वास्तुकला परिषद्
Council of Architecture
वास्तुविद अधिनियम, 1972 के अंतर्गत भारत सरकार का एक स्वायत्त सांविधिक निकाय
(An Autonomous Statutory Body of Govt. of India under the Architects Act, 1972)

Ref. CA/489/2024/Climate Change
March 18, 2024

1. TO ALL THE HEADS OF ARCHITECTURAL INSTITUTIONS IMPARTING RECOGNIZED ARCHITECTURAL QUALIFICATIONS IN THE COUNTRY

2. TO ALL THE VICE-CHANCELLORS & REGISTRARS UNIVERSITIES AWARDING B.ARCH. DEGREE IN THE COUNTRY

Subject: Revision in the curriculum of 5-year B.Arch. degree course imparted at Architectural Institutions on the issues related to Climate Change – reg.

Dear Sir/ Madam,

As you may be aware, the impacts of Climate Change in Global Scenario are being felt more urgently and frequently. Intergovernmental Panel on Climate Change (IPCC) sounded a code red alert for humanity in 2021.

The alarm bells are deafening, and the evidence is irrefutable: greenhouse-gas emissions from fossil-fuel burning and deforestation are choking our planet and putting billions of people at immediate risk. Global heating is affecting every region on Earth, with many of the changes becoming irreversible.

India is now the third-biggest carbon emitter worldwide, accounting for seven percent of global emissions in 2020 and buildings account for about 38% of India's carbon emissions. We recognize that buildings are also our first defense against climate change hazards like heat waves, storms, and floods. At COP26 Summit for countries held in 2021, the Hon'ble Prime Minister had announced India's Panchamrit goals to cut its emissions to net zero by 2070.

In order to address issues related to Climate Change in the context of Architectural education, the Council of Architecture constituted a Sub-Committee of architect-experts to assist the Council to suggest appropriate changes to the curriculum in Architectural Institutions and give its recommendations.

The report containing the recommendations of the Sub-Committee was considered by the Council of Architecture at its 80th meeting held on 02.09.2023. The Full Council perused the report and approved the changes in curriculum suggested by the Sub-Committee and directed that the same be sent to architectural institutions for adoption. A copy of the report containing revision in the curriculum of 5-year B.Arch. degree course on the issues related to Climate Change, is enclosed herewith for your kind perusal.

In view of the above, all the universities as well as architectural institutions imparting 5-year B.Arch. degree course in the country are requested to revise the curriculum of the course by introducing the courses related to Climate Change, as recommended in the said report.

The Council be kept informed of the action taken in the matter.

Thanking You,

Yours faithfully,

R. K. Oberoi
Registrar

Encl: As above

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Government of Gujarat
Roads & Buildings Department

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Date: 14 June, 2023

To,
The Registrar,
Council of Architecture.
India Habitat Center, Core 6 A,
First Floor, Lodhi Road, New Delhi. 110003

Sub: Sub-Committee to assist the Council of Architecture to suggest appropriate changes to the curriculum in Architectural Institutions on the issues related to Climate Change-reg.

Ref: CoA letter No.: CA/485/2023 dated March 27, 2023

Dear Sir,
With reference to above, The Sub-Committee proposes the additions to the prevailing curriculum for the Five Year Degree Course in Architecture as attached in Appendix A.

The changes proposed by this Sub-Committee are intended to:

- Revise existing coursework to include the capabilities to be learned by architecture students for climate mitigation and adaptation by changing specific and relevant topics, so as to not increase the number of mandatory courses or the overall time required to teach these courses.
- Make the curriculum future-ready and forward looking in terms of climate change, recognising the contribution the profession of architecture can make towards the Government of India's climate goals and Nationally Determined Contributions.
- It is proposed that Council of Architecture shall made available, The detailed curriculum, state wise case studies, reading materials, list of reference books & Journals etc., before implementation of revised curriculum proposed herewith.

The proposed additions, which are highlighted in yellow mark are recommended to insert at appropriate place, in prevailing regulations.

Regards,

Vishal Vyas
(Convener, Sub-Committee on Climate Change)

Encl : As Above.

Annexure A

India's Nationally Determined Contributions towards the Paris Agreement include reducing the carbon emissions intensity of its economy by 45% by 2030 and achieve net zero emissions by 2070. It is recognised that climate resilient net-zero buildings will contribute to these goals to reduce emissions in the building sector and protect our property and lives from climate change hazards like heat waves, storms, and floods. It is therefore mandated that architectural undergraduate curricula shall develop competencies and knowledge in three areas.

Understanding the Causes and Impacts of Climate Change (Climate Literacy): Develop competencies in understanding anthropogenic global warming, contribution to greenhouse gas emissions from sectors of the economy including building construction and operation, recent and projected impacts of climate change on people and biodiversity, and climate-related policies at the city, state, and national level, as well as carbon credits, offsets, and taxation or trading schemes.

Climate Change and Social Responsibility (Climate Justice): Develop competencies in understanding differential vulnerability of regions and populations to climate change hazards, issues of equity, interconnectedness of disaster resilient infrastructure systems, and analytical methods of assessing vulnerability, risk, and resilience.

Climate Change Mitigation and Adaptation (Climate Action): Develop competencies in delivering comfortable, resilient, and carbon-neutral buildings, zero waste approaches, water sufficiency, integration of right-sized engineered systems, disaster resilient infrastructure, improved biodiversity, product innovation, and evidence-based design processes, which use testing and performance simulations with a broad knowledge of codes and statutory regulations.

Sections of Regulation 2020.

3. The suggested list of courses under each of these groups is provided in following Table 1.0

TABLE 1.0

I. PROFESSIONAL CORE COURSES (PC)

1. Basic Design and Visual Arts
2. Architectural Design
3. Architectural Design Thesis
4. Architectural Graphics and Drawing
5. History of Architecture and Culture
6. Principles/ Theory of Architecture
7. Urban Design
8. Human Settlements Planning
9. Housing
10. Landscape Design
11. Site Planning
12. Carpentry and Model Making Workshop
13. Specifications, Cost Estimation and Budgeting
14. Net-Zero and Resilient Design

II. BUILDING SCIENCES AND APPLIED ENGINEERING (BS AND AE)

15. Building Materials
16. Building Construction
17. Applied Mechanics
18. Structural Design and Systems
19. Climatology
20. Building Services

21. Surveying and Leveling
22. Acoustics
23. Environmental lab
24. Environmental Science for Architecture
25. Built Environment and Climate Change
26. Building Science and Performance Measurement
27. Environmental Performance Simulation and Analysis

ELECTIVE COURSE (EC)

The list of electives given below is suggestive and the Institution or University may adopt the electives as found feasible.

III. PROFESSIONAL ELECTIVE (PE)

28. Theory of Design
29. Vernacular Architecture
30. Interior Design
31. Art Appreciation
32. Art in Architecture
33. Graphic and Product Design
34. Contemporary Processes in Architecture
35. Architectural Journalism
36. Disaster Mitigation and Management
37. Green Buildings and Rating Systems
38. Sustainable Cities and Communities
39. Building Performance and Compliance
40. Architecture of South East Asia
41. Architectural Design with Steel
42. Architectural Design with Glass
43. Furniture Design
44. Appropriate Building Technologies
45. Earthquake Resistant Architecture
46. Architectural Conservation
47. Building Systems Integration and Management
48. Advanced Vulnerability Assessment Methods
49. Advanced Building Performance Assessment Methods

OPEN ELECTIVE (OE)

Courses approved by the Institution or University from subjects of study other than Architecture which will add value to the course and enable the overall development of the student

IV. PROFESSIONAL ABILITY ENHANCEMENT COURSES

A. PROFESSIONAL ABILITY ENHANCEMENT COMPULSORY COURSES

50. Professional Practice
51. Internship or Practical Training
52. Project Management
53. Dissertation or Seminar or Research Methodology

B. SKILL ENHANCEMENT COURSES

54. Communication Skills
55. Computer Studio
56. Building Information Modeling
57. Digital Graphics and Art
58. Entrepreneurship Skills for

I. Brief description of the courses listed as Professional Core (PC)

14. NET-ZERO AND RESILIENT BUILDING DESIGN

This course will focus on the principles, case studies and exercises for building design solutions for climate change mitigation and adaptation with net-zero energy, carbon, water, and waste. It will build competency in design for: reduction of energy consumption through passive design, efficient design of building envelope, lighting, and heating-cooling systems; on-site renewable energy systems; methods of reduction of embodied energy in building materials and construction and; design strategies to reduce vulnerability to hazards such as heatwaves, floods, storms, and rising sea-levels. Design work should be supported by relevant calculations, and quantitative system analysis. Introduction to the principles of restorative and regenerative architecture.

This content may be included sequentially or wholly to be integrated in the design problems for architectural and other design studios between semesters 3 through 8. If integrated in architectural and other design studios, this need not be introduced as an additional mandatory course in the syllabus. Prerequisites for this course are: Built Environment and Climate Change, Building Science and Performance Measurements, Environmental Performance Simulations and Analysis. The content of this course should be referenced and can be integrated in the following courses in the syllabus: Architectural Design Project or Thesis, Urban Design, Housing, Landscape Design, Site Planning, Specifications, Cost Estimation and Budgeting, Building Materials, Building Construction, Building Services.

II. ,Brief description of the courses listed as Building Sciences and Applied Engineering (BS and AE)

25. BUILT ENVIRONMENT AND CLIMATE CHANGE

This course develops an understanding of the causes of anthropogenic climate change and the contribution of GHG emissions from the building sector in India as well as globally. International and national commitments and programmes – clean energy development, and state or city action plans. Predicted and differential vulnerabilities to physical, social and economic risks of Climate Change and analysis of risk maps. Adaptation and resilience strategies such as heat action plans, resilience facilities, thermal protection, microclimate improvement, and flood management. Mitigation strategies for reduction in embodied carbon in construction, minimising operational energy, clean energy substitution, carbon sequestration, and carbon offsets.

This coursework should be completed before the sixth semester. The content of this course should be referenced, and can be integrated in the following courses in the syllabus: History of Architecture and Culture, Urban Design, Human Settlements Planning, Housing, Landscape Design, Site Planning, Product Innovation and Making.

26. BUILDING SCIENCE AND PERFORMANCE MEASUREMENTS

This course develops the knowledge base for architectural design to provide thermal, visual comfort, indoor environmental quality for wellbeing of occupants. It includes the study of solar movement, climatic parameters, climatic analysis; climate responsive passive design; dynamic thermal behaviour and heat transfer through the building envelope, impact or shading and natural ventilation. Parameters of adaptive thermal comfort, illumination and visual comfort with daylighting and artificial lighting, indoor air quality, will be introduced along with units of measurement and standards.

This learning shall be aided with use of tools to develop and assess design solutions, and practical use of measurement instruments to assess the performance of materials, assemblies, and buildings. This will build towards the competency of using software and measurement tools to assess compliance with performance standards and codes.

This course includes the intent of, and goes beyond the Climatology course. When taught alongside Architectural Design and completed by semester 5, this course can replace the Climatology course in the curriculum. The course

will require a stock of measurement and recording instruments for measuring thermal parameters, air movement and illumination.

27. ENVIRONMENTAL PERFORMANCE SIMULATIONS AND ANALYSIS

This course develops skills of quantitative environmental performance analysis using manual and computational methods. It includes metrics for performance efficiency relating to energy and water, climate resilience and environmental factors affecting health and wellbeing. It will focus on methods to generate and interpret relevant data to make informed decisions from early to detailed design stages. It will cover simulation software for predicting thermal performance, thermal comfort, energy consumption, visual performance, visual comfort, water balance calculations. This will build towards the competency of assessing compliance with performance standards and codes. It will include an introduction to life cycle cost analysis of alternatives.
Built Environment and Climate Change and Building Science and Performance Measurement courses will be prerequisites for this course. This course includes the intent of, and goes beyond the Environmental Lab course, and when taught alongside Architectural Design, it can replace the Environmental Lab course in the syllabus. It will require a range of software tools for use by students.

III. Brief description of the courses listed as Professional Electives (PE)

48. ADVANCED CLIMATE VULNERABILITY ASSESSMENT METHODS

This course will develop competencies for understanding the impact of future climate change scenarios, with techniques of multi-hazard assessment for risk and vulnerability. It will include case studies of communities affected by climate change hazards, especially communities on the extremes, to develop understanding of how they have coped. The course will take a skill-based and place-based approach to study, and students will develop the competency to assess the site and incorporate climate risk in project designs.

49. ADVANCED BUILDING PERFORMANCE ASSESSMENT METHODS

This course develops skills of quantitative analysis using advanced computational methods. It will develop advanced skills in simulation software for predicting thermal performance, and energy consumption with the integration of HVAC systems and artificial lighting systems, computation fluid dynamics analysis for natural ventilation, and glare analysis for lighting systems. It includes quantitative analysis of water, wastewater, and storm water calculations for net zero water performance. This will build towards the competency of assessing compliance with performance standards and codes. Evaluation of economic affordability of complex systems integration and Life Cycle Analysis will be explored in depth.
This will require a range of software tools and multiple licenses to be provided for use by students.