards for Architectural Design | Michael Crosbie, Donald Watson | McGraw Hill Education India, December 2011; ISBN-10 7981257002872 : ISBN-13 12570028-798 : 92 |
| 3 | Daylighting – Natural light in Architecture | Derek phillips | Architectural press An Imprint of Elsevier, Burlington ISBN 0750663235 First Publication 20041 |
| 4 | Visual Dictionary of Architecture | Francis D.K.Ching | John Wiley & Sons, United States ISBN-10 : 8126535644 ISBN-13 : 978-8126535644, Second edition (23 April 2012) |
| 5 | Neufert, Architects' Data | Ernst Neufert | Wiley-Blackwell, United Kingdom ISBN-10 : 111928435X ISBN-13 : 978-1119284352, 5th edition (12 July 2019) |
| 6 | Architecture + Design | Journal/Magazine | Burda Media India ISSN: 0970-2369 |
| 7 | Inside Outside | Journal/Magazine | Business India Group ISSN: 0970-1761 |
| 8 | Indian Architect and Builder | Journal/Magazine | Jasubhai Media Pvt. Ltd. ISSN:0971-5509 |

10. SOFTWARE/LEARNING WEBSITES

- www.greatbuildings.com
- www.architecturalrecord.com
- www.archdaily.com
- www.dezeen.com
- www.archpaper.com
- www.architectmagazine.com
- www.archello.com
- www.designboom.com

11. PO-COMPETENCY-CO MAPPING

| Semester II | Architectural Design Fundamentals(Course Code:4315001) | | | | | | | | |
|------------------------------|---|--------------------------|---|--|---|----------------------------|----------------------------|------------------------------|---------------------|
| | POs and PSOs | | | | | | | | |
| Competency & Course Outcomes | PO 1 Basic & Discipline specific knowledge | PO 2 Problem Analysis | PO 3 Design/development of solutions | PO 4 Engineering Tools, Experimentation & Testing | PO 5 Engineering practices for society, sustainability & environment | PO 6 Project Management | PO 7 Life-long learning | * PSO 1 Planning & Design | #PSO 2 Execution |
| Competency | Prepare architectural design for a single volume building, its presentation drawings and models | | | | | | | | |

| Course Outcomes | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| a) Analyze the collected primary and secondary data of existing residential bungalows considering the given parameters | 3 | 3 | - | 1 | - | 2 | 2 | 1 | - |
| b) Prepare architectural design for the residential bungalow as per given requirements | 3 | 3 | 3 | 1 | 2 | 1 | 3 | 2 | 1 |
| c) Prepare a set of architectural presentation drawings for the designed residential bungalow along with its model to appropriate scale | 3 | 1 | 3 | 1 | 1 | 2 | 3 | 3 | 1 |

Legend: '3' for high, '2' for medium, '1' for low and '-' for no correlation of each CO with PO/PSO.

***PSO 1: Planning and Design:** Prepare architectural designs and all types of drawings with appropriate material specifications and application techniques as per specific requirements of the project.

#**PSO 2: Execution:** Work competently as assistants in architectural firms so as to contribute and coordinate both office work and execution on site

Course Title: Building Construction - I

Semester –III

Teaching and Examination Scheme

| Subject Name | Category | Sem | Hours | | | | Credit Total | Internal | | External | | Total |
|---------------------------|----------|-----|-------|---|---|-------|--------------|----------|-----------------------|----------|------------|-------|
| | | | L | T | P | Total | | Exam | Continuous /Viva/Jury | Exam | Viva/ Jury | |
| Building Construction - I | BS & AE | 3 | 2 | 0 | 4 | 6 | 4 | 20 | 30 | 50 | 0 | 100 |

FOCUS:

This course is in continuation with the "Building Materials And Construction -1" offered in their previous semester. It introduces the learners to various Advanced Building Materials used in the construction industry. In this course knowledge of various properties and uses of different building materials are imbibed in learners in such a way that this knowledge will enable them to take suitable material selection related decisions for architectural projects. In this course, the technology related to

some of the important and widely used construction materials have been dealt with. This course will enrich architecture students in performing their task with required competency and start learning about construction technology using materials which they have learned in previous semester.

CONTENT

| Unit | Unit Outcomes (UOs) (4 to 6 UOs at different levels) | Topics and Sub-topics |
|------|--|---|
| 1 | Introduction to long-span structures: | 1.1 define various long span structure and study their different types and materials and construction technology. |
| 2 | Introduction to FOLDED PLATES | |
| 3 | Introduction to SHELL STRUCTURE | 2.1. case study |
| 4 | Introduction to TENSILE STRUCTURE | 3.1. case study 4.1. case study |

SUGGESTED BOOKS

| S. No. | Title of Book | Author | Publication with place, year and ISBN |
|--------|--|---|--|
| 1 | The text book of Building Construction | S. P. Arora, S. P. Bindra | Dhanpat Rai Publications (P) Limited ISBN:978-81-89928-80-3 |
| 2 | The Construction of Buildings (Vol.1 to 5) | R. Barry | Wiley Publications, ISBN:978-1-118-97721-7 |
| 3 | Building Construction | Dr. B. C. Punmia, Er. Ashok K. Jain, Dr. Arun K. Jain | Laxmi Publication (P) Limited, Eleventh Edition (2016), ISBN:978-81-318-0428-5 |
| 4 | Building Construction (Vol.1 to 4) | W. B. McKay | Orient Longman Limited |
| 5 | Building Construction | Rangwala | Charotar Publishing House (P) Limited ISBN:978-93-85039-04-1 |
| 6 | Building Construction and Materials | Gurcharan Singh | Standard Book House, ISBN-13: 9788189401214 |

Course Title : Structure - I

Semester –III

TEACHING AND EXAMINATION SCHEME

| Subject Name | Category | Sem | Hours | | | | Credit Total | Internal | | External | | Total |
|---------------|----------|-----|-------|---|---|-------|--------------|----------|-----------------------|----------|------------|-------|
| | | | L | T | P | Total | | Exam | Continuous /Viva/Jury | Exam | Viva/ Jury | |
| Structure - I | BS & AE | 3 | 2 | 0 | 2 | 4 | 4 | 20 | 30 | 50 | 0 | 100 |

Focus:

- To provide an overview of the fundamental principles that govern structural systems. The direct force mechanism in structures refers to the concept of how forces are transmitted directly from one component to another.
- This mechanism involves the understanding of resultant forces, which are the combined effect of several forces acting on a structure.
- Additionally, tension and compression are two types of forces that can occur within a building, where tension refers to forces that pull or stretch a material, while compression refers to forces that push or compress a material.
- The equilibrium of forces refers to the state in which all forces acting on an object are balanced, resulting in no net force.
- The idea of structure involves the arrangement and organization of components within a system.
- A tie is a structural element that connects and supports different parts of a structure.

CONTENTS:

1. Introduction: Introduction Fundamental principles of Engineering Mechanics, Newton's laws of motion, law of parallelogram of forces, principle of transmissibility, concept of rigid body, particle.
2. Natural forms: Understanding Nature- a creative base for understanding structure, correlation between natural & manmade structure.
3. Forces : Introduction to types of forces, Static loading, Time dependent loading, Impact loading, Cause & effect of various forces like Dead load, Imposed load, Wind load, Earthquake load, Hydrostatic load, erection force etc on building. Effect of physical form on load transfer i.e. Forces acting through point, distributed forces on line, & area.

4. Force systems: Free body diagram, Resolution of forces into components, Types of force systems, concurrent, coplanar, non concurrent etc. forces in plane & space. □ Calculation of resultant for coplanar parallel & coplanar concurrent force system, calculation of moment.
5. Equilibrium: Introduction to Equilibrium, Conditions of equilibrium for the coplanar parallel & coplanar concurrent force system, Types of supports, Determinacy & Stability, Basic behavior of elements in load transfer i.e. bending, torsion, shear, tension, compression etc.
6. Tension and Compression: Introduction as a flexural element, simply supported, overhanging & cantilever beams, determinacy, calculation of Reaction at supports for beam, Application. Introduction, Types of truss, Analysis of a plane truss. Use of graphical method. Introduction to space truss, Application.
7. Simple Stresses and Strains – Concept of Deformable Bodies, Types of Stress (compressive, tensile, bending, shear) and strain (axial, shear, volumetric). Simple problems.
8. Bending Moment and Shear Force Diagrams: Concept of Shear force and bending moment. BMD and SFD for statically determinate beams subjected to combinations of concentrated and uniformly distributed load.
9. Relationship among Load, Shear force and Bending Moment.

SUGGESTED BOOKS

- Vector mechanics for engineers- statics by Bear & Johnston
- Engineering Mechanics, statics & Dynamics by Desai & Mistry
- Applied Mechanics by Junarkar & H.J. Shah
- Seeking structure from nature by Jeffery Cook
- Strength of Material – RK Bansal, Laxmi Publications, New Delhi, Third Edition
- Application Mechanics and Strength of Materials by IB Prasad

Course Title: History of Architecture - I

Semester –III

TEACHING AND EXAMINATION SCHEME

| Subject Name | Category | Sem | Hours | | | | Credit Total | Internal | | External | | Total |
|-----------------------------|-------------------|-----|-------|---|---|-------|--------------|----------|-----------------------|----------|-----------|-------|
| | | | L | T | P | Total | | Exam | Continuous /Viva/Jury | Exam | Viva/Jury | |
| History of Architecture - I | professional Core | 3 | 2 | 0 | 0 | 2 | 2 | 20 | 30 | 50 | 0 | 100 |

Focus :

To develop knowledge regarding various architectural styles of ancient India and their historic evolution with respect to factors influencing them e.g. climate, geographical location, culture, construction technology, etc.

Study and understanding of various building elements, proportions, scale and other such design parameters found in Historical Structures helps to apply this knowledge for his/her own architectural creations.

Content :

| Unit | Unit Outcomes(UOs) (4to6UOs at different levels) | Topics and Sub-topics |
|----------------------------|---|---|
| Unit:1 Introduction | 1a. Differentiate between History And History of Architecture. 1b. Explain the importance of history of architecture. 1c. List the Periods of Indian History of Architecture 1d. Describe different Factors influencing architecture | History & History of Architecture Importance of History of Architecture Periods of Indian History of Architecture Factor influencing architecture Climate Topography Material Technology Socio-cultural forces. |

| | | |
|---|--|--|
| <p>Unit – II Ancient India Architecture</p> | <p>Describe with help of neat sketches the planning, construction systems and use of materials during Indus valley civilization.</p> <p>Describe with the help of neat sketches the planning, construction systems and use of elements in a Vedic Village.</p> | <p>Indus Valley Civilization: Planning and construction systems and materials Harappa & Mohen-jo-Daro Dholavira & Lothal Vedic Village: Planning and construction systems and materials Elements: Huts, Railing & Gate</p> |
| <p>Unit- III Architecture of Buddhist Period</p> | <p>Enlist various types of Buddhist Architecture Explain Elements of Buddhist Architecture with help of neat sketches</p> | <p>Introduction to types of Buddhist Architecture. (Stambha, stupa, chaitya, and Vihara) Stambha: Its characteristics of Ashoka Pillar, Stupa: Architectural Character of Sanchi Stupa</p> |
| <p>Unit</p> | <p>Unit Outcomes (UOs) (4 to 6 UOs at different levels)</p> | <p>Topics and Sub-topics</p> |
| | <p>3. illustrate the architectural features of the Ashoka Pillar with neatly labelled sketches. 3.d Describe the architectural features of the Sanchi Stupa with neatly labelled sketches.</p> | |

| | | |
|--|--|--|
| <p>Unit-IV Rock-Cut Architecture and Cave Architecture</p> | <p>Classification of Rock Cut Architecture (Monolith, Cave & Temples)</p> <p>Describe the architectural features of Chaitya Hall at Karle and Vihara at Ajanta cave.</p> <p>Describe the architectural features of Badami Caves.</p> <p>Explain the architectural features of Kailash Temple with neatly labelled sketches.</p> <p>Describe The Rathas at Mahabalipuram with the help of neatly labelled sketches.</p> | <p>Introduction to Rock Cut Architecture</p> <p>Chaitya: Architectural Character of Karle Chaitya Hall Vihara at Ajanta Caves. Badami Caves Kailash Temple at Ellora Rathas of Mahabalipuram</p> |
| <p>Unit-V Temple Architecture</p> | <p>5. a. Enlist various styles of Temple Architecture in India.</p> <p>Describe various parts and elements of typical temple architecture.</p> <p>Illustrate the architectural features of the given temple with neatly labelled sketches.</p> | <p>Introduction to Temple Architecture in India.</p> <p>Typical temple: Architectural characteristics and planning.</p> <p>Architectural characteristics and planning of following temples</p> <p>Aihole-Ladkhan temple & Durga Temple. Lingaraja temple at Bhuvaneshwar Sun Temples of Konark & Modhera Kandaria Mahadev Temple</p> |
| <p>Unit-VI Islamic Architecture</p> | <p>Enlist various periods of Islamic Architecture in India.</p> <p>Describe various parts and elements of typical mosque in India.</p> <p>Illustrate the given building or a structure with a neatly labelled sketch.</p> | <p>Introduction to Islamic architecture in India</p> <p>Typical Mosque: Architectural characteristics and planning.</p> <p>Mosques: Jama Masjid Ahmedabad & Delhi</p> <p>6.3 Tombs: Taj Mahal, Gol Gumbaz</p> |
| <p>Unit</p> | <p>Unit Outcomes (UOs) (4 to 6 UOs at different levels)</p> | <p>Topics and Sub-topics</p> |
| | <p>6. d. Explain the planning of Fatehpur Sikri with the help of sketches.</p> | <p>Qutub Minar Fatehpur Sikri: Planning of Fatehpur Sikri, Salim Chistie's Tomb, Buland Darwaja, Diwan-e-Aam, Diwan-e-Khas, Jodhabai's Palace, Panchmahal, Lotus Throne and Birbal Bhavan</p> |

Reference :

| S. No. | Title of Book | Author | Publication with place, year and ISBN |
|--------|---------------------------------------|---------------------------------|---|
| 1 | Indian Architecture, Hindu & Buddhist | Percy Brown | Taraporewala Publications ISBN: 9781446510216, 1446510212 |
| 2 | Indian Architecture - Islamic | Percy Brown | Taraporewala Publications ISBN-10: 1446509362 ISBN-13: 978-1446509364 |
| 3 | Indian Architecture - Islamic | Grover Satish | Vikas Publishing House ISBN-10: 070691130X ISBN-13: 978-0706911305 |
| 4 | The History of Architecture in India | Tadgell Christopher | Phaidon, 1994 ISBN: 0714829609 ISBN13: 9780714829609 |
| 5 | Islam Art and Architecture. | Hattstein Markus & Delius Peter | Konemann ISBN 10-978-3829025584 ISBN 13-978-3829025584 |
| 6 | A Global History of Architecture | Francis D. K. Ching | ISBN-13: 978-1118981337 |

Course Title: Surveying and Levelling

Semester –III

Teaching and Examination Scheme

| Subject Name | Category | Sem | Hours | | | | Credit Total | Internal | | External | | Total |
|-------------------------|----------|-----|-------|---|---|-------|--------------|----------|-----------------------|----------|------------|-------|
| | | | L | T | P | Total | | Exam | Continuous /Viva/Jury | Exam | Viva/ Jury | |
| Surveying and Levelling | BS & AE | 3 | 2 | 0 | 2 | 4 | 2 | 20 | 30 | 20 | 30 | 100 |

FOCUS:

- Acquiring knowledge about the subject matter and its physical features is crucial for
- learners in order to create maps or drawings for civil or architectural projects.
- This course aims to familiarize learners with a range of surveying devices and
- enhance their awareness of the topography of building sites.
- This training offers a chance to enhance primary-level surveying skills.

CONTENTS:

The course curriculum should be instructed and applied with the objective of cultivating

various skill sets, enabling learners to gain the following proficiencies:

- Conduct various forms of field survey and create the necessary set of drawings and
- maps.
- Analyze several forms of surveyed drawings and contoured maps.

1. Introduction

2. Chain and Tape Survey

3. Compass Survey

4. Leveling

5. Introduction to advanced surveying Techniques.

SUGGESTED BOOKS

- Surveying and leveling, T. P. Kanetkar & S. V. Kulkarni
- Surveying and leveling, Dr. B. C. Punmia
- Surveying and leveling, N.N.Basak
- Surveying and leveling, R.Agor
- Surveying, S.K.Duggal

Course Title: Computer Skills-I

Semester –III

Teaching and Examination Scheme

| Subject Name | Category | Sem | Hours | | | | Credit Total | Internal | | External | | Total |
|--------------------|----------|-----|-------|---|---|-------|-----------------|----------|--------------------------|----------|---------------|-------|
| | | | L | T | P | Total | | Exam | Continuous /Viva/Jury | Exam | Viva/ Jury | |
| Computer Skills -I | SEC | 3 | 0 | 0 | 4 | 4 | 2 | 20 | 30 | 50 | 0 | 100 |

Focus

To develop Drafting and development of drawings skills using software, the task of drafting has become simplified and easy.

To acquire knowledge of CAD -2D, the basic knowledge of 3D drawing software such as Sketch Up and Revit Architecture. This knowledge is very helpful in inculcating essential 3D visualization ability in the learner.

Content :

| Unit | Unit Outcomes (UOs) (4 to 6 UOs at different levels) | Topics and Sub-topics |
|-----------------|--|---|
| Unit- ICAD2D | 1a. Use 2D commands to draw building components such as wall, door window. 1b. Use modification commands to alter the existing drawing. | Simple drawing creation and saving it as a new drawing. Replication of drawn objects using blocks. Draw plans, sections and elevations of the character bungalow designed in the previous semester. |
| Unit | Unit Outcomes (UOs) (4 to 6 UOs at different levels) | Topics and Sub-topics |

| | | |
|--|--|--|
| Unit: II Adding text and dimensions | 2a. Multilinetextandsinglelinetext. 2b. Dimensioningusingappropriate commands. | Writingtext,formattingtextstyle. FormattingDimensionstyle,editingDimensionstyle. ApplyingcomponentsfromCADLibraries(DesignCentre)todrawing. |
| Unit: III Plot/ Print | 3a. Print/plot the prepareddrawing to appropriate scale. | PlotDialoguebox. Plot style manager – creatingplotstyles. Printing and saving drawing asPDF. |
| Unit: IV CAD3D | 4a. Useappropriate3Dtoolbarsand commandstocreatedifferent views in 3D CAD orsimilar software and plot thesame. | Prepara3Dviewofthecharacter bungalow designed inthe previous semester using 3Dcommandslike, <ul style="list-style-type: none"> • 3D Basics – Axes, Planes andFaces • 3D Modification – Rotate,Mirror,ArrayandScale • 3D Boolean operations – Union,Subtract,Intersect 3DPrimitiveobjects– Box,Wedge, Cone, Sphere, Cylinder,TorusandPyramids |

Reference :

| S. No. | TitleofBook | Author | Publicationwithplace,year and ISBN |
|--------|---|--|---|
| 1 | Practical AutodeskAutoCAD 2021 andAutoCAD LT2021:Anononsense, beginner'sguide to drafting and 3Dmodeling with AutodeskAutoCAD | Yasser Shoukry,JaiprakashPandey | Packt Publishing Limited;Illustratededition(15May 2020) ISBN-10:1709019171 ISBN-13:1709019172-970 |
| 2 | AutoCAD2021:A Problem-SolvingApproach, Basic andIntermediate,27th Edition | Prof. ShamTickoo ofurdueUniversity,CADCIM Technologies | CADCIM Technologies; 27th edition(14 June2020) ASIN :LWTL97B8OB |

| | | | |
|---|--|--------------------------------------|--|
| 3 | The Sketch Up Workflow for Architecture: Modeling Buildings, Visualizing Design, and Creating Construction Documents with SketchUp Pro and Lay Out | Michael Bri ghtman | Wiley; 2nd edition (7 September 2018) ISBN-10: 9701119303837 ISBN-13: 1119303837-970 |
| 4 | Mastering Autodesk Revit 2020 | Robert Yori, Marcus Kim, Lance Kirby | Sybex; 1st edition (2 January 2020) ISBN-10: 1119771123 ISBN-13: 1119771127-970 |
| 5 | Photographic Rendering with V-Ray for SketchUp | Brian Bradley | Packt Publishing Limited (19 March 2014) ISBN-10: 1029893228 ISBN-13: 1029893228-970 |

VEER NARMAD SOUTH GUJARAT UNIVERSITY
DIPLOMA IN ARCHITCTURE

Semester – IV

| Sr. No. | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|---------|--|----------------------------|-----|-------|---|----|-------|--------|----------|------------------------|----------|------------|-------|
| | | | | L | T | P | Total | | Exam | Cont inous /Viva /Jury | Exam | Viva/ Jury | |
| 1 | Architectural Design Studio-IV | Professional Core | 4 | 0 | 0 | 10 | 10 | 6 | 0 | 50 | 0 | 50 | 100 |
| 2 | Building Services | BS & AE | 4 | 2 | 0 | 4 | 6 | 3 | 20 | 30 | 50 | 0 | 100 |
| 3 | Structure - II | BS & AE | 4 | 2 | 0 | 2 | 4 | 3 | 20 | 30 | 50 | 0 | 100 |
| 4 | Enviromental science | BS & AE | 4 | 2 | 0 | 0 | 2 | 2 | 20 | 30 | 50 | 0 | 100 |
| 5 | History of Architecture-II | Professional Core | 4 | 2 | 0 | 2 | 4 | 2 | 20 | 30 | 50 | 0 | 100 |
| 6 | Computer Skills-II | SEC | 4 | 0 | 0 | 4 | 4 | 2 | 20 | 30 | 50 | 0 | 100 |
| 7 | Bldg. Bye Laws & professional practice | Professional Core | 4 | 2 | 3 | 0 | 2 | 2 | 20 | 30 | 50 | 0 | 100 |
| 8 | Indian Knowledge System & Tradition | PAEC- Elective 1 (Any One) | 4 | 2 | 0 | 0 | 2 | 2 | 20 | 30 | 25 | 25 | 100 |
| 9 | Personality Development Course | PAEC- Elective 1 (Any One) | 4 | 2 | 0 | 0 | 2 | 2 | 20 | 30 | 25 | 25 | 100 |

*L=lectures, T=tutorial, P=Practical, E=TheoryExternal, M=TheoryInternal, I=Practical Internal, V=Practical External, On Job Training(OJT) is equivalent to Practical

Course Title: Architectural Design Studio – IV

Semester – IV

1. TEACHING AND EXAMINATION SCHEME

| Sr. No | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|--------|--------------------------------|-------------------|-----|-------|---|----|-------|--------|----------|-----------------------------|----------|---------------|-------|
| | | | | L | T | P. | Total | | Exam | Continous/ Viva/ Jury | Exam | Viva/ Jury | |
| 1 | Architectural Design Studio-IV | Professional Core | 5 | 0 | 0 | 12 | 12 | 06 | 0 | 50 | 0 | 50 | 100 |

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical

1. EMPHASIZE

To understand the use of technologies developed in other fields as a precursor to creating architecture. The design shall deal with multiple functions resulting in complex form. The design shall be sensitive to the needs of disabled, aged people and children To understand creating of spaces. Formal, informal and interactive spaces and their hierarchies in built Environment.

Design emphasis shall also be laid on structural feasibility and use of innovations in materials and techniques of construction for achieving the thermal comfort and energy efficiency for a given context. The design shall be mainly addressing to the local issues and construction processes.

2. INTENSION OF THIS SUBJECT

Understanding of architectural structures and building services and the coordination thereof through a comprehensive resolution of the design of a complex building in the urban context.

3. COURSE OUTCOMES (COs)

CO1: To foster an understanding required to handle large scale building projects like campuses and multi-utility building complexes.

CO2: Understanding design as a function of specific agendas of complex building services, building sciences, building bye-laws in accordance to Master Plan of city and structural systems.

CO3: Integrating aspects of Sustainability in design and Site planning as essential components of the projects.

CO4: Incorporating active methods for achieving sustainability like Water Harvesting, Waste management, Solar and Wind Energy beside others for achieving a smaller carbon footprint of the project.

4. SUGGESTED PRACTICAL/STUDIO EXERCISES

- Designing an Institutional /Public Building with Complexity Of Services/Functions having 500-750 sq.mt area.
- Studio project shall include problems involving above considerations such as institutes, Residential schools, Shopping malls (medium size), Single function Sports Complex, medium rise buildings, apartments etc (G+3).

- One major project and one minor project and a time problem to be tackled in the semester. Detailing of architectural features of the major project has to be attempted
 - Study of various building techniques and planning methods adopted in building for achieving thermal comfort and energy efficiency.
 - Study of structural system adopted
 - Case study, data collection, literature survey
 - Design proposal including study model
 - Detailing of architectural features involved shall be attempted

The COs' sub-components are the subsequent practical outcomes (PrOs). They are essential for that specific CO at the 'Precision Level' of Dave's Taxonomy in the 'Psychomotor Domain'.

| S. No. | Practical Outcomes (PrOs) | Unit No. | Approx. Hrs. required |
|--------|---|----------|-----------------------|
| 1 | Case Study: Prepare an analytical drawing for various parameters like Site context, master plan, climatical, circulation, bye-laws, built-up, services, cluster level, unit level, Architectural character etc. for appropriate case-study or reference projects of similar nature. | I | 20 |
| 2 | Prepare a Conceptual Design by formulating design requirements for a given single volume design project. | II | 15 |
| 3 | Prepare preliminary sketch designs of the given design project to the scale using anthropometric requirements | III | 15 |
| 4 | Prepare a set of final presentation drawings including plans, sections, elevations and views for the designed building | IV | 20 |
| 5 | Draw 3-dimensional view of the designed building | IV | 08 |
| 6 | Make a model of the designed project to scale | IV | 08 |
| | Total Hrs. | | 86 |
| | | | |

Note:

- The teacher of the relevant course may design and provide additional practical exercises to help students achieve the COs by enhancing their industry-related skills and outcomes. Just a suggested list, the table above.
- Due to the fact that this is a first-year study report, caution must be given when assigning and grading it. A group assignment is required for the study report, data collection report, and analytic report. Before the group begins their market research, the teacher must discuss the types of data (which and why).
- The following are a few examples of "Process" and "Product" related skills that are present in the above-mentioned Practical Exercises of this course and are ultimately incorporated into the COs and the competency (more may be added or omitted depending on the course).

| Sr. No. | Examples of Performance Measures for PrOs | Weightage in % |
|--------------|---|----------------|
| 1 | Accurate measurement and graphical representation of data collection for the given design project | 20 |
| 2 | Ability to analyze the form and functional clarity of the studied buildings. | 10 |
| 3 | Prepare bubble diagram showing inter-relationships and circulation | 10 |
| 4 | Concept development with originality of idea | 20 |
| 5 | Apply the inferences from the studied buildings in the design process | 20 |
| 6 | Final presentation drawings and model | 10 |
| 7 | Adherence to deadlines | 10 |
| Total | | 100 |

5. AFFECTIVE DOMAIN OUTCOMES

The following *sample* Affective Domain Outcomes (ADOs) are embedded in many of the above-mentioned COs and PrOs. More could be added to fulfil the development of this competency.

- a) Work as a leader/a team member.
- b) Follow ethical practices.
- c) Practice environmentally friendly methods and processes. (Environment related)

6. CONTENT:

The primary theory is shown below and is based on the higher level UOs of the Revised Bloom's taxonomy that are developed for the growth of the COs and competencies. The course instructor may add more of these UOs if necessary to emphasize proficiency and the achievement of COs.

| Unit | Unit Outcomes (UOs) |
|--|---|
| Unit – I Introduction | 1. Understand and learn how to solve the Built Environment needs for multifaceted public activities especially for large campuses. 2. Recognizing and Integrating aspects of Sustainable design and planning. |
| Unit –II Site Analysis & Case Study | 1. Examining existing case and literature studies of similar nature to develop design criteria. 2. Extensive Site analysis of the proposed site for assessing on-site and off-site potentials and constraints. |
| Unit– III Design Proposal Design of large campuses | 1. Incorporating principles of efficient and sustainable site planning, space planning, circulation and services. |
| Unit– IV Integration of Advanced Services | 1. Structure and Active Sustainable Strategies 2. Besides design and planning of buildings within the campus the concentrations also need to be on integration of complex building |

| | |
|--|--|
| | services, building sciences, building bye-laws in accordance to Master Plan of city and structural systems. 3. Strategies of water harvesting, waste management, utilization of solar and wind energy and reducing the overall carbon footprint of the project. |
|--|--|

7. SUGGESTED STUDENT ACTIVITIES

Other than the classroom and laboratory learning, following are the suggested student- related **co-curricular** activities which can be undertaken to accelerate the attainment of the various outcomes in this course: Students should perform following activities in group and prepare reports of about 5 pages for each activity. They should also collect/record physical evidences for their (student's) portfolio which may be useful for their placement interviews:

- a) Undertake periodic site visits to relate to the present architectural practices.
- b) Identify and explore the design parameters for the locally available Public buildings.
- c) Attend Interactive sketching workshops.
- d) Visit and explore art exhibitions and libraries
- e) Give seminar on the relevant topic under consideration.
- f) Prepare portfolio of Architectural Design for Public Buildings
- g) Participate in model making workshops

8. SUGGESTED LEARNING RESOURCES

1. High rise buildings of urban design
2. Jencks, Charles – Modern Architecture
3. North, Whitney – Small urban spaces
4. Ashuhano, Yoshinobu – Exterior design in architecture
5. Time Saver Standards for Architectural Design Data by John Hanock,
6. Architectural Graphic Standard by Ramsay and Sleeper.
7. Neufert Data Standards Ernst Neufert Archon Books
8. Building Drawing Shah, Kale, Patki Tata Mcgraw Hill Publishing

9. SOFTWARE/LEARNING WEBSITES

- www.greatbuildings.com
- www.architecturalrecord.com
- www.archdaily.com
- www.dezeen.com
- www.archpaper.com
- www.architectmagazine.com
- www.archello.com
- www.designboom.com

10. PO-COMPETENCY-CO MAPPING

| Semester V | Architectural Design Fundamentals (Course Code: 1016301) | | | | | | | | |
|--|---|--------------------------|---|--|---|----------------------------|----------------------------|------------------------------|---------------------|
| | POs and PSOs | | | | | | | | |
| Competency & Course Outcomes | PO 1 Basic & Discipline specific knowledge | PO 2 Problem Analysis | PO 3 Design/development of solutions | PO 4 Engineering Tools, Experimentation & Testing | PO 5 Engineering practices for society, sustainability & environment | PO 6 Project Management | PO 7 Life-long learning | * PSO 1 Planning & Design | #PSO 2 Execution |
| Competency | Prepare architectural design for a single volume building, its presentation drawings and models | | | | | | | | |
| Course Outcomes CO1: To foster an understanding required to handle large scale building projects like campuses and multi-utility building complexes. | 2 | 2 | 3 | 1 | - | - | 1 | 1 | - |
| CO2: Understanding design as a function of specific agendas of complex building services, building sciences, building bye-laws in accordance to Master Plan of city and structural systems. | 1 | 2 | 3 | 2 | 1 | 1 | 2 | - | 1 |
| CO3: Integrating aspects of Sustainability in design and Site planning as essential components of the projects. | 1 | 1 | - | 1 | 1 | - | - | 3 | - |
| CO4: Incorporating active methods for achieving sustainability like Water Harvesting, Waste management, Solar and Wind Energy beside others for achieving a smaller carbon footprint of the project. | - | - | 2 | 1 | 3 | 1 | 2 | - | 1 |

Legend: '3' for high, '2' for medium, '1' for low and '-' for no correlation of each CO with PO/PSO.

***PSO 1: Planning and Design:** Prepare architectural designs and all types of drawings with appropriate material specifications and application techniques as per specific requirements of the project.

#PSO 2: Execution: Work competently as assistants in architectural firms so as to contribute and coordinate both office work and execution on site

Course Title: Building Services

Semester – IV

1. TEACHING AND EXAMINATION SCHEME

| Sr. No. | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|---------|-------------------|----------|-----|-------|---|---|-------|--------|----------|----------------------|----------|-----------|-------|
| | | | | L | T | P | Total | | Exam | Continuous/Viva/Jury | Exam | Viva/Jury | |
| 2 | Building Services | BS & AE | 4 | 2 | 0 | 4 | 6 | 03 | 20 | 30 | 50 | 0 | 100 |

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical

2. RATIONALE

This course focuses on a learner's acquisition of knowledge, skills and practices of essential building services for proper functioning and utility of building as a 'whole' unit/entity. Building services play a critical role in the overall functioning and performance of a building, affecting factors such as energy efficiency, comfort, safety, and sustainability. Building services are a cross-disciplinary field, involving aspects of electrical, mechanical, and plumbing engineering, and it is important to have a basic understanding of these systems. Knowledge about domestic water supply & sanitation system (external & internal) and house drainage & disposal facilities, rain water harvesting, ventilation and air conditioning, acoustics and creation of movement provisions and fire safety measures is imparted. Understanding of building services is essential for architects in the design and construction process, as well as for maintenance of buildings in the future. Hence, the study of building services is a critical component of the education of architecture students, providing them with the knowledge and skills necessary to design and manage the technical systems of buildings effectively.

3. COMPETENCY

The course content should be taught and curriculum should be implemented with the aim to develop required skills so that students are able to acquire following competency:

- Apply knowledge of essential building services in architectural designs for their effective & efficient functioning

4. COURSE OUTCOMES (COs)

The practical exercises, the underpinning knowledge and the relevant soft skills associated with the identified competency are to be developed in the student for the achievement of the following COs:

- a) Draw layout plan of water supply system, drainage system and rain water harvesting for a given building.
- b) Prepare a plan indicating the location of ventilation/air conditioning system, lift, escalators, ramps and fire safety provision for a given building.
- c) Select appropriate type of acoustic material as per the requirement for a given building.

5. SUGGESTED PRACTICAL/STUDIO EXERCISES

The following practical outcomes (PrOs) are the sub-components of the COs. They are crucial for that particular CO at the 'Precision Level' of Dave's Taxonomy related to 'Psychomotor Domain'.

| S. No. | Practical Outcomes (PrOs) | Unit No. | Approx. Hrs. required |
|--------|---|----------|-----------------------|
| 1 | Draw scheme for water supply for a given building | I | 6 |
| 2 | Draw detailed scheme for house drainage, sanitary fixtures and rain water harvesting for a given building | II | 6 |
| 3 | Prepare detailed layout of ventilation and air-conditioning for a given building | III | 4 |
| 4 | Design acoustics and identify fire safety provisions for a given building. | IV, V | 6 |
| 5 | Plan movement facilities: Lifts, escalators, ramps etc. for a given public building | V | 6 |
| | Total Hrs. | | 28 |

Note

- i. More *Practical/Studio Exercises* can be designed and offered by the respective course teacher to develop the industry relevant skills/outcomes to match the COs. The above table is only a suggestive list.
- ii. Study report, data collection and analysis report must be assigned in a group. Teacher has to discuss about type of data (which and why) before group start their site visits.
- iii. The following are some sample 'Process' and 'Product' related skills (more may be added/deleted depending on the course) that occur in the above listed *Practical/Studio Exercises* of this course required which are embedded in the COs and ultimately the competency.

| S. No. | Sample Performance Indicators for the PrOs | Weightage in % |
|--------|--|----------------|
| 1 | Proper planning and layout of drawing sheet – overall composition (for optimum use of drawing sheet) | 10 |
| 2 | Completing given practice problems | 20 |
| 3 | Accuracy of drawing | 20 |
| S. No. | Sample Performance Indicators for the PrOs | Weightage in % |
| 4 | Neatness of drawing | 10 |
| 5 | Timely submission of completed drawing sheet | 20 |
| 6 | Answering viva voce questions | 20 |
| | Total | 100 |

6. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

These major equipment with broad specifications for the PrOs is a guide to procure them by the administrators to usher in uniformity of practicals in all institutions across the state.

| S. No. | Equipment Name with Broad Specifications | PrO.No |
|--------|---|--------|
| 1 | Drawing Board with other drawing Instruments | 1-5 |
| 2 | Interactive board with LCD overhead projector | 1-5 |

7. AFFECTIVE DOMAIN OUTCOMES

The following *sample* Affective Domain Outcomes (ADOs) are embedded in many of the above-mentioned COs and PrOs. More could be added to fulfil the development of this competency.

- a) Work as a leader/a team member.
- b) Follow ethical practices.
- c) Social and Functional Competence of design
- d) Participates in class discussions and present the design effectively, Generate new ideals.
- e) Practice environmentally friendly methods and design processes.

The ADOs are best developed through the laboratory/field based exercises. Moreover, the level of achievement of the ADOs according to Krathwohl's 'Affective Domain Taxonomy' should gradually increase as planned below:

- i. 'Valuing Level' in 1st year
- ii. 'Organization Level' in 2nd year.
- iii. 'Characterization Level' in 3rd year.

8. UNDERPINNING THEORY

The major underpinning theory is given below based on the higher level UOs of *Revised Bloom's taxonomy* that are formulated for development of the COs and competency. If required, more such UOs could be included by the course teacher to focus on attainment of COs and competency.

| Unit | Unit Outcomes (UOs) (4 to 6 UOs at different levels) | Topics and Sub-topics |
|--------------------------------------|--|---|
| Unit -I Domestic water supply | 1a. Enlist various sources of water and uses of water. 1b. Calculate demand of water for domestic purpose. 1c. Explain the factors affecting rate of demand of water. 1d. Explain various methods of water distribution and layout of distribution pipes with sketch. | 1.1 Sources of water 1.1.1 Uses of water 1.1.2 Demand of water for domestic purpose only 1.1.3 Factors affecting rate of demand of water 1.2 Methods of water distribution 1.2.1 Systems of supply of water 1.2.2 Methods of layout of distribution pipes |

| Unit | Unit Outcomes (UOs) (4 to 6 UOs at different levels) | Topics and Sub-topics |
|--|---|--|
| | <p>1e. Explain various water supply system</p> <p>1f. Explain various water supply fittings, fixtures and pipes.</p> <p>1g. Draw layout of water supply system for a residence.</p> <p>1h. Plan for Rain water harvesting in the new buildings</p> | <p>1.3 Water supply fittings & fixtures Air valves, Bib cocks, Fire hydrants, Refluxvalves, Relief valves, Sluice valves, Water meters</p> <p>1.3.1 Pipes of different materials used for water supply</p> <p>1.4 Simple layout of water supply system for a residence</p> <p>1.5 Rain water harvesting for buildings</p> |
| <p>Unit- II Sanitatio nand house drainage</p> | <p>2a. Explain various purposes and principles of sanitation.</p> <p>2b. Define Bacteria, Invert, Refuse, Sewer, Sewerage</p> <p>2c. Explain various system of sewerage.</p> <p>2d. Explain principles of housedrainage.</p> <p>2e. Define traps and classify them according to shape and function</p> <p>2f. Explain various system of plumbing and</p> <p>2g. Define Anti-siphonage pipe, Cowl, Fresh air inlet, Siphonage, Soil pipe, Vent pipe, Waste pipe.</p> <p>2h. Explain various sanitary fittings and</p> <p>2i. Draw Drainage plan of a building.</p> <p>2j. Explain maintenance of house drainage system</p> <p>2k. Explain septic tank, soak pit and manholes with sketch.</p> <p>2l. Describe objective of manhole</p> <p>2m. Explain location and classification of manhole</p> | <p>2.1 Purpose of sanitation</p> <p>2.1.1 Principles of sanitation</p> <p>2.1.2 Definitions: Bacteria, Invert, Refuse, Sewer, Sewerage</p> <p>2.1.3 Systems of sewerage:</p> <ul style="list-style-type: none"> • Separate system • Combined system • Partially separate system <p>2.2 Principles of house drainage-</p> <p>2.2.1 Traps: definition, function and requirement of a good trap</p> <p>2.2.2 Classification of traps according to shape-P, Q and S Traps</p> <p>2.2.3 Classification of traps according to function- Intercepting traps, Gully traps, Grease traps</p> <p>2.2.4 Definitions of Anti-siphonage pipe, Cowl, Fresh air inlet, Siphonage, Soil pipe, Vent pipe, Waste pipe</p> <p>2.2.5 System of Plumbing</p> <ul style="list-style-type: none"> • Single stack system • One pipe system • One pipe system partially ventilated • Two pipe system <p>2.2.6 Sanitary Fittings-Sinks, Bath tub, Water closets, Flushing cistern, Urinals, wash basin</p> <p>2.3 Drainage plan of a building</p> <p>2.4 Maintenance of house drainage system</p> <p>2.5 Septic tank and soak pit- constructional features,</p> |

| Unit | Unit Outcomes (UOs) (4 to 6 UOs at different levels) | Topics and Sub-topics |
|--|---|--|
| | | advantages and disadvantages 2.6 Manholes: <ul style="list-style-type: none"> • Definitions • Objective • Location • Classification of manholes • Component parts |
| Unit – III Ventilation and Air conditioning | 3a. Define ventilation and its necessity. Explain the functional requirements and essentials of good ventilation system. 3b. Describe system of ventilation 3c. Define air conditioning and purpose and classification of air conditioning. 3d. Explain the principles of comfort air conditioning. 3e. Describe the system of air conditioning with sketch. | 3.1 Definition of ventilation and its necessity 3.1.1 Functional requirements of ventilation system. 3.1.2 System of ventilation- Natural/mechanical i.e., exhaust air supply and combined. 3.1.3 Essentials of good ventilating system. 3.2 Definition of air conditioning 3.2.1 Purpose of air conditioning. 3.2.2 Classification of air conditioning. <ul style="list-style-type: none"> • Comfort A.C • Industrial comfort • Summer, Winter air conditioning. 3.2.3 Principles of comfort air conditioning. <ul style="list-style-type: none"> • Temp control • Air velocity control • Humidity control 3.2.4 System of air conditioning. 3.2.5 Central system 3.2.6 Self-contained system unit 3.2.7 Combined system |
| Unit – IV Acoustics | 4a. List out and explain characteristics of audible sound 4b. Explain various acoustical defects. 4c. Define insufficient loudness and external noise. 4d. Classify various sound absorbent materials and explain them. 4e. Explain the required conditions of good acoustics. | 4.1 General discussion 4.2 Characteristics of audible sound <ul style="list-style-type: none"> • Frequency of pitch • Intensity of loudness of sound • Measurement of sound • Principles of acoustics. • Behavior of sound and its effect. 4.3 Acoustical defects <ul style="list-style-type: none"> • Formation of echoes. • Reverberation • Reverberation time • Optimum time of reverberation |

| Unit | Unit Outcomes (UOs) (4 to 6 UOs at different levels) | Topics and Sub-topics |
|--|---|---|
| | 4f. Explain general principles in acoustical design. | <ul style="list-style-type: none"> • Dead spot • Sound foci 4.4 Insufficient loudness and external noise. 4.5 Sound absorbent material and their classification. 4.6 Requirement and conditions of good acoustics. 4.7 General principles in acoustical design <ul style="list-style-type: none"> • Site selection • Volume • Space • Treatment of interior • Surface • Reverberation • Sound absorption • Seats and seating arrangement |
| Unit – V Movement Facilities & Fire Safety Provisions | 5a. Explain electrical lifts along with its component parts with sketch. 5b. Describe what is an escalator, its types, space required and approaches. 5c. Explain ramps for different 5d. Apply various types of fire services as per requirements of building 5e. Select suitable types of fire protection | 5.1 Electrical lifts, lift wall, lift door and gates and their detail with sketch 5.2 Escalators – types, space required and approaches 5.3 Ramp details for different purposes as well as their spaces and locations 5.4 Causes and effects of fire 5.5 General requirements of fire resisting building as per IS and NBC 2005 5.6 Characteristics of fire resisting materials |

9. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

| Unit No. | Unit Title | Teaching Hours | Distribution of Theory Marks | | | |
|--------------|--|----------------|------------------------------|-----------|-----------|-------------|
| | | | R Level | U Level | A Level | Total Marks |
| I | Domestic water supply | 08 | 02 | 08 | 04 | 14 |
| II | Sanitation and house drainage | 10 | 02 | 10 | 04 | 16 |
| III | Ventilation and Air conditioning | 09 | 02 | 06 | 06 | 14 |
| IV | Acoustics | 09 | 02 | 08 | 04 | 14 |
| V | Movement Facilities & Fire Safety Provisions | 06 | 00 | 07 | 05 | 12 |
| Total | | 42 | 08 | 39 | 23 | 70 |

Legends: R=Remember, U=Understand, A=Apply and above (Revised Bloom's taxonomy)

Note: This specification table provides general guidelines to assist learners for their learning and to teachers to teach and question paper designers/setters to formulate test items/questions to assess the attainment of the UOs. The actual distribution of marks at different taxonomy levels (of R, U and A) in the question paper may slightly vary from above table.

10. SUGGESTED LEARNER ACTIVITIES

Other than the classroom and laboratory learning, following are the suggested learner-related **co-curricular** activities which can be undertaken to accelerate the attainment of the various outcomes in this course: Learners should perform following activities in group and prepare reports of about 5 pages for each activity. They should also collect/record physical evidences for their (learner's) portfolio which may be useful for their placement interviews:

- a) Visit of construction sites to observe the current services practices and prepare a report.
- b) In a group of 4-5 students prepare an internet/library-based presentation for each of above topics considering recent practices prevailing across the world

11. SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES (if any)

These are sample strategies, which the teacher can use to accelerate the attainment of the various outcomes in this course:

- a) Massive open online courses (*MOOCs*) may be used to teach various topics/sub topics.
- b) Guide learner(s) in undertaking micro-projects.
- c) '*L*' in section No. 4 means different types of teaching methods that are to be employed by teachers to develop the outcomes.
- d) About **20% of the topics/sub-topics** which are relatively simpler or descriptive in nature is to be given to the learners for *self-learning*, but to be assessed using different assessment methods.
- e) With respect to *section No.10*, teachers need to ensure to create opportunities and provisions for *co-curricular activities*.
- f) Guide learners on how to address issues on sketching, model making, etc.
- g) Use relevant video/animation films to explain various concepts and processes related to basic Architectural design themes for Public Buildings.
- h) Use different instructional strategies in classroom teaching.
- i) Use the relevant architectural assignments in the given situation.
- j) Guide learners on form, functions utility, method of construction, etc. to facilitate them to prepare actual measured drawings.
- k) Use the technique of table top discussions along with design jury sessions to teach the relevant content to the learners.
- l) Adopt various strategies to enhance each learner's individual creative ability especially with reference to concept and form

12. SUGGESTED DESIGN MICRO-PROJECTS

Only one micro-project is planned to be undertaken by a learner that needs to be assigned to him/her in the beginning of the semester. In the first four semesters, the micro-project are

group-based (group of 3 to 5). However, **in the fifth and sixth semesters**, the number of learners in the group should **not exceed three**.

The micro-project could be industry application based, internet-based, workshop-based, laboratory-based or field-based. Each micro-project should encompass two or more COs which are in fact, an integration of PrOs, UOs and ADOs. Each learner will have to maintain dated work diary consisting of individual contribution in the project work and give a seminar presentation of it before submission. The duration of the microproject should be about **14-16 (fourteen to sixteen) learner engagement hours** during the course. The learners ought to submit micro-project by the end of the semester to develop the industry-oriented COs.

A suggestive list of micro-projects is given here. This has to match the competency and the Co. Similar micro-projects could be added by the concerned course teacher:

- a. Study of on-going constructions works and documentation of the provisions of building services in the form of a report with photographs and sketches.

13. SUGGESTED LEARNING RESOURCES

| S. No. | Title of Book | Author | Publication with place, year and ISBN |
|--------|---|--|---|
| 1 | The text book of Building Construction | S. P. Arora, S. P. Bindra | Dhanpat Rai Publications (P) Limited ISBN: 978-81-89928-80-3 |
| 2 | Building Construction | Rangwala | Charotar Publishing House (P) Limited ISBN: 978-93-85039-04-1 |
| 3 | Building Construction | Dr. B. C. Punmia, Er. Ashok K. Jain, Dr. Arun K. Jain | Laxmi Publication (P) Limited, Eleventh Edition (2016), ISBN: 978-81-318-0428-5 |
| 4 | Building Construction and Materials | Gurcharan Singh | Standard Book House, ISBN-13: 9788189401214 |
| 5 | Water supply and sanitary Engineering (including environmental engineering) | S.C. Rangwala | Charotar Publications, ISBN-10: 9385039202 |
| 6 | Water supply and sanitary Engineering | Gurucharan Singh & Jagdish Singh | Standard Publishers, ISBN-10: 8180140296 |
| 7 | A text book of Water supply and sanitary Engineering | G. J. Kulkarni | Oxford & IBH Pub. ISBN:812041683X |
| 8 | Building Services and Equipment: Volume 1 to 3 | Frederick E. Hall | Routledge, ISBN-13, 978-0582236523 |
| 9 | National Building Code of India - 2005 | National Building Code of India - 2005 | BIS, New Delhi |

14. SOFTWARE/LEARNING WEBSITES

- a) <https://archive.nptel.ac.in/courses/105/102/105102176/>
- b) www.epa.gov/iaq/schooldesign/hvac.html

c) PO-COMPETENCY-CO MAPPING

| Semester IV | Building Services (Course Code: 4345004) | | | | | | | | |
|---|---|------------------|---------------------------------|--|---|--------------------|--------------------|-------------------|-----------|
| | POs and PSOs | | | | | | | | |
| Competency & Course Outcomes | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | * PSO 1 | #PSO 2 |
| | Basic & Discipline specific knowledge | Problem Analysis | Design/development of solutions | Engineering Tools, Experimentation & Testing | Engineering practices for society, sustainability & environment | Project Management | Life-long learning | Planning & Design | Execution |
| Competency | <ul style="list-style-type: none"> Apply knowledge of essential building services in architectural designs for their effective & efficient functioning | | | | | | | | |
| Course Outcomes | | | | | | | | | |
| a) Draw layout plan of water supply system and drainage system for given residential building. | 3 | 3 | 2 | - | 1 | 1 | 1 | 3 | 1 |
| b) Prepare a plan indicating the location of ventilation/air conditioning system, lift, escalators, ramps and fire safety provision for a given residential building. | 3 | 3 | 2 | - | 1 | 1 | 1 | 3 | 1 |
| c) Select appropriate type of acoustic material as per the requirement for a given building. | 3 | 3 | 1 | - | 2 | 1 | 2 | 3 | 2 |

Legend: '3' for high, '2' for medium, '1' for low and '-' for no correlation of each CO with PO/PSO.

***PSO 1: Planning and Design:** Prepare architectural designs and all types of drawings with appropriate material specifications and application techniques as per specific requirements of the project.

#PSO 2: Execution: Work competently as assistants in architectural firms so as to contribute and coordinate both office work and execution on site

Course Title: Structure- II

Semester – IV

TEACHING AND EXAMINATION SCHEME

| Sr. No. | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|---------|----------------|----------|-----|-------|---|---|-------|--------|----------|------------------------|----------|-----------|-------|
| | | | | L | T | P | Total | | Exam | Continuous /Viva /Jury | Exam | Viva/Jury | |
| 3 | Structure - II | BS & AE | 4 | 2 | 0 | 2 | 4 | 03 | 20 | 30 | 50 | 0 | 100 |

*L=lectures, T=tutorial, P=Practical, E=TheoryExternal, M=TheoryInternal, I=Practical Internal, V=Practical External, On Job Training(OJT) is equivalent to Practical

FOCUS:

- To provide a comprehensive understanding of the structural characteristics of columns and beams.
- The purpose of this course is to offer an overview of the principles and techniques involved in designing reinforced concrete structures.
- Teaching the role of structures in architecture is necessary.

CONTENTS:

1. Concrete: This pertains to the composition, fundamental principles of mix design, water-cement ratio, strength, durability, and workability requirements.
2. The significance of Reinforced Concrete Construction (RCC) in the field of architecture Benefits of Reinforced Concrete Construction (RCC) compared to other traditional structural methods. The steel used for Reinforced Cement Concrete (RCC) consists of both plain and twisted bars, in accordance with the provisions of the IS 456 code.
3. Working Stress method of Design: The working stress method of design focuses on the basic concept, types of loads, assumptions, and the calculation of the moment of resistance for a singly reinforced concrete beam.
4. Key principles of pre-stressed concrete, pre-stressing techniques, materials, the structural response of pre-stressed concrete beams, and factors contributing to pre-stress reduction.
5. This text provides an introduction to specific structural forms and fundamental concepts related to shells, folding plates, domes, grid structures, flat slabs (reinforced concrete), space frames, tensile structures, and pneumatic structures. It does not involve any problem-solving exercises.

SUGGESTED BOOKS

- RCC by H. J. Shah
- RCC by Bhavikatti
- RCC by Jain and Jaikrishna
- RCC by Ramamrutham
- RCC – design and practice by N Krishna Raju and R N Pranesh

Course Title: Environmental Science

Semester – IV

TEACHING AND EXAMINATION SCHEME

| Sr. No. | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|---------|-----------------------|----------|-----|-------|---|---|-------|--------|----------|---------------------|----------|-----------|-------|
| | | | | L | T | P | Total | | Exam | Continous/Viva/Jury | Exam | Viva/Jury | |
| 4 | Environmental science | BS & AE | 4 | 2 | 0 | 0 | 2 | 2 | 20 | 30 | 50 | 0 | 100 |

*L=lectures, T=tutorial, P=Practical, E=TheoryExternal, M=TheoryInternal, I=Practical Internal, V=Practical External, On Job Training(OJT) is equivalent to Practical

FOCUS:

To develop the knowledge required for understanding the influence of climate on architecture. Understanding Environmental issues, ecology and ecosystem. Also developing the understanding that how buildings can be designed with climate as the basic parameter of design.

CONTENTS:

- Environment, ecology, ecosystem with natural cycles, Resources, causes of resources exhaustion and resource pollution.
- Urbanization and impacts
- Introduction – Elements of climate, measurement and representations of climate data. Classification of tropical climates, Major climatic Zones of India.
- Thermal comfort: Effect of climatic elements on thermal comfort environment. Body's heat exchange with surrounding environment.
- Principles of thermal design and means of thermal control.
- Natural ventilation: functions of natural ventilation, Design consideration and effects of openings and external features on internal airflow.
- Day lighting: Advantages and limitations, components of Day light factor, Shading devices – Sun – Path diagram, use of solar charts in climatic design. Types of shading devices. Procedure of designing shading devices.

PROJECTS:

- Projects on Ecosystem, study of some example of resources and pollution. Study of vernacular architecture.

SUGGESTED BOOKS

- Manual of Tropical Housing & Building (Part-II) by Koenigsberger
- Housing Climate and Comfort by Martin Evans

- Environment and Ecology by Norman Korm

Course Title: History Of Architecture - II

Semester – IV

TEACHING AND EXAMINATION SCHEME

| Sr. No. | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|---------|----------------------------|-------------------|-----|-------|---|---|-------|--------|----------|---------------------------|----------|---------------|-------|
| | | | | L | T | P | Total | | Exam | Conti nous/ Viva /Jury | Exam | Viva/ Jury | |
| 5 | History of Architecture-II | Professional Core | 4 | 2 | 0 | 2 | 4 | 2 | 20 | 30 | 50 | 0 | 100 |

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical

FOCUS :

Acquiring knowledge regarding various architectural styles of ancient India and their historic evolution with respect to factors influencing them e.g. climate, geographical location, culture, construction technology, etc. To develop the appropriate skills of reading, discussion and writing as well as understanding the physical experience of buildings in order to appreciate the complexity of the influences bearing on architecture, as reflected in the major historical periods.

Critical appreciation characterized by technology, ornamentation, planning practices & influences in general.

CONTENTS:

UNIT-1:

Introduction: Introduction and understanding of 'Islam's' philosophy and its interpretation in building type e.g. mosque, tomb, fort and their elements like domes, minarets, arch, squinch etc.

The Sultanate Style: With reference to the Slave, Khalji, Tughlaq, Sayyid, Lodhis and Shershah Suri regimes (who ruled from Delhi) and their architecture.

UNIT-2:

Provincial Architecture: Development of colloquial styles in various provinces of India like - Punjab, Jaumpur, Gujrat, Bengal, Bijapur, Bidar and Deccan.

UNIT-3:

Cities and Citadels: Morphology of fortified cities of Jaisalmer, fort/ palaces like Mandu, Chittorgarh, Orchha, Datia, Jodhpur etc. with an overview on architectural types like havelis, stepwells, gates, baradaris etc.

UNIT-4:

Mughal Architecture: The architecture of the Timurids in India-Babur, Hamayun, Akbar, Jahangir and Shahjahan.

The Later Moghuls: The Oudh architecture in Lucknow and its surroundings briefly outlining the Lucknow city.

UNIT-5:

Colonial Architecture: The British architecture of the colonial days in India- the capitol at Delhi and the residency at Lucknow emphasizing on their planning criteria and architectural features.

REFERENCE BOOKS

1. History of Architecture -Sir Banister Fletcher
2. Prehistory to post modernism -Marvin & Isabel
3. Indian Architecture – Islamic -Grover Satish Vikas Publishing House

Course Title: Computer Skills - II

Semester – IV

TEACHING AND EXAMINATION SCHEME

| Sr. No. | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|---------|--------------------|----------|-----|-------|---|---|-------|--------|----------|-----------------------------------|----------|---------------|-------|
| | | | | L | T | P | Total | | Exam | Continu- ous/ Viva/ Jury | Exam | Viva/ Jury | |
| 6 | Computer Skills-II | SEC | 4 | 0 | 0 | 4 | 4 | 2 | 20 | 30 | 50 | 0 | 100 |

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical.

Course Objectives

To develop skills required for preparation of two-dimensional drawings with the use of computer as a digital media for architectural design drawings.

Understanding AutoCAD:

Learn various 2D commands their functions and application. Understanding coordinate systems.

Working on Layers and Colours Drawing plans, Elevations, Sections using Auto- Cad. Dimensioning

Drawings Connecting from one file format to another. Various file formats & their Usefulness.

PRACTICAL:-

1. To present various 2D commands their functions and application and Understanding coordinate systems.
2. Working on Layers and Colors, Drawing plans, Elevations, Sections using Auto- Cad, dimensioning Drawings, Connecting from one file format to another., Various file formats & their Usefulness.

REFERENCE BOOKS

1. A primer on computer aided engineering drawing – VTU

Course Title: Building Byelaws & Professional Practice

Semester – IV

TEACHING AND EXAMINATION SCHEME

| Sr.No | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|-------|-----------------------------------|----------|-----|-------|---|---|-------|--------|----------|-----------------------------|----------|---------------|-------|
| | | | | L | T | P | Total | | Exam | Continous/ Viva/ Jury | Exam | Viva/ Jury | |
| 5 | Building Byelaws & Prof. Practice | PE | 4 | 2 | 3 | 0 | 2 | 2 | 20 | 30 | 50 | 0 | 100 |

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical

FOCUS:

Develop understanding of building bye laws and its implementation in reference to building design. To develop an understanding of basic professional skills to practice of various type of projects and its complexity.

CONTENTS:

BUILDING BYE LAWS

- Zoning of areas: residential, institutional, industrial agricultural entertainment etc
- Introduction to city, town and village bye laws,
- Evolution of GDCR (Mumbai municipal act, town planning act and GDCR)
- Need of bye laws
- Other prevailing laws (environment law etc)

PROFESSIONAL PRACTICE

- Role and responsibilities of a professional
- Prevailing pattern of professional practice
- Comparison and inter relationship with other professionals and professional bodies
- Various professional associations and registering body; their responsibilities, detail understanding of professional ethics; fee structure
- Office organization and management skills
- Detail understanding of office day to day responsibilities towards staff and other government bodies
- Understanding of contract and its management, site supervision, Role, responsibilities, liabilities

SUGGESTED BOOKS

- GDCR
- Hand book on professional practice by council of architecture, New Delhi
- Hand book on professional practice by Indian Institute of Architecture
- BPMC Act
- GTP and GDCR rules
- Professional practice with Elements of Estimating, Valuation contract and
- Arbitration By Dr. Roshan H. Namavati
- Estimating and costing in Civil Engineering Theory and Practice by B.N. Datta

Course Title: Indian Knowledge System & Tradition (Elective 1)

Semester – IV

1. TEACHING AND EXAMINATION SCHEMES

| Sr. No. | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|---------|-------------------------------------|---------------------------|-----|-------|---|---|-------|--------|----------|-----------------------|----------|------------|-------|
| | | | | L | T | P | Total | | Exam | Continous /Viva /Jury | Exam | Viva/ Jury | |
| 8 | Indian Knowledge System & Tradition | PAEC-Elective 1 (Any One) | 4 | 2 | 0 | 0 | 2 | 2 | 20 | 30 | 25 | 25 | 100 |

*L=lectures, T=tutorial, P=Practical, E=TheoryExternal, M=TheoryInternal, I=Practical Internal, V=Practical External, On Job Training(OJT) is equivalent to Practical

2. RATIONALE :

National education Policy 2020, has given ample emphasis on Indian Knowledge system. The significance of teaching of Indian knowledge and Tradition is very much required as for centuries this great tradition had been trampled under the feet of invaders. Even after Independence, Indian Knowledge System had been neglected and only Western parameters have been considered as standard.

The essence of Indian culture has been carried through centuries only because of its scientific and humanitarian approach. It is the need of the hour that young students learn the significance of the contribution made by Indian Knowledge Systems and contribute to the world with pride and confidence even in the field of Science and technology which had been mastered centuries ago but was perished by invaders. This course will provide an opportunity to the students the hidden secrets of the great heritage of knowledge that existed thousands of years ago in Indian Tradition.

3. COMPETENCY:

- 1) Study of IKS will enable students to respect and relish the greatness of our tradition. The awareness of IKS will make them feel proud about their own culture.
- 2) The knowledge of Indian knowledge will enable and empower them with the firsthand knowledge of India's great heritage, culture and traditions.

3) This will create a scope and awareness amongst the foreigners regarding India and its contribution to the world.

4. COURSE OUTCOMES

1. Students will attain awareness regarding the significance of IKS
2. The syllabus will enhance their confidence in Indian traditional knowledge system and enable them to perceive at the problems with Indian perspective
3. This will also enable them to analyze the issues on their own and enable them for critical thinking.
4. The knowledge about the ancient Indian Scientific traditions will generate more confidence in themselves.
5. This will lead them to make research and innovative thinking which can result in global contribution at later stage.

5. PRACTICAL / PROJECT :

The student can visit any historical / monumental sights like Adalaj step well or Rani Ki Vav – Patan and study about architectural skills of Indians in past.

Topics:-

1. Ancient Indian Astronomy :

➤ Development of Astronomy:

- A) Consideration of Purnima and Amavasya
- B) Beginning of The New Year- Vasant Ritu- (Vernal Equinox)
- C) Ancient Indian Calender
- D) Science Behind “Adhikmaas”
- E) Uttarayan and Dakshinayan

➤ Knowledge about Constellations / planets / distance between planets etc.

- A) Saptarushi – seven Seers- Significant Knowledge of star and constellations
- B) Knowledge of Speed of Light – Rigveda(1.50.04)
- C) Distance between Earth and Sun (Hanuman Chalisa)

➤ Advances in Mathematics and Geometry in Ancient India

- A) Sulbha- Sutra (Kalpa Sutra) composed by Baudhayana, Manava, Apastamba and Katyayana

B) Contribution of Ancient Rishis to Mathematics

- A) Bodhayana's value of pie
- B) Lilavati
- C) Bhaskaracharya
- D) Arya Bhatt.

2. Town Planning in Ancient India

- A) Roads in Ancient India – Uttarpath by Chandra Gupta
- B) Ancient Indian Trade Routs/ Waterways
- C) Ship- Building In Ancient India
- D) Temple Architecture
-Nagar Style/ Dravida style/ Vesara style

3. Atomic Theory of by Kanada

- A) Concept of Seven Padartha and Nine Dravyas
- B) Theory of Gurutva
- C) Characteristics of Atom

4. Metallurgical Discoveries in Ancient India

- Lime a Mortar
- Bronze
- Gold & Silver Δ
- Glass / Iron
- Nagarjuna's Contribution in making Alloys

5. Vimanshastra - Airbourne Vehicles.

- A) Referencés of Vimana- Flying Machines in Rigveda, Mahabharat and Ramayana
- B) BhardwajSutra- Chapter-1 Rasyagnoadhikari

6. REFERENCE BOOKS:

- 1) History of Science, Arts & Technology By Dr. Shripad Dattatrya Kulkarni, Bhishma Prakashan, Mumbai -1998.
- 2) Introduction to Indian Knowledge System: Concepts and Applications by B. Mahadevan, VinayakRajat Bhat, Nagendra Pavana, PHI Learning Pvt. Ltd., Delhi
- 3) Town Planning in Ancient India by Binode Bihari Dutt, Thacker, Spink & Co.
- 4) ભારતનો વૈજ્ઞાનિક વારસો લેખક-જે. જે. રાવલ યુનવર્સીટી ઝામ નરંણ બોરડા, ગજરાત રાજ્ય

Course Title: Personality Development course (Elective – 1)

Semester – IV

1. TEACHING AND EXAMINATION SCHEME:

| Sr. No. | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|---------|--------------------------------|---------------------------|-----|-------|---|---|-------|--------|----------|---------------------|----------|-----------|-------|
| | | | | L | T | P | Total | | Exam | Continous/Viva/Jury | Exam | Viva/Jury | |
| 9 | Personality Development Course | PAEC-Elective 1 (Any One) | 4 | 2 | 0 | 0 | 2 | 2 | 20 | 30 | 25 | 25 | 100 |

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training(OJT) is equivalent to Practical

2. TYPE OF COURSE

Value-based holistic personality development course for university students.

3. RATIONALE

IPDC aims to prepare students for the modern challenges they face in their daily lives. Promoting fortitude in the face of failures, unity amongst family discord, self-discipline amidst distractions, and many more priceless lessons. The course focuses on morality and character development at the core of student growth, to enable students to become self-aware, sincere, and successful in their many roles - as an ambitious student, reliable employee, caring family member, and considerate citizen.

4. COURSE OUTCOMES

- To provide students with a holistic value-based education that will enable them to be successful in their academic, professional, and social lives.
- To give the students the tools to develop effective habits, promote personal growth, and improve their wellbeing, stability, and productivity.
- To allow students to establish a stronger connection with their family through critical thinking and devolvement of qualities such as unity, forgiveness, empathy, and effective communication.
- To provide students with soft skills that complement their hard skills, making them more marketable when entering the workforce.
- To enhance awareness of India's glory and global values, and to create considerate citizens who strive for the betterment of their family, college, workforce, and nation.
- To inspire students to strive for a higher sense of character by learning from role models who have lived principled, disciplined, and value-based lives.

5. COURSE-CONTENT:

Each lecture can be taken in a continuous two-hour session, or in two separate one-hour

sessions. In addition to the core lectures, an induction and concluding lectures are recommended as shown in the below table.

| Lecture No. | Module & Subject | Subject Description | Hours |
|--------------------------------------|--|--|-------|
| IPDC-1 (First Phase/Semester) | | | |
| Intro-duction | The Need for Values | Students will learn about the need for values as part of their holistic development to become successful in their many roles - as ambitious students, reliable employees, caring family members, and considerate citizens. | 2 |
| 1 | Module: Remaking Yourself Subject: Restructuring Yourself | Students learn how self-improvement enables them to secure a bright future for themselves. They will learn 6 powerful thought-processes that can develop their physical, intellectual, emotional, and spiritual quotients. | 2 |
| 2 | Module: Remaking Yourself Subject: Power of Habit | Students will undergo a study of how habits work, the habits of successful professionals, and the practical techniques that can be used to develop good habits in their life. | 2 |
| 3 | Module: Learning from Legends Subject: Tendulkar & Tata | Students will learn from the inspirational lives of India's two legends, Sachin Tendulkar and Ratan Tata. They will implement these lessons through relatable case studies. | 2 |
| 4 | Module: From House to Home Subject: Listening & Understanding | Active listening is an essential part of academic progress and communications. Students will learn to listen with their eyes, ears, mind, and heart. | 2 |
| 5 | Module: Facing Failures Subject: Welcoming | This lecture enables students to revisit the way in which they approach challenges. Through the study of successful figures | 2 |

| | | | |
|----|---|--|---|
| | Challenges | such as Disney, Lincoln and Bachchan, students will learn to face difficulties through a positive perspective. | |
| 6 | Module: Facing Failures Subject : Significance of Failures | Failure is a student's daily source of fear, negativity, and depression. Students will be given the constructive skills to understand failure as formative learning experiences. | 2 |
| 7 | Module: My India My Pride Subject : Glorious Past - Part 1 | India's ancient Rishis, scholars, and intellectuals have made tremendous contributions to the world, they developed an advanced, sophisticated culture and civilization which began thousands of years ago. Students will learn the importance of studying India's glorious past so that they could develop a strong passion and pride for our nation. | 2 |
| 8 | Module: My India My Pride Subject : Glorious Past - Part 2 | Our ancient concepts can be used to seek revolutionary ideas and to generate inspiration. Students will develop a deeper interest in India's Glorious Past – by appreciating the need to read about it, research it, write about it, and share it. | 2 |
| 9 | Module: Learning from Legends Subject : A.P.J. Abdul Kalam | Dr Kalam's inspirational life displayed legendary qualities which apply to students (1) Dare to Dream (2) Work Hard (3) Get Good Guidance (4) Humility (5) Use Your Talents for the Benefit of Others | 2 |
| 10 | Module: Soft Skills Subject : Networking & Leadership | Students are taught the means of building a professional network and developing a leadership attitude. | 2 |
| 11 | Module: Soft Skills Subject : Project Management | Students will learn the secrets of project management through the Akshardham case study. They will then practice these skills through an activity relevant to student life. | 2 |
| 12 | Module: Remaking Yourself Subject : Handling Social Media | Students will learn how social media can become addictive and they will imbibe simple methods to take back control. | 2 |
| 13 | Module: Facing Failures Subject : Power of | Students will learn about the power and necessity of faith in our daily lives. | 2 |

| | | | |
|----|--|--|---|
| | Faith | | |
| 14 | Module: From House to Home Subject : Bonding the Family | Students will understand the importance of strong family relationships. They will learn how to overcome the generation gap and connect with their family more. | 2 |
| 15 | Module: Selfless Service Subject : Seva | Students will learn that performing seva is beneficial to one's health, wellbeing, and happiness. It also benefits and inspires others. | 2 |

6. COURSE MATERIAL / MAIN COURSE WORKBOOK:

Workbook will be designed and presented by IPDC Team. These official workbooks would be the course- material for study of IPDC. These workbooks will solve the purpose of study, submission, viva and exams for students.

IPDC Workbook-1 (*published by Swaminarayan Aksharpith*)

7. IPDC REFERENCES:

These are the reference material for the IPDC lectures. This is not compulsory reading for the students as the essential information is contained in the workbook.

| Module No | Module | References |
|-----------|-----------------|---|
| 1 | Facing Failures | <ol style="list-style-type: none"> 1. Thomas Edison's factory burns down, New York Times Archives, Page 1, 10/12/1914 2. <u>Lincoln Financial Foundation</u>, Abraham Lincoln's "Failures": Critiques, Forgotten Books, 2017 3. J.K. Rowling Harvard Commencement Speech Harvard University Commencement, 2008 4. Born Again on the Mountain: A Story of Losing Everything and Finding It Back, <u>Arunima Sinha</u>, Penguin, 2014 5. Failing Forward: Turning Mistakes Into Stepping Stones for Success, <u>John C. Maxwell</u>, Thomas Nelson, 2007 6. Steve Jobs: The Exclusive Biography Paperback, <u>Walter Isaacson</u>, Abacus, 2015 7. Failing Forward: Turning Mistakes Into Stepping Stones for Success, <u>John C. Maxwell</u>, Thomas Nelson, 2007 |

| | | |
|---|-----------------------|--|
| 2 | Learning from Legends | <ol style="list-style-type: none"> 1. Chase Your Dreams: My Autobiography, Sachin Tendulkar, Hachette India, 2017 2. Playing It My Way: My Autobiography, Sachin Tendulkar, Hodder & Stoughton, 2014 3. The Wit and Wisdom of Ratan Tata, Ratan Tata, Hay House, 2018 4. The Tata Group: From Torchbearers to Trailblazers, Shashank Shah, Penguin Portfolio, 2018 5. The Leader Who Had No Title, Robin Sharma, Jaico Publishing House, 2010 6. In the Joy of Others: A Life-Sketch of Pramukh Swami Maharaj, Mohanlal Patel and BAPS Sadhus, Swaminarayan Aksharpith, 2013 |
| 3 | My India My Pride | <ol style="list-style-type: none"> 1. Rishis, Mystics, and Heroes of India, Sadhu Mukundcharandas, Swaminarayan Aksharpith, 2011 2. Physics in Ancient India, <u>Narayan Dongre</u>, <u>Shankar Nene</u>, National Book Trust, 2016 3. <u>The Rise of Civilization in India and Pakistan</u>, Raymond Allchin, Bridget Allchin, Cambridge University Press, 1982 4. <u>The Āryabhaṭīya of Āryabhaṭa: An Ancient Indian Work on Mathematics and Astronomy (1930)</u>, <u>Walter Eugene Clark</u>, University of Chicago Press, reprint, Kessinger Publishing, 2006 |
| 4 | Remaking Yourself | <ol style="list-style-type: none"> 1. Power of Habit, Charles Duhigg, Random House Trade Paperbacks, 2014 2. Change Your Habit, Change Your Life, Tom Corley, North Loop Books, 2016 3. The Seven Habits of Highly Effective People, Stephen Covey, Simon & Schuster, 2013 4. Seven Habits of Highly Effective Teens, Sean Covey, Simon & Schuster, 2012 5. Atomic Habits, James Clear, Random House, 2018 6. How a handful of tech companies control billions of minds every day, Tristan Harris, TED Talk, 2017 |
| 5 | From House to Home | <ol style="list-style-type: none"> 1. "What Makes a Good Life? Lessons from the Longest Study on Happiness", R. Waldinger, Ted Talks, 2015 2. Long Walk To Freedom, <u>Nelson Mandela</u>, Back Bay Books, 1995 3. Outliers, Malcolm Gladwell, Back Bay Books, 2011 |
| 6 | Soft Skills | <ol style="list-style-type: none"> 1. The 17 Indisputable Laws of Teamwork, John Maxwell, HarperCollins, 2013 2. Team of Teams: New Rules of Engagement for a Complex World, Stanley McChrystal, Portfolio, 2015 |

| | | |
|---|------------------|--|
| | | <p>3. Predictably Irrational, Revised and Expanded Edition: The Hidden Forces That Shape Our Decisions, <u>Dan Ariely</u>, Harper Perennial, 2010</p> |
| 7 | Selfless Service | <p>1. Open: An Autobiography, Andre Agassi, Vintage, 10 August 2010</p> <p>2. The Physiological Power of Altruism [online], James Hamblin, The Atlantic, December 30, 2015, https://www.theatlantic.com/health/archive/2015/12/altruism-for-a-better-body/422280/ [last accessed June 10, 2020]</p> <p>3. TBI Blogs: From Entrepreneurs to Doorkeepers, Everybody Serves with Love & Warmth at This Ahmedabad Café [online], <u>The People Place Project</u>, The Better India, May 29, 2017, https://www.thebetterindia.com/102551/small-way-serve-ahmedabad-seva-cafe/, [last accessed June 10, 2020]</p> |

VEER NARMAD SOUTH GUJARAT UNIVERSITY

DIPLOMA IN ARCHITCTURE

Semester – V

TEACHING AND EXAMINATION SCHEME

| Sr. No | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|--------|---------------------------------|----------------------------|-----|-------|---|----|-------|--------|----------|------------------------------|----------|---------------|-------|
| | | | | L | T | P. | Total | | Exam | Conti nous/ Viva/ Jury | Exam | Viva/ Jury | |
| 1 | Architectural Design Studio-V | Professional Core | 5 | 0 | 0 | 12 | 12 | 06 | 0 | 50 | 0 | 50 | 100 |
| 2 | Site Planning and Services | BS & AE | 5 | 0 | 0 | 6 | 6 | 4 | 20 | 30 | 50 | 0 | 100 |
| 3 | Ekiotics | SEC | 5 | 2 | 0 | 2 | 4 | 2 | 20 | 30 | 50 | 0 | 100 |
| 4 | Environmental Science-II | BS & AE | 5 | 2 | 0 | 0 | 2 | 2 | 20 | 30 | 50 | 0 | 100 |
| 5 | Art Appreciation and Aesthetics | SEC | 5 | 2 | 0 | 2 | 4 | 2 | 20 | 30 | 20 | 30 | 100 |
| 6 | Estimation and Costing | Professional Core | 5 | 2 | 0 | 0 | 2 | 2 | 20 | 30 | 50 | 0 | 100 |
| 7 | Landscape Design | PAEC- Elective 1 (Any One) | 5 | 2 | 0 | 2 | 4 | 2 | 0 | 25 | 0 | 25 | 50 |
| 8 | Sustainable & Green Building | PAEC- Elective 1 (Any One) | 5 | 2 | 0 | 2 | 4 | 2 | 0 | 25 | 0 | 25 | 50 |
| 9 | Product Design | PAEC- Elective 2 (Any One) | 5 | 2 | 0 | 2 | 4 | 2 | 0 | 25 | 0 | 25 | 50 |
| 10 | Furniture Design | PAEC- Elective 2 (Any One) | 5 | 2 | 0 | 2 | 4 | 2 | 0 | 25 | 0 | 25 | 50 |

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical

Course Title: Architectural Design Studio – V

Semester – V

1. TEACHING AND EXAMINATION SCHEME

| Sr. No | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|--------|-----------------|-------------------|-----|-------|---|----|-------|--------|----------|-----------------------------|----------|---------------|-------|
| | | | | L | T | P | Total | | Exam | Continous/ Viva/ Jury | Exam | Viva/ Jury | |
| 1 | Design Studio-V | Professional Core | 5 | 0 | 0 | 14 | 14 | 06 | 0 | 50 | 0 | 50 | 100 |

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical

2. EMPHASIZE

Architectural working drawing as tool to communicate and execute architectural design, construction details with the relevant specifications.

3. INTENSION OF THIS SUBJECT

Learning to prepare a set of working drawings for the purpose of execution and construction, architectural detailing of building components, details and function of building services like electrical, plumbing and drainage, back and forth design processes, exposure to materials, products and assembly, methods of specifications writings in the drawings.

4. COURSE OUTCOMES (COs)

CO1: Develop and transform design intent to a technically sound plan and communicate the architectural vision of a given project to the contractors through a set of drawings and documents

CO2: Prepare the Submission Drawings and the techniques for preparation of Good For Construction drawings which will be easily readable by construction team, for the construction of a Residential structure

5. SUGGESTED PRACTICAL/STUDIO EXERCISES

1. Preparation of complete set of working drawings for a small dwelling/institute building unit of 500-750 sq.mt.
2. Preparation of working detail models of 1:50 scale

The COs' sub-components are the subsequent practical outcomes (PrOs). They are essential for that specific CO at the 'Precision Level' of Dave's Taxonomy in the 'Psychomotor Domain'.

| S. No. | Practical Outcomes (PrOs) | Unit No. | Approx. Hrs. required |
|--------|---|----------|-----------------------|
| 1 | Case Study: Prepare an analytical drawing for various parameters like Site context, master plan, climatical, circulation, bye-laws, built-up, services, cluster level, unit level, Architectural character etc. for appropriate case-study or reference projects of similar nature. | I | 20 |
| 2 | Prepare a Conceptual Design by formulating design requirements for a given single volume design project. | II | 15 |
| 3 | Prepare preliminary sketch designs of the given design project to the scale using anthropometric requirements | III | 15 |

| | | | |
|---|--|----|-----------|
| 4 | Prepare a set of final presentation drawings including plans, sections, elevations and views for the designed building | IV | 20 |
| 5 | Draw 3-dimensional view of the designed building | IV | 08 |
| 6 | Make a model of the designed project to scale | IV | 08 |
| | Total Hrs. | | 86 |
| | | | |

Note:

- The teacher of the relevant course may design and provide additional practical exercises to help students achieve the COs by enhancing their industry-related skills and outcomes. Just a suggested list, the table above.
- Due to the fact that this is a first-year study report, caution must be given when assigning and grading it. A group assignment is required for the study report, data collection report, and analytic report. Before the group begins their market research, the teacher must discuss the types of data (which and why).
- The following are a few examples of "Process" and "Product" related skills that are present in the above-mentioned Practical Exercises of this course and are ultimately incorporated into the COs and the competency (more may be added or omitted depending on the course).

| Sr. No. | Examples of Performance Measures for PrOs | Weightage in % |
|---------|---|----------------|
| 1 | Accurate measurement and graphical representation of data collection for the given design project | 20 |
| 2 | Ability to analyze the form and functional clarity of the studied buildings. | 10 |
| 3 | Prepare bubble diagram showing inter-relationships and circulation | 10 |
| 4 | Concept development with originality of idea | 20 |
| 5 | Apply the inferences from the studied buildings in the design process | 20 |
| 6 | Final presentation drawings and model | 10 |
| 7 | Adherence to deadlines | 10 |
| | Total | 100 |

6. AFFECTIVE DOMAIN OUTCOMES

The following *sample* Affective Domain Outcomes (ADOs) are embedded in many of the above-mentioned COs and PrOs. More could be added to fulfil the development of this competency.

- Work as a leader/a team member.
- Follow ethical practices.
- Practice environmental friendly methods and processes. (Environment related)

7. CONTENT:

The primary theory is shown below and is based on the higher level UOs of the Revised Bloom's taxonomy that are developed for the growth of the COs and competencies. The course instructor may add more of these UOs if necessary to emphasize proficiency and the achievement of COs.

| Unit | Unit Outcomes (UOs) |
|---|--|
| Unit – I Preliminary Stage | Design of a small project like residence, guesthouse etc. in an urban situation; making presentation drawings. Developing a set of corporation drawings following local byelaws. |
| Unit –II Development Stage | 1 Architectural design development and resolving issues in plan, section and elevation. 2 Making structural drawings for foundation, plinth beams, floor beams and slabs and coordinating the architectural design drawings with structural drawings. 3 Making site layout drawings. |
| Unit– III Space Detailing | 1 Detailing specific activity spaces; making plans, sectional elevations, details for toilets, kitchen, staircase etc. |
| Unit– IV Services And Site Development | 1 Making sheets for electrical layout, TV, telephone etc. lines, internal plumbing and sanitation. 2 Site plan, sanitation and water supply drawings. |
| Unit– V Element Detailing | Making drawings of Door, window, ventilator details. Woodworking, grills, main gate, railings, boundary wall etc. detail sheets. Schedule of finishes. |

8. SUGGESTED STUDENT ACTIVITIES

Other than the classroom and laboratory learning, following are the suggested student- related **co-curricular** activities which can be undertaken to accelerate the attainment of the various outcomes in this course: Students should perform following activities in group and prepare reports of about 5 pages for each activity. They should also collect/record physical evidences for their (student's) portfolio which may be useful for their placement interviews:

- a) Undertake periodic site visits to relate to the present architectural practices.
- b) Visit and explore various material shops & meet vendors.
- c) Visit and explore art exhibitions and libraries.
- d) Attend seminar on the relevant topic under consideration.
- e) Visit various sites under execution.
- f) Participate in various construction related workshops.

9. SUGGESTED LEARNING RESOURCES

1. Architects working details – Vol. 1 to 5
2. Macay, W. B. – Building construction Vol. 1 to 4
3. Stitt – Architects detail library
4. Handisyde, Cicil – Everyday details

5. Styles, Keith – Working drawing hand book
6. Handisyde, Cicil – Everyday details

10. SOFTWARE/LEARNING WEBSITES

- www.greatbuildings.com
- www.architecturalrecord.com
- www.archdaily.com
- www.dezeen.com
- www.archpaper.com
- www.architectmagazine.com
- www.archello.com
- www.designboom.com

11. PO-COMPETENCY-CO MAPPING

| Semester V | Architectural Design -V | | | | | | | | |
|--|---|--------------------------|---|--|---|----------------------------|----------------------------|------------------------------|---------------------|
| | POs and PSOs | | | | | | | | |
| Competency & Course Outcomes | PO 1 Basic & Discipline specific knowledge | PO 2 Problem Analyses | PO 3 Design/development of solutions | PO 4 Engineering Tools, Experimentation & Testing | PO 5 Engineering practices for society, sustainability & environment | PO 6 Project Management | PO 7 Life-long learning | * PSO 1 Planning & Design | #PSO 2 Execution |
| Competency | Prepare architectural design for a single volume building, its presentation drawings and models | | | | | | | | |
| Course Outcomes CO1: Develop and transform design intent to a technically sound plan and communicate the architectural vision of a given project to the contractors through a set of drawings and documents | 2 | 1 | 3 | -3 | 1 | -2 | 3 | 1 | 3 |
| CO2: Prepare the Submission Drawings and the techniques for preparation of Good For Construction drawings which will be easily readable by construction team, for the construction of a Residential structure | - | - | 1 | 3 | - | 1 | 3 | - | 3 |

Legend: '3' for high, '2' for medium, '1' for low and '-' for no correlation of each CO with PO/PSO.

***PSO 1: Planning and Design:** Prepare architectural designs and all types of drawings with appropriate material specifications and application techniques as per specific requirements of the project.

#PSO 2: Execution: Work competently as assistants in architectural firms so as to contribute and coordinate both office work and execution on site

Course Title: Site Planning & Services

Semester – V

TEACHING AND EXAMINATION SCHEME

| Sr. No | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|--------|----------------------------|----------|-----|-------|---|----|-------|--------|----------|----------------------|----------|-----------|-------|
| | | | | L | T | P. | Total | | Exam | Continuous/Viva/Jury | Exam | Viva/Jury | |
| 2 | Site Planning and Services | BS & AE | 5 | 0 | 0 | 6 | 6 | 4 | 20 | 30 | 50 | 0 | 100 |

*L=Lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical

FOCUS:

To develop an understanding towards factors influencing site planning. To develop understanding of principles and techniques of site planning and apply them to actual situation. To emphasize the role of an Architect in site planning.

CONTENTS:

- Introduction to zoning in site planning, definition of site planning, site planning history, site planning process, methods of site Analysis.
- Understanding various factors influencing site, like context, climate, social factors, topography etc., site selection and resource analysis.
- Difference between site planning in urban area, site planning in natural area and site planning in rural area.
- Site planning standards, sources of information for site data and site information.
- Topography-Contour map and its interpretation.
- Basics of drainage system in site planning.
- Formation of site plan, Site planning for residential projects, Site planning for institutions and public areas, Site planning for resorts, parks and tourist complexes.
- There will be two projects in a semester.
- The first project will be introductory and students will take up an existing site for detail analysis and study of various issues related to site planning.
- The second project will be the major project whereas the information and techniques of site planning will be applied in detail.

SUGGESTED BOOKS

- Site planning, Lynch, Kevin
- A Guide to Site and Environmental Planning, Rubinstein, Harvey M.
- Grade Easy, Untermann, Richard K.
- Site Planning for Cluster Housing, Untermann, Richard K.
- Design with Nature, Mc Harg, Ian
- Urbanization Primer, Caminos, Horatio, and Reinhard Goethert
- Designed for Recreation, Beazley Elizabeth
- Campus Planning, Dober, Richard P.
-

Course Title: Ekistics

Semester – V

TEACHING AND EXAMINATION SCHEME

| Sr. No | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|--------|--------------|----------|-----|-------|---|---|-------|--------|----------|-----------------------------|----------|---------------|-------|
| | | | | L | T | P | Total | | Exam | Continous/ Viva/ Jury | Exam | Viva/ Jury | |
| 3 | Ekistics | PE | 5 | 2 | 0 | 2 | 4 | 2 | 20 | 30 | 50 | 0 | 100 |

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical

FOCUS:

It involves the study of all kinds of human settlements, with a view to geography and ecology — the Physical environment — and human psychology and anthropology, and cultural, political, and occasionally aesthetics, organized in five **ekistics elements**: Nature, Anthropos, Society, Shells, and Networks.

CONTENTS:

- Scope, definition and introduction
- Ekistics units: Anthropos (1) to Ecumenopolis – 50,000 million
- Details of history and extent of human settlements, quality of human settlements
- 5 elements of Ekistics – Nature, Anthropos, Society, Shells and Networks
- The ekistics study will be conducted to analyze and understand human settlements in details in the following manner:
- Physical factors- such as buildings used for housing, community services, commerce and recreation.
- Activity pattern- means the various socio-economic and cultural activities which form the basic functions of the core
- Traffic factor- study of movement and transportation facilities which connect activities and spaces
- Aesthetic factors- include the visual aspects perceived by human sensory systems. Study of certain features like color, form, smell and noise, sense of motion and visual contrast.

PROJECTS:

- Live Case-Study or literature study of various Settlements with focus on geography, ecology, human psychology, anthropology, culture

SUGGESTED BOOKS

- Ekistics: an introduction to the science of human settlements, Kōnstantinos Apostolou Doxiadēs, Oxford University Press, 1968
- Ekistics 1969, 312 (Nov. 1969) by W.A. Howard,
- Emergence and Growth of an Urban Region, Vol.1, Analysis (1966); Vol. 2, Future Alternatives (1967); Vol. 3, A by C.A. Doxiadis,
- Concept for Future Development (1970) (Detroit Edison Co., Detroit)
- Past journals “Ekistics” published by Ekistic Institute, Athens, Greece

Course Title: Environmental Science-II

Semester – V

TEACHING AND EXAMINATION SCHEME

| Sr. No | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|--------|--------------------------|----------|-----|-------|---|---|-------|--------|----------|----------------------|----------|-----------|-------|
| | | | | L | T | P | Total | | Exam | Continuous/Viva/Jury | Exam | Viva/Jury | |
| 4 | Environmental Science-II | BS & AE | 5 | 2 | 0 | 0 | 2 | 2 | 20 | 30 | 50 | 0 | 100 |

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical

FOCUS:

Developing an understanding regarding the importance and impact of sustainable architecture in present context. Enabling student to understand the design strategies for different climatic regions.

CONTENTS:

- Site Climate: Effect of landscape elements on site / microclimate.
- Design considerations for buildings in tropical climates with special reference to hot – dry, warm – humid and composite climates.
- Study of Passive Solar Architecture.
- Resource conservation and optimization, Role of Designer in achieving Sustainability.
- Modern techniques to analyse climatic parameters and design buildings accordingly.

PROJECTS:

- Live Case Study or literature study of a Well-Designed Building having various sustainable architecture features. Project on design strategies for different climatic regions.

SUGGESTED BOOKS

- Manual of Tropical Housing & Building (Part-II) by Koenigsberger
- Buildings in the tropics by Maxwell fry
- Climate Responsive Architecture by Arvind Kishan, Baker & Szok

Course Title: Art Appreciation and Aesthetics

Semester – V

TEACHING AND EXAMINATION SCHEME

| Sr. No | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|--------|---------------------------------|----------|-----|-------|---|---|-------|--------|----------|-----------------------------|----------|---------------|-------|
| | | | | L | T | P | Total | | Exam | Continous/ Viva/ Jury | Exam | Viva/ Jury | |
| 5 | Art Appreciation and Aesthetics | PE | 5 | 2 | 0 | 2 | 4 | 2 | 20 | 30 | 20 | 30 | 100 |

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical

FOCUS:

A global survey and comparative exploration of art, architecture, and design from the historical origins of civilization to contemporary manifestations of art practice. Emphasis will be placed on the artist's role in society and how social factors give rise to various art forms. Students will evaluate and examine contextual and cultural factors and their influence on the patronage and production of formal and stylistic visual languages that arises out of a specific time, place, and culture. Art appreciation requires the acquisition of a critical and formal language in which students come to identify, describe, analyze and compare the visual characteristics of various works using the correct art historical terminology and vocabulary. Art appreciation cultivates a deeper and more expansive awareness of Art, images, and the vast cultural histories we have inherited. In addition to this course, the student should realize the importance of Aesthetics as one dimension of Quality in Business Products and Services. A good combination of Business, Information Technology will be integrated in Art Appreciation and Aesthetics.

CONTENTS:

- Identify the purposes and functions of art in human society and arrive at a coherent definition of what is meant by "art" as a cultural endeavor.
- Define basic art terms and processes; develop a knowledge of and an ability to recognize design principles and elements in selected works of art.
- Identify by artist, title, or style, major selected art works from various historical and global contexts in a variety of media.
- Understand the highlights of the biographies of a variety of artists as they relate to the meaning of their works.
- Study of different art isms such as Abstract Art, Dadaism, Brutalism, and Impressionism.
- Recognize major periods of world art history.
- Describe the techniques used in a variety of art media.
- Develop a formal analysis of a work of art.
- Evaluate the relationship of form to content and context.
- Understand and identify the symbols used in iconographic art works.
- Demonstrate an understanding of art criticism including the description, analysis, interpretation, and evaluation of a given work.

- Develop a deeper understanding of the culture that we are currently immersed in, and the ability to think critically with regards to the images and visual forms that engage us.
- ARTS IN TIME: Prehistoric, Egyptian, Greek, Roman, Medieval, Renaissance, Baroque, Rococo, Nineteenth Century, Twentieth Century, Art Since 1945
- AESTHETICS AND QUALITY: Dimensions of Quality, Products and Service Design, The Value of Aesthetics in Business

SUGGESTED BOOKS

- Introduction to Art Appreciation and Aesthetics by Panizo, Rustia, Rex Bookstore, Inc.
- Aesthetics and the Environment: The Appreciation of Nature, Art and Architecture by Allen Carlson, Routledge, 2000
- Art and ideas by William Fleming
- Aesthetics by Yuri Borev
- The story of modern art by Sheldon Cheney

Course Title: Estimation and Costing

Semester – V

TEACHING AND EXAMINATION SCHEME

| Sr. No | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|--------|------------------------|-------------------|-----|-------|---|----|-------|--------|----------|---------------------------|----------|-----------|-------|
| | | | | L | T | P. | Total | | Exam | Continuous/Viva/Viva/Jury | Exam | Viva/Jury | |
| 6 | Estimation and Costing | Professional Core | 5 | 2 | 0 | 0 | 2 | 2 | 20 | 30 | 50 | 0 | 100 |

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical

FOCUS:

- The objective is to acquire the essential expertise in estimating and drafting specifications for diverse architectural projects and construction endeavors, with the aim of optimizing both cost-effectiveness and quality standards.

CONTENTS:

- This section provides an introduction to the topic, emphasizing the significance of estimating. It also covers several sorts of estimations and the methods used for measurement.
- Analysis of regional SR rates, market rates, Measurement book (MB), RA bill, intermediate and final certificate
- Comprehensive evaluation of the cost of building components based on the current schedule of rates (CSR) provided by the local Public Works Department (PWD) and Central Public Works Department (CPWD) in Delhi.
- Schedule of Rates – provided solely for informational purposes
- Proportions of different materials utilized in the construction of objects such as cement, steel, rubble, metal, sand brick, tiles, etc.
- Comprehensive and specific standards for diverse materials and components utilized in construction
- Comprehension of the significance of specifications in contract documents and their purpose in execution.
- Estimation of :
 - Load-bearing and reinforced concrete (RCC) framed structures, with one example for each.
 - Different types of roofs, such as steel and wood, including roofing materials like Mangalore tiles, asbestos cement (AC), galvanized iron (GI) sheets, etc.
 - Water supply and sanitary works.
 - A sample layout design, including roads, culverts, etc.
- Acquire knowledge through hands-on site visits, informative presentations, in-depth case studies, interactive tutorials, analysis of Bill of Quantities (BOQ), and engaging workshops that focus on the practical application of theoretical concepts in the construction industry.

SUGGESTED BOOKS

- Estimating and Costing by S K Dutta
- Estimating by SC Rangwala

Course Title: Landscape Design (Elective -1)

Semester – V

TEACHING AND EXAMINATION SCHEME

| Sr No | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|-------|------------------|---------------------------|-----|-------|---|---|-------|--------|----------|-----------------------------|----------|---------------|-------|
| | | | | L | T | P | Total | | Exam | Continous/ Viva/ Jury | Exam | Viva/ Jury | |
| 7 | Landscape Design | PAEC-Elective 1 (Any One) | 5 | 2 | 0 | 4 | 6 | 2 | 0 | 50 | 0 | 50 | 100 |

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical

FOCUS:

To introduce students to the discipline of landscape architecture and to develop basic skills required in handling simple landscape design projects.

CONTENT:

- Introduction to Landscape Architecture,
- Role of Landscape in architecture, natural and manmade landscape, urban and rural landscape
- Landscape elements – land forms, water bodies' vegetation, climate, and landscape furniture – their application in design.
- Study of Landscape materials and plant materials of surrounding region
- Landscape Design principles.
- Graphic design in Landscape
- Introduction to site planning: site study, site analysis, requirement analysis, synthesis and final siteplan.
- Introduction to historical gardens like Mughal, Chinese, Japanese, Indian etc
- Study and analysis of contemporary landscape designs with two or three examples.
- Study of landscape of courtyards, roads, pathways, urban spaces, gardens, parking areas.

SUGGESTED BOOKS

- Landscape architecture by J .O. Simonds
- The landscape we see by Garrett Eckbo
- Introduction to landscape architecture by Michael Laurie.
- Time Saver Standards for Landscape architecture

Course Title: Sustainable & Green Building (Elective -1)

Semester – V

1. TEACHING AND EXAMINATION SCHEME

| Sr.No | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|-------|------------------------------|---------------------------|-----|-------|---|---|-------|--------|----------|-----------------------------|----------|---------------|-------|
| | | | | L | T | P | Total | | Exam | Continous/ Viva/ Jury | Exam | Viva/ Jury | |
| 8 | Sustainable & Green Building | PAEC-Elective 1 (Any One) | 5 | 2 | 0 | 2 | 4 | 2 | 0 | 25 | 0 | 25 | 50 |

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical

2. RATIONALE

Our natural environment is significantly impacted by the expansion and development of our communities. Many of our natural resources are used in the production, planning, construction, and maintenance of the buildings where we live and work. This course is developed to acquaint the learner about the increasing effectiveness with which buildings and their sites utilize energy, water, and materials while minimizing impacts on human health and environment. Green Buildings are designed to have reduced environmental impacts in terms of energy, water, transportation, waste and the indoor environment. Beyond the confines of buildings, green-building principles also apply to site, community, and land-use planning concerns. Therefore this course will enable the learner to understand the challenges of today's era in an effective way to design the building as green for sustainable development.

3. COMPETENCY

The course content should be taught and implemented with the aim to develop different types of skills leading to the achievement of the following competency:

Will be able to apply prevailing green building concepts for architectural design

4. COURSE OUTCOMES (COs)

The practical exercises, the underpinning knowledge and the relevant soft skills associated with this competency are to be developed in the student to display the following COs:

- Explore appropriate environmentally friendly building materials and technology.
- Green building using the principles of green building design and the relevant materials. (rating)
- Conceptualize green building design for a given site.
- Develop the design using various concepts of green building.

5. SUGGESTED PRACTICAL EXERCISES

The following practical outcomes (PrOs) are the sub-components of the COs. Some of the PrOs marked '*' are compulsory, as they are crucial for that particular CO at the 'Precision Level' of Dave's Taxonomy related to 'Psychomotor Domain'.

| S. No. | Practical Outcomes (PrOs) | Unit No. | Approx . Hrs. required |
|--------------|---|----------|------------------------|
| 1 | Enlist green building practices with regard to National and International Green Building Rating systems | 1 | 12 |
| 2 | Identifying Green building concepts and Green building rating systems through secondary/primary case study of existing buildings in India. | 2 | 12 |
| 3 | Prepare conceptual drawings of a given residential site: Develop Green building design of a selected a building unit and prepare all Drawings and sketch to a suitable scale. | 3 | 12 |
| 4 | Prepare all final presentation drawings: Prepare all Plans, Sections, Elevations and Details highlighting Green Building parameters | 4 | 12 |
| 5 | Evaluate the designed project with reference to Green Building fundamentals | 4 | 8 |
| Total | | | 56 |

Note

- i. *More Practical Exercises can be designed and offered by the respective course teacher to develop the industry relevant skills/outcomes to match the COs. The above table is only a suggestive list.*
- ii. *The following are some sample 'Process' and 'Product' related skills (more may be added/deleted depending on the course) that occur in the above listed Practical Exercises Of this course required which are embedded in the COs and ultimately the competency.*

6. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

These major equipment with broad specifications for the PrOs is a guide to procure them by the administrators to usher in uniformity of practical in all institutions across the state.

| Sr. No. | Equipment Name with Broad Specifications | PrO. No. |
|---------|---|----------|
| 1 | Measuring tape, laser measure tape, drawing sheets, tracing papers | 1-5 |
| 2 | Drawing board (A1 size @ 23"X32") with other instruments like parallel, set squares (45° and 30°-60°), adjustable set square, triangular scale, tracing papers, and drawing sheets. | 1-5 |
| 3 | Interactive board with LCD overhead projector. | 1-5 |
| 4 | Desktop PCs with latest configuration | 1-5 |
| 5 | Latest Digital Single-Lens Reflex (DSLR) Camera | 1-5 |

7. AFFECTIVE DOMAIN OUTCOMES

The following *sample* Affective Domain Outcomes (ADOs) are embedded in many of the above-mentioned Cos and PrOs. More could be added to fulfill the development of this competency.

- a) Work as a leader/a team member.
- b) Follow ethical practices.
- c) Participates in class discussions.

The ADOs are best developed through the laboratory/field-based exercises. Moreover, the level of achievement of the ADOs according to Krathwohl's 'Affective Domain Taxonomy' should gradually increase as planned below:

- i. 'Valuing Level' in 1st year
- ii. 'Organization Level' in 2nd year.
- iii. 'Characterization Level' in 3rd year.

8. UNDERPINNING THEORY

Only the major Underpinning Theory is formulated as higher level UOs of *Revised Bloom's taxonomy* in order development of the COs and competency is not missed out by the students and teachers. If required, more such higher level UOs could be included by the course teacher to focus on attainment of COs and competency.

| Unit | Unit Outcomes (UOs) | Topics and Sub-topics |
|---|---|---|
| Unit — 1 Green Building Concept and Principles | 1a. Discuss the concept of Green building and sustainable development. | 1.1 Introduction –Concept of Green building and sustainable development |
| | 1b. Enlist the Objectives, Principles and Benefits of Green building design. 1.c. Discuss various National & International Green Building Rating System: | 1.2 Objectives, Principles and Benefits of Green building design. ● design for healthy, comfortable & environmentally friendly homes |
| | | ● Effective use of site resources ● Water conservation ● Energy efficiency ● Handling of house-hold waste-5 – R concept (Refuse, Reduce, Reuse & Repurpose, Recycle) |
| | | 1.3 National & International Green Building Rating System: GRIHA, IGBC & USGBC |
| Unit— 2 Case study of Existing Green building | 2a. Understand the existing green building concept, design and its requirements. 2b. Use GRIHA/IGBC/USGBC checklist to assess existing green buildings. | 2.1 Study of selected examples of Green Building based on – materials, Factors affecting indoor environment quality, water & energy saving and waste management. |

| | | |
|---|--|--|
| <p>Unit—3 Development of Concept</p> | <p>3a. Develop conceptual design considering various green design parameters for further design development of the given residential site (<i>Preferably Sem 2nd Advanced architectural design studio project or any other similar project</i>).</p> <p>3b. Design development with green building considerations.</p> <p>3c. Discuss about embodied energy for different material and its application, operational energy in building and life cycle energy in construction industry.</p> | <p>3.1 Various concept development parameters</p> <ul style="list-style-type: none"> ● Building orientation on Sustainable Site ● Material & Resources : ● Sustainable building Material & Resources. ● Land and building relationship. ● Functional aspects ● Water conservation ● Energy efficiency ● Indoor Environmental Quality ● Handling of house-hold waste |
| <p>Unit—4 Final Presentation with details</p> | <p>4a. Develop design considering various green design parameters.</p> <p>4b. Development of elevations and sections with respect to activities and usage of different green materials.</p> <p>4.c. Self-evaluation of proposed design</p> | <p>4.1 Floor plan with complete Site layout should include building units, roads and landscaped areas drawn clearly with appropriate annotations.</p> <p>4.2 Green building design's details with annotations to understand the layout in its totality.</p> <p>4.3 Detailed drawings showing all the components and elements of Green building e.g. Water</p> |
| | | <p>conservation, passive solar design, alternative energy sources, energy conservation, and reuse of materials etc. as per the design</p> <p>4.4 Exercise of self-evaluation of proposed design with reference to any of rating system i.e. IGBC etc. and study the outcome</p> |

Note: The UOs need to be formulated at the 'Application Level' and above of Revised Bloom's Taxonomy' to accelerate the attainment of the COs and the competency.

9. SUGGESTED SPECIFICATION TABLE FOR QUESTIONPAPER DESIGN

| Unit No. | Unit Title | Teaching Hours | Distribution of Theory Marks | | | |
|--------------|---------------------------------------|----------------|------------------------------|---------|---|-------------|
| | | | R Level | U Level | A | Total Marks |
| I | Green Building Concept and Principles | 8 | Not Applicable | | | |
| II | Case study of Existing Green building | 12 | | | | |
| III | Development of Concept | 16 | | | | |
| IV | Final Presentation with details | 20 | | | | |
| Total | | 56 | | | | |

Legends: R=Remember, U=Understand, A=Apply and above (Revised Bloom's taxonomy)

Note: This specification table provides general guidelines to assist learners for their learning and to teachers to teach and question paper designers/setters to formulate test items/questions assess the attainment of the UOs. The actual distribution of marks at different taxonomy levels (of R, U and A) in the question paper may vary slightly from the above table.

10. SUGGESTED STUDENT ACTIVITIES

Following is the list of proposed student activities like: course/topic-based seminars, internet-based assignments, teacher guided self-learning activities, and course/library/internet/lab based Mini-Projects, etc. These could be individual or group based.

- i) Visit existing green building and draw sketches of elements of green building
- ii) Poster making on green building
- iii) Visit exhibitions and seminars related to Green building and sustainable development
- iv) Encourage and promote activity such as interacting with the architects / firms practicing green building concepts & principles.
- v) Relevant internet-based case studies.

11. SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES (if any)

These are sample strategies, which the teacher can use to accelerate the attainment of the various outcomes in this course:

- a) Massive open online courses (*MOOCs*) may be used to teach various topics/subtopics.
- b) Guide student(s) in undertaking micro-projects.
- c) Different types of teaching methods that are to be employed by teachers to develop the outcomes.
- d) About **20% of the topics/sub-topics** which are relatively simpler or descriptive in nature are to be given to the learners for *self-learning*, but to be assessed using different assessment methods.
- e) Use different instructional strategies in classroom teaching.
- f) Guide learners on form, functions utility, method of construction, etc. to facilitate them to prepare actual measured drawings.
- g) Use the technique of table top discussions along with design jury sessions to teach the relevant content to the learners.

12. SUGGESTED MICRO-PROJECTS

Only one micro-project is planned to be undertaken by a student that needs to be assigned to

him/her in the beginning of the semester. In the first four semesters, the micro-project are group-based. However, in the fifth and sixth semesters, it should be preferably be *individually* undertaken to build up the skill and confidence in every student to become problem solver so that s/he contributes to the projects of the industry. In special situations where groups have to be formed for micro-projects, the number of students in the group should *not exceed three*. The

micro-project could be industry application based, internet-based, workshop-based, laboratory-based or field-based. Each micro-project should encompass two or more COs which are in fact, an integration of PrOs, UOs and ADOs. Each student will have to maintain a dated work diary consisting of individual contributions in the project work and give a seminar presentation of it before submission. The total duration of the micro-project should not be less than *16 (sixteen) student engagement hours* during the course. The student ought to submit a micro-project by the end of the semester to develop the industry-oriented COs.

A suggested list of micro-projects is given here. This has to match the competency and the COs. Similar micro-projects could be added by the concerned course teacher:

- a) Document similar existing green building
- b) Prepare a presentation on elements of Green building e.g. Site Selction, Water conservation, passive solar design, alternative energy sources, net zero buildings, etc.

13. SUGGESTED LEARNING RESOURCES

| S. No. | Title of Book | Author | Publication with place, year and ISBN |
|--------|--|---|--|
| 1 | Green Building Fundamentals | G Harihara Iyer | Notion Press,2022,ISBN: 979-8886416091 |
| 2 | The Idea of Green Building | A.K. Jain | Khanna Publishers; First edition (1 January 2014),ISBN: 978-8174092564 |
| 3 | Sustainable Building Design: Applications Using Climatic Data in India (Design Science and Innovation) | Chitrarekha Kabre | Springer; 1st ed. 2018 edition (23 October 2017),ISBN:978- 9811046179 |
| 4 | A Green Vitruvius: Principles and Practices of Sustainable Architectural Design | J.Owen Lewis | Routledge; 2nd edition (17 June 2011) ISBN-13 : 978-1849711913 |
| 5 | Green design: design for the Environment | Dorothy Mackenzie | Laurence King Publishing; 2nd edition (7 April 1997), ISBN-13 : 978-1856690966 |
| 6 | Green Shift: Changing attitudes in architecture to the Natural World | John Farmer (Author), Kenneth Richardson (Editor) | Architectural Press; 2nd edition (10 September 1999), ISBN-13 : 978-0750643405 |
| 7 | Non-Conventional Energy Resources | G. D. Rai | Khanna Publishers (1 January 1988), ISBN-13 : 978-8174090737 |

14. SOFTWARE/LEARNING WEBSITES

- a) <https://igbc.in/igbc/redirectHtml.htm?redVal=showGreenHomesnospign>
- b) <https://www.usgbc.org/leed>
- c) <https://www.greenbusinesscentre.com/>
- d) <https://www.grihaindia.org/>
- e) <https://www.usgbc.org/resources/green-building-design-and-construction-curriculum-toolkit-guide>

- f) https://urban-industrial.in/hrdpmp/igep-uid/content/e5170/e6258/e14631/e14635/TrainingManual_GreenBuilding.pdf
- g) [https://igbc.in/igbc/html_pdfs/abridged/IGBC%20Green%20New%20Buildings%20Rating%20System%20\(Versio%203.0\).pdf](https://igbc.in/igbc/html_pdfs/abridged/IGBC%20Green%20New%20Buildings%20Rating%20System%20(Versio%203.0).pdf)
- h) www.nptel.iitm.ac.in/
- i) www.khanacademy/

15. PO-COMPETENCY-CO MAPPING

| Semester V | Green Buildings | | | | | | |
|--|---|-----------------------------|--|---|--|-----------------------------------|--------------------------------|
| | POs and PSOs | | | | | | |
| Competency & Course Outcomes | PO 1 Basic & Discipline specific | PO 2 Problem Analysis | PO 3 Design/ develop ment of solutions | PO 4 Engineerin g Tools, Experiment | PO 5 Engineering practices for society, | PO 6 Project Manage ment | PO 7 Life- long learning |
| | knowledg e | | | ation &Testin g | sustainability & environment | | |
| Competency | Will be able to apply prevailing green building concepts for architectural design | | | | | | |
| Course Outcomes CO a) Explore appropriate environmentally friendly building materials and technology. | 1 | - | - | - | 1 | - | 2 |
| CO b) Document the building using the principles of green building and the relevant materials. | 1 | 1 | - | - | 1 | - | - |
| CO c) Conceptualize green building design for a given site. | 1 | 2 | 2 | - | 2 | - | 2 |
| CO d) Develop the design using various concepts of green building. | 1 | 2 | 2 | - | 2 | - | - |

Legend: '3' for high, '2' for medium, '1' for low or '-' for the relevant correlation of each competency, CO, with PO

***PSO 1: Planning & Design:** Prepare architectural designs and all types of drawings with appropriate material specifications and application techniques as per specific project requirements.

#PSO 2: Execution: Suggest appropriate building materials as per the requirement.

Course Title: Product design (Elective -2)

Semester – V

1. TEACHING AND EXAMINATION SCHEME

| Sr.No | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|-------|----------------|---------------------------|-----|-------|---|---|-------|--------|----------|-----------------------------|----------|---------------|-------|
| | | | | L | T | P | Total | | Exam | Continous/ Viva/ Jury | Exam | Viva/ Jury | |
| 9 | Product Design | PAEC-Elective 2 (Any One) | 5 | 2 | 0 | 2 | 4 | 2 | 0 | 25 | 0 | 25 | 50 |

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical

2. RATIONALE

In today's world, there are many challenges and problems that need to be addressed. In this situation, innovation is what provides the solution that will benefit the maximum number of users. And such innovation is often enabled by design. Product Design focuses on design thinking, creative problem solving and understanding product design factors. Through this course, the learner can take on the role of a design maker of a table-top sized product.

Product design involves the design of an object from concept stage to design development employing graphics and model making. This course places a strong emphasis on the design process, and combines creative ability with technical skills. It is based on project work with an emphasis on learning by doing.

The design thinkers start by observing, interviewing or just plain experiencing a situation. Then, they proceed to improve the situation of the humans by solving problems for them.

The designed product should be eco-friendly materials, aesthetic appeal, functional and user friendly.

3. COMPETENCY

The course content should be taught and curriculum should be implemented with the aim to develop required skills so that the students are able to acquire the following competencies:

- To demonstrate the process of design of a product and create a viable product by finding solutions to problems by modifying forms and functions

4. COURSE OUTCOMES (COs)

The practical exercises, the underpinning knowledge and the relevant soft skills associated with the identified competency are to be developed in the learner for the achievement of the following course outcomes in cognitive, psychomotor and affective domains:

- Introduce the notion of design of a product as it evolved through time
- Understand creativity & its application
- Develop the ability to identify problems and finding needs
- Understand the Design process
- Create a viable product

5. SUGGESTED PRACTICAL/STUDIO EXERCISES

The following practical outcomes (PrOs) are the sub-components of the COs. They are crucial for that particular CO at the 'Precision Level' of Dave's Taxonomy related to 'Psychomotor Domain'.

| S. No. | Practical Outcomes (PrOs) | Unit No. | Approx. Hrs. required |
|-------------------|---|----------|-----------------------|
| 1 | Introduction to Creative Thinking: 1. Prepare sketches and models showing the evolution of design any one table-top product (e.g. laptop base, mobileholder, coaster holder etc.) 2. Prepare sketches and models showing how to repurpose an item by selecting any and creating a fresh perspective leading to new uses of the existing item | I | 14 |
| 2 | Problem Identification: 1. Identify the product to be designed 2. Enlist the material, use and technology of the existing product 3. Sketch the various stages and reasons of transformation of the desired product with a brief historical back ground | II | 14 |
| 3 | Design Process: Prepare schematic sketch designs (10 to 15) and finalize one with material and technology and develop a rough prototype | III | 14 |
| 4 | Design of the Product: Prepare all necessary detailed drawings required for developing the product and construct its model | IV | 14 |
| Total Hrs. | | | 56 |

Note

- i. More Practical/Studio Exercises can be designed and offered by the respective course teacher to develop the industry relevant skills/outcomes to match the COs. The above table is only a suggestive list.
- ii. Study report, data collection and analysis report must be assigned in a group. Teacher has to discuss about type of data (which and why) before group start their site visits.
- iii. The following are some **sample** 'Process' and 'Product' related skills (more may be added/deleted depending on the course) that occur in the above listed Practical/Studio Exercises of this course required which are embedded in the COs and ultimately the competency.

| Sr. No. | Sample Performance Indicators for the PrOs | Weightage in % |
|---|--|----------------|
| Assessment should be done on the basis of demonstration of, | | |
| 1 | Skills | 40 |
| 2 | Learning Process | 20 |
| 3 | Communication | 20 |
| 4 | Learning Attitude | 20 |
| Total | | 100 |

6. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

These major equipment with broad specifications for the PrOs is a guide to procure them by the administrators to usher in uniformity of practicals in all institutions across the state.

| S. No. | Equipment Name with Broad Specifications | PrO. No. |
|--------|--|----------|
| 1 | Measuring Tape, Laser measure tape, Drawing Sheets, Tracing papers | 1-4 |
| 2 | Drawing Board (A1 size @ 23"X32") with other Other Instruments like Parallel, Set squares (45° and 30°-60°), Adjustable set square, Triangular scale, Tracing papers, Drawing Sheets | 1-4 |
| 3 | Interactive board with LCD overhead projector | 1-4 |
| 4 | Desktop PCs with latest configuration | 1-4 |

7. AFFECTIVE DOMAIN OUTCOMES

The following *sample* Affective Domain Outcomes (ADOs) are embedded in many of the above-mentioned COs and PrOs. More could be added to fulfil the development of this competency.

- Work as a leader/a team member.
- Follow ethical practices.
- Social and Functional Competence of design.
- Participate in class discussions and present the design effectively, Generate new ideals.
- Practice environmentally friendly methods and design processes.

The ADOs are best developed through the laboratory/field based exercises. Moreover, the level of achievement of the ADOs according to Krathwohl's 'Affective Domain Taxonomy' should gradually increase as planned below:

- 'Valuing Level' in 1st year
- 'Organization Level' in 2nd year.
- 'Characterization Level' in 3rd year.

8. UNDERPINNING THEORY

The major underpinning theory is given below based on the higher level UOs of *Revised Bloom's taxonomy* that are formulated for development of the COs and competency. If required, more such UOs could be included by the course teacher to focus on attainment of COs and competency.

| Unit | Unit Outcomes (UOs) (4 to 6 UOs at different levels) | Topics and Sub-topics |
|--|--|---|
| Unit –I Introduction to Creative Thinking | 1a. Evolution of Design 1b. Logical Thinking vs. Creative Thinking 1c. Exploring Creativity through various mediums | 1.1 Introduction to design thinking of a product 1.2 A brief history of evolution of design of a product 1.3 Product design elements: appearance, functionality and quality 1.4 Logical thinking 1.5 Creative thinking 1.6 Creativity and its applications |

| | | |
|--|--|--|
| Unit– II Problem Identification | 2a. Methods and Techniques 2b. Identification and Analysis | 2.1 Method 1: Define, envision, develop, deliver 2.2 Method 2: Ideation, research, planning and execution, launch 2.3 Brainstorming 2.4 Identifying and defining the product 2.5 Sketching the various stages and reasons of transformation of the desired product with a brief historical back ground |
| Unit – III Design Process | 3a. Creating different designs for the defined product 3b. Prototyping | 3.1 Sketching different designs for the product. 3.2 Shortlisting the best three designs and finalising one of them. 3.3 Creating a rough prototype of the finalised design. |
| Unit – IV Design of the Product | 4a. Producing a sample of the finalised product 4b. Sample testing 4c. Creating the final product after required modifications | 4.1 Preparing all detailed drawings to construct the model of the finalised design 4.2 Modifying the product as required after sample testing 4.3 Creating the final product |

9. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

| Unit No. | Unit Title | Teaching Hours | Distribution of Theory Marks | | | |
|----------|-----------------------------------|----------------|------------------------------|---------|---------|-------------|
| | | | R Level | U Level | A Level | Total Marks |
| I | Introduction to Creative Thinking | | Not Applicable | | | |
| II | Problem Identification | | | | | |
| III | Design Process | | | | | |
| IV | Design of the Product | | | | | |
| | Total | | | | | |

Legends: R=Remember, U=Understand, A=Apply and above (Revised Bloom's taxonomy)

Note: This specification table provides general guidelines to assist learners for their learning and to teachers to teach and question paper designers/setters to formulate test items/questions to assess the attainment of the UOs. The actual distribution of marks at different taxonomy levels (of R, U and A) in the question paper may slightly vary from above table.

10. SUGGESTED LEARNER ACTIVITIES

Other than the classroom and laboratory learning, following are the suggested learner-related **co-curricular** activities which can be undertaken to accelerate the attainment of the various outcomes in this course. Learners should perform following activities in group and prepare reports of about 5 to 7 pages for each activity. They should also collect/record physical evidences for their (learner's) portfolio which may be useful for their placement interviews.

Students should conduct user surveys for the desired product, collect data and samples of different materials used for manufacturing them and analyze them by making a presentation and/or an interactive group discussion. These could be done individually or in a group. For such data collection and other study, students need to go out of the institute to markets, shops, industries or interior sites. Students should go for site visits and prepare a report on it. Such visits should be organized by concerned faculty member/s who should compulsorily accompany the students for this purpose.

The practical/exercises should be properly designed and implemented with an attempt to develop different types of practical skills (Course Outcomes in psychomotor and affective domain) so that learners are able to acquire the competencies (Programme Outcomes).

Note: Here only Course Outcomes in psychomotor domain are listed as practical/exercises. However, if these practical/exercises are completed appropriately, they would also lead to development of Programme Outcomes/Course Outcomes in affective domain as given in a common list at the beginning of curriculum document for this programme. Faculty should refer to that common list and should ensure that learners also acquire those Programme Outcomes/Course Outcomes related to affective domain.

11. SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES (if any)

These are sample strategies, which the teacher can use to accelerate the attainment of the various outcomes in this course:

- a) Massive open online courses (*MOOCs*) may be used to teach various topics/sub topics.
- b) Guide learner(s) in undertaking micro-projects.
- c) '*L*' in *section No. 4* means different types of teaching methods that are to be employed by teachers to develop the outcomes.
- d) About *20% of the topics/sub-topics* which are relatively simpler or descriptive in nature is to be given to the learners for *self-learning*, but to be assessed using different assessment methods.
- e) With respect to *section No.10*, teachers need to ensure to create opportunities and provisions for *co-curricular activities*.
- f) Guide learners on how to address issues on sketching, model making, etc.
- g) Use relevant video/animation films to explain various concepts and processes related to basic Architectural design themes for Public Buildings.
- h) Use different instructional strategies in classroom teaching.
- i) Use the relevant architectural assignments in the given situation.
- j) Guide learners on form, functions utility, method of construction, etc. to facilitate them to prepare actual measured drawings.
- k) Use the technique of table top discussions along with design jury sessions to teach the relevant content to the learners.
- l) Adopt various strategies to enhance each learner's individual creative ability especially with reference to concept and form
- m) Expert lectures should be arranged to cover topics of all units thoroughly.

12. SUGGESTED DESIGN MICRO-PROJECTS

Only one micro-project is planned to be undertaken by a learner that needs to be assigned to him/her in the beginning of the semester. In the first four semesters, the micro-project are group-based (group of 3 to 5). However, **in the fifth and sixth semesters**, the number of learners in the group should **not exceed three**.

The micro-project could be industry application based, internet-based, workshop-based, laboratory-based or field-based. Each micro-project should encompass two or more COs which are in fact, an integration of PrOs, UOs and ADOs. Each learner will have to maintain

dated work diary consisting of individual contribution in the project work and give a seminar presentation of it before submission. The duration of the micro-project should be about **14-16 (fourteen to sixteen) learner engagement hours** during the course. The learners ought to submit micro-project by the end of the semester to develop the industry-oriented COs.

A suggestive list of micro-projects is given here. This has to match the competency and the CO. Similar micro-projects could be added by the concerned course teacher:

- a. Enlist the advantages and disadvantages of any existing product and work out a better solution for the same.
- b. Create an imaginary functional product using some new innovative materials.

13. SUGGESTED LEARNING RESOURCES

| S. No. | Title of Book | Author | Publication with place, year and ISBN |
|--------|--|--|---|
| 1 | The Design of Everyday things | Donald Norman | The MIT Press, 1998 ISBN: 9780262525671 |
| 2 | Product Design and Development | <u>Karl Ulrich,</u> <u>Steven</u> <u>D. Eppinger</u> | McGraw Hill Education, 1 July 2017 ISBN-13: 978-9352601851 |
| 3 | Industrial Design- Reflections of a century | Jocelyn de Noblet | Thames & Hudson, 1993. ISBN 10: 2080135392 |
| 4 | What is a Designer: Things, Places, Messages | Norman Potter | Princeton Architectural Press, 2002 ISBN 10: 0907259162 ISBN 13: 9780907259169 |
| 5 | Design: History, Theory and Practice of Product Design | Bernhard E. Bürdek | Birkhauser Verlag AG (1 January 2005) ISBN-10 : 3038213810 ISBN-13 : 978-3038213819 |
| 6 | Ergodesign Methodology for Product Design | Marcelo M. Soares | CRC Press (October 2021) ISBN: 9781032054483 |
| 7 | Time Saver Standards for Interior Design | Joseph De Chiara Julius Panero Martin Zelnik | McGraw Hill Education; ISBN : 0-07-016299-9 ISBN : 0-07-112589-2 |
| 8 | Color in Interior Design | John Pile | McGraw-Hill Professional (16 June 1997) ISBN-10 : 0060501653 ISBN-13 : 978-0070501652 |
| 9 | Inside Outside | Journal/Magazine | Business India Group ISSN: 0970-1761 |
| 10 | Space Design | Archiworld | ARCHI (1 January 2015) ISBN-10 : 4956601494 ISBN-13 : 978-8957701492 |

14. SOFTWARE/LEARNING WEBSITES

- https://www.mycoted.com/Main_Page
- <http://creatingminds.org/>
- [Creative teaching: Replacing problems with opportunities \(YouTube Video\)](#)

- <https://www.celt.iastate.edu/instructional-strategies/teaching-format/14-creative-ways-to-engage-students/>
- <https://www.teachingexpertise.com/classroom-ideas/creative-thinking-activity/>
- www.designboom.com

15. PO-COMPETENCY-CO MAPPING

| Semester V | Product design (Elective -2) | | | | | | | | |
|---|---|------------------|---------------------------------|--|---|--------------------|--------------------|-------------------|-----------|
| | POs and PSOs | | | | | | | | |
| Competency & Course Outcomes | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | * PSO 1 | #PSO 2 |
| | Basic & Discipline specific knowledge | Problem Analysis | Design/development of solutions | Engineering Tools, Experimentation & Testing | Engineering practices for society, sustainability & environment | Project Management | Life-long learning | Planning & Design | Execution |
| Competency | To demonstrate the process of design of a product and create a viable product by finding solutions to problems by modifying forms and functions | | | | | | | | |
| a) Introduce the notion of design of a product as it evolved through time | 2 | 1 | 1 | 1 | 1 | 1 | 1 | - | - |
| b) Understand creativity and its application | 2 | 1 | 2 | - | 1 | 1 | - | - | - |
| c) Develop the ability to identify problems and finding needs | 2 | 1 | 2 | - | 1 | 1 | - | - | - |
| d) Understand the design process | 2 | 3 | 1 | 2 | 1 | 1 | - | - | - |
| e) Create a viable product | 3 | 2 | 3 | 1 | 1 | 2 | 2 | 2 | 3 |

Legend: '3' for high, '2' for medium, '1' for low and '-' for no correlation of each CO with PO/PSO.

***PSO 1: Planning & Design:** Prepare architectural designs and all types of drawings with appropriate material specifications and application techniques as per specific project requirements.

#PSO 2: Execution: Suggest appropriate building materials as per the requirement.

Course Title: Furniture design (Elective -2)

Semester – V

1. TEACHING AND EXAMINATION SCHEME

| Sr. No | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|--------|------------------|---------------------------|-----|-------|---|---|-------|--------|----------|-----------------------------|----------|---------------|-------|
| | | | | L | T | P | Total | | Exam | Continous/ Viva/ Jury | Exam | Viva/ Jury | |
| 10 | Furniture Design | PAEC-Elective 2 (Any One) | 5 | 2 | 0 | 2 | 4 | 2 | 0 | 25 | 0 | 25 | 50 |

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical

2. RATIONALE

Furniture design is a multi-layered process which requires recall and application of knowledge of previously covered parameters of anthropometrics, basic design, materials, construction technology, aesthetics, space, climate and its inter relationships. Through this subject, the learner can take on the role of a furniture designer. Understand today's need, digital tools, material properties, working methods and assembly processes. Designing indoor/outdoor furniture object from concept stage to design development employing visual composition, graphics and model making. This course places a strong emphasis on the design process, and combines creative ability with technical skills.

With the change of time, space and culture, new design evolves in the society, which inter linked with human need. Furniture design focuses on production of useful items that result in tactile experiences. Designing furniture relies on inspiration, a concept or idea, judgment, design skills, engineering principles, knowledge and the commitment to give pleasure to those who use it. The designed object should use eco-friendly materials, sustainable, aesthetic appeal, functional and user friendly. This course is designed in view of above outlook and for developing the competency mentioned below, accordingly.

3. COMPETENCY

The course content should be taught and implemented with the aim to develop different types of skills leading to the achievement of the following competency:

- Will be able to design an innovative furniture product with a high degree of creativity and quality, considering human scale and basic ergonomics

4. COURSE OUTCOMES (COs)

The practical exercises, the underpinning knowledge and the relevant soft skills associated with the identified competency are to be developed in the learner for the achievement of the following course outcomes in cognitive, psychomotor and affective domains:

- a. Comprehend the history of furniture design.
- b. Review the importance and need of ergonomics, human scale, functionality and comfort with relation to furniture design.
- c. Explore various material combinations for the designed furniture.
- d. Prepare a prototype of the designed furniture.

5. SUGGESTED PRACTICAL EXERCISES

The following practical outcomes (PrOs) are the sub-components of the COs. *Some of the PrOs marked '*' are compulsory, as they are crucial for that particular CO at the 'Precision Level' of Dave's Taxonomy related to 'Psychomotor Domain'.*

| S. No. | Practical Outcomes (PrOs) | Unit No. | Approx. Hrs. required |
|--------|--|----------|-----------------------|
| 1 | Collect Furniture Data: Collect data for desired furniture unit from evolution to an existing design like plan, section, views, joinery details and analyze design transformation. Materials and technology: Collect data of Materials and technology used in furniture and analyze design transformation. | I | 8 |
| 2 | Develop Concept: Prepare conceptual sketch designs, block model for desired furniture unit considering different design parameters | II | 8 |
| 3 | Ergonomics and Anthropometry: Analyze design with aspects like ergonomics, functionality and Anthropocentric with help of sketches and design software. Elementary Anatomy and Physiology of Human Body: Analyze design on Anatomy and Physiology principles, relationship between human feelings, culture and design by group discussion, survey and questionnaires. | II | 8 |
| 4 | Materials Used for Furniture: Compare and analyse different suitable materials for designed furniture unit consideration of environmental and energy efficiency parameters. Finishes Used for Furniture: Compare and analyse different suitable finishes for designed furniture unit consideration of human Physiology, environmental, coast, spatial context etc. | III | 8 |
| 5 | Furniture Detailing: Prepare sets of final presentation drawings including all joineries, materials, finishes, dimensions and approximate coast. Preparing shop drawings of furniture: Prepare sets of detail drawings from top down to the last detail, specifying | IV | 16 |
| | materials, construction process and including pre & post construction precautions. | | |
| 6 | Prototype of the designed furniture: Prepare a model of the designed project to scale or create virtual 3D model in any 3D design software and Prepare rendered views of the designed furniture. | V | 8 |

Note

- i. *More Practical Exercises can be designed and offered by the respective course teacher to develop the industry relevant skills/outcomes to match the COs. The above table is only a suggestive list.*
- ii. *The following are some sample 'Process' and 'Product' related skills (more may be added/deleted depending on the course) that occur in the above listed Practical Exercises of this course required which are embedded in the COs and ultimately the competency..*

| Sr. No. | Sample Performance Indicators for the PrOs | Weightage in % |
|---|--|----------------|
| Assessment should be done on the basis of demonstration of, | | |
| 1 | Skills | 40 |
| 2 | Learning Process | 20 |
| 3 | Communication | 20 |
| 4 | Learning Attitude | 20 |
| Total | | 100 |

6. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

These major equipment with broad specifications for the PrOs is a guide to procure them by the administrators to usher in uniformity of practical in all institutions across the state.

| S. No. | Equipment Name with Broad Specifications | PrO. No. |
|--------|--|----------|
| 1 | Measuring Tape, Laser measure tape, etc. | 1-6 |
| 2 | Drawing Board (A1 size @ 23"X32") with other Instruments like Parallel, Set squares (45° and 30°-60°), Adjustable set square, Triangular scale, Tracing papers, Drawing Sheets, Model making set, etc. | 1-6 |
| 3 | Interactive board with LCD overhead projector | 1-6 |
| 4 | Desktop PCs with latest configuration (64-bit Intel, AMD or Equivalent multi-core processor, Minimum 8 GB RAM, Minimum 6 GB Dedicated Graphics Card) | 1-6 |
| 5 | Sheets, Cutter, thermocol sheets, clay etc | 2 & 6 |
| 6 | Latest Digital Single-Lens Reflex (DSLR) Camera | 1-6 |

7. AFFECTIVE DOMAIN OUTCOMES

The following *sample* Affective Domain Outcomes (ADOs) are embedded in many of the abovementioned Cos and PrOs. More could be added to fulfill the development of this competency.

- a) Work as a leader/a team member.
- b) Follow ethical practices.
- c) Social and Functional Competence of design
- d) Participates in class discussions and present the design effectively, Generate new ideals.
- e) Practice environmentally friendly materials, methods and design processes.

The ADOs are best developed through the laboratory/field based exercises. Moreover, the level of achievement of the ADOs according to Krathwohl's 'Affective Domain Taxonomy' should gradually increase as planned below:

- i. 'Valuing Level' in 1st year
- ii. 'Organization Level' in 2nd year.
- iii. 'Characterization Level' in 3rd year.

8. UNDERPINNING THEORY

Only the major Underpinning Theory is formulated as higher level UOs of *Revised Bloom's taxonomy* in-order development of the COs and competency is not missed out by the students and teachers. If required, more such higher level UOs could be included by the course teacher to focus on attainment of COs and competency.

Note: The UOs need to be formulated at the 'Application Level' and above of Revised Bloom's Taxonomy' to accelerate the attainment of the COs and the competency.

| Unit | Unit Outcomes (UOs) (4 to 6 UOs at Application and above level) | Topics and Sub-topics |
|---|--|---|
| <p>UNIT- I</p> <p>History of Furniture Styles and Evolution of Design</p> | <p>1a. Introduction and evolution of furniture styles</p> <p>1b. Transformation of furniture styles</p> <p>1c. Development of conceptual design</p> | <p>1.1 Concise understanding of evolution from ancient to modern, post-modern ideologies to contemporary (Egyptian, Greek, Roman, Gothic, Baroque, Renaissance, Arts and Crafts Movement, Art Nouveau, De Stijl, Modernism, Post Modernism and Contemporary)</p> <p>1.2 Understanding role of materials and technology in their transformation and various theories associated in their evolution</p> <p>1.3 Sketches for various periods of furniture</p> |
| <p>UNIT- II</p> <p>Design developments with respect to Ergonomics and Anthropometry</p> | <p>2a. Develop conceptual design</p> <p>2b. Application of Principles of Ergonomics and Anthropometry</p> <p>2c. Application of elementary Anatomy and Physiology of Human Body</p> | <p>Design and Development of Drawings</p> <p>2.1 Develop conceptual design through Logical and Creative Thinking for residential/office use considering design aspects like function, utility, visual beauty, principles of design, ergonomics, environmental design matters, the surrounding spatial context and express through various mediums</p> <p>2.2 Development of furniture unit with respect to Principles of Ergonomics and Anthropometry express with architectural sketching, rendering techniques or use software</p> |

| | | |
|--|--|--|
| | | <p>2.3 Conducting and analyzing the user surveys to justify Anatomy and Physiology for designed furniture unit and modify to be well suited to human needs</p> |
| <p>UNIT- III Materials and finishes for Furniture</p> | <p>3a. Analysis and Identify best suitable materials</p> <p>3b. Analysis and Identify best suitable finish</p> | <p>3.1 Selection of materials like wood, processed wood (block boards, laminates, veneers, particle board), metals, cane, plastics, fiber glass etc with considering factors like availability, strength, flexibility, durability, climate, furnishing climate needs and environmental and energy efficiency, cost, etc</p> <p>3.2 Selection of finishes like Varnish, polish, lacquer, melamine, paints, staining etc with considering factors like functionality, material used, workability, aesthetics, human Physiology, environmental, coast, spatial context, etc</p> |
| <p>UNIT- IV Development Drawings of Design unit</p> | <p>4a. Prepare Furniture Detail drawings</p> <p>4b. Prepare execution/shop drawings</p> | <p>4.1 Furniture Detailing: Development of final presentation drawings including all joineries, materials, finishes, dimensions and approximate cost.</p> <p>4.2 Execution/shop drawings of furniture: development of construction detail drawings from start to end, specifying materials, construction process and including pre & post construction precautions.</p> |
| <p>UNIT-V Prototype of the designed furniture</p> | <p>5a. Producing a prototype of the finalized product</p> <p>5b. Survey analysis</p> | <p>5.1 Conducting user surveys of the product Prepare a model of the designed project to scale or create virtual 3D model in any 3D design software and Prepare rendered views of the designed furniture.</p> <p>5.2 Conducting user surveys of the final designed unit and analyze</p> |

9. SUGGESTED SPECIFICATION TABLE FOR QUESTIONPAPER DESIGN

| Unit Title | | Distribution of Theory Marks | | | | |
|--------------|---|------------------------------|---------|---------|---------|-------------|
| Unit No. | | Teaching Hours | R Level | U Level | A Level | Total Marks |
| I | Primary and Secondary Data collection | | | | | |
| II | Development of Concept and Site layout | | | | | |
| III | Preparing Sketch Design | | | | | |
| IV | Design & Development of Drawings | | | | | |
| V | Final Presentation of Drawings and Models | | | | | |
| Total | | | | | | |

Legends: R=Remember, U=Understand, A=Apply and above (Revised Bloom's taxonomy)

Note: This specification table provides general guidelines to assist student for their learning and to teachers to teach and question paper designers/setters to formulate test items/questions assess the attainment of the UOs. The actual distribution of marks at different taxonomy levels (of R, U and A) in the question paper may vary slightly from above table.

10. SUGGESTED LEARNER ACTIVITIES

Other than the classroom and laboratory learning, following are the suggested learner-related **co-curricular** activities which can be undertaken to accelerate the attainment of the various outcomes in this course: Learners should perform following activities in group and prepare reports of about 5 pages for each activity. They should also collect/record physical evidences for their (learner's) portfolio which may be useful for their placement interviews:

- Students should survey the market for latest available materials, finishing materials, collect data and samples of different materials used in furniture design understand their fixture details and analyze them by survey/interactive group discussion. These could be done individually or in a group.
- Visits to design degree/diploma institutes for studying and knowledge-sharing on documented/on-going students' 'Furniture design' works.
- Visits to under construction interior sites, furniture workshops to study 'Furniture' designs as well as for data collection.
- Visits furniture museum/gallery to understand evolution in design, material, joinery and technology

The practical/exercises should be properly designed and implemented with an attempt to develop different types of practical skills (Course Outcomes in psychomotor and affective domain) so that learners are able to acquire the competencies (Programme Outcomes). Following is the list of practical exercises for guidance.

Note: Here only Course Outcomes in psychomotor domain are listed as practical/exercises. However, if these practical/exercises are completed appropriately, they would also lead to development of Programme Outcomes/Course Outcomes in affective domain as given in a common list at the beginning of curriculum document for this programme. Faculty should refer to that common list and should ensure that learners also acquire those Programme Outcomes/Course Outcomes related to affective domain

11. SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES (if any)

These are sample strategies, which the teacher can use to accelerate the attainment of the various outcomes in this course:

- Massive open online courses (**MOOCs**) may be used to teach various topics/sub topics.
- Guide student(s) in undertaking micro-projects.

- c) 'L' in section No. 4 means different types of teaching methods that are to be employed by teachers to develop the outcomes.
- d) About 20% of the topics/sub-topics which are relatively simpler or descriptive in nature is to be given to the learners for *self-learning*, but to be assessed using different assessment methods.
- e) With respect to section No.10, teachers need to ensure to create opportunities and provisions for *co-curricular activities*.
- f) Guide learners on how to address issues on sketching, model making, etc.
- g) Use relevant video/animation films to explain various concepts, transformation and processes related to indoor/outdoor furniture design themes.
- h) Use different instructional strategies in classroom teaching.
- i) Use the relevant design assignments in the given situation.
- j) Guide learners on form, functions utility, method of construction, etc. to facilitate them to prepare actual measured drawings.
- k) Use the technique of tabletop discussions, presentation along with design jury sessions to teach the relevant content to the learners.
- l) Adopt various strategies to enhance each learner's individual creative ability especially with reference to concept and form

12. SUGGESTED MICRO-PROJECTS

Only one micro-project is planned to be undertaken by a student that needs to be assigned to him/her in the beginning of the semester. In the first four semesters, the micro-project are group-based. However, in the fifth and sixth semesters, it should be preferably be *individually* undertaken to build up the skill and confidence in every student to become problem solver so that s/he contributes to the projects of the industry. In special situations where groups have to be formed for micro-projects, the number of students in the group should *not exceed three*. The micro-project could be industry application based, internet-based, workshop-based, laboratory-based or field-based. Each micro-project should encompass two or more COs which are in fact, an integration of PrOs, UOs and ADOs. Each student will have to maintain dated work diary consisting of individual contribution in the project work and give a seminar presentation of it before submission. The total duration of the micro-project should not be less than 12 (Twelve) student engagement hours during the course. The student ought to submit micro-project by the end of the semester to develop the industry oriented COs.

A suggestive list of micro-projects is given here. This has to match the competency and the COs. Similar micro-projects could be added by the concerned course teacher:

- a. Design a functional and comfortable furniture unit for physically challenged person.
- b. Design a furniture unit by using waste materials and express with help of sketches.
- c. Justify existing furniture unit on green and sustainable concepts or explain ways to modify unit to fit in given criterions.

Time Problem:

The duration of the time problem should be about one or two days.

A suggestive list of time problem is given here. This has to match the competency and the CO. Similar time problem could be added by the concerned course teacher:

- a. Justify best material and technology for given furniture prototype.
- b. Transform historical unit to contemporary design

13. SUGGESTED LEARNING RESOURCES

| S. No | Title of Book | Author | Publication with place, year and ISBN |
|-------|--|---------------------------|---|
| 1 | Constructing Medieval Furniture: Plans and Instructions with Historical Notes | Daniel Diehl | Stackpole Books (1 December 1996) ISBN-10 : 0511121155 ISBN-13 : 0511121152-115 |
| 2 | Furniture Design Second edition | James Christopher Postell | John Wiley & Sons Inc (7 December 2012) ISBN-10 : 1118090780 |
| 3 | The Encyclopedia of Furniture | Joseph Aronson | Potter Style; 3rd edition (14 December 1961) ISBN-10 : 0511031351 ISBN-13 : 0511031355-115 |
| 4 | Mid-Century Modern | Bradley Quinn | Conran; Illustrated edition (15 October 2004) ISBN-10 : 1540114065 ISBN-13 : 1540114061-115 |
| 5 | The Interior Design Handbook | Frida Ramstedt | Particular Books (29 October 2020) ISBN-10 : X024143511 ISBN-13 : 978-0241438114 |
| 6 | History of Interior Design and Furniture: From Ancient Egypt to Nineteenth-Century Europe: From Ancient Egypt to 19th-century Europe | Robbie G. Blakemore | John Wiley & Sons (18 December 1996) ISBN-10 : 0411256161 ISBN-13 : 978-0471286769 |

14. SOFTWARE/LEARNING WEBSITES

- www.architecturalrecord.com
 - www.archdaily.com
 - www.dezeen.com
 - www.archpaper.com
 - www.architectmagazine.com
 - www.archello.com
- Suggestive list of 3D Design Software:**
- SketchUp
 - AutoCAD
 - ArchiCAD
 - Dynamo
 - Rhinoceros 3D: Rhino+ Grasshopper
 - Revit Architecture

15. PO-COMPETENCY-CO MAPPING

| Semester V | Furniture Design | | | | | | | | |
|--|---|--------------------------|---|--|---|----------------------------|----------------------------|-----------|--------|
| | POs and PSOs | | | | | | | | |
| Competency & Course Outcomes | PO 1 Basic & Discipline specific knowledge | PO 2 Problem Analysis | PO 3 Design/development of solutions | PO 4 Engineering Tools, Experimentation & Testing | PO 5 Engineering practices for society, sustainability & environment | PO 6 Project Management | PO 7 Life-long learning | * PSO1 | # PSO2 |
| | <ul style="list-style-type: none"> Will be able to design an innovative furniture product with a high degree of creativity and quality, considering human scale and basic ergonomics | | | | | | | | |
| a) Comprehend the history of furniture design. | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 |
| b) Review the importance and need of ergonomics, human scale, functionality and comfort with relation to furniture design. | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 |
| c) Explore various material combinations for the designed furniture. | 3 | 1 | 1 | 2 | 3 | 2 | 2 | 3 | 3 |
| d) Prepare a prototype of the designed furniture. | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 |

Legend: '3' for high, '2' for medium, '1' for low or '*' for the relevant correlation of each competency, CO, with PO

***PSO1: Planning & Design:** Prepare architectural designs and all types of drawings with appropriate material specifications and application techniques as per specific project requirements.

#PSO2: Execution: Suggest appropriate building materials as per the requirement.

VEER NARMAD SOUTH GUJARAT UNIVERSITY

DIPLOMA IN ARCHITCTURE

Semester – VI

1. TEACHING AND EXAMINATION SCHEME

| Sr. No | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|--------|--------------------------|-------------------|-----|-------|---|----|-------|--------|----------|-----------------------------|----------|---------------|-------|
| | | | | L | T | P | Total | | Exam | Continous/ Viva/ Jury | Exam | Viva/ Jury | |
| 1 | Architectural Internship | Professional Core | 6 | 0 | 0 | 14 | 14 | 12 | 0 | 50 | 0 | 50 | 100 |

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical

2. RATIONALE

The learner of Diploma in Architecture learns and acquires skills relevant to his profession during the first five semesters of the diploma programme. By the sixth semester, the learner has got exposure to enough opportunities to develop professional abilities needed to work as an architectural assistant. However, during the sixth semester, it is important to integrate previous learning/experiences to demonstrate professional competence by way of completing a comprehensive Internship. Internship aims to provide an environment for the Intern to integrate, coordinate and apply all the skills acquired by him during the entire course of study.

By working as an 'Intern' in an architectural firm or organization, the learner can avail the benefits of an appropriate environment where he gets to apply his skills as well as get exposure to learn new skills. Thus, this course gives an essential comprehensive practical exposure to the learner and helps him gain valuable real life experience to enhance competency essential for his career advancement.

3. COMPETENCY

The course content should be taught and implemented with the aim to develop different types of skills leading to the achievement of the following competency:

- **Execute all assigned tasks with professional competency both as a team member as well as individually in an architectural firm**

4. COURSE OUTCOMES (COs)

The practical exercises, the underpinning knowledge and the relevant soft skills associated with this competency are to be developed in the Intern to display the following COs:

- Prepare conceptual, presentation and working drawings of architectural projects.
- Monitor the execution of work on site as per drawing.
- Select finishing materials for an architectural project.
- Demonstrate inter personal skills as professional.

(*): As per Evaluation pattern suggested below

Legend: L-Lecture; T – Tutorial/Teacher Guided Theory Practice; P -Practical; C – Credit, CA - Continuous Assessment; ESE -End Semester Examination.

Teaching Scheme and Teaching Load:

Indicates tasks to be expedited by assigned teaching faculty & interns during internship period,

1. Guiding the students for Internship.
2. Total contact/working hours during internship of student interns should be a minimum of 36 hours per week at the respective firms / organisations
3. Checking weekly report for individual Interns and evaluating on weekly basis.
4. Continuous supervision and monitoring of each Intern throughout the entire Architectural Internship period.
5. Assigned faculty will conduct a minimum of one follow-up visit per month to the firms / organisations to ensure their progress. Additionally, the (faculty) internal examiner will perform continuous evaluations during their monthly visits to the architectural firm/organization.
6. Interns are expected to make monthly visits to the institute to present their monthly training progress. Assigned faculty will conduct continuous assessments during these visits.
7. The faculty will guide the Interns in preparing their final presentation and training report, and also review and evaluate the final presentation and report.

Important Note:-

Contact hours of faculty for student interns have been considered as per 'Clause 9' of GR of Education Department of Gujarat state dated 15th June 2023 (No.PaRaCh/102022/312/Sa) for internship, which clearly states that "the batch size will be 15 students and weekly workload shall be 12 hours."

***Evaluation Pattern:**

➤ Progressive Assessment (PA) shall be done in the form of Performance Appraisal of Intern in the given Form – A & C (Suggested in appendices) on weekly basis by Intern training provider.

After completion of Internship, the Intern should report back to the institute immediately and submit all their work along with filled up forms (Forms B & C). (Maximum 50 marks)

➤ End Semester Exam (ESE) shall be conducted by External Examiner (Maximum 50 marks)

Evaluation by External Examiner should be done on the basis of,

- i. The actual work done during Internship period which the Intern shall submit in the form of portfolio duly certified and signed by the Intern training supervisor/provided.
- ii. Each Intern should compulsorily mention the number of hours dedicated to this work in their individual diaries (Form B) which should also be submitted to the department at the end of the training along with the training work-portfolio.

Continuous Assessment: (Maximum marks - 50)

Internal teaching faculty (only architecture core faculty) should evaluate training on following criteria and marks

- i. Review of Daily, Weekly & Monthly Reports (Form - B). Two compulsory intermediate presentations of 100 marks each during visits of Intern to institute. (Maximum 20 Marks)
- ii. Internship Appraisal Report (IAR) in the form of filled up forms (Form - C) at end of semester/internship.(Maximum marks - 10)
- iii. Internal presentation and viva by internal teaching faculty at the end of the semester on a date specified by the department (Maximum marks - 10)
- iv. Final Portfolios submission at the end of the Internship period (Maximum marks - 10)

End Semester External Examination: (Maximum marks - 50)

Evaluation through ESE shall be done by External Exam for this course (maximum 25 Interns per day shall be examined by External Examiner) on following criteria and marks,

- i. Review of record and Training Report such as Daily Reports, Weekly Reports, PA and Final Training Report including a Certificate issued by the Training provider with a critical review of the trainee/Intern during the tenure of Internship (Maximum marks - 20)
- ii. Review of Training Portfolio (Maximum marks – 20)
- iii. Portfolio presentation with viva-voce (Maximum marks - 10)

Important Note: Both internal and external examiners should strictly qualified as an Architect (basic degree of teaching faculty should be in relevant discipline) as per latest Gujarat Government's recruitment rule (No.SCT/10/2013/616356/GH/1176 date 28/10/13) and CoA rules and regulations.

5. SUGGESTED PRACTICAL EXERCISES

The following practical outcomes (PrOs) that are the sub-components of the COs. *Some of the PrOs marked '**' are compulsory, as they are crucial for that particular CO at the 'Precision Level' of Dave's Taxonomy related to 'Psychomotor Domain'.*

| S. No. | Practical Outcomes (PrOs) | Unit No. | Approx. Hrs. required |
|----------------|---------------------------|----------|-----------------------|
| Not Applicable | | | |

Note

- i. *More Practical Exercises can be designed and offered by the respective course teacher to develop the industry relevant skills/outcomes to match the COs. The above table is only a suggestive list.*
- ii. *The following are some sample 'Process' and 'Product' related skills (more may be added/deleted depending on the course) that occur in the above listed Practical Exercises of this course required which are embedded in the COs and ultimately the competency..*

| S. No. | Sample Performance Indicators for the PrOs | Weightage in % |
|----------------|--|----------------|
| Not Applicable | | |

6. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

These major equipment with broad specifications for the PrOs is a guide to procure them by the administrators to usher in uniformity of practical in all institutions across the state.

| S. No. | Equipment Name with Broad Specifications | PrO No. |
|----------------|--|---------|
| Not Applicable | | |

7. AFFECTIVE DOMAIN OUTCOMES

The following *sample* Affective Domain Outcomes (ADOs) are embedded in many of the above mentioned COs and PrOs. These are indicators of fulfillment of the development of this competency.

- a) Work as a leader/a team member.
- b) Follow ethical practices.
- c) Participates in class discussions.

The ADOs are best developed through the laboratory/field based exercises. Moreover, the level of achievement of the ADOs according to Krathwohl's 'Affective Domain Taxonomy' should gradually increase as planned below:

- i. 'Valuing Level' in 1st year
- ii. 'Organization Level' in 2nd year.
- iii. 'Characterization Level' in 3rd year.

8. UNDERPINNING THEORY

Only the major Underpinning Theory is formulated as higher level UOs of *Revised Bloom's taxonomy* in order development of the COs and competency is not missed out by the Interns and Faculty. If required, more such higher level UOs could be included by the course teacher to focus on attainment of COs and competency.

| Unit | Unit Outcomes (UOs) (4 to 6 UOs at different levels) | Topics and Sub-topics |
|----------------|---|-----------------------|
| Not Applicable | | |

Note: The UOs need to be formulated at the 'Application Level' and above of Revised Bloom's Taxonomy' to accelerate the attainment of the COs and the competency.

9. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

| Unit No. | Unit Title | Teaching Hours | Distribution of Theory Marks | | | |
|----------------|------------|----------------|------------------------------|---------|---|-------------|
| | | | R Level | U Level | A | Total Marks |
| Not Applicable | | | | | | |

Legends: R=Remember, U=Understand, A=Apply and above (Revised Bloom's taxonomy)

Note: This specification table provides general guidelines to assist Intern for their learning and to teachers to teach and question paper designers/setters to formulate test items/questions assess the attainment of the UOs. The actual distribution of marks at different taxonomy levels (of R, U and A) in the question paper may vary slightly from above table.

10. SUGGESTED INTERNSHIP ACTIVITIES

Following is the list of proposed Intern activities like: course/topic based seminars, internet based assignments, teacher guided self-learning activities, and course/library/internet/lab based Mini-Projects, etc. These should be individual.

- i) Prepare a report on architectural practices followed in office.
- ii) Prepare an office correspondences sample files.
- iii) Visit art/material/trade exhibitions.
- iv) Undertake a visit of ongoing architectural as well as interior project and make reports.

11. SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES (if any)

These are sample strategies, which the teacher can use to accelerate the attainment of the various outcomes in this course:

- i. Every Intern must work in an architect's office as a full time Intern/trainee for a period as specified by the university in academic calendar, subject to a minimum

- of 14 calendar weeks and submit joining report (form –A) at the institute.
- ii. The training should be undertaken in a firm, where an architect is the owner/proprietor/partner and is registered with the Council of Architecture in India.
 - iii. The intern should involve himself / herself in various aspects of office work such as working drawings, presentation drawings, quantity estimation, site supervision and preparation of corporation drawings as well as do liaison work with various agencies.
 - iv. The intern is required to maintain a work diary from which he/she shall present their work once a month (last working Saturday of every month). The Intern is required to bring hard/soft copies of all the work done for these periodic presentations. These would be finally evaluated by an internal examiner through a viva voce examination prior to the external exam, on a date decided by the department.

12. SUGGESTED LEARNING RESOURCES

Following is the list of proposed learning resources,

1. Books and periodicals available with the training provider's office / any other library
2. Relevant architecture related websites and e-journals
3. Research works available with Architecture degree institute library
4. Seminars/workshops/discussions/symposiums conducted at nearby architecture degree colleges and also listen to talks by experts, with prior permission from the college authorities
5. Site visits of ongoing and completed projects of respective Architectural Firm/Organization

13. PO-COMPETENCY-CO MAPPING

| | | | | | | | |
|-------------|--------------------------|--|--|--|--|--|--|
| Semester VI | ARCHITECTURAL INTERNSHIP | | | | | | |
| | POs and PSOs | | | | | | |

Legend: '3' for high, '2' for medium, '1' for low or '-' for the relevant correlation of each competency, CO, with PO

| Competency & Course Outcomes | PO 1 Basic & Discipline specific knowledg e | PO 2 Problem Analysis | PO 3 Design/ developme nt of solutions | PO 4 Engineering Tools, Experimentati on & Testing | PO 5 Engineering practices for society, sustainability & environment | PO 6 Project Managem ent | PO 7 Life- long learning |
|---|--|-----------------------------|--|--|---|-----------------------------------|-----------------------------|
| <u>Competency</u> Execute all assigned tasks with professional competency both as a team member as well as individually in an architectural firm | | | | | | | |
| <u>Course Outcomes</u> CO a) Prepare conceptual, presentation and working drawings of architectural projects | 1 | | 2 | | | 3 | 2 |
| CO b) Monitor the execution of work on site as per drawing. | | | | | | 2 | 3 |
| CO c) Select finishing materials for an architectural project. | 1 | | 2 | | | | |
| CO d) Demonstrate inter personal skills as professional. | | | | 2 | | 3 | 2 |

Subject: Joining report of _____

Respected Sir

_____ has reported for Architectural
Internship for a minimum period of 16 weeks at our office or entire term duration, of VNSGU
(whichever is higher) located at _____

on _____.

The weekly off-day/holiday of my office falls on _____.

Thanking you

Yours sincerely

Signature and Stamp of Architect/Supervisor

CoA Registration No. of Architect/Supervisor

(To be sent immediately after joining the office on letter pad)

(Needs to be on Letter Pad of Architect/Architect's Firm)

Form – C

Internship Appraisal Report (IAR)
ARCHITECTURAL INTERNSHIP

Name of Intern:

Enrollment No:

Diploma in Architectural

Assistantship College Name:

| Criteria for IAR | Excellent | Good | Average | Need Improvement |
|--------------------------------------|-----------|------|---------|------------------|
| Willingness to Learn | | | | |
| Team Work | | | | |
| Interpersonal Relationship | | | | |
| Sincerity | | | | |
| Professionalism | | | | |
| Soft Skills | | | | |
| Communication Skills (Oral) | | | | |
| Communication Skills (Written) | | | | |
| Overall Evaluation (Out of 10 Marks) | | | | |
| Special Skill Observed (If Any) | | | | |

Appraised by:

Date of Evaluation:

Sign & Stamp:



**VEER NARMAD SOUTH GUJARAT UNIVERSITY
DIPLOMA IN ARCHITCTURE**

Semester – IV

| Sr. No. | Subject Name | Category | Sem | Hours | | | Total | Credit | Internal | | External | | Total |
|---------|--|----------------------------|-----|-------|---|----|-------|--------|----------|------------------------|----------|------------|-------|
| | | | | L | T | P | | | Exam | Cont inous /Viva /Jury | Exam | Viva/ Jury | |
| 1 | Architectural Design Studio-IV | Professional Core | 4 | 0 | 0 | 10 | 10 | 6 | 0 | 50 | 0 | 50 | 100 |
| 2 | Building Services | BS & AE | 4 | 2 | 0 | 2 | 4 | 3 | 20 | 30 | 50 | 0 | 100 |
| 3 | Structure - II | BS & AE | 4 | 2 | 0 | 0 | 2 | 3 | 20 | 30 | 50 | 0 | 100 |
| 4 | Enviromental science | BS & AE | 4 | 2 | 0 | 0 | 2 | 2 | 20 | 30 | 50 | 0 | 100 |
| 5 | History of Architecture-II | Professional Core | 4 | 2 | 0 | 2 | 4 | 2 | 20 | 30 | 50 | 0 | 100 |
| 6 | Computer Skills-II | SEC | 4 | 0 | 0 | 4 | 4 | 2 | 20 | 30 | 50 | 0 | 100 |
| 7 | Bldg. Bye Laws & professional practice | Professional Core | 4 | 2 | 3 | 0 | 2 | 2 | 20 | 30 | 50 | 0 | 100 |
| 8 | Indian Knowledge System & Tradition | PAEC- Elective 1 (Any One) | 4 | 2 | 0 | 0 | 2 | 2 | 20 | 30 | 25 | 25 | 100 |
| Total | | | | | | | 30 | | | | | | |

*L=lectures, T=tutorial, P=Practical, E=TheoryExternal, M=TheoryInternal, I=Practical Internal, V=Practical External, On Job Training(OJT) is equivalent to Practical

Course Title: Architectural Design Studio – IV

Semester – IV

1. TEACHING AND EXAMINATION SCHEME

| Sr. No | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|--------|--------------------------------|-------------------|-----|-------|---|----|-------|--------|----------|------------------------------|----------|---------------|-------|
| | | | | L | T | P. | Total | | Exam | Conti nous/ Viva/ Jury | Exam | Viva/ Jury | |
| 1 | Architectural Design Studio-IV | Professional Core | 5 | 0 | 0 | 12 | 12 | 06 | 0 | 50 | 0 | 50 | 100 |

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical

1. EMPHASIZE

To understand the use of technologies developed in other fields as a precursor to creating architecture. The design shall deal with multiple functions resulting in complex form. The design shall be sensitive to the needs of disabled, aged people and children To understand creating of spaces. Formal, informal and interactive spaces and their hierarchies in built Environment.

Design emphasis shall also be laid on structural feasibility and use of innovations in materials and techniques of construction for achieving the thermal comfort and energy efficiency for a given context. The design shall be mainly addressing to the local issues and construction processes.

2. INTENSION OF THIS SUBJECT

Understanding of architectural structures and building services and the coordination thereof through a comprehensive resolution of the design of a complex building in the urban context.

3. COURSE OUTCOMES (COs)

CO1: To foster an understanding required to handle large scale building projects like campuses and multi-utility building complexes.

CO2: Understanding design as a function of specific agendas of complex building services, building sciences, building bye-laws in accordance to Master Plan of city and structural systems.

CO3: Integrating aspects of Sustainability in design and Site planning as essential components of the projects.

CO4: Incorporating active methods for achieving sustainability like Water Harvesting, Waste management, Solar and Wind Energy beside others for achieving a smaller carbon footprint of the project.

4. SUGGESTED PRACTICAL/STUDIO EXERCISES

- Designing an Institutional /Public Building with Complexity Of Services/Functions having 500-750 sq.mt area.
- Studio project shall include problems involving above considerations such as institutes, Residential schools, Shopping malls (medium size), Single function Sports Complex, medium rise buildings, apartments etc (G+3).

- One major project and one minor project and a time problem to be tackled in the semester. Detailing of architectural features of the major project has to be attempted
 - Study of various building techniques and planning methods adopted in building for achieving thermal comfort and energy efficiency.
 - Study of structural system adopted
 - Case study, data collection, literature survey
 - Design proposal including study model
 - Detailing of architectural features involved shall be attempted

The COs' sub-components are the subsequent practical outcomes (PrOs). They are essential for that specific CO at the 'Precision Level' of Dave's Taxonomy in the 'Psychomotor Domain'.

| S. No. | Practical Outcomes (PrOs) | Unit No. | Approx. Hrs. required |
|--------|---|----------|-----------------------|
| 1 | Case Study: Prepare an analytical drawing for various parameters like Site context, master plan, climatical, circulation, bye-laws, built-up, services, cluster level, unit level, Architectural character etc. for appropriate case-study or reference projects of similar nature. | I | 20 |
| 2 | Prepare a Conceptual Design by formulating design requirements for a given single volume design project. | II | 15 |
| 3 | Prepare preliminary sketch designs of the given design project to the scale using anthropometric requirements | III | 15 |
| 4 | Prepare a set of final presentation drawings including plans, sections, elevations and views for the designed building | IV | 20 |
| 5 | Draw 3-dimensional view of the designed building | IV | 08 |
| 6 | Make a model of the designed project to scale | IV | 08 |
| | Total Hrs. | | 86 |
| | | | |

Note:

- *The teacher of the relevant course may design and provide additional practical exercises to help students achieve the COs by enhancing their industry-related skills and outcomes. Just a suggested list, the table above.*
- *Due to the fact that this is a first-year study report, caution must be given when assigning and grading it. A group assignment is required for the study report, data collection report, and analytic report. Before the group begins their market research, the teacher must discuss the types of data (which and why).*
- *The following are a few examples of "Process" and "Product" related skills that are present in the above-mentioned Practical Exercises of this course and are ultimately incorporated into the COs and the competency (more may be added or omitted depending on the course).*

| Sr. No. | Examples of Performance Measures for PrOs | Weightage in % |
|--------------|---|----------------|
| 1 | Accurate measurement and graphical representation of data collection for the given design project | 20 |
| 2 | Ability to analyze the form and functional clarity of the studied buildings. | 10 |
| 3 | Prepare bubble diagram showing inter-relationships and circulation | 10 |
| 4 | Concept development with originality of idea | 20 |
| 5 | Apply the inferences from the studied buildings in the design process | 20 |
| 6 | Final presentation drawings and model | 10 |
| 7 | Adherence to deadlines | 10 |
| Total | | 100 |

5. AFFECTIVE DOMAIN OUTCOMES

The following *sample* Affective Domain Outcomes (ADOs) are embedded in many of the above-mentioned COs and PrOs. More could be added to fulfil the development of this competency.

- a) Work as a leader/a team member.
- b) Follow ethical practices.
- c) Practice environmentally friendly methods and processes. (Environment related)

6. CONTENT:

The primary theory is shown below and is based on the higher level UOs of the Revised Bloom's taxonomy that are developed for the growth of the COs and competencies. The course instructor may add more of these UOs if necessary to emphasize proficiency and the achievement of COs.

| Unit | Unit Outcomes (UOs) |
|---|---|
| Unit – I Introduction | 1. Understand and learn how to solve the Built Environment needs for multifaceted public activities especially for large campuses. 2. Recognizing and Integrating aspects of Sustainable design and planning. |
| Unit –II Site Analysis & Case Study | 1. Examining existing case and literature studies of similar nature to develop design criteria. 2. Extensive Site analysis of the proposed site for assessing on-site and off-site potentials and constraints. |
| Unit– III Design Proposal Design of large campuses | 1. Incorporating principles of efficient and sustainable site planning, space planning, circulation and services. |
| Unit– IV Integration of Advanced Services | 1. Structure and Active Sustainable Strategies 2. Besides design and planning of buildings within the campus the concentrations also need to be on integration of complex building |

| | |
|--|--|
| | services, building sciences, building bye-laws in accordance to Master Plan of city and structural systems. 3. Strategies of water harvesting, waste management, utilization of solar and wind energy and reducing the overall carbon footprint of the project. |
|--|--|

7. SUGGESTED STUDENT ACTIVITIES

Other than the classroom and laboratory learning, following are the suggested student- related **co-curricular** activities which can be undertaken to accelerate the attainment of the various outcomes in this course: Students should perform following activities in group and prepare reports of about 5 pages for each activity. They should also collect/record physical evidences for their (student's) portfolio which may be useful for their placement interviews:

- a) Undertake periodic site visits to relate to the present architectural practices.
- b) Identify and explore the design parameters for the locally available Public buildings.
- c) Attend Interactive sketching workshops.
- d) Visit and explore art exhibitions and libraries
- e) Give seminar on the relevant topic under consideration.
- f) Prepare portfolio of Architectural Design for Public Buildings
- g) Participate in model making workshops

8. SUGGESTED LEARNING RESOURCES

1. High rise buildings of urban design
2. Jencks, Charles – Modern Architecture
3. North, Whitney – Small urban spaces
4. Ashuhano, Yoshinobu – Exterior design in architecture
5. Time Saver Standards for Architectural Design Data by John Hanock,
6. Architectural Graphic Standard by Ramsay and Sleeper.
7. Neufert Data Standards Ernst Neufert Archon Books
8. Building Drawing Shah, Kale, Patki Tata Mcgraw Hill Publishing

9. SOFTWARE/LEARNING WEBSITES

- www.greatbuildings.com
- www.architecturalrecord.com
- www.archdaily.com
- www.dezeen.com
- www.archpaper.com
- www.architectmagazine.com
- www.archello.com
- www.designboom.com

10. PO-COMPETENCY-CO MAPPING

| Semester V | Architectural Design Fundamentals (Course Code: 1016301) | | | | | | | | |
|--|--|--------------------------|---|--|---|----------------------------|----------------------------|------------------------------|---------------------|
| | POs and PSOs | | | | | | | | |
| Competency & Course Outcomes | PO 1 Basic & Discipline specific knowledge | PO 2 Problem Analyses | PO 3 Design/development of solutions | PO 4 Engineering Tools, Experimentation & Testing | PO 5 Engineering practices for society, sustainability & environment | PO 6 Project Management | PO 7 Life-long learning | * PSO 1 Planning & Design | #PSO 2 Execution |
| Competency | Prepare architectural design for a single volume building, its presentation drawings and models | | | | | | | | |
| Course Outcomes CO1: To foster an understanding required to handle large scale building projects like campuses and multi-utility building complexes. | 2 | 2 | 3 | 1 | - | - | 1 | 1 | - |
| CO2: Understanding design as a function of specific agendas of complex building services, building sciences, building bye-laws in accordance to Master Plan of city and structural systems. | 1 | 2 | 3 | 2 | 1 | 1 | 2 | - | 1 |
| CO3: Integrating aspects of Sustainability in design and Site planning as essential components of the projects. | 1 | 1 | - | 1 | 1 | - | - | 3 | - |
| CO4: Incorporating active methods for achieving sustainability like Water Harvesting, Waste management, Solar and Wind Energy beside others for achieving a smaller carbon footprint of the project. | - | - | 2 | 1 | 3 | 1 | 2 | - | 1 |

Legend: '3' for high, '2' for medium, '1' for low and '-' for no correlation of each CO with PO/PSO.

***PSO 1: Planning and Design:** Prepare architectural designs and all types of drawings with appropriate material specifications and application techniques as per specific requirements of the project.

#PSO 2: Execution: Work competently as assistants in architectural firms so as to contribute and coordinate both office work and execution on site

Course Title: Building Services

Semester – IV

1. TEACHING AND EXAMINATION SCHEME

| Sr. No. | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|---------|-------------------|----------|-----|-------|---|---|-------|--------|----------|-----------------------|----------|------------|-------|
| | | | | L | T | P | Total | | Exam | Continous /Viva /Jury | Exam | Viva/ Jury | |
| 2 | Building Services | BS & AE | 4 | 2 | 0 | 2 | 4 | 03 | 20 | 30 | 50 | 0 | 100 |

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical

2. RATIONALE

This course focuses on a learner's acquisition of knowledge, skills and practices of essential building services for proper functioning and utility of building as a 'whole' unit/entity. Buildingservices play a critical role in the overall functioning and performance of a building, affecting factors such as energy efficiency, comfort, safety, and sustainability. Building services are a cross-disciplinary field, involving aspects of electrical, mechanical, and plumbing engineering, and it is important to have a basic understanding of these systems. Knowledge about domestic water supply & sanitation system (external & internal) and house drainage & disposal facilities, rain water harvesting, ventilation and air conditioning, acoustics and creation of movement provisions and fire safety measures is imparted. Understanding of building services is essential for architects in the design and construction process, as well as for maintenance of buildings in the future. Hence, the study of building services is a critical component of the education of architecture students, providing them with the knowledge and skills necessary to design and manage the technical systems of buildings effectively.

3. COMPETENCY

The course content should be taught and curriculum should be implemented with the aim to develop required skills so that students are able to acquire following competency:

- **Apply knowledge of essential building services in architectural designs for their effective & efficient functioning**

4. COURSE OUTCOMES (COs)

The practical exercises, the underpinning knowledge and the relevant soft skills associated with the identified competency are to be developed in the student for the achievement of the following COs:

- a) Draw layout plan of water supply system, drainage system and rain water harvesting for a given building.
- b) Prepare a plan indicating the location of ventilation/air conditioning system, lift, escalators, ramps and fire safety provision for a given building.
- c) Select appropriate type of acoustic material as per the requirement for a given building.

5. SUGGESTED PRACTICAL/STUDIO EXERCISES

The following practical outcomes (PrOs) are the sub-components of the COs. They are crucial for that particular CO at the 'Precision Level' of Dave's Taxonomy related to 'Psychomotor Domain'.

| S. No. | Practical Outcomes (PrOs) | Unit No. | Approx. Hrs. required |
|--------|---|----------|-----------------------|
| 1 | Draw scheme for water supply for a given building | I | 6 |
| 2 | Draw detailed scheme for house drainage, sanitary fixtures and rain water harvesting for a given building | II | 6 |
| 3 | Prepare detailed layout of ventilation and air-conditioning for a given building | III | 4 |
| 4 | Design acoustics and identify fire safety provisions for a given building. | IV, V | 6 |
| 5 | Plan movement facilities: Lifts, escalators, ramps etc. for a given public building | V | 6 |
| | Total Hrs. | | 28 |

Note

- i. More **Practical/Studio Exercises** can be designed and offered by the respective course teacher to develop the industry relevant skills/outcomes to match the COs. The above table is only a suggestive list.
- ii. Study report, data collection and analysis report must be assigned in a group. Teacher has to discuss about type of data (which and why) before group start their site visits.
- iii. The following are some **sample** 'Process' and 'Product' related skills (more may be added/deleted depending on the course) that occur in the above listed **Practical/Studio Exercises** of this course required which are embedded in the COs and ultimately the competency.

| S. No. | Sample Performance Indicators for the PrOs | Weightage in % |
|--------------|--|----------------|
| 1 | Proper planning and layout of drawing sheet – overall composition (for optimum use of drawing sheet) | 10 |
| 2 | Completing given practice problems | 20 |
| 3 | Accuracy of drawing | 20 |
| S. No. | Sample Performance Indicators for the PrOs | Weightage in % |
| 4 | Neatness of drawing | 10 |
| 5 | Timely submission of completed drawing sheet | 20 |
| 6 | Answering viva voce questions | 20 |
| Total | | 100 |

6. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

These major equipment with broad specifications for the PrOs is a guide to procure them by the administrators to usher in uniformity of practicals in all institutions across the state.

| S. No. | Equipment Name with Broad Specifications | PrO.No |
|--------|---|--------|
| 1 | Drawing Board with other drawing Instruments | 1-5 |
| 2 | Interactive board with LCD overhead projector | 1-5 |

7. AFFECTIVE DOMAIN OUTCOMES

The following *sample* Affective Domain Outcomes (ADOs) are embedded in many of the above-mentioned COs and PrOs. More could be added to fulfil the development of this competency.

- Work as a leader/a team member.
- Follow ethical practices.
- Social and Functional Competence of design
- Participates in class discussions and present the design effectively, Generate new ideals.
- Practice environmentally friendly methods and design processes.

The ADOs are best developed through the laboratory/field based exercises. Moreover, the level of achievement of the ADOs according to Krathwohl's 'Affective Domain Taxonomy' should gradually increase as planned below:

- 'Valuing Level' in 1st year
- 'Organization Level' in 2nd year.
- 'Characterization Level' in 3rd year.

8. UNDERPINNING THEORY

The major underpinning theory is given below based on the higher level UOs of *Revised Bloom's taxonomy* that are formulated for development of the COs and competency. If required, more such UOs could be included by the course teacher to focus on attainment of COs and competency.

| Unit | Unit Outcomes (UOs) (4 to 6 UOs at different levels) | Topics and Sub-topics |
|--|--|---|
| Unit –I Domestic water supply | 1a. Enlist various sources of water and uses of water. 1b. Calculate demand of water for domestic purpose. 1c. Explain the factors affecting rate of demand of water. 1d. Explain various methods of water distribution and layout of distribution pipes with sketch. | 1.1 Sources of water 1.1.1 Uses of water 1.1.2 Demand of water for domestic purpose only 1.1.3 Factors affecting rate of demand of water 1.2 Methods of water distribution 1.2.1 Systems of supply of water 1.2.2 Methods of layout of distribution pipes |

| Unit | Unit Outcomes (UOs) (4 to 6 UOs at different levels) | Topics and Sub-topics |
|---|---|--|
| | <p>1e. Explain various water supply system</p> <p>1f. Explain various water supply fittings, fixtures and pipes.</p> <p>1g. Draw layout of water supply system for a residence.</p> <p>1h. Plan for Rain water harvesting in the new buildings</p> | <p>1.3 Water supply fittings & fixtures Air valves, Bib cocks, Fire hydrants, Reflux valves, Relief valves, Sluice valves, Water meters</p> <p>1.3.1 Pipes of different materials used for water supply</p> <p>1.4 Simple layout of water supply system for a residence</p> <p>1.5 Rain water harvesting for buildings</p> |
| <p>Unit– II Sanitation and house drainage</p> | <p>2a. Explain various purposes and principles of sanitation.</p> <p>2b. Define Bacteria, Invert, Refuse, Sewer, Sewerage</p> <p>2c. Explain various system of sewerage.</p> <p>2d. Explain principles of house drainage.</p> <p>2e. Define traps and classify them according to shape and function</p> <p>2f. Explain various system of plumbing and</p> <p>2g. Define Anti-siphonage pipe, Cowl, Fresh air inlet, Siphonage, Soil pipe, Vent pipe, Waste pipe.</p> <p>2h. Explain various sanitary fittings and</p> <p>2i. Draw Drainage plan of a building.</p> <p>2j. Explain maintenance of house drainage system</p> <p>2k. Explain septic tank, soak pit and manholes with sketch.</p> <p>2l. Describe objective of manhole</p> <p>2m. Explain location and classification of manhole</p> | <p>2.1 Purpose of sanitation</p> <p>2.1.1 Principles of sanitation</p> <p>2.1.2 Definitions: Bacteria, Invert, Refuse, Sewer, Sewerage</p> <p>2.1.3 Systems of sewerage:</p> <ul style="list-style-type: none"> • Separate system • Combined system • Partially separate system <p>2.2 Principles of house drainage-</p> <p>2.2.1 Traps: definition, function and requirement of a good trap</p> <p>2.2.2 Classification of traps according to shape-P, Q and S Traps</p> <p>2.2.3 Classification of traps according to function- Intercepting traps, Gully traps, Grease traps</p> <p>2.2.4 Definitions of Anti-siphonage pipe, Cowl, Fresh air inlet, Siphonage, Soil pipe, Vent pipe, Waste pipe</p> <p>2.2.5 System of Plumbing</p> <ul style="list-style-type: none"> • Single stack system • One pipe system • One pipe system partially ventilated • Two pipe system <p>2.2.6 Sanitary Fittings-Sinks, Bath tub, Water closets, Flushing cistern, Urinals, wash basin</p> <p>2.3 Drainage plan of a building</p> <p>2.4 Maintenance of house drainage system</p> <p>2.5 Septic tank and soak pit- constructional features,</p> |

| Unit | Unit Outcomes (UOs) (4 to 6 UOs at different levels) | Topics and Sub-topics |
|--|--|---|
| | | <p>advantages and disadvantages</p> <p>2.6 Manholes:</p> <ul style="list-style-type: none"> • Definitions • Objective • Location • Classification of manholes • Component parts |
| Unit – III Ventilation and Air conditioning | <p>3a. Define ventilation and its necessity. Explain the functional requirements and essentials of good ventilation system.</p> <p>3b. Describe system of ventilation</p> <p>3c. Define air conditioning and purpose and classification of air conditioning.</p> <p>3d. Explain the principles of comfort air conditioning.</p> <p>3e. Describe the system of air conditioning with sketch.</p> | <p>3.1 Definition of ventilation and its necessity</p> <p>3.1.1 Functional requirements of ventilation system.</p> <p>3.1.2 System of ventilation- Natural/mechanical i.e., exhaust air supply and combined.</p> <p>3.1.3 Essentials of good ventilating system.</p> <p>3.2 Definition of air conditioning</p> <p>3.2.1 Purpose of air conditioning.</p> <p>3.2.2 Classification of air conditioning.</p> <ul style="list-style-type: none"> • Comfort A.C • Industrial comfort • Summer, Winter air conditioning. <p>3.2.3 Principles of comfort air conditioning.</p> <ul style="list-style-type: none"> • Temp control • Air velocity control • Humidity control <p>3.2.4 System of air conditioning.</p> <p>3.2.5 Central system</p> <p>3.2.6 Self-contained system unit</p> <p>3.2.7 Combined system</p> |
| Unit – IV Acoustics | <p>4a. List out and explain characteristics of audible sound</p> <p>4b. Explain various acoustical defects.</p> <p>4c. Define insufficient loudness and external noise.</p> <p>4d. Classify various sound absorbent materials and explain them.</p> <p>4e. Explain the required conditions of good acoustics.</p> | <p>4.1 General discussion</p> <p>4.2 Characteristics of audible sound</p> <ul style="list-style-type: none"> • Frequency of pitch • Intensity of loudness of sound • Measurement of sound • Principles of acoustics. • Behavior of sound and its effect. <p>4.3 Acoustical defects</p> <ul style="list-style-type: none"> • Formation of echoes. • Reverberation • Reverberation time • Optimum time of reverberation |

| Unit | Unit Outcomes (UOs) (4 to 6 UOs at different levels) | Topics and Sub-topics |
|--|---|---|
| | 4f. Explain general principles in acoustical design. | <ul style="list-style-type: none"> • Dead spot • Sound foci 4.4 Insufficient loudness and external noise. 4.5 Sound absorbent material and their classification. 4.6 Requirement and conditions of good acoustics. 4.7 General principles in acoustical design <ul style="list-style-type: none"> • Site selection • Volume • Space • Treatment of interior • Surface • Reverberation • Sound absorption • Seats and seating arrangement |
| Unit – V Movement Facilities & Fire Safety Provisions | 5a. Explain electrical lifts along with its component parts with sketch. 5b. Describe what is an escalator, its types, space required and approaches. 5c. Explain ramps for different 5d. Apply various types of fire services as per requirements of building 5e. Select suitable types of fire protection | 5.1 Electrical lifts, lift wall, lift door and gates and their detail with sketch 5.2 Escalators – types, space required and approaches 5.3 Ramp details for different purposes as well as their spaces and locations 5.4 Causes and effects of fire 5.5 General requirements of fire resisting building as per IS and NBC 2005 5.6 Characteristics of fire resisting materials |

9. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

| Unit No. | Unit Title | Teaching Hours | Distribution of Theory Marks | | | |
|--------------|--|----------------|------------------------------|-----------|-----------|-------------|
| | | | R Level | U Level | A Level | Total Marks |
| I | Domestic water supply | 08 | 02 | 08 | 04 | 14 |
| II | Sanitation and house drainage | 10 | 02 | 10 | 04 | 16 |
| III | Ventilation and Air conditioning | 09 | 02 | 06 | 06 | 14 |
| IV | Acoustics | 09 | 02 | 08 | 04 | 14 |
| V | Movement Facilities & Fire Safety Provisions | 06 | 00 | 07 | 05 | 12 |
| Total | | 42 | 08 | 39 | 23 | 70 |

Legends: R=Remember, U=Understand, A=Apply and above (Revised Bloom's taxonomy)

Note: This specification table provides general guidelines to assist learners for their learning and to teachers to teach and question paper designers/setters to formulate test items/questions to assess the attainment of the UOs. The actual distribution of marks at different taxonomy levels (of R, U and A) in the question paper may slightly vary from abovetable.

10. SUGGESTED LEARNER ACTIVITIES

Other than the classroom and laboratory learning, following are the suggested learner-related **co-curricular** activities which can be undertaken to accelerate the attainment of the various outcomes in this course: Learners should perform following activities in group and prepare reports of about 5 pages for each activity. They should also collect/record physical evidences for their (learner's) portfolio which may be useful for their placement interviews:

- a) Visit of construction sites to observe the current services practices and prepare a report.
- b) In a group of 4-5 students prepare an internet/library-based presentation for each of above topics considering recent practices prevailing across the world

11. SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES (if any)

These are sample strategies, which the teacher can use to accelerate the attainment of the various outcomes in this course:

- a) Massive open online courses (**MOOCs**) may be used to teach various topics/sub topics.
- b) Guide learner(s) in undertaking micro-projects.
- c) '**L**' in **section No. 4** means different types of teaching methods that are to be employed by teachers to develop the outcomes.
- d) About **20% of the topics/sub-topics** which are relatively simpler or descriptive in nature is to be given to the learners for **self-learning**, but to be assessed using different assessment methods.
- e) With respect to **section No.10**, teachers need to ensure to create opportunities and provisions for **co-curricular activities**.
- f) Guide learners on how to address issues on sketching, model making, etc.
- g) Use relevant video/animation films to explain various concepts and processes related to basic Architectural design themes for Public Buildings.
- h) Use different instructional strategies in classroom teaching.
- i) Use the relevant architectural assignments in the given situation.
- j) Guide learners on form, functions utility, method of construction, etc. to facilitate them to prepare actual measured drawings.
- k) Use the technique of table top discussions along with design jury sessions to teach the relevant content to the learners.
- l) Adopt various strategies to enhance each learner's individual creative ability especially with reference to concept and form

12. SUGGESTED DESIGN MICRO-PROJECTS

Only one micro-project is planned to be undertaken by a learner that needs to be assigned to him/her in the beginning of the semester. In the first four semesters, the micro-project are

group-based (group of 3 to 5). However, **in the fifth and sixth semesters**, the number of learners in the group should **not exceed three**.

The micro-project could be industry application based, internet-based, workshop-based, laboratory-based or field-based. Each micro-project should encompass two or more COs which are in fact, an integration of PrOs, UOs and ADOs. Each learner will have to maintain dated work diary consisting of individual contribution in the project work and give a seminar presentation of it before submission. The duration of the microproject should be about **14-16 (fourteen to sixteen) learner engagement hours** during the course. The learners ought to submit micro-project by the end of the semester to develop the industry-oriented COs.

A suggestive list of micro-projects is given here. This has to match the competency and the Co. Similar micro-projects could be added by the concerned course teacher:

- a. Study of on-going constructions works and documentation of the provisions of building services in the form of a report with photographs and sketches.

13. SUGGESTED LEARNING RESOURCES

| S. No. | Title of Book | Author | Publication with place, year and ISBN |
|--------|---|---|---|
| 1 | The text book of Building Construction | S. P. Arora, S. P. Bindra | Dhanpat Rai Publications (P) Limited ISBN: 978-81-89928-80-3 |
| 2 | Building Construction | Rangwala | Charotar Publishing House (P) Limited ISBN: 978-93-85039-04-1 |
| 3 | Building Construction | Dr. B. C. Punmia, Er. Ashok K. Jain, Dr. Arun K. Jain | Laxmi Publication (P) Limited, Eleventh Edition (2016), ISBN: 978-81-318-0428-5 |
| 4 | Building Construction and Materials | Gurcharan Singh | Standard Book House, ISBN-13: 9788189401214 |
| 5 | Water supply and sanitary Engineering (including environmental engineering) | S.C. Rangwala | Charotar Publications, ISBN-10: 9385039202 |
| 6 | Water supply and sanitary Engineering | Gurucharan Singh & Jagdish Singh | Standard Publishers, ISBN-10: 8180140296 |
| 7 | A text book of Water supply and sanitary Engineering | G. J. Kulkarni | Oxford & IBH Pub. ISBN:812041683X |
| 8 | Building Services and Equipment: Volume 1 to 3 | Frederick E. Hall | Routledge, ISBN-13, 978-0582236523 |
| 9 | National Building Code of India - 2005 | National Building Code of India - 2005 | BIS, New Delhi |

14. SOFTWARE/LEARNING WEBSITES

- a) <https://archive.nptel.ac.in/courses/105/102/105102176/>
- b) www.epa.gov/iaq/schooldesign/hvac.html

c) **PO-COMPETENCY-CO MAPPING**

| Semester IV | Building Services (Course Code: 4345004) | | | | | | | | |
|---|---|--------------------------|---|--|---|----------------------------|----------------------------|------------------------------|---------------------|
| | POs and PSOs | | | | | | | | |
| Competency & Course Outcomes | PO 1 Basic & Discipline specific knowledge | PO 2 Problem Analysis | PO 3 Design/development of solutions | PO 4 Engineering Tools, Experimentation & Testing | PO 5 Engineering practices for society, sustainability & environment | PO 6 Project Management | PO 7 Life-long learning | * PSO 1 Planning & Design | #PSO 2 Execution |
| Competency | <ul style="list-style-type: none"> Apply knowledge of essential building services in architectural designs for their effective & efficient functioning | | | | | | | | |
| Course Outcomes | | | | | | | | | |
| a) Draw layout plan of water supply system and drainage system for given residential building. | 3 | 3 | 2 | - | 1 | 1 | 1 | 3 | 1 |
| b) Prepare a plan indicating the location of ventilation/air conditioning system, lift, escalators, ramps and fire safety provision for a given residential building. | 3 | 3 | 2 | - | 1 | 1 | 1 | 3 | 1 |
| c) Select appropriate type of acoustic material as per the requirement for a given building. | 3 | 3 | 1 | - | 2 | 1 | 2 | 3 | 2 |

Legend: '3' for high, '2' for medium, '1' for low and '-' for no correlation of each CO with PO/PSO.

***PSO 1: Planning and Design:** Prepare architectural designs and all types of drawings with appropriate material specifications and application techniques as per specific requirements of the project.

#PSO 2: Execution: Work competently as assistants in architectural firms so as to contribute and coordinate both office work and execution on site

Course Title: Structure- II

Semester – IV

TEACHING AND EXAMINATION SCHEME

| Sr. No. | Subject Name | Category | Sem | Hours | | | Total | Credit | Internal | | External | | Total |
|---------|----------------|----------|-----|-------|---|---|-------|--------|----------|------------------------|----------|------------|-------|
| | | | | L | T | P | | | Exam | Cont inous /Viva /Jury | Exam | Viva/ Jury | |
| 3 | Structure - II | BS & AE | 4 | 2 | 0 | 0 | 2 | 03 | 20 | 30 | 50 | 0 | 100 |

*L=lectures, T=tutorial, P=Practical, E=TheoryExternal, M=TheoryInternal, I=Practical Internal, V=Practical External, On Job Training(OJT) is equivalent to Practical

FOCUS:

- To provide a comprehensive understanding of the structural characteristics of columns and beams.
- The purpose of this course is to offer an overview of the principles and techniques involved in designing reinforced concrete structures.
- Teaching the role of structures in architecture is necessary.

CONTENTS:

1. Concrete: This pertains to the composition, fundamental principles of mix design, water-cement ratio, strength, durability, and workability requirements.
2. The significance of Reinforced Concrete Construction (RCC) in the field of architecture Benefits of Reinforced Concrete Construction (RCC) compared to other traditional structural methods. The steel used for Reinforced Cement Concrete (RCC) consists of both plain and twisted bars, in accordance with the provisions of the IS 456 code.
3. Working Stress method of Design: The working stress method of design focuses on the basic concept, types of loads, assumptions, and the calculation of the moment of resistance for a singly reinforced concrete beam.
4. Key principles of pre-stressed concrete, pre-stressing techniques, materials, the structural response of pre-stressed concrete beams, and factors contributing to pre-stress reduction.
5. This text provides an introduction to specific structural forms and fundamental concepts related to shells, folding plates, domes, grid structures, flat slabs (reinforced concrete), space frames, tensile structures, and pneumatic structures. It does not involve any problem-solving exercises.

SUGGESTED BOOKS

- RCC by H. J. Shah
- RCC by Bhavikatti
- RCC by Jain and Jaikrishna
- RCC by Ramamrutham
- RCC – design and practice by N Krishna Raju and R N Pranesh

Course Title: Environmental Science

Semester – IV

TEACHING AND EXAMINATION SCHEME

| Sr. No. | Subject Name | Category | Sem | Hours | | | Total | Credit | Internal | | External | | Total |
|---------|-----------------------|----------|-----|-------|---|---|-------|--------|----------|-----------------------|----------|------------|-------|
| | | | | L | T | P | | | Exam | Continous /Viva /Jury | Exam | Viva/ Jury | |
| 4 | Environmental science | BS & AE | 4 | 2 | 0 | 0 | 2 | 2 | 20 | 30 | 50 | 0 | 100 |

*L=lectures, T=tutorial, P=Practical, E=TheoryExternal, M=TheoryInternal, I=Practical Internal, V=Practical External, On Job Training(OJT) is equivalent to Practical

FOCUS:

To develop the knowledge required for understanding the influence of climate on architecture. Understanding Environmental issues, ecology and ecosystem. Also developing the understanding that how buildings can be designed with climate as the basic parameter of design.

CONTENTS:

- Environment, ecology, ecosystem with natural cycles, Resources, causes of resources exhaustion and resource pollution.
- Urbanization and impacts
- Introduction – Elements of climate, measurement and representations of climate data. Classifications of tropical climates, Major climatic Zones of India.
- Thermal comfort: Effect of climatic elements on thermal comfort environment. Body's heat exchange with surrounding environment.
- Principles of thermal design and means of thermal control.
- Natural ventilation: functions of natural ventilation, Design consideration and effects of openings and external features on internal airflow.
- Day lighting: Advantages and limitations, components of Day light factor, Shading devices – Sun –Path diagram, use of solar charts in climatic design. Types of shading devices. Procedure of designing shading devices.

PROJECTS:

- Projects on Ecosystem, study of some example of resources and pollution. Study of vernacular architecture.

SUGGESTED BOOKS

- Manual of Tropical Housing & Building (Part-II) by Koenigsberger
- Housing Climate and Comfort by Martin Evans

- Environment and Ecology by Norman Korm

Course Title: History Of Architecture - II

Semester – IV

TEACHING AND EXAMINATION SCHEME

| Sr. No. | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|---------|----------------------------|-------------------|-----|-------|---|---|-------|--------|----------|-----------------------------|----------|---------------|-------|
| | | | | L | T | P | Total | | Exam | Continous/ Viva /Jury | Exam | Viva/ Jury | |
| 5 | History of Architecture-II | Professional Core | 4 | 2 | 0 | 2 | 4 | 2 | 20 | 30 | 50 | 0 | 100 |

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical

FOCUS :

Acquiring knowledge regarding various architectural styles of ancient India and their historic evolution with respect to factors influencing them e.g. climate, geographical location, culture, construction technology, etc. To develop the appropriate skills of reading, discussion and writing as well as understanding the physical experience of buildings in order to appreciate the complexity of the influences bearing on architecture, as reflected in the major historical periods.

Critical appreciation characterized by technology, ornamentation, planning practices & influences in general.

CONTENTS:

UNIT-1:

Introduction: Introduction and understanding of 'Islam's' philosophy and its interpretation in building type e.g. mosque, tomb, fort and their elements like domes, minarets, arch, squinch etc.

The Sultanate Style: With reference to the Slave, Khalji, Tughlaq, Sayyid, Lodhis and Shershah Suri regimes (who ruled from Delhi) and their architecture.

UNIT-2:

Provincial Architecture: Development of colloquial styles in various provinces of India like - Punjab, Jaunpur, Gujrat, Bengal, Bijapur, Bidar and Deccan.

UNIT-3:

Cities and Citadels: Morphology of fortified cities of Jaisalmer, fort/ palaces like Mandu, Chittorgarh, Orchha, Datia, Jodhpur etc. with an overview on architectural types like havelis, stepwells, gates, baradaris etc.

UNIT-4:

Mughal Architecture: The architecture of the Timurids in India-Babur, Hamayun, Akbar, Jahangir and Shahjahan.

The Later Moghuls: The Oudh architecture in Lucknow and its surroundings briefly outlining the Lucknow city.

UNIT-5:

Colonial Architecture: The British architecture of the colonial days in India- the capitol at Delhi and the residency at Lucknow emphasizing on their planning criteria and architectural features.

REFERENCE BOOKS

1. History of Architecture -Sir Banister Fletcher
2. Prehistory to post modernism -Marvin & Isabel
3. Indian Architecture – Islamic -Grover Satish Vikas Publishing House

Course Title: Computer Skills - II

Semester – IV

TEACHING AND EXAMINATION SCHEME

| Sr. No. | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|---------|--------------------|----------|-----|-------|---|---|-------|--------|----------|-------------------------------|----------|---------------|-------|
| | | | | L | T | P | Total | | Exam | Continu-ous/ Viva/ Jury | Exam | Viva/ Jury | |
| 6 | Computer Skills-II | SEC | 4 | 0 | 0 | 4 | 4 | 2 | 20 | 30 | 50 | 0 | 100 |

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical.

Course Objectives

To develop skills required for preparation of two-dimensional drawings with the use of computer as a digital media for architectural design drawings.

Understanding AutoCAD:

Learn various 2D commands their functions and application. Understanding coordinate systems.

Working on Layers and Colours Drawing plans, Elevations, Sections using Auto- Cad. Dimensioning

Drawings Connecting from one file format to another. Various file formats & their Usefulness.

PRACTICAL-:

1. To present various 2D commands their functions and application and Understanding coordinate systems.

2. Working on Layers and Colors, Drawing plans, Elevations, Sections using Auto- Cad, dimensioning

Drawings, Connecting from one file format to another., Various file formats & their Usefulness.

REFERENCE BOOKS

1. A primer on computer aided engineering drawing – VTU

Course Title: Building Byelaws & Professional Practice

Semester – IV

TEACHING AND EXAMINATION SCHEME

| Sr.No | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|-------|-----------------------------------|----------|-----|-------|---|---|-------|--------|----------|-----------------------------|----------|---------------|-------|
| | | | | L | T | P | Total | | Exam | Continous/ Viva/ Jury | Exam | Viva/ Jury | |
| 5 | Building Byelaws & Prof. Practice | PE | 4 | 2 | 3 | 0 | 2 | 2 | 20 | 30 | 50 | 0 | 100 |

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical

FOCUS:

Develop understanding of building bye laws and its implementation in reference to building design. To develop an understanding of basic professional skills to practice of various type of projects and its complexity.

CONTENTS:

BUILDING BYE LAWS

- Zoning of areas: residential, institutional, industrial agricultural entertainment etc
- Introduction to city, town and village bye laws,
- Evolution of GDCR (Mumbai municipal act, town planning act and GDCR)
- Need of bye laws
- Other prevailing laws (environment law etc)

PROFESSIONAL PRACTICE

- Role and responsibilities of a professional
- Prevailing pattern of professional practice
- Comparison and inter relationship with other professionals and professional bodies
- Various professional associations and registering body; their responsibilities, detail understanding of professional ethics; fee structure
- Office organization and management skills
- Detail understanding of office day to day responsibilities towards staff and other government bodies
- Understanding of contract and its management, site supervision, Role, responsibilities, liabilities

SUGGESTED BOOKS

- GDCR
- Hand book on professional practice by council of architecture, New Delhi
- Hand book on professional practice by Indian Institute of Architecture
- BPMC Act
- GTP and GDCR rules
- Professional practice with Elements of Estimating, Valuation contract and
- Arbitration By Dr. Roshan H. Namavati
- Estimating and costing in Civil Engineering Theory and Practice by B.N. Datta

Course Title: Indian Knowledge System & Tradition (Elective 1)

Semester – IV

1. TEACHING AND EXAMINATION SCHEMES

| Sr. No. | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|---------|-------------------------------------|---------------------------|-----|-------|---|---|-------|--------|----------|------------------------|----------|------------|-------|
| | | | | L | T | P | Total | | Exam | Cont inous /Viva /Jury | Exam | Viva/ Jury | |
| 8 | Indian Knowledge System & Tradition | PAEC-Elective 1 (Any One) | 4 | 2 | 0 | 0 | 2 | 2 | 20 | 30 | 25 | 25 | 100 |

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2. RATIONALE :

National education Policy 2020, has given ample emphasis on Indian Knowledge system. The significance of teaching of Indian knowledge and Tradition is very much required as for centuries this great tradition had been trampled under the feet of invaders. Even after Independence, Indian Knowledge System had been neglected and only Western parameters have been considered as standard.

The essence of Indian culture has been carried through centuries only because of its scientific and humanitarian approach. It is the need of the hour that young students learn the significance of the contribution made by Indian Knowledge Systems and contribute to the world with pride and confidence even in the field of Science and technology which had been mastered centuries ago but was perished by invaders. This course will provide an opportunity to the students the hidden secrets of the great heritage of knowledge that existed thousands of years ago in Indian Tradition.

3. COMPETENCY:

- 1) Study of IKS will enable students to respect and relish the greatness of our tradition. The awareness of IKS will make them feel proud about their own culture.
- 2) The knowledge of Indian knowledge will enable and empower them with the firsthand knowledge of India's great heritage, culture and traditions.

3) This will create a scope and awareness amongst the foreigners regarding India and its contribution to the world.

4. COURSE OUTCOMES

1. Students will attain awareness regarding the significance of IKS
2. The syllabus will enhance their confidence in Indian traditional knowledge system and enable them to perceive at the problems with Indian perspective
3. This will also enable them to analyze the issues on their own and enable them for critical thinking.
4. The knowledge about the ancient Indian Scientific traditions will generate more confidence in themselves.
5. This will lead them to make research and innovative thinking which can result in global contribution at later stage.

5. PRACTICAL / PROJECT :

The student can visit any historical / monumental sights like Adalaj step well or Rani Ki Vav – Patan and study about architectural skills of Indians in past.

Topics:-

1. Ancient Indian Astronomy :

➤ Development of Astronomy:

- A) Consideration of Purnima and Amavasya
- B) Beginning of The New Year- Vasant Ritu- (Vernal Equinox)
- C) Ancient Indian Calender
- D) Science Behind “Adhikmaas”
- E) Uttarayan and Dakshinayan

➤ Knowledge about Constellations / planets / distance between planets etc.

- A) Saptarushi – seven Seers- Significant Knowledge of star and constellations
- B) Knowledge of Speed of Light – Rigveda(1.50.04)
- C) Distance between Earth and Sun (Hanuman Chalisa)

➤ Advances in Mathematics and Geometry in Ancient India

- A) Sulbha- Sutra (Kalpa Sutra) composed by Baudhayana, Manava, Apastamba and Katyayana

B) Contribution of Ancient Rishis to Mathematics

- A) Bodhayana’s value of pie
- B) Lilavati
- C) Bhaskaracharya
- D) Arya Bhatt.

2. Town Planning in Ancient India

- A) Roads in Ancient India – Uttarpath by Chandra Gupta
- B) Ancient Indian Trade Routs/ Waterways
- C) Ship- Building In Ancient India
- D) Temple Architecture
-Nagar Style/ Dravida style/ Vesara style

3. Atomic Theory of by Kanada

- A) Concept of Seven Padartha and Nine Dravyas
- B) Theory of Gurutva
- C) Characteristics of Atom

4. Metallurgical Discoveries in Ancient India

- Lime a Mortar
- Bronze
- Gold & Silver \
- Glass / Iron
- Nagarjuna's Contribution in making Alloys

5. Vimanshastra - Airbourne Vehicles.

- A) References of Vimana- Flying Machines in Rigveda, Mahabharat and Ramayana
- B) BhardwajSutra- Chapter-1 Rasyagnoadhikari

6. REFERENCE BOOKS:

- 1) History of Science, Arts & Technology By Dr. Shripad Dattatrya Kulkarni, Bhishma Prakashan, Mumbai -1998.
- 2) Introduction to Indian Knowledge System: Concepts and Applications by B. Mahadevan, VinayakRajat Bhat, Nagendra Pavana, PHI Learning Pvt. Ltd., Delhi
- 3) Town Planning in Ancient India by Binode Bihari Dutt, Thacker, Spink & Co.

VEER NARMAD SOUTH GUJARAT UNIVERSITY
DIPLOMA IN ARCHITCTURE
Semester – V

TEACHING AND EXAMINATION SCHEME

| Sr. No | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|--------|---------------------------------|----------------------------|-----|-------|---|----|-------|--------|----------|------------------------------|----------|---------------|-------|
| | | | | L | T | P. | Total | | Exam | Conti nous/ Viva/ Jury | Exam | Viva/ Jury | |
| 1 | Architectural Design Studio-V | Professional Core | 5 | 0 | 0 | 10 | 10 | 06 | 0 | 50 | 0 | 50 | 100 |
| 2 | Site Planning and Services | BS & AE | 5 | 0 | 0 | 4 | 4 | 4 | 20 | 30 | 50 | 0 | 100 |
| 3 | Environmental Science-II | BS & AE | 5 | 2 | 0 | 0 | 2 | 2 | 20 | 30 | 50 | 0 | 100 |
| 4 | Art Appreciation and Aesthetics | SEC | 5 | 2 | 0 | 0 | 2 | 2 | 20 | 30 | 20 | 30 | 100 |
| 5 | Estimation and Costing | Professional Core | 5 | 2 | 0 | 2 | 4 | 2 | 20 | 30 | 50 | 0 | 100 |
| 6 | Landscape Design | PAEC- Elective 1 (Any One) | 5 | 2 | 0 | 2 | 4 | 2 | 0 | 25 | 0 | 25 | 50 |
| 7 | Product Design | PAEC- Elective 2 (Any One) | 5 | 2 | 0 | 2 | 4 | 2 | 0 | 25 | 0 | 25 | 50 |
| Total | | | | | | | 30 | 20 | | | | | |

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical

Course Title: Architectural Design Studio – V

Semester – V

1. TEACHING AND EXAMINATION SCHEME

| Sr. No | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|--------|-----------------|-------------------|-----|-------|---|----|-------|--------|----------|-----------------------------|----------|---------------|-------|
| | | | | L | T | P | Total | | Exam | Continous/ Viva/ Jury | Exam | Viva/ Jury | |
| 1 | Design Studio-V | Professional Core | 5 | 0 | 0 | 10 | 10 | 06 | 0 | 50 | 0 | 50 | 100 |

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical

2. EMPHASIZE

Architectural working drawing as tool to communicate and execute architectural design, construction details with the relevant specifications.

3. INTENSION OF THIS SUBJECT

Learning to prepare a set of working drawings for the purpose of execution and construction, architectural detailing of building components, details and function of building services like electrical, plumbing and drainage, back and forth design processes, exposure to materials, products and assembly, methods of specifications writings in the drawings.

4. COURSE OUTCOMES (COs)

CO1: Develop and transform design intent to a technically sound plan and communicate the architectural vision of a given project to the contractors through a set of drawings and documents

CO2: Prepare the Submission Drawings and the techniques for preparation of Good For Construction drawings which will be easily readable by construction team, for the construction of a Residential structure

5. SUGGESTED PRACTICAL/STUDIO EXERCISES

1. Preparation of complete set of working drawings for a small dwelling/institute building unit of 500-750 sq.mt.
2. Preparation of working detail models of 1:50 scale

The COs' sub-components are the subsequent practical outcomes (PrOs). They are essential for that specific CO at the 'Precision Level' of Dave's Taxonomy in the 'Psychomotor Domain'.

| S. No. | Practical Outcomes (PrOs) | Unit No. | Approx. Hrs. required |
|--------|---|----------|-----------------------|
| 1 | Case Study: Prepare an analytical drawing for various parameters like Site context, master plan, climatical, circulation, bye-laws, built-up, services, cluster level, unit level, Architectural character etc. for appropriate case-study or reference projects of similar nature. | I | 20 |
| 2 | Prepare a Conceptual Design by formulating design requirements for a given single volume design project. | II | 15 |
| 3 | Prepare preliminary sketch designs of the given design project to the scale using anthropometric requirements | III | 15 |

| | | | |
|---|--|----|-----------|
| 4 | Prepare a set of final presentation drawings including plans, sections, elevations and views for the designed building | IV | 20 |
| 5 | Draw 3-dimensional view of the designed building | IV | 08 |
| 6 | Make a model of the designed project to scale | IV | 08 |
| | Total Hrs. | | 86 |
| | | | |

Note:

- The teacher of the relevant course may design and provide additional practical exercises to help students achieve the COs by enhancing their industry-related skills and outcomes. Just a suggested list, the table above.
- Due to the fact that this is a first-year study report, caution must be given when assigning and grading it. A group assignment is required for the study report, data collection report, and analytic report. Before the group begins their market research, the teacher must discuss the types of data (which and why).
- The following are a few examples of "Process" and "Product" related skills that are present in the above-mentioned Practical Exercises of this course and are ultimately incorporated into the COs and the competency (more may be added or omitted depending on the course).

| Sr. No. | Examples of Performance Measures for PrOs | Weightage in % |
|---------|---|----------------|
| 1 | Accurate measurement and graphical representation of data collection for the given design project | 20 |
| 2 | Ability to analyze the form and functional clarity of the studied buildings. | 10 |
| 3 | Prepare bubble diagram showing inter-relationships and circulation | 10 |
| 4 | Concept development with originality of idea | 20 |
| 5 | Apply the inferences from the studied buildings in the design process | 20 |
| 6 | Final presentation drawings and model | 10 |
| 7 | Adherence to deadlines | 10 |
| | Total | 100 |

6. AFFECTIVE DOMAIN OUTCOMES

The following *sample* Affective Domain Outcomes (ADOs) are embedded in many of the above-mentioned COs and PrOs. More could be added to fulfil the development of this competency.

- Work as a leader/a team member.
- Follow ethical practices.
- Practice environmental friendly methods and processes. (Environment related)

7. CONTENT:

The primary theory is shown below and is based on the higher level UOs of the Revised Bloom's taxonomy that are developed for the growth of the COs and competencies. The course instructor may add more of these UOs if necessary to emphasize proficiency and the achievement of COs.

| Unit | Unit Outcomes (UOs) |
|---|--|
| Unit – I Preliminary Stage | Design of a small project like residence, guesthouse etc. in an urban situation; making presentation drawings. Developing a set of corporation drawings following local byelaws. |
| Unit –II Development Stage | 1 Architectural design development and resolving issues in plan, section and elevation. 2 Making structural drawings for foundation, plinth beams, floor beams and slabs and coordinating the architectural design drawings with structural drawings. 3 Making site layout drawings. |
| Unit– III Space Detailing | 1 Detailing specific activity spaces; making plans, sectional elevations, details for toilets, kitchen, staircase etc. |
| Unit– IV Services And Site Development | 1 Making sheets for electrical layout, TV, telephone etc. lines, internal plumbing and sanitation. 2 Site plan, sanitation and water supply drawings. |
| Unit– V Element Detailing | Making drawings of Door, window, ventilator details. Woodworking, grills, main gate, railings, boundary wall etc. detail sheets. Schedule of finishes. |

8. SUGGESTED STUDENT ACTIVITIES

Other than the classroom and laboratory learning, following are the suggested student- related **co-curricular** activities which can be undertaken to accelerate the attainment of the various outcomes in this course: Students should perform following activities in group and prepare reports of about 5 pages for each activity. They should also collect/record physical evidences for their (student's) portfolio which may be useful for their placement interviews:

- a) Undertake periodic site visits to relate to the present architectural practices.
- b) Visit and explore various material shops & meet vendors.
- c) Visit and explore art exhibitions and libraries.
- d) Attend seminar on the relevant topic under consideration.
- e) Visit various sites under execution.
- f) Participate in various construction related workshops.

9. SUGGESTED LEARNING RESOURCES

1. Architects working details – Vol. 1 to 5
2. Macay, W. B. – Building construction Vol. 1 to 4
3. Stitt – Architects detail library
4. Handisyde, Cicil – Everyday details
5. Styles, Keith – Working drawing hand book

6. Handisyde, Cicil – Everyday details

10. SOFTWARE/LEARNING WEBSITES

- www.greatbuildings.com
- www.architecturalrecord.com
- www.archdaily.com
- www.dezeen.com
- www.archpaper.com
- www.architectmagazine.com
- www.archello.com
- www.designboom.com

11. PO-COMPETENCY-CO MAPPING

| Semester V | Architectural Design -V | | | | | | | | |
|--|--|--------------------------|---|--|---|----------------------------|----------------------------|------------------------------|---------------------|
| | POs and PSOs | | | | | | | | |
| Competency & Course Outcomes | PO 1 Basic & Discipline specific knowledge | PO 2 Problem Analyses | PO 3 Design/development of solutions | PO 4 Engineering Tools, Experimentation & Testing | PO 5 Engineering practices for society, sustainability & environment | PO 6 Project Management | PO 7 Life-long learning | * PSO 1 Planning & Design | #PSO 2 Execution |
| Competency | Prepare architectural design for a single volume building, its presentation drawings and models | | | | | | | | |
| Course Outcomes CO1: Develop and transform design intent to a technically sound plan and communicate the architectural vision of a given project to the contractors through a set of drawings and documents | 2 | 1 | 3 | -3 | 1 | -2 | 3 | 1 | 3 |
| CO2: Prepare the Submission Drawings and the techniques for preparation of Good For Construction drawings which will be easily readable by construction team, for the construction of a Residential structure | - | - | 1 | 3 | - | 1 | 3 | - | 3 |

Legend: '3' for high, '2' for medium, '1' for low and '-' for no correlation of each CO with PO/PSO.

***PSO 1: Planning and Design:** Prepare architectural designs and all types of drawings with appropriate material specifications and application techniques as per specific requirements of the project.

#PSO 2: Execution: Work competently as assistants in architectural firms so as to contribute and coordinate both office work and execution on site

Course Title: Site Planning & Services

Semester – V

TEACHING AND EXAMINATION SCHEME

| Sr. No | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|--------|----------------------------|----------|-----|-------|---|----|-------|--------|----------|----------------------|----------|-----------|-------|
| | | | | L | T | P. | Total | | Exam | Continuous/Viva/Jury | Exam | Viva/Jury | |
| 2 | Site Planning and Services | BS & AE | 5 | 0 | 0 | 4 | 4 | 4 | 20 | 30 | 50 | 0 | 100 |

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical

FOCUS:

To develop an understanding towards factors influencing site planning. To develop understanding of principles and techniques of site planning and apply them to actual situation. To emphasize the role of an Architect in site planning.

CONTENTS:

- Introduction to zoning in site planning, definition of site planning, site planning history, site planning process, methods of site Analysis.
- Understanding various factors influencing site, like context, climate, social factors, topography etc., site selection and resource analysis.
- Difference between site planning in urban area, site planning in natural area and site planning in rural area.
- Site planning standards, sources of information for site data and site information.
- Topography-Contour map and its interpretation.
- Basics of drainage system in site planning.
- Formation of site plan, Site planning for residential projects, Site planning for institutions and public areas, Site planning for resorts, parks and tourist complexes.
- There will be two projects in a semester.
- The first project will be introductory and students will take up an existing site for detail analysis and study of various issues related to site planning.
- The second project will be the major project whereas the information and techniques of site planning will be applied in detail.

SUGGESTED BOOKS

- Site planning, Lynch, Kevin
- A Guide to Site and Environmental Planning, Rubinstein, Harvey M.
- Grade Easy, Untermann, Richard K.
- Site Planning for Cluster Housing, Untermann, Richard K.
- Design with Nature, Mc Harg, Ian
- Urbanization Primer, Caminos, Horatio, and Reinhard Goethert
- Designed for Recreation, Beazley Elizabeth
- Campus Planning, Dober, Richard P.
-

Course Title: Environmental Science-II

Semester – V

TEACHING AND EXAMINATION SCHEME

| Sr. No | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|--------|--------------------------|----------|-----|-------|---|---|-------|--------|----------|----------------------|----------|-----------|-------|
| | | | | L | T | P | Total | | Exam | Continuous/Viva/Jury | Exam | Viva/Jury | |
| 4 | Environmental Science-II | BS & AE | 5 | 2 | 0 | 0 | 2 | 2 | 20 | 30 | 50 | 0 | 100 |

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical

FOCUS:

Developing an understanding regarding the importance and impact of sustainable architecture in present context. Enabling student to understand the design strategies for different climatic regions.

CONTENTS:

- Site Climate: Effect of landscape elements on site / microclimate.
- Design considerations for buildings in tropical climates with special reference to hot – dry, warm – humid and composite climates.
- Study of Passive Solar Architecture.
- Resource conservation and optimization, Role of Designer in achieving Sustainability.
- Modern techniques to analyse climatic parameters and design buildings accordingly.

PROJECTS:

- Live Case Study or literature study of a Well-Designed Building having various sustainable architecture features. Project on design strategies for different climatic regions.

SUGGESTED BOOKS

- Manual of Tropical Housing & Building (Part-II) by Koenigsberger
- Buildings in the tropics by Maxwell fry
- Climate Responsive Architecture by Arvind Kishan, Baker & Szok

Course Title: Art Appreciation and Aesthetics

Semester – V

TEACHING AND EXAMINATION SCHEME

| Sr. No | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|--------|---------------------------------|----------|-----|-------|---|---|-------|--------|----------|-----------------------------|----------|---------------|-------|
| | | | | L | T | P | Total | | Exam | Continous/ Viva/ Jury | Exam | Viva/ Jury | |
| 5 | Art Appreciation and Aesthetics | PE | 5 | 2 | 0 | 0 | 2 | 2 | 20 | 30 | 20 | 30 | 100 |

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical

FOCUS:

A global survey and comparative exploration of art, architecture, and design from the historical origins of civilization to contemporary manifestations of art practice. Emphasis will be placed on the artist's role in society and how social factors give rise to various art forms. Students will evaluate and examine contextual and cultural factors and their influence on the patronage and production of formal and stylistic visual languages that arises out of a specific time, place, and culture. Art appreciation requires the acquisition of a critical and formal language in which students come to identify, describe, analyze and compare the visual characteristics of various works using the correct art historical terminology and vocabulary. Art appreciation cultivates a deeper and more expansive awareness of Art, images, and the vast cultural histories we have inherited. In addition to this course, the student should realize the importance of Aesthetics as one dimension of Quality in Business Products and Services. A good combination of Business, Information Technology will be integrated in Art Appreciation and Aesthetics.

CONTENTS:

- Identify the purposes and functions of art in human society and arrive at a coherent definition of what is meant by "art" as a cultural endeavor.
- Define basic art terms and processes; develop a knowledge of and an ability to recognize design principles and elements in selected works of art.
- Identify by artist, title, or style, major selected art works from various historical and global contexts in a variety of media.
- Understand the highlights of the biographies of a variety of artists as they relate to the meaning of their works.
- Study of different art isms such as Abstract Art, Dadaism, Brutalism, and Impressionism.
- Recognize major periods of world art history.
- Describe the techniques used in a variety of art media.
- Develop a formal analysis of a work of art.
- Evaluate the relationship of form to content and context.
- Understand and identify the symbols used in iconographic art works.
- Demonstrate an understanding of art criticism including the description, analysis, interpretation, and evaluation of a given work.
- Develop a deeper understanding of the culture that we are currently immersed in, and the ability to think critically with regards to the images and visual forms that engage us.

- **ARTS IN TIME:** Prehistoric, Egyptian, Greek, Roman, Medieval, Renaissance, Baroque, Rococo, Nineteenth Century, Twentieth Century, Art Since 1945
- **AESTHETICS AND QUALITY:** Dimensions of Quality, Products and Service Design, The Value of Aesthetics in Business

SUGGESTED BOOKS

- Introduction to Art Appreciation and Aesthetics by Panizo, Rustia, Rex Bookstore, Inc.
- Aesthetics and the Environment: The Appreciation of Nature, Art and Architecture by Allen Carlson, Routledge, 2000
- Art and ideas by William Fleming
- Aesthetics by Yuri Borev
- The story of modern art by Sheldon Cheney

Course Title: Estimation and Costing

Semester – V

TEACHING AND EXAMINATION SCHEME

| Sr. No | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|--------|------------------------|-------------------|-----|-------|---|----|-------|--------|----------|----------------------|----------|-----------|-------|
| | | | | L | T | P. | Total | | Exam | Continuous/Viva/Jury | Exam | Viva/Jury | |
| 6 | Estimation and Costing | Professional Core | 5 | 2 | 0 | 2 | 4 | 2 | 20 | 30 | 50 | 0 | 100 |

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical

FOCUS:

- The objective is to acquire the essential expertise in estimating and drafting specifications for diverse architectural projects and construction endeavors, with the aim of optimizing both cost-effectiveness and quality standards.

CONTENTS:

1. This section provides an introduction to the topic, emphasizing the significance of estimating. It also covers several sorts of estimations and the methods used for measurement.
2. Analysis of regional SR rates, market rates, Measurement book (MB), RA bill, intermediate and final certificate
3. Comprehensive evaluation of the cost of building components based on the current schedule of rates (CSR) provided by the local Public Works Department (PWD) and Central Public Works Department (CPWD) in Delhi.
4. Schedule of Rates – provided solely for informational purposes
5. Proportions of different materials utilized in the construction of objects such as cement, steel, rubble, metal, sand brick, tiles, etc.
6. Comprehensive and specific standards for diverse materials and components utilized in construction
7. Comprehension of the significance of specifications in contract documents and their purpose in execution.
8. Estimation of :
 - a) Load-bearing and reinforced concrete (RCC) framed structures, with one example for each.
 - b) Different types of roofs, such as steel and wood, including roofing materials like Mangalore tiles, asbestos cement (AC), galvanized iron (GI) sheets, etc.
 - c) Water supply and sanitary works. d) A sample layout design, including roads, culverts, etc.
9. Acquire knowledge through hands-on site visits, informative presentations, in-depth case studies, interactive tutorials, analysis of Bill of Quantities (BOQ), and engaging workshops that focus on the practical application of theoretical concepts in the construction industry.

SUGGESTED BOOKS

- Estimating and Costing by S K Dutta
- Estimating by SC Rangwala

Course Title: Landscape Design (Elective -1)

Semester – V

TEACHING AND EXAMINATION SCHEME

| Sr No | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|-------|------------------|---------------------------|-----|-------|---|---|-------|--------|----------|-----------------------------|----------|---------------|-------|
| | | | | L | T | P | Total | | Exam | Continous/ Viva/ Jury | Exam | Viva/ Jury | |
| 7 | Landscape Design | PAEC-Elective 1 (Any One) | 5 | 2 | 0 | 4 | 6 | 2 | 0 | 50 | 0 | 50 | 100 |

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical

FOCUS:

To introduce students to the discipline of landscape architecture and to develop basic skills required in handling simple landscape design projects.

CONTENT:

- Introduction to Landscape Architecture,
- Role of Landscape in architecture, natural and manmade landscape, urban and rural landscape
- Landscape elements – land forms, water bodies' vegetation, climate, and landscape furniture – their application in design.
- Study of Landscape materials and plant materials of surrounding region
- Landscape Design principles.
- Graphic design in Landscape
- Introduction to site planning: site study, site analysis, requirement analysis, synthesis and final siteplan.
- Introduction to historical gardens like Mughal, Chinese, Japanese, Indian etc
- Study and analysis of contemporary landscape designs with two or three examples.
- Study of landscape of courtyards, roads, pathways, urban spaces, gardens, parking areas.

SUGGESTED BOOKS

- Landscape architecture by J .O. Simonds
- The landscape we see by Garrett Eckbo
- Introduction to landscape architecture by Michael Laurie.
- Time Saver Standards for Landscape architecture

Course Title: Product design (Elective -2)

Semester – V

1. TEACHING AND EXAMINATION SCHEME

| Sr.No | Subject Name | Category | Sem | Hours | | | | Credit | Internal | | External | | Total |
|-------|----------------|---------------------------|-----|-------|---|---|-------|--------|----------|-----------------------------|----------|---------------|-------|
| | | | | L | T | P | Total | | Exam | Continous/ Viva/ Jury | Exam | Viva/ Jury | |
| 9 | Product Design | PAEC-Elective 2 (Any One) | 5 | 2 | 0 | 2 | 4 | 2 | 0 | 25 | 0 | 25 | 50 |

*L=lectures, T=tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training (OJT) is equivalent to Practical

2. RATIONALE

In today's world, there are many challenges and problems that need to be addressed. In this situation, innovation is what provides the solution that will benefit the maximum number of users. And such innovation is often enabled by design. Product Design focuses on design thinking, creative problem solving and understanding product design factors. Through this course, the learner can take on the role of a design maker of a table-top sized product.

Product design involves the design of an object from concept stage to design development employing graphics and model making. This course places a strong emphasis on the design process, and combines creative ability with technical skills. It is based on project work with an emphasis on learning by doing.

The design thinkers start by observing, interviewing or just plain experiencing a situation. Then, they proceed to improve the situation of the humans by solving problems for them.

The designed product should be eco-friendly materials, aesthetic appeal, functional and user friendly.

3. COMPETENCY

The course content should be taught and curriculum should be implemented with the aim to develop required skills so that the students are able to acquire the following competencies:

- **To demonstrate the process of design of a product and create a viable product by finding solutions to problems by modifying forms and functions**

4. COURSE OUTCOMES (COs)

The practical exercises, the underpinning knowledge and the relevant soft skills associated with the identified competency are to be developed in the learner for the achievement of the following course outcomes in cognitive, psychomotor and affective domains:

- Introduce the notion of design of a product as it evolved through time
- Understand creativity & its application
- Develop the ability to identify problems and finding needs
- Understand the Design process
- Create a viable product

5. SUGGESTED PRACTICAL/STUDIO EXERCISES

The following practical outcomes (PrOs) are the sub-components of the COs. They are crucial for that particular CO at the 'Precision Level' of Dave's Taxonomy related to 'Psychomotor Domain'.

| S. No. | Practical Outcomes (PrOs) | Unit No. | Approx. Hrs. required |
|-------------------|---|----------|-----------------------|
| 1 | Introduction to Creative Thinking: 1. Prepare sketches and models showing the evolution of design any one table-top product (e.g. laptop base, mobileholder, coaster holder etc.) 2. Prepare sketches and models showing how to repurpose an item by selecting any and creating a fresh perspective leading to new uses of the existing item | I | 14 |
| 2 | Problem Identification: 1. Identify the product to be designed 2. Enlist the material, use and technology of the existing product 3. Sketch the various stages and reasons of transformation of the desired product with a brief historical back ground | II | 14 |
| 3 | Design Process: Prepare schematic sketch designs (10 to 15) and finalize one with material and technology and develop a rough prototype | III | 14 |
| 4 | Design of the Product: Prepare all necessary detailed drawings required for developing the product and construct its model | IV | 14 |
| Total Hrs. | | | 56 |

Note

- i. More **Practical/Studio Exercises** can be designed and offered by the respective course teacher to develop the industry relevant skills/outcomes to match the COs. The above table is only a suggestive list.
- ii. Study report, data collection and analysis report must be assigned in a group. Teacher has to discuss about type of data (which and why) before group start their site visits.
- iii. The following are some **sample** 'Process' and 'Product' related skills (more may be added/deleted depending on the course) that occur in the above listed **Practical/Studio Exercises** of this course required which are embedded in the COs and ultimately the competency.

| Sr. No. | Sample Performance Indicators for the PrOs | Weightage in % |
|---|--|----------------|
| Assessment should be done on the basis of demonstration of, | | |
| 1 | Skills | 40 |
| 2 | Learning Process | 20 |
| 3 | Communication | 20 |
| 4 | Learning Attitude | 20 |
| Total | | 100 |

6. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

These major equipment with broad specifications for the PrOs is a guide to procure them by the administrators to usher in uniformity of practicals in all institutions across the state.

| S. No. | Equipment Name with Broad Specifications | PrO. No. |
|--------|--|----------|
| 1 | Measuring Tape, Laser measure tape, Drawing Sheets, Tracing papers | 1-4 |
| 2 | Drawing Board (A1 size @ 23”X32”) with other Other Instruments like Parallel, Set squares (45° and 30°-60°), Adjustable set square, Triangular scale, Tracing papers, Drawing Sheets | 1-4 |
| 3 | Interactive board with LCD overhead projector | 1-4 |
| 4 | Desktop PCs with latest configuration | 1-4 |

7. AFFECTIVE DOMAIN OUTCOMES

The following *sample* Affective Domain Outcomes (ADOs) are embedded in many of the above-mentioned COs and PrOs. More could be added to fulfil the development of this competency.

- Work as a leader/a team member.
- Follow ethical practices.
- Social and Functional Competence of design.
- Participate in class discussions and present the design effectively, Generate new ideals.
- Practice environmentally friendly methods and design processes.

The ADOs are best developed through the laboratory/field based exercises. Moreover, the level of achievement of the ADOs according to Krathwohl’s ‘Affective Domain Taxonomy’ should gradually increase as planned below:

- ‘Valuing Level’ in 1st year
- ‘Organization Level’ in 2nd year.
- ‘Characterization Level’ in 3rd year.

8. UNDERPINNING THEORY

The major underpinning theory is given below based on the higher level UOs of *Revised Bloom’s taxonomy* that are formulated for development of the COs and competency. If required, more such UOs could be included by the course teacher to focus on attainment of COs and competency.

| Unit | Unit Outcomes (UOs) (4 to 6 UOs at different levels) | Topics and Sub-topics |
|--|--|---|
| Unit –I Introduction to Creative Thinking | 1a. Evolution of Design 1b. Logical Thinking vs. Creative Thinking 1c. Exploring Creativity through various mediums | 1.1 Introduction to design thinking of a product 1.2 A brief history of evolution of design of a product 1.3 Product design elements: appearance, functionality and quality 1.4 Logical thinking 1.5 Creative thinking 1.6 Creativity and its applications |

| | | |
|--|---|---|
| Unit– II Problem Identification | 2a. Methods and Techniques 2b. Identification and Analysis | 2.1 Method 1: Define, envision, develop, deliver 2.2 Method 2: Ideation, research, planning and execution, launch 2.3 Brainstorming 2.4 Identifying and defining the product 2.5 Sketching the various stages and reasons of transformation of the desired product with a brief historical back ground |
| Unit – III Design Process | 3a. Creating different designs for the defined product 3b. Prototyping | 3.1 Sketching different designs for the product. 3.2 Shortlisting the best three designs and finalising one of them. 3.3 Creating a rough prototype of the finalised design. |
| Unit – IV Design of the Product | 4a. Producing a sample of the finalised product 4b. Sample testing 4c. Creating the final product after required modifications | 4.1 Preparing all detailed drawings to construct the model of the finalised design 4.2 Modifying the product as required after sample testing 4.3 Creating the final product |

9. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

| Unit No. | Unit Title | Teaching Hours | Distribution of Theory Marks | | | |
|--------------|-----------------------------------|----------------|------------------------------|---------|---------|-------------|
| | | | R Level | U Level | A Level | Total Marks |
| I | Introduction to Creative Thinking | | Not Applicable | | | |
| II | Problem Identification | | | | | |
| III | Design Process | | | | | |
| IV | Design of the Product | | | | | |
| Total | | | | | | |

Legends: R=Remember, U=Understand, A=Apply and above (Revised Bloom's taxonomy)

Note: This specification table provides general guidelines to assist learners for their learning and to teachers to teach and question paper designers/setters to formulate test items/questions to assess the attainment of the UOs. The actual distribution of marks at different taxonomy levels (of R, U and A) in the question paper may slightly vary from above table.

10. SUGGESTED LEARNER ACTIVITIES

Other than the classroom and laboratory learning, following are the suggested learner-related **co-curricular** activities which can be undertaken to accelerate the attainment of the various outcomes in this course. Learners should perform following activities in group and prepare reports of about 5 to 7 pages for each activity. They should also collect/record physical evidences for their (learner's) portfolio which may be useful for their placement interviews.

Students should conduct user surveys for the desired product, collect data and samples of different materials used for manufacturing them and analyze them by making a presentation and/or an interactive group discussion. These could be done individually or in a group. For such data collection and other study, students need to go out of the institute to markets, shops, industries or interior sites. Students should go for site visits and prepare a report on it. Such visits should be organized by concerned faculty member/s who should compulsorily accompany the students for this purpose.

The practical/exercises should be properly designed and implemented with an attempt to develop different types of practical skills (Course Outcomes in psychomotor and affective domain) so that learners are able to acquire the competencies (Programme Outcomes).

Note: Here only Course Outcomes in psychomotor domain are listed as practical/exercises. However, if these practical/exercises are completed appropriately, they would also lead to development of Programme Outcomes/Course Outcomes in affective domain as given in a common list at the beginning of curriculum document for this programme. Faculty should refer to that common list and should ensure that learners also acquire those Programme Outcomes/Course Outcomes related to affective domain.

11. SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES (if any)

These are sample strategies, which the teacher can use to accelerate the attainment of the various outcomes in this course:

- a) Massive open online courses (*MOOCs*) may be used to teach various topics/sub topics.
- b) Guide learner(s) in undertaking micro-projects.
- c) '*L*' in *section No. 4* means different types of teaching methods that are to be employed by teachers to develop the outcomes.
- d) About **20% of the topics/sub-topics** which are relatively simpler or descriptive in nature is to be given to the learners for *self-learning*, but to be assessed using different assessment methods.
- e) With respect to *section No.10*, teachers need to ensure to create opportunities and provisions for *co-curricular activities*.
- f) Guide learners on how to address issues on sketching, model making, etc.
- g) Use relevant video/animation films to explain various concepts and processes related to basic Architectural design themes for Public Buildings.
- h) Use different instructional strategies in classroom teaching.
- i) Use the relevant architectural assignments in the given situation.
- j) Guide learners on form, functions utility, method of construction, etc. to facilitate them to prepare actual measured drawings.
- k) Use the technique of table top discussions along with design jury sessions to teach the relevant content to the learners.
- l) Adopt various strategies to enhance each learner's individual creative ability especially with reference to concept and form
- m) Expert lectures should be arranged to cover topics of all units thoroughly.

12. SUGGESTED DESIGN MICRO-PROJECTS

Only one micro-project is planned to be undertaken by a learner that needs to be assigned to him/her in the beginning of the semester. In the first four semesters, the micro-project are group-based (group of 3 to 5). However, **in the fifth and sixth semesters**, the number of learners in the group should **not exceed three**.

The micro-project could be industry application based, internet-based, workshop-based, laboratory-based or field-based. Each micro-project should encompass two or more COs

which are in fact, an integration of PrOs, UOs and ADOs. Each learner will have to maintain dated work diary consisting of individual contribution in the project work and give a seminar presentation of it before submission. The duration of the micro-project should be about **14- 16 (fourteen to sixteen) learner engagement hours** during the course. The learners ought to submit micro-project by the end of the semester to develop the industry-oriented COs.

A suggestive list of micro-projects is given here. This has to match the competency and the CO. Similar micro-projects could be added by the concerned course teacher:

- a. Enlist the advantages and disadvantages of any existing product and work out a better solution for the same.
- b. Create an imaginary functional product using some new innovative materials.

13. SUGGESTED LEARNING RESOURCES

| S. No. | Title of Book | Author | Publication with place, year and ISBN |
|--------|--|---|---|
| 1 | The Design of Everyday things | Donald Norman | The MIT Press, 1998 ISBN: 9780262525671 |
| 2 | Product Design and Development | Karl Ulrich , Steven D. Eppinger | McGraw Hill Education, 1 July 2017 ISBN-13: 978-9352601851 |
| 3 | Industrial Design- Reflections of a century | Jocelyn de Noblet | Thames & Hudson, 1993. ISBN 10: 2080135392 |
| 4 | What is a Designer: Things, Places, Messages | Norman Potter | Princeton Architectural Press, 2002 ISBN 10: 0907259162 ISBN 13: 9780907259169 |
| 5 | Design: History, Theory and Practice of Product Design | Bernhard E. Bürdek | Birkhauser Verlag AG (1 January 2005) ISBN-10 : 3038213810 ISBN-13 : 978-3038213819 |
| 6 | Ergodesign Methodology for Product Design | Marcelo M. Soares | CRC Press (October 2021) ISBN: 9781032054483 |
| 7 | Time Saver Standards for Interior Design | Joseph De Chiara Julius Panero Martin Zelnik | McGraw Hill Education; ISBN : 0-07-016299-9 ISBN : 0-07-112589-2 |
| 8 | Color in Interior Design | John Pile | McGraw-Hill Professional (16 June 1997) ISBN-10 : 0060501653 ISBN-13 : 978-0070501652 |
| 9 | Inside Outside | Journal/Magazine | Business India Group ISSN: 0970-1761 |
| 10 | Space Design | Archiworld | ARCHI (1 January 2015) ISBN-10 : 4956601494 ISBN-13 : 978-8957701492 |

14. SOFTWARE/LEARNING WEBSITES

- https://www.mycoted.com/Main_Page

- <http://creatingminds.org/>
- [Creative teaching: Replacing problems with opportunities](#) (YouTube Video)
- <https://www.celt.iastate.edu/instructional-strategies/teaching-format/14-creative-ways-to-engage-students/>
- <https://www.teachingexpertise.com/classroom-ideas/creative-thinking-activity/>
- www.designboom.com

15. PO-COMPETENCY-CO MAPPING

| Semester V | Product design (Elective -2) | | | | | | | | |
|---|---|------------------|---------------------------------|--|---|--------------------|--------------------|-------------------|-----------|
| | POs and PSOs | | | | | | | | |
| Competency & Course Outcomes | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | * PSO 1 | #PSO 2 |
| | Basic & Discipline specific knowledge | Problem Analysis | Design/development of solutions | Engineering Tools, Experimentation & Testing | Engineering practices for society, sustainability & environment | Project Management | Life-long learning | Planning & Design | Execution |
| Competency | To demonstrate the process of design of a product and create a viable product by finding solutions to problems by modifying forms and functions | | | | | | | | |
| a) Introduce the notion of design of a product as it evolved through time | 2 | 1 | 1 | 1 | 1 | 1 | 1 | - | - |
| b) Understand creativity and its application | 2 | 1 | 2 | - | 1 | 1 | - | - | - |
| c) Develop the ability to identify problems and finding needs | 2 | 1 | 2 | - | 1 | 1 | - | - | - |
| d) Understand the design process | 2 | 3 | 1 | 2 | 1 | 1 | - | - | - |
| e) Create a viable product | 3 | 2 | 3 | 1 | 1 | 2 | 2 | 2 | 3 |

Legend: '3' for high, '2' for medium, '1' for low and '-' for no correlation of each CO with PO/PSO.

***PSO 1: Planning & Design:** Prepare architectural designs and all types of drawings with appropriate material specifications and application techniques as per specific project requirements.

#PSO 2: Execution: Suggest appropriate building materials as per the requirement.