

MINORS OFFERED AT HABIB UNIVERSITY



**OFFICE OF UNDERGRADUATE EDUCATION &
ACCREDITATION**

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Minors Offered at Habib University

What is a Minor?

Modern education is primarily centered on training individuals to succeed in focused fields of specialization, but in a world with constantly changing dynamics, it is no longer realistic to confine yourself to an isolated field of specialization. Minors are a way for you to graduate with more than one area of specialization, and due to the interdisciplinary nature of Habib University's major and minor programs, skills learned in both types of specializations can be used interchangeably.

Minors are an integral part of the Liberal Arts and Sciences educational experience at HU as they allow you to explore your interests, personalize, and diversify your undergraduate programs.

This unique academic experience will help you develop a critical understanding of the world you live in by giving you the opportunity to engage with, think critically about, and be able to solve the complex problems of today.

The Benefits of Taking a Minor

All HU students, regardless of major, can expand their fields of specialization by taking an optional minor program to supplement their major program. Minors help in honing a variety of skills including the capacity to engage in intellectual and scientific inquiry. The advantages vary, as each individual specialty will give you a unique perspective in the way you perceive and exist in the world today.

Graduating with a minor has many advantages, including:

- A chance to pursue a wide range of post-graduate degree programs, dependent on your major-minor combination
- The ability to qualify for an expansive range of career options due to a uniquely specialized degree program
- The development, and utilization, of a variety of interdisciplinary skill-sets that will help students in your future entrepreneurial and academic endeavors

Minors expand students' future possibilities and allow them to graduate with a honed interdisciplinary focus. An interdisciplinary approach towards society's complex social, political and scientific problems will allow students to solve modern day problems using innovative.

List of Minors offered at Habib

S. No	Minors	Offered by	Offering School	No of Courses	Credit Hours ⁺	
1	Comparative Literature	Comparative Humanities (CH) Program	SAHSS	6	18	
2	Philosophy			5	15	
3	Religious Studies			5	15	
4	History			5	15	
5	South Asian Music	South Asian Music Center & CH Program		5*	15*	
6	Communication <i>(Applicable for Class of 2025 & onwards)</i>	CND Program		5	19	
7	Design <i>(Applicable for Class of 2025 & onwards)</i>			5	18	
8	Communication and Design <i>(Applicable for Class of 2023 & 2024)</i>			5	15	
9	Social Development & Policy	SDP Program		5	18	
10	Physics	iSciM Program		DSSE	7**	20
11	Mathematics				7	20
12	Bio-Science				5	17
13	Computer Science				CS Program	7
14	Electrical and Computer Engineering	ECE Program			7	18

⁺ Minimum credit hours required.

*South-Asian music minor – an additional 3 semesters of Practicum in the Music room are required.

**Physics minor – in addition to the 7 courses, 2 lab courses are also to be taken to fulfill the foundational requirement.

Minors Offered by the School of Arts, Humanities and Social Sciences

1a. Comparative Literature (CL) Minor

Offered by: Comparative Humanities (CH) Program

The minor in comparative literature will feature a range of courses explaining how world literatures have adapted to, and been transformed by the rise of English as a global medium for literary production. The aim of the minor is to introduce students to multiple ways to analyze texts and produce a theoretically informed interpretation of several texts and traditions in dialogue. It will enable students to work comparatively and fluidly with texts and read, write, and think critically, creatively, and imaginatively. This makes Comparative Literature compelling for both graduate schools across the human and social sciences and employers across a range of sectors of the economy.

Learning Outcomes:

- Locate major writers in English, Urdu, and World Literature within their respective linguistic, cultural, and historical periods.
- Define and discuss the evolution of themes, styles, and techniques across genres and within traditions.
- Work comparatively and fluidly with texts in translation and in conversation with their respective linguistic and cultural milieux.
- Explain how world literatures have adapted to, and been transformed by, the rise of English as a global medium for literary production.
- Analyze texts closely using methods appropriate to literary analysis and translation studies.
- Critically assess conceptual problems integral to the nature of literary and aesthetic experience.
- Produce a theoretically informed interpretation of several texts and traditions in dialogue.
- Read, write, and think critically, creatively, and imaginatively.

Eligibility criteria (if any):

All Habib University students from all majors except those majoring in CH program are eligible to declare and pursue the CL Minor.

Credits required: 18 (minimum)

Courses required: 06 (see details below)

a. Core Courses (3)

1. *LIT 104 - What is World Literature: Introduction to the Study of World* formerly known as *LIT/CND 203 Reading, Writing and Thinking Literature* (or another course that satisfies the requirement) *
2. *LIT 225 - Intro to Literary Theory and Criticism*
3. *CORE 121 - Jehan-e-Urdu*

**Note – The course must be approved from Program Board of Studies, and Board of Faculty.*

b. Elective Courses (2) - Upper Division LIT Electives (300/400 level)

c. Elective in Comparative Humanities (1) (3/4 credit-hours)

One Comparative Humanities elective at any level, that is one course in the area of HUM/HIST/LIT/PHIL/RELS/MUS, relevant to the student's area of focus in the Minor, (which could be either South Asian Literature, World Literature, or a mixed configuration of the two or another area in Literature).

Habib Liberal Core courses cannot be used to fulfill requirements for category 'c'.

NB:

No single Habib Liberal Core course can count towards fulfilling requirements towards completion of more than one of CL, HIST, RELS, and PHIL Minors

1b. English and Comparative Literature (ECL) Minor

(Applicable for Class of 2021 & 2022 only)

Offered by: Comparative Humanities (CH) Program

Eligibility criteria (if any):

Students of Classes of 2021 and 2022 are eligible to declare and pursue the ECL Minor.

Credits required: 20

Courses required: 06

Details of the Courses:

a. Required Course (1)

LIT 104 - What is World Literature: Introduction to the Study of World formerly known as *LIT/CND 203 Reading, Writing and Thinking Literature* (or another course that satisfies the requirement) *

**Note – The course must be approved from Program Board of Studies, and Board of Faculty.*

b. Any level LIT electives (3)

c. Upper-level LIT (300/400) electives (2)

Other Details:

Credit Hour Count Waiver:

If a student has fulfilled the course requirements for the ECL Minor then the minimum 20 credit hours count requirement would be waived in favor of a range, amounting to between 18 and 20 credit-hours.

Grade Requirements:

Courses cleared with C minus/passing grade can be counted towards completion of the ECL Minor.

NB:

No single Habib Liberal Core course can count towards fulfilling requirements towards completion of more than one of ECL OR CL, HIST, RELS, and PHIL Minors

2. Philosophy Minor

Offered by: Comparative Humanities (CH) Program

The study and practice of Philosophy is concerned with the re-organization of existing patterns of thought and the generation of new thought and concepts, directed towards the transformation of humans and their worlds. The minor gives students philosophical training that enables them to explore continuities between Philosophy and other aspects of their ongoing curricular, professional and personal experiences. Students completing the minor will have sufficient capacity to think and write about universal philosophical themes pertaining to ontology, epistemology, aesthetics, ethics, and politics.

The cognitive qualities of analytical, critical and synthetic power, as well as the power of conceptual innovation, that are all associated with the practice of philosophy make philosophical study attractive both for graduate studies, as well as for employers across a range of sectors of the economy.

Learning outcomes:

- Develop the capacity to engage in intellectual inquiry that runs in the circuit of existence, knowledge, conceptions of the human and the subject, and the history of Philosophy.
- Develop the capacity to raise, and to work through ethical questions, including questions in meta-ethics, applied and professional ethics and questions pertaining to the ethical implications of political thought.
- Develop the capacity to probe questions of philosophical methodology, that is, various forms of logic and dialectic in the history of Philosophy, and the role of mathematical thought in Philosophy.
- Develop the capacity for production and critique of knowledge production and practice in the various fields and disciplines of the Arts, Humanities, Social Sciences, and STEM.

Eligibility criteria (if any):

All Habib University students from all majors except those majoring in CH program are eligible to declare and pursue the Philosophy Minor.

Credits required: 15 (minimum)

Courses required: 05

Details of courses:

a. Core Courses (2)

1. Either *PHIL 200 - What is Philosophy?* OR *PHIL 122 - Introduction to Western Philosophy* (or another course that satisfies the requirement) *
2. Either *CORE 202 - Hikma I*, or Formal Reasoning (meaning either *CORE 111 - Logical Problem Solving* or *CS 101 – Algorithmic Problem Solving*, but not both).

Note – The course ‘CS 101 – Programming Fundamentals’ taken prior to Fall 2023 can be counted to fulfill the 2nd core course requirement.

b. Intermediate course (1)

A 200-level or above course in either Epistemology or Ontology (or another course that satisfies the requirement) *

For further clarity please note that intermediate level is broadly defined to include courses with codes ranging from 200 to 400, and which have sustained engagement with ontological and/or

epistemological inquiry. (See Annexure 'A' below for list of relevant courses, updated in September 2021)

**Note – The course must be approved from Program Board of Studies, and Board of Faculty.*

c. Upper-Division (300/400 level) PHIL electives (2)

Annexure 'A'

Listing courses - taught in fall 2019 and onwards - that satisfy requirement (b) for the minor:

S.No.	Course Code	Course Title
1	PHIL 324	The Oneness of Being: The Creative Imagination of Ibn 'Arabi
2	PHIL 325	Dream Interpretation: A Decolonial History
3	PHIL 375	Philosophy in the Anthropocene
4	PHIL/RELS 327	Spirituality, Philosophy and Science
5	PHIL/LIT 311	Philosophy, Literature, and the Question of Virtue
6	PHIL 326	Philosophical Hermeneutics
7	HUM/PHIL 301	Comparative Hermeneutics of the Self
8	PHIL/SDP 222	What is Power? Foucault, Biopolitics & Critical Thinking
9	PHIL/ECON 421	Philosophy of Marx
10	PHIL/CS 233	Ethics of Artificial Intelligence
11	MATH/PHIL 222	Paradox & Infinity

NB:

No single Habib Liberal Core course can count towards fulfilling requirements towards completion of more than one of ECL OR CL, HIST, RELS, and PHIL Minors

3. Religious Studies Minor

Offered by: Comparative Humanities (CH) Program

The minor will feature a range of courses in comparative religion, theory and methods in the study of religion, textual analysis, and specialized topics in religious studies. The aim of the minor is to introduce students to multiple ways of approaching world religious traditions, and the ways in which these traditions have been shaped by historical, political, and social realities. Students will appreciate the plurality and richness of religious expression throughout history, and the modes in which religious traditions continuously interact. This makes Religious Studies compelling for both graduate school across the human and social sciences, as well as for employers across a range of sectors of the economy.

Learning Outcomes:

- Apply methods from several key disciplines in the social sciences and the humanities in the study of religion.
- Question notions of 'mainstream' religion, religious essentialism, and the immutability of religious traditions and their underlying moral frameworks
- Employ comparative approaches to understand the ways in which world religious traditions have influenced and shaped each other
- Explore the interface between religious, institutions, texts, ideas, and practice
- Critically reflect on the historical roots of contemporary conflicts that are popularly seen to be rooted in religious difference

Eligibility criteria:

All Habib University students from all majors except those majoring in Comparative Humanities are eligible to declare and pursue the Religious Studies Minor.

Credits required: 15

Courses required: 05

Details of Courses:

a. Core Courses (2)

1. Either *REL 122 - World Religions* (or another course that satisfies the requirement) *
2. *CORE 202 - Hikma I*

b. Intermediate course (1)

REL 223 – Comparative approaches, methods and key issues in the study of religion (or another course that satisfies the requirement) *

**The course must be approved from Program Board of Studies, and Board of Faculty.*

c. Upper-Division (300/400 level) RELS electives (2)

Note: the course 'CORE 302 - Hikma II' can be one of two electives for requirement 'c', provided the student is not already counting Hikma II for the second philosophical thought requirement in the Habib Liberal Core Curriculum.

NB:

No single Habib Liberal Core course can count towards fulfilling requirements towards completion of more than one of ECL OR CL, HIST, RELS, and PHIL Minors

4. History

Offered by: Comparative Humanities (CH) Program

History is regarded as an essential component of a liberal arts education. The aim of the minor is to awaken the student's curiosity about how the past shapes our present and to nurture the critical thinking, research, and writing skills that are essential for historical study. The minor will teach students to identify, understand and critically analyze historical change and difference, as well as the legacies, conscious or unconscious, that each generation inherits from its past, and the many perspectives and relations one can have vis-à-vis those legacies. The cognitive qualities of complexity, rigor, ability to recognize contingency and imagine alternatives, as well as, sensitivity to change and transformation in the midst of continuity make historical study attractive both for graduate school across the human and social sciences, as well as for employers across a range of sectors of the economy.

Learning Outcomes:

- Appreciate the interconnectedness of histories of various parts of the world.
- Critically analyze the historically crucial role of conceptual and discursive shifts and transformations across historical mentalities and spaces.
- Conduct historical research and craft arguments that resonate with diverse audiences

- Navigate historiographical debates, historical methodologies and interpretive frameworks

Eligibility criteria:

All Habib University students from all majors except those majoring in CH program are eligible to declare and pursue the History minor

Credits required: 15 (minimum)

Courses required: 05

Details of Courses:

a. Core Courses (2)

1. A course in Global Histories or another course that satisfies the requirement*
2. *CORE 201 - Pakistan and Modern South Asia*

**Note – The course must be approved from Program Board of Studies, and Board of Faculty.*

b. Intermediate course (1)

*HIST 227 - Understanding Histories: Historiography and Historical Methods***

Historical Being, Being Historical: Historicity & Historical Method (or another course in Historiography/Theory of History/Methods in History/Philosophy of History)

*** The course offered with a different course code also qualifies the requirement.*

c. Upper-Division (300/400 level) HIST electives (2)

NB:

No single Habib Liberal Core course can count towards fulfilling requirements towards completion of more than one of ECL OR CL, HIST, RELS, and PHIL Minors

5. South Asian Music

Offered by: Center for South Asian Music & Comparative Humanities (CH) Program

The minor in South Asian Music at Habib University will provide an opportunity for students to explore the field of Music and engage with their South Asian musical heritage through courses exploring the evolution and theoretical basis of South Asian music, contrasting them with other musical traditions and genres. The minor will offer courses that introduce basic musical theory, explore the scientific and mathematical frameworks of music, locate South Asian music in its historical and social contexts, and establish a foundation for pursuing advanced studies in music. Some courses for the minor will require students to learn a particular musical skill (instrumental, vocal or compositional). The practice component of the minor will be fulfilled by enrolling in music tutorials for three semesters.

Learning Outcomes:

- Recognize and distinguish between, various forms of musical performance (*e.g. dhrupad, khayal, thumri, kafi, kajri, dadra etc.*) and musical structures (*e.g. raags, taals, gats etc.*).
- Identify the properties of the twelve-tone scale and its usage in Western and South Asian music and apply techniques (both rhythmic and melodic) to generate rudimentary musical sounds.

- Articulate the mathematics inherent to musical forms and the mathematics used to generate musical ideas
- Accurately describe the social and historical contexts in which South Asian music has evolved and explain the global music context in which it currently stands.
- Assess, ethnographically, the system of South Asian music, its practitioner communities and audience, and use it as a lens for understanding the historical and contemporary socio-political landscape of the region.

Eligibility criteria:

Students from all programs at Habib University can take the South Asian Music Minor

Credits required: 15 Credits (minimum)

Courses required: 5 Courses (3 credits each) and 3 semesters of enrollment in the Music room lessons.

Details of Courses:

a. Core Courses (4)

- *MUS 101 - Music of South Asia: Styles and Structures* (3 Credits)
- *MATH 106 - Music and Mathematics* (3 Credits)
- *MUS 222 - Sound and Subjectivity* (3 Credits)
- *MUS 221 - Humari Meeras: History and Discourse in South Asian Music* (3 Credits)

b. Elective Course (1)

One elective course in either History, Theory, or Practice. The courses that currently qualify for such an elective are:

- *LIT 121 - Introduction to Pakistani Film Music** (3 Credits)
- *MUS 111 - Breathing Bansuri* (3 Credits)
- *ANT/MUS 203 - Musicking: The Anthropology of Music** (3 Credits)

* *The above courses offered with a different course code/prefix also qualify the requirement.*

c. Other:

Three semesters of practicum in Music Lessons offered at the Khawaja Mashooqullah Music Room, offered through the Centre for South Asian Music. Students declaring a South Asian Music Minor will be required to get attestation from the Music Room Manager and the Center Director in their final semester at Habib and will receive a certificate of completion of the three-semester practicum from the Center for South Asian Music. This requirement is in addition to the requirement for Music Room enrolment for MUS 101 (a course requirement).

Note

The student must meet at least two times a week for a 45-minute session with the instructor and must also carve out time for daily practice. Practicum is handled by the Centre for South Asian Music.

Grade Requirements:

The student should have a C+ or higher grade in all the 5 courses.

6. Communication

(Applicable for Class of 2025 & onwards)

Offered by: Communication and Design (CND) Program

The Communication (COM) minor is based around a condensed curriculum in New Media Production and Media Studies. Theory and practice are twinned in this minor, and the required courses will provide students with foundational to intermediate skills in media production, along with a proficient understanding of the global aesthetics of cultural production, with the aim to eventually apply this knowledge to the local context. Students will be able to use the two required electives to delve a little deeper into the kind of production they want to practice, or take more seminar courses in media studies and history if their interests lie in examining the impact of cultural production on society.

Learning Outcomes:

- Produce New Media artefacts aimed at knowledge creation, awareness generation and social change, among others
- Engage in creative and divergent thinking to approach content creation in innovative ways
- Demonstrate a capacity to think beyond disciplinary epistemes when considering the role of media in modern society

Eligibility criteria:

All Habib University Students from all majors (Class of 2025 & onwards) except those majoring in CND program can pursue the minor.

Credits required: 19 (minimum)

Courses required: 05

Details of courses:

1. *CND 103 - Intro to Design and Media* (5 credits)
2. *COM 201 - Production Fundamentals I* (5 credits)
3. *COM 204 - Elements of Aesthetics I* (3 credits)
4. One 100/200 COM elective – 3/4 credits
5. One 300/400 COM elective – 3/4 credits

7. Design

(Applicable for Class of 2025 & onwards)

Offered by: Communication and Design (CND) Program

This research and participatory design centered minor aims to provide students of other programs with foundational-to-intermediate skills and methodologies in human centered design. Students will be required to take both studio and seminar courses in order to complete this minor, and can expect to spend their time in these courses learning how to understand peoples' needs and respond to them with appropriate and innovative interventions.

Learning Outcomes:

- Conduct research on local communities along the principles of human centered design to achieve an empathetic and holistic understanding of their needs
- Engage in creative and divergent thinking to approach problems in innovative ways
- Develop interventions in the form of products or services in order to bring about meaningful societal change

Eligibility criteria:

All Habib University Students from all majors (Class of 2025 & onwards) except those majoring in CND program can pursue the minor.

Credits required: 18 (minimum)

Courses required: 05

Details of courses:

1. *CND 103 - Intro to Design and Media* (5 credits)
2. *DES 203 - Designing for and with People* (5 credits)
3. *DES 302 - Design & Social Change* (2 credits) OR *DES 204 - Research in Design* (2 credits)
4. One 100/200 DES elective – 3/4 credits
5. One 300/400 DES elective – 3/4 credits

8. Communication & Design

(Applicable for Class of 2023 & 2024 - This Minor has been discontinued for Class of 2025 & onwards)

Offered by: Communication and Design (CND) Program

Communication and Design has multiple intersections with all majors currently offered at Habib. The minor trains students to be critical observers of the visible world and helps them communicate their observations with clarity and insight. Coursework develops students' abilities through a combination of theoretical engagement and studio practice and teaches students how to move meticulously from an idea to its materialization. Students completing a CND minor will be better equipped to offer unique solutions to contemporary issues facing Pakistan by being able to address professional and intellectual challenges from a design point of view and to communicate strategies that are easier to implement.

Learning Outcomes:

- Understand how various media operates to shape our understanding of an interaction with the world around us
- Apply design thinking to solve critical issues facing Pakistan and the world
- Innovate creative solutions to the 'Wicked problems' within students' home discipline.

Eligibility criteria:

All Habib University Students from all majors except those majoring in CND program can pursue the minor.

Credits required: 15 (minimum)

Courses required: 05

Details of courses:

a. Core

One of Either:

- *CND 105 - Shaping Modernity* (Pre-Fall 2021) (4 credit hours)
- *CND 105 - Forms of Inquiry* (For Spring 2022) (2 credit hours) / *CND 106 - Forms of Inquiry* (Pre-Fall 2021) (4 credit hours)
- *COM 202 - Communication and Culture* (2 credit hours)/*CND 126 - Communication and Culture* (Pre-Fall 2021) (3/4 credit hours)
- *COM 209 - Thinking Media* (2 credit hours) / *CND 226 - Thinking Media* (3/4) credit hours

One of Either:

- *CND 311 - Elements of Aesthetics* (3 or 4 credit hours) or *COM 204 - Elements of Aesthetics 1* (3 credit hours)
- *CND 301- Transdesign Practicum* (4 credit hours) OR *DES 203 - Designing for and with People* (4 credit hours)

b. Electives

Minimum three CND, COM or DES electives (9-12 credit hours)

9. Social Development and Policy Minor

Offered by: Social Development and Policy (SDP) Program

Eligibility criteria:

Students from all programs from all majors except those majoring in SDP program at Habib University can take the SDP Minor.

Credits required: 18 (minimum)

Courses required: 05

Details of courses:

To earn a minor in SDP, students must successfully complete following courses:

1. SDP 101 - Development and Social Change
2. SDP 201 -Qualitative Research Methods (QRM1) or SDP 202B - Quantitative Research Methods (QRM2)
3. SDP 204 - Public Policy I or SDP 301 - Public Policy*
4. One SDP Elective at any level
5. One SDP elective at an upper-level (300 or 400).

**The course has been discontinued after Spring 2022.*

Minors offered by Dhanani School of Science and Engineering

10. PHYSICS

Offered by: Integrated Sciences and Math (iSciM) Program

The Physics minor is designed to open the opportunity for students with a significant interest in physics to deepen their understanding of the subject. This will provide a foundation for a broader range of technical fields, enhancing their ability to keep abreast of an ever-changing technological world.

Learning outcomes:

By the end of the Physics Minor, students will be able to:

1. Solve scientific problems by employing knowledge of fundamental physical laws and principles.
2. Model physical scenarios by utilizing a variety of mathematical and computational techniques, and experimental data.
3. Create and conduct experiments while observing standard scientific procedures, which includes equipment operation, data gathering and analysis, calculating uncertainties, etc.
4. Effectively communicate scientific information in written and oral forms.

Eligibility criteria:

Students from all programs at Habib University can take the Physics Minor.

Credits required: 20 (minimum)

Courses required:

Students must take all foundational courses (04 courses & 2 labs) specified in the table below, with (03) additional courses of 300 or higher level to qualify for the Physics minor.

Details of the Courses:

- a. Core Courses – 14 credit hours

Foundational Courses	Credit Hours	Pre-requisite(s)
PHY 101 - Mechanics and Thermodynamics (Course 1)	3	None
PHY 101L - Mechanics & Thermodynamics Lab (Lab 1)	1	PHY 101 - Mechanics and Thermodynamics
PHY 201 - Modern Physics (Course 2)	3	PHY 101 - Mechanics and Thermodynamics
PHY 102L - Advanced Physics Lab (Lab 2)	1	PHY 101L - Mechanics & Thermodynamics Lab

PHY 202 - Quantum Mechanics (Course 3)	3	PHY 201 - Modern Physics, and PHY 101 - Mechanics and Thermodynamics
PHY 241 - Electromagnetic Theory (Course 4)	3	MATH 202 - Engineering Mathematics or equivalent

- b. Elective Courses: Additional 3 elective courses (300 level or above) of minimum 3 credit-hour each.

Note:

1. The offering of electives is subject to the availability of faculty and is contingent on the number of students enrolled.
2. A minimum of seven (07) students are required to offer a course. In case fewer students enroll, individual study courses may be offered by the program subject to the availability of relevant faculty.

Grade Requirements:

Students must earn a C grade or higher in all *mandatory* courses (foundation courses) to continue with the minor.

11. MATHEMATICS

Offered by: Integrated Sciences and Math (iSciM) Program

The mathematics' minor at Habib University offers an opportunity to students from all disciplines with a significant interest in mathematics to develop strong foundations in key areas of mathematics. This optional field of study is designed to provide a foundation in Calculus, Linear Algebra, and basic modelling techniques using differential equations. Convergent thinking is also developed through the analysis of quantitative problems directed towards the right procedure for the right outcomes. The choice of courses available within the minor allows the students to take either a pure mathematics track, an applied mathematics track or a mix of the two.

Learning outcomes

Students successful at completing the minor requirements will be able to:

5. Develop Mathematical Maturity: to acquire a basic repertoire of mathematical knowledge that sets students well for further study and/or a career in mathematics, sciences, and/or other related fields
6. Effectively Communicate: to be able to read, understand and write mathematical texts independently; to communicate (written, oral, etc.) mathematical ideas in a simple, concise and elegant form, to varied audiences, with the appropriate use of notation, proof, and arguments.
7. Problem Solve: appreciate the application of mathematics across varied fields, and be able to apply fundamental mathematical skills and understanding of procedures to varied real-life problems and contexts
8. Develop Intellectually: recognize self-critical skills and gaps in their mathematical expertise, and address these appropriately by developing mathematical and intellectual confidence

Eligibility criteria:

Students from all programs at Habib University can take the Mathematics Minor.

Courses required: 07

Students must take (04) foundational courses specified in below table and (03) additional courses with at least two of them of 300 or higher level to qualify for the mathematics minor.

Credits required: 20 (minimum)

Details of the Courses:

a. Core Courses (List of courses with course names and credits)

Foundational Courses	Credit Hours	Prerequisite(s)
MATH-102 Calculus II	3	MATH-101 Calculus I
MATH-202 Engineering Mathematics	3	MATH-101 Calculus I
MATH-205 Linear Algebra	3	MATH-202 Engineering Mathematics
MATH-310/EE-354 Probability and Statistics	3	None

Note:

1. Math 0xx level courses cannot be taken to satisfy the minor.
2. DSSE students have a mandatory requirement of MATH 101 but it cannot be double counted towards the minor.
3. SAHSS students can count '*MATH 101 – Calculus I*' towards the minor.
4. Students are free to choose electives either from Pure Mathematics or Applied Mathematics or both.
5. Depending on the availability of the faculty, a variety of courses can be offered within Pure and Applied Mathematics. Please check with the program at the start of the academic year for the latest list of elective offerings.
6. A minimum of seven (07) students is required to offer a course. In case fewer students enroll, individual study courses may be offered by the program subject to the availability of relevant faculty.

Grade Requirements:

Students must earn a C grade or higher in all mandatory courses (foundational courses) to continue with the minor.

12. Bioscience

Offered by: Integrated Sciences and Math (iSciM) Program

With the advancing need to understand the physical and natural environments that we live in, now more than ever, the Bioscience minor will serve as a necessary gateway for students to understand and respond to the pressing requirements of the post-COVID-19 era. The minor in Bioscience will augment the educational experience of students who want to tailor their academic interests outside their respective disciplines. It will be instrumental in shaping a solid conceptual foundation for biological principles and phenomena by including innovative research projects which allow hands-on training and an opportunity for students to link these concepts with their majors at Habib University. The design framework of the minor caters to individual interest by giving students the freedom to choose from diverse tracks, ranging from courses such as Cell Biology and Public Health, Biochemistry, Ecology, and Evolutionary Biology, Global Health and Disease, The Secret World of Microbes, and Food and Nutrition. After all, post-COVID-19, the world is unlikely to resume to the way it was, highlighting the need for an integrated sciences approach to tackle the challenges that affect all life on earth.

Learning Outcomes:

- Apply systems thinking to connect structure and function across different levels of biological organization.
- Design research projects around real-world issues; gather, analyze, and interpret scientific data and articulate conclusions.
- Evaluate scientific information and communicate it using accurate terminology via a variety of modes, such as reports, posters, and presentations.
- Develop skills to safely and effectively work in a bioscience laboratory environment.

Eligibility criteria:

Students from all programs at Habib University can take the Bioscience Minor.

Credits required: 17 (minimum)

Details of the Courses: 05

- Students must take (02) foundational courses with labs specified in the table below.

Foundational Courses	Credit Hours
BIO 101 & BIO 101L – Cell Biology and Public Health (with lab)	3-1
BIO 211 & BIO 211L – Understanding the Human Body (with lab)	3-1

- Students must take any (02) lower-level electives.
- Students must take any (01) high-level elective course. A list of courses that could be offered at the 300 or 400 level is provided in the table below.

- The pre-requisite for all these courses would be the completion of the two (02) foundational courses.
- This provides students with a minimum of 3 credits.

Upper-Level Electives (Any one)	Credit Hours
BIO 301* – Global Health and Disease**	3
3xx/4xx – Cancer, Infectious diseases, and Immunology	3
3xx/4xx – Independent Study (Research) – Research projects in Biosciences	3

*Formerly offered with the course code of BIO 103

** If you have taken BIO 103 in Fall 2019 & Fall 2020, it will be counted as a 100-level elective

13. Computer Science

Offered by: Computer Science (CS) Program

The Computer Science minor at Habib University provides students with the opportunity to explore fundamental areas within the discipline, including basic programming and problem-solving, mathematical foundations, and software development. Starting with foundational courses in Algorithmic Problem-Solving, Discrete Mathematics, and Data Structures and Algorithms- the students' progress to advanced topics such as operating systems and software engineering, while also selecting CS electives to enhance their knowledge in their chosen major. The minor ensures a well-rounded understanding of Computer science, equipping students with a valuable skill set applicable across diverse fields, and meeting the increasing demand for CS professionals.

Learning outcomes:

- Demonstrate an understanding of fundamental principles and theory for developing computational solutions.
- Apply computer science theory and foundational software development skills to design effective computing solutions.
- Identify interdisciplinary connections by recognizing computational concepts in various contexts beyond the domain of computer science.

Eligibility criteria:

Habib University students from all majors except those majoring in CS are eligible for the CS Minor and they can double-count at most 4 required courses or program electives to fulfill their CS minor.

Note: The double-counting of a maximum of 4 required courses or program electives is applicable from the Class of 2025 & onwards (only) towards both the student's major and the CS minor.

Credits required: 22 (minimum)

The exact number of credit hours will depend on the nature of individual courses i.e., courses with/without a lab component.

Courses required: 07

Details of Courses:

Course or Course Category	Credit Hours	Pre-requisite(s)
CS Foundation: (All 3 Courses)		
CS 101 – Programming Fundamentals /Algorithmic Problem Solving	2-1/3-1	None
CS 113 - Discrete Mathematics	3	None
CS 102 - Data Structures and Algorithms	3-1	None
CS Kernel: Two 200 or higher-level courses from CS Kernel		
CS 201 - Data Structures II	3	CS 102 – Data Structures and Algorithms, CS-113 Discrete Mathematics
CS 224 -Object Oriented Programming	3-1	CS 102 – Data Structures and Algorithms
CS 212 - Nature of Computation	3	CS-113 Discrete Mathematics
CS 232 - Operating Systems	3-1	CS 330 – Computer Architecture (Theory)
CS 355 - Database systems	3-1	CS 102 – Data Structures and Algorithms
CS 412 - Algorithms: Design and Analysis	3	CS 201 – Data Structures II, CS 212 – Nature of Computation, MATH 310 – Probability and Statistics
CS 353 - Software Engineering	3	CS 224 – Object Oriented Programming, CS 355 – Database Systems
CS 351 – Artificial Intelligence	3	CS 102 – Data Structures and Algorithms, MATH 310 – Probability and Statistics
CS Elective: (Any 2 Courses)		
Any two 200-level or above CS Electives	6-8	

Instructions:

1. Before enrolling in any course for the CS minor, student must have obtained a passing grade in the respective pre-requisite course.
2. CS elective courses with CS 2xx (only from the list below), CS 3xx and CS 4xx course numbers will qualify. Also, courses (300 level and above) offered by other programs that are approved, can be counted as CS electives that can be taken. These CS Electives can be either 3 or 4 credit hour courses.

List of electives:

CS 261 - Understanding Social Networks
CS 262 - Computational Social Science
CS 222 - Programming Language

Brief guide for CS Minor:

CS Foundation (3 courses)

- CS 101 Programming Fundamentals
2+1, offered throughout the year
requires: none
- CS 102 Data Structures and Algorithms
3+1, offered mostly in Spring semester
requires: none
- CS 113 Discrete Mathematics
3+1, offered mostly in Spring semester
requires: none

CS Kernel (Any 2 courses)

- CS 201 Data Structures 2
3+0, offered mostly in Spring semester
requires: CS 102, CS 113
- CS 212 Nature of Computation
3+0, offered mostly in Spring semester
requires: CS 113
- CS 224 Object Oriented Programming & Design Methodologies
3+1, offered throughout the year
requires: CS 102
- CS 412 Algorithms: Design and Analysis
3+0, offered mostly in Spring semester
requires: CS 102
- ...

CS Electives (Any 2 courses)

- CS 440 Computer Graphics
3+0, offered mostly in Fall semester
requires: CS 201, CS 224, MATH 205
- ...
- other program approved courses

14. Electrical and Computer Engineering (ECE)

Offered by: Electrical and Computer Engineering (ECE) Program

The increasingly blurring boundaries between various disciplines in the present world have placed students interested in multiple areas in the difficult position of choosing between those areas. The minor in ECE provides an opportunity to students enrolled in other programs at HU to be exposed to the extensive breadth of ECE discipline areas, without a substantial investment of time on their part. The minor has been designed such that the students have reasonable academic preparation in terms of the foundations of ECE, but then have the option to create their own path through the different concentrations within ECE, including Communications, Power and Energy, Signal Processing, Control and Robotics, Analog Circuits, Digital Circuits, Electromagnetics, and Embedded Systems.

Learning Outcomes

- Construct circuits and test them in the laboratory using basic test equipment or simulation tools, with intermediate level of proficiency
- Analyze the behavior of electric circuits and systems, and reach substantiated conclusions using mathematical techniques
- Design ECE systems, components or processes that meet specified needs at beginner level of proficiency
- Either apply knowledge from one technical discipline within ECE, or comprehend knowledge from a few technical disciplines within ECE

Eligibility criteria:

All Habib University students from all majors except those majoring in EE & CE are eligible for the ECE Minor.

Credits required: 18 (minimum)

The exact number of credit hours will depend on the nature of elective courses i.e., courses with/without a lab component. It may be noted that in case electives are being offered with labs then the course has to be taken with the lab.

Courses required:

07 accompanied by labs (where applicable). Some courses have prerequisites/co-requisites in CS or MATH. **Up to three courses can be double-counted towards both the student's major and the ECE minor.**

Details of the Courses

a. Core Courses (4) – 9 credit hours

Course Number	Course Code	Course Title	Pre-requisite(s)	Co-requisite(s)
1	EE 100 ¹ /CE 100	Introduction to Electrical and Computer Engineering (0-2 credits)	None	CS 101; EE 112/CE 112
2	EE 112 ² /CE 112	Electric Circuits – I (2-0 credits)	None	EE/CE 100
3	ENGR 291	Engineering Workshop (0-1 credit)	None	None
One of the following four courses needs to be taken:				
4	EE 211 & EE 211L/ CE 211 & CE 211L	Basic Electronics (3-1 credits)	EE 112/CE 112	None
	EE 172 & EE 172L/ CE 222 & CE 222L	Digital Logic Design (3-1 credits)	None	None
	EE-213 ³ EE-213L ³	Electric Circuits - II (3-1 credits) Electric Circuits Lab (0-1 credits)	EE 112/CE 112; MATH 201	None
	EE 252 & EE 252L/ CE 251 & CE 251L	Signals and Systems (3-1 credits)	MATH 101	None

Note – Equivalent courses prior to Fall 2022:

¹EE 101 – Introduction to Electrical & Computer Engineering (2-2 credit hours)

²EE 111 – Electric Circuit Analysis (3-1 credit hours)

³EE 212 – Electric Network Analysis (3-1 credit hours)

b. Elective Courses: (minimum 9 credit hours)

Three additional courses are needed, out of which at least two should be at 300 level or above. At least one 300 level or higher course should be such that it is not being counted towards the student's major too. A list of approved electives for the minor can be requested from the program's office.

Note - It may be noted that in case electives are being offered with labs then the course has to be taken with the lab.

Grade Requirements:

A minimum grade of 'C+' is required in all mandatory courses.

Note:

- At most one of the 300 level courses and a maximum of three courses in total can be cross-listed with the student's major.
- Pre-requisite courses (if any) should have been passed by the student before enrollment in any of the courses.
- This scheme is applicable for students interested in pursuing ECE minor from Fall 2022 onwards.