Habib University
shaping futures

Course Catalog|
2021-2022

Disclaimer
Habib University Course Catalog 2021-22

The catalog is not to be considered as a binding contract between Habib University and students, parents, or guardians of students, nor other interested parties. Habib University reserves the right at any time, without advance notice, to change any part, portion or provision of the catalog; no vested rights shall run or be created by the catalog, including the right to notice of any modification, novation, amendment, supplementation, or other change of any term, provision or content of the catalog; such right of the University to enact changes, etc., especially shall include but not be limited to:

a) Withdrawal or cancellation of classes, courses, and programs;

b) Changes in fee schedules;

c) Changes in the academic calendar;

d) Changes in admission and registration requirements;

e) Changes in the regulations and requirements governing instruction in and graduation from the University;

f) Changes of instructors;

g) Changes of rules and regulations governing the students and student body organizations;

h) Changes of on-campus facilities, programs, and costs for room and/or board of students;

i) Changes of extra-curricular student activities, programs, and offerings; and

j) Changes of any other regulation affecting students, their parents/guardians, or other interested parties.

The official version of the Habib University Course Catalog is updated at the start of every academic year and resides on the Habib University website (See https://habib.edu.pk/office-of-registrar/academic-prospectus/).

Consult the University website (www.habib.edu.pk) for further information about the University.

Catalog compiled by the Office of the Academic Systems and Registrar; produced by the Office of Marketing and Communications.

Habib University
Course Catalog

2021-2022

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President's Message

Dear Class of 2025,

Welcome to Habib University.

You have just begun one of the most exhilarating journeys of your lives, one that will lead you on paths of intellectual discovery that will enable you to become engaged, thoughtful and skilled leaders of the world.

This Catalog is your companion to the courses offered at Habib University in 2021-2022 and is an invaluable resource for you to discover our curriculum and learn about the academic policies in force. You will also find within the guiding principles of Habib University's liberal arts education, its core courses and arts and sciences programs.

The easing of the restrictions and the resumption of limited in-person classes is a positive sign that slowly but surely, we are headed back to full on-campus learning and teaching activities. In the meantime, I want to assure you that we have invested deeply in cultivating a community, which is there to help you to navigate your journey and to become effective and successful in this complex and challenging world.

Do take the time to explore the University Catalog and find courses of interest which will help you become socially conscientious citizens of the world, who are equipped with the knowledge and skills to deal with the challenges posed by a post-Covid world.

All the best.

Wasif A. Rizvi
President

Vision

To be a global leader and South Asia's preeminent undergraduate liberal arts and sciences university.

Mission

Habib University's mission is shaping futures. The University accomplishes this mission by providing a demanding, contextually relevant and engaging world class liberal arts and sciences education to the most talented students, regardless of their financial capacity or any social considerations, thereby empowering them to build their futures, enrich their lives and become leaders in improving their country and the world.

Values

قِيمَةُ كُلِّ امْرِى ءٍ مَا يُحسِنُه

EVERY HUMAN BEING'S WORTH IS IN THEIR

YOHSIN

EXCELLENCE . PASSION . RESPECT . BEAUTY . SERVICE

Habib University's values are captured in the Arabic verb Yohsin (يحسن), which is rooted in the core Islamic notion of 'iḥsān. A multidimensional concept, with no single word corollary in English, Yohsin entails measuring each person's worth not only by the depth of their knowledge or skills, but by the application of their knowledge and skills to both personal self-cultivation and perfecting the world. This core philosophy is reflected in Habib's five aspirational values for all community members: (1) strive for excellence, (2) do what is beautiful in all actions, (3) nurture passion, (4) respect all others, and (5) serve the community.

University Learning Goals

	Themes	Imp. Attributes	Goals
KNOW	Knowledge	*Breadth & Depth*	Demonstrate both a genuine breadth of knowledge through the Habib Liberal Core and a capable depth of knowledge through command of their chosen major.
	Interdisciplinary & Transdisciplinary	*Synthesis & Connections*	Synthesize knowledge, methods and viewpoints from different disciplines to both make meaningful connections among and transcend them.
	Context	*Contextually Grounded*	Demonstrate their knowledge is grounded in a firm understanding of the historical, social, political, economic, religious, regional and global contexts in which they are located.
ACT	Creativity & Innovation	*Imaginative & Interesting*	Imagine, develop and produce creative, original ideas, interpretations and works.
	Critical Inquiry	*Analysis & Critical Thought*	Analyze and formulate relevant critical questions, and answer those questions in a substantive way supported by quantitative and qualitative evidence.
	Communication & Collaboration	*Interaction & Teamwork*	Listen actively to comprehend the meaning of others and successfully express cogent meaning through capable oral, written, and artistic modes of communication. Effectively interact and collaborate with others.
VALUE	Social Impact	*Service & Sustainability*	Recognize the reciprocity of knowledge and service, and benefit their community, society and the environment through socially responsible and sustainable engagement.
	Thoughtful Self-Cultivation	*Yohsin Values & Lifelong Learning*	Cultivate lifelong curiosity by engaging in inquiry and reflection to acquire and apply new knowledge.
	Ethical & Cultural Competence	*Personal & Professional Ethics*	Develop and nurture their own beliefs, values and sense of responsibility to reach informed conclusions, while considering, appreciating and respecting the perspectives of others.

Academic Calendar 2021-22

Fall 2021	
Faculty Returns	August 5, 2021
Summer 2021 Final Exams	August 6 – 7, 2021
Pakistan Independence Day	August 14, 2021
Ashura*	August 17 – 19, 2021*
Orientation for New Students, and Academic Planning for Spring 2022	August 23 – 27, 2021
First Day of Classes	August 30, 2021
Last Day to DROP Courses	September 8, 2021
Last Day to ADD Courses	September 10, 2021
Designated Saturday for Teaching (Monday Schedule to be Followed)	September 18, 2021
Arbaeen/Chehlum of Imam Hussain (AS)*†	September 28, 2021
Designated Saturday for Teaching (Tuesday Schedule to be Followed)	October 2, 2021
Mid-Term Examinations	October 11 – 22, 2021
12th Rabi-ul-Awwal*†	October 19, 2021
Diwali	November 4, 2021
Announcement of Final Class Schedule and Beginning of Advisement Period for Spring 2022	November 15, 2022
Designated Saturday for Teaching (Wednesday Schedule to be Followed)	November 6, 2021
Last Day to WITHDRAW from Courses	November 19, 2021
Designated Saturday for Teaching (Thursday Schedule to be Followed)	November 20, 2021
Self-Service Enrollment for Seniors	November 23 – 24, 2021
Self-Service Enrollment for Juniors	November 26 – 26, 2021
Self-Service Enrollment for Sophomores	November 30 – December 1, 2021
Self-Service Enrollment for First-Year Students	December 2 – 3, 2021
Last Day of Regular Classes	December 3, 2021
Designated Saturday for Teaching (Friday Schedule to be Followed)	December 4, 2021
Final Examinations for Fall 2021	December 7 – 15, 2021
Last Date to File Petition for Incomplete Grade	December 15, 2021
General Enrollment for Spring 2022 Resumes	December 16, 2021
Grades for Fall 2021 Due	December 24, 2021
Spring 2022	
Faculty Returns	January 5, 2022
Faculty Trainings and Development Workshops	January 5 – 7, 2022
First Day of Classes	January 10, 2022
Last Day to DROP Courses	January 19, 2022
Last Day to ADD Courses	January 21, 2022
Letter grades for I Grades Awarded in Fall 2021 Due	January 27, 2022
Kashmir Day Holiday	February 5, 2022
Conference Week: No Classes	March 21 – 25, 2022
Pakistan Day	March 23, 2022
1st Ramadan*; The University Switches to Ramadan Schedule	April 3, 2022
Announcement of Final Class Schedule and Beginning of Advisement Period for Fall 2022	April 6, 2022
Last Day to WITHDRAW from Courses	April 8, 2022
Self-Service Enrollment for Rising Seniors	April 14 – 15, 2022
Self-Service Enrollment for Rising Juniors	April 19 – 20, 2022

Self-Service Enrollment for Rising Sophomores	April 21 – 22, 2022
Youm-e-Ali (Martyrdom of Imam Ali) *†	April 23, 2022
Last Day of Classes	April 29, 2022
Eid-ul-Fitr Holidays*	May 3 – 6, 2022
Final Examinations for Spring 2022	May 9 – 18, 2022
Last Date to File Petition for Incomplete Grade	May 18, 2022
General Enrollment for Fall 2022 Resumes	May 19, 2022
Grades for Spring 2022 Due	May 27, 2022
Convocation (Tentative)	June 11, 2022
Summer 2022	
Last Day to ADD/DROP Courses	June 3, 2022
First Day of Classes	June 6, 2022
Incomplete Grades for Spring 2022 Due	June 30, 2022
Eid-ul-Adha*†	July 11 – 13, 2022
Last Day of Classes	August 3, 2022
Final Examinations for Summer 2022	August 4 – 5, 2022
Ashura*	August 7 – 9, 2022
Grades for Summer 2022 Due and Official Announcement	August 10, 2022

Notes:

- Habib University reserves the right to correct typographical errors or to adjust the Academic Calendar at any time it deems necessary.
- Board of Faculty meetings will be scheduled in the 3rd or 4th week of each month, except for June and July.
- Academic Council meetings will be held in the 4th week of every even-numbered month, except for June.

* Subject to sighting of the new moon.

† No classes.

About Habib University

Habib University's liberal arts and sciences framework offers students broad-based knowledge across a variety of disciplines while delving deeply into a specific field. It proves a combination of technical expertise and vital soft skills, qualities that are highly sought in today's professional world.

Passionate and supportive, Habib University's internationally qualified faculty is invested in their students' academic, personal and professional success. As dedicated teachers, respected experts and innovative researchers, they will share their experience with students, involve them in their projects and prime them to embark fearlessly on their academic journey. Habib University provides a meta-curricular learning experience, which takes students beyond conventional academics.

Student Life activities are a large part of what defines learning at Habib. Through these activities, students will encounter diverse perspectives and find solutions to real-world problems, making their learning experience a truly transformative one. With multipurpose recreational spaces, technology-enabled classrooms, state-of-the-art labs and studios, and much more, Habib University's purpose-built campus provides students plenty of opportunities to maximize their potential.

Habib University forms a diverse community of learners hailing from a variety of backgrounds, who bring with them a myriad of perspectives and opinions. Encountering such different people and ideas builds an awareness of global perspectives among students.

Global partnerships have been instrumental in the development of Habib University, enabling us to adopt the best practices in higher education. Partnerships with two of the top universities in the US – Texas A&M and Carnegie Mellon – have resulted in mutually enriching and supportive relationships from the early stages of institutional planning through curriculum development to ongoing academic operations and administration. Habib University is also collaborating with leading undergraduate liberal arts colleges – including Harvey Mudd College and Pitzer College, in Claremont, California – on faculty and student exchange, faculty development, co-teaching of courses, and program development.

To expand student opportunities, Habib University has partnered with some of the world's leading programs and universities, including Stanford University's Summer International Honors Program, University of California at Berkley and University of Michigan at Ann Arbor. These are highly competitive programs that allow our top students to spend a Summer for study abroad.

Academic Policies

(Applicable to all Habib University students, faculty, and academic staff)

Academic Rights and Responsibilities

Habib University is a community of learners founded on the basis of the right to freedom of thought and respectful exchange of ideas. Neither students nor faculty should be disadvantaged on the basis of their political, religious, or other opinions. No member of the Habib University community will behave in any manner that infringes on the rights of any student or faculty to teach, learn, carry out research, or pursue creative or other activities connected to the University.

Students are expected to attend all classes, seminars, and labs and to follow any other reasonable course of study as determined by their instructors, academic advisors, or the Board of Faculty. Classroom assignments and course/degree requirements should be completed as prescribed in order to allow faculty sufficient time for adequate evaluation. Failure to fulfill these responsibilities may adversely affect course grades, cumulative grade point average (CGPA), and/or progress within the student's degree program.

Academic dishonesty shall be considered a serious violation of these responsibilities and will be subject to strict disciplinary action as prescribed by the Habib University's 'Student Code of Conduct and Honor Code.' Academic dishonesty includes, but is not limited to, cheating, plagiarism, and collusion.

Faculty shall evaluate student performance based upon the expectations and the actual content of the class, lab, studio, or another course of study as defined and communicated to the students by the faculty member at the outset of the course. Students who feel that they have received a capricious or arbitrary grade can appeal said grade as defined elsewhere in this document.

University Statement of Anti-Discrimination

Habib University is committed to providing a learning environment free from discrimination and to nurturing a diverse and vibrant University community while respecting the fundamental dignity and worth of all of its members. Supporting this commitment, the University does not tolerate discrimination in any form and provides mechanisms for redress for students who feel they are being discriminated against.

Habib University does not discriminate against any person in the management and administration of its academic and admission policies, scholarship and financial aid programs, and other University-administered programs nor does the University permit the harassment of any student or applicant on the basis of race, color, sex, gender, religion, national origin, creed, disability, marital status, sexual orientation, partnership status, pregnancy, age, military status, or any other legally protected status.

The Office of Community Values and Standards (OCVS) is responsible for coordinating the University's adherence to this policy and for complaint procedures in regard to discrimination or harassment.

Academic Advising

Academic Advising is a central element of the undergraduate experience at Habib University. Every student enrolled at Habib University is assigned two advisors: (i) a faculty advisor belonging to the student's program, and (ii) an advisor in the Office of Academic Performance (OAP), at the time of

enrollment. Advising is intended to be a collaborative relationship between a student and their advisors through which students create educational plans consistent with their personal, academic, and career goals. Students should meet with their advisors at least three times per semester to discuss their academic progress. Students who are struggling academically should first speak with their academic and OAP advisors for guidance. Students who have been placed below good academic standing must meet with their academic and OAP advisors as described later in this document.

A student's academic advisor is listed in the University's Campus Management System (PeopleSoft) available via the Student Portal at the University's Intranet. Students wishing to change their advisor should make a formal request to the Office of Academic Performance.

Declaration of a Major

All first-year students enrolled in DSSE must declare their major at the time of admission .

Change of a Major

Students wishing to change their major must submit a 'Change of Major' application form to the Office of the Registrar. A change of major application must be approved by the student's academic advisor, the concerned program director/assistant dean, and the Office of Academic Performance. Once the approval process is complete, a coursework/graduation plan must be submitted by the student to the Office of the Registrar based on the graduation requirements for the most recent catalog year of the new major. This plan must be developed in consultation with the student's academic advisor and the Office of Academic Performance. The Office of the Registrar will process a change of major and notify the student and all concerned University offices including the Office of Student Finance for any financial adjustments needed that result from this change. Depending upon how many courses are transferred from the previous major to new major, a change of major may result in lengthening the student's stay at Habib University beyond eight semesters.

Declaration of a Minor

Minors provide students at Habib University the opportunity to pursue an area of secondary specialization. A minor consists of a smaller set of courses within a well-defined area as determined by the awarding program and duly approved by the University's Academic Council. Students interested in completing a minor must declare their choice before the end of enrollment of their seventh semester by filing a Declaration of Minor Form and submitting it to the Office of the Registrar.

Transfers

All transfer requests, including transfer of credits, will be reviewed on a case-by-case basis. Incoming students who have completed university-level course work at other institutions may request for transfer of credits. All students, regardless of their transfer status, must satisfy the University's Liberal Core requirements and spend at least four semesters at the University as full-time students before graduation and fulfill transfer criteria as per the University and Higher Education Commission (HEC) policies.

Enrolled students at the University may submit a request for a transfer of credits earned at other recognized institutions (e.g., through the University's learning abroad program) to the Office of the Registrar. On receiving a form that is duly-filled and signed by student, the Office of the Registrar

sends the form along with the necessary documents (as mentioned in the form) to the relevant program director for approval of the Program Board of Studies (BoS). On receiving an approval of the Program BoS and the concerned assistant dean of the school, the Office of the Registrar processes the application and notifies the student and all concerned departments/units accordingly.

Courses for which a transfer of credits is approved appear on the student's transcript with a 'TR' (transfer) grade, which is not counted towards a student's semester/cumulative GPA. Further details and procedures are available in the Habib University's Transfer of Credits Policy.

Attendance/Engagement Policy

Whenever classes are held face-to-face on campus, attendance is mandatory at Habib University. Unless an absence is due to a University-sanctioned event in which a student is officially representing the University, there is no distinction between excused and unexcused absences. Attendance will be taken and absences noted in all classes by the course instructors in the University's Campus Management System (PeopleSoft). All students must maintain at least 85% attendance for each class in which they are registered. Non-compliance with the minimum attendance requirements will result in an automatic failure of the course with an award of an 'F' grade and may require the student to repeat the course when next offered, subject to the University's course repeat policy.

When classes are held online, or in HyFlex mode, students are expected to watch all pre-recorded sessions and attend all synchronous sessions. Students failing to join any live sessions must inform their instructor within a pre-determined time-frame along with the reason. If a student does not attend any or majority of the live sessions, and the nature of the class requires in-class participation then the instructor may request the Registrar Office to

- drop the students from course, if the request is made before the course drop deadline;
- withdraw the student from the course with a grade 'W' recorded on the transcript;
- fail the student, in which case an 'F' will appear on the transcript against the course.

The third option is exercised rarely and in extreme cases. In this case, the student may petition the Committee on Academic Standing for a retroactive withdrawal from the course. The Committee will confer with the faculty member to make the determination whether the retroactive withdrawal is appropriate.

Grades and their Numerical Equivalents

Letter Grade	Scale
A+	4.00
A	4.00
A-	3.67
B+	3.33
B	3.00
B-	2.67
C+	2.33
C	2.00
C-	1.67
F	0.00
AU	Audit
W	Withdrawal
I	Incomplete
TR	Transfer
R	Repeat
R*	Repeat (substitute)
S	Suspended
P	Pass
CR	Credit (Pass)
NC	Non-Credit (Fail)

Grade Point Average (GPA)

At the conclusion of each semester during a student's tenure at the University, grade point average will be reported in two ways:

- Semester GPA (SGPA): GPA for a single semester only;
- Cumulative (CGPA): A cumulative GPA for the duration of the student's enrollment.

Semester and cumulative GPAs are calculated only for courses attended at the University. In some cases, GPAs might be calculated for a school, program, concentration, or major. However, these specialized GPAs will not appear on a transcript.

Calculating GPA

- Grades A+ to F earned in a course shall be counted towards the calculation of SGPA and CGPA.
- Grade F replaced by R or R*, upon repeating a course, shall not be counted towards the calculation of SGPA and CGPA.
- Following grades shall not be counted towards the calculation of SGPA or CGPA: Audit (A), Withdraw (W), Incomplete (I), Transfer (T), Suspended (S), Credit (CR), Non-Credit (NCR), Pass (P).
- In case of a change of major, grades of the following courses earned while pursuing previous major will be transferred to new major and will be counted towards the calculation of CGPA:
  - All Liberal Core Courses irrespective of grade(s) earned;
  - Any core courses relevant to the new major irrespective of the grade earned;
  - Courses with a passing grade that may be eligible for transfer to new major as electives.
- In case of a change of major, the courses and respective grades which are not transferred to the new major will also be listed on the transcript but their grades and credit hours will not be counted towards the calculation of CGPA. All passing grades of the courses not transferred will be recorded as CR and failing grades will be recorded as NCR or R, as per the number of attempts made for a failing course.

The formula for calculating GPA or CGPA is to divide the Total Quality Points (TQPs) earned in all courses by the Total Attempted Credits (TACs).

GPA = Total Quality Points (TQP) / Total Earned Credits

Quality Points (QP) for a course equal the course credit hours multiplied by the numeric value of letter grade earned in the course, as per the grading scale. Total Quality Points is the sum of Quality Points of all the courses that are included in the calculation of GPA.

First Semester Grades

First semester is the transition semester from high school to a university environment for first year students. The transition requires them to learn new skills, adjust to a new environment, understand university expectations, and learn to manage themselves as independent learners. This policy has been developed to allow for an enriching first semester experience, without the pressure of maintaining a high semester grade point average (GPA) required to be in good academic standing.

- Students' aggregate scores in a course will be converted into Credit (CR) for a pass grade and Non-credit (NCR) for a fail grade for all the courses attended in their first semester at Habib University.
- The cut-off for CR will be equivalent to the passing grade as described in the grading scheme of the most recent course catalog.
- Aggregate scores are awarded for the purpose of determining CR/NCR status. These will not be recorded in the students' transcript or in any other official document.
- CR/NCR will not be included in the calculation of the final Cumulative Grade Point Average (CGPA) that appears on a student's transcript. However, the number of credits earned during the first semester will be counted in the total credits required to graduate.
- Students earning an NCR in one or more first semester course(s) may repeat the same course(s) or equivalent, in subsequent semesters. For such courses, the grading policy of CR/NCR shall apply.

- First semester CR/NCR will be considered in assessing students' academic standing status. First year students receiving one NCR (noncredit grade) or more in the first semester will be placed on 'Academic Warning' as per the University's Academic Standing Policy.
- Habib University's financial commitment to first year students, if any, will not be affected by their first semester grades.
- First year students will be considered eligible for student employment in the second semester of their study at Habib University if they earn CR in all of their first semester courses.

Incomplete (I) Grade

Students are expected to complete all academic coursework and assignments during a semester latest by the last day of classes for that semester. If a student is unable to complete a course due to serious illness or exceptional circumstances beyond their control, and the work completed to date is of passing quality, they may request an Incomplete (I) grade from the instructor, provided that the grade gives no undue advantage to that student. Incomplete grades are not a privilege and are only awarded to students under exceptional circumstances i.e., they cannot be awarded as part of a course's assessment and grading policy.

Procedure

The Student-Faculty Meeting

The student is expected to first meet with the faculty member of the course and determine together if the outstanding work can realistically be completed within 6 weeks of the last day of exams for the semester. This meeting is expected to take place in advance of the deadline for incomplete requests, which is the last day of final exams for a semester. Under exceptional circumstances where students are unable to meet with the faculty member (e.g., the student is hospitalized), the faculty member may proceed with submitting the petition for an incomplete on behalf of the student, but indicate why the meeting with the student has not occurred.

Only the instructor for the class may submit the petition for an Incomplete request, and must do so no later than the last day of exams for the semester.

Review of Incomplete Petitions by the Associate Dean for Academic Systems

Before making a decision, the Associate Dean for Academic Systems may request to meet with the student and faculty member to discuss the incomplete request and to clarify arrangements for the completion of outstanding work. The Associate Dean may also request documentation from the student if documentation has not been provided and is deemed necessary. Students and faculty will be notified of the Associate Dean's decision regarding the incomplete request by e-mail.

If an incomplete is approved, the faculty member should not enter any grade for the student. The Associate Dean for Academic Systems will enter the grade of "I" in the student record.

The instructor must record the permanent grade by the last day to complete I grades, as indicated in the Academic Calendar, or the 'I' will default to an 'F' grade. Incomplete grades are not calculated into a student's grade point average.

Change of Grades

Grades awarded at the end of a semester/term for each course are considered final. Instructors may submit to the Office of the Registrar a Change-of-grade' form after seeking approval of the Dean of

Faculty clearly mentioning the reason for which a change of grade is needed, which can only be due to a calculation or a clerical error. Change-of-grade form must be submitted by the course instructor latest by the end of the subsequent semester.

Course Lettering and Numbering

All courses are designated by a letter prefix denoting the program/subject area in which the course originates. The prefix code is followed by a three-digit sequence denoting the course level. Levels are designated as follows:

000 – Pre-University and/or noncredit courses offered by the University. This may include some transitional courses.

100 – Courses that are generally taken in the first year.

200 – Courses that are generally taken in the second year.

300 – Courses that are generally taken in the third year.

400 – Courses that are generally taken in the final year of study.

In general, the course level dictates the point at which a student should take a particular course within the sequence of requirements. Typically, 100- and 200-level courses are categorized as lower-division whereas 300- and 400-level courses are categorized as upper-division courses. Before enrolling in a course, students should check all of the course prerequisites to make sure that they are eligible to enroll in that course.

Cross-listed courses must be approved by all the participating programs/teaching units through their respective Program Boards of Studies. Approved cross-listed courses shall have the prefixes of all the participating programs and shall have the same level.

Course Repeat Policy

Students are permitted to repeat any course offered by the University, either to improve their original grade or to clear a course in which an 'F', 'W' or 'R' grade was received. A student is permitted to retake a course two (02) times only, for a total of three (03) attempts. All attempts will be recorded on the student's transcript, but only the best-earned grade will be counted towards GPA. Previous attempts will be recorded with an 'R' grade, denoting Repeat.

The University is not obligated to re-offer elective courses, but courses defined as graduation requirements (e.g., Habib Liberal Core or programmatic requirements), must be re-offered or, if the course has been significantly redesigned or discontinued, must have an equivalent course defined by the relevant Board of Studies. The grade(s) earned in the discontinued course will be recorded on the transcript with an 'R*,' denoting that the original course has been discontinued and the requirement is met with a new course.

Students failing to clear courses required by their chosen program, especially those that are prerequisite(s) for later courses, may be unable to graduate within eight (08) regular semesters and must seek advice from their academic advisor and the program. The Office of Academic Performance (OAP) shall provide additional advising and academic support, in collaboration with the offering program, on a per case basis. Students failing a required course twice should give careful consideration to the chosen field of study and should seek advice from their academic and OAP advisors regarding future course of action.

A course repeat fee may be charged for any repeated course, regardless of the reason for a repeat.

Maximum and Minimum Course Load

Full-time students at Habib University must register for a minimum of twelve (12) credit hours in a semester to maintain full-time status. The maximum allowable course load per semester is twenty (20) credit hours. Students with a cumulative GPA (CGPA) of 3.0 and above who are in their third or final year may submit a request to the Office of the Registrar to enroll in an additional course beyond the maximum allowable limit. This is subject to the approval by the Committee on Academic Standing.

Failure to maintain full-time status may affect student's financial aid and scholarship. Students who are allowed to take course overload may be charged additional fee. In either case, students are advised to contact the Office of Student Finance for details of financial implications of course overload and underload.

Auditing a Course

Students may audit a course for self-enrichment and academic exploration. An audited course will appear on the transcript with an "AU" (audit) grade. An audited course does not earn a grade or credit, is not included in the calculation of GPA, and does not count toward the minimum course load required for continuous enrollment. Students registering a course for credit have priority over those wishing to audit the course. A student auditing a course may be asked to drop the course during the semester enrollment period if another student wants to enroll in the course for credit.

Audit courses do not fulfill degree requirements, but the credit value of audited courses may be included in the semester load for determining fees and the maximum number of credits carried each semester. An audited course cannot be used to meet the pre- or co-requisite condition of another course. The extent to which a student may or may not be required to participate in the audited course, including attendance or engagement, is determined by the instructor prior to enrollment. For example, the instructor may decide if a student auditing a course will be permitted to take exams, submit homework and have it evaluated. Students choosing to audit a laboratory course may be required to pay the additional lab fee.

The process for registering to audit a course is the same as registering for a course for credit along with the following additional requirements:

- Students wishing to audit a course must obtain approvals from the course instructor and their academic advisor and submit them to the Office of the Registrar using the Add/Drop course form before the end of the enrollment period.
- For courses with a laboratory component, approval from the lab instructor must also be obtained.
- The program that offers the course may have additional requirements. Students wishing to audit the course should contact the concerned program director for information about these requirements.

Changing a course status from audit to credit, or from credit to audit, or dropping an audit course must be done during the semester enrollment period. A student wishing to change from credit to audit status must meet the additional requirements of registering for an audit course.

An additional fee may be applicable for auditing a course if a student exceeds the maximum allowable course load. Students on financial aid should bear in mind that any fee for auditing a course may not be covered in their financial aid package. It is the student's responsibility to resolve all financial matters related to auditing a course by contacting the agency administering the scholarship or the Office of Student Finance.

Academic Standing, Probation, and Dismissal Policies

Habib University requires that all students to maintain good academic standing. Academic standing is determined by academic performance and is measured through a cumulative grade point average (CGPA). Failure to maintain good academic standing may result in an academic warning, first academic probation, final probation, or dismissal. At each stage, below good academic standing, students are provided learning support and advice in order for them to achieve good academic standing.

The Academic Standing policy defines good academic standing as well as identifies the circumstances under which a student is placed on academic warning, first academic probation or final probation, and the consequences of these standings.

Details of Academic Standing

Good Academic Standing

Students who maintain a minimum cumulative grade point average (CGPA) as per the University's graduation requirement i.e., 2.33 and a fulltime status by enrolling in minimum 12 credit hours per semester are considered to be in 'Good Academic Standing.'

Students who do not maintain a good academic standing, will not be eligible for the following:

- Apply for the University's learning abroad program;
- To be on Dean's Honors List of the University in a given regular semester;
- Avail student employment opportunities;
- Avail scholarship and/or financial–aid.

Academic Alert

Following two categories of students, while still in 'Good Academic Standing,' will be considered to be on 'Academic Alert.'

- Students who maintain a CGPA between 2.33 and 2.67;
- Students who maintain a CGPA above 2.33 but their semester GPA (SGPA) falls below 2.33 in any semester.

An 'Academic Alert' triggers interventions by the Office of Academic Performance (OAP) and concerned academic program(s). It is intended to provide timely academic support to prevent a student from losing their good academic standing. No official letter will be issued to students on Academic Alert.

Academic Warning

Students will be placed on 'Academic Warning' in one or more of the following situations:

- Their CGPA falls below 2.33;
- Freshmen receiving one or more NCR (non-credit fail) grade in the first semester;
- They fail to maintain a full-time status.

Students will return to 'Good Academic Standing' if they meet the requisite conditions as defined under Good Academic Standing.

Students on Academic Warning must meet with their academic advisor in OAP and their faculty advisor to design an Academic Success Plan. If the student achieves a CGPA of 2.33 at the end of the semester, the student shall be restored to 'Good Academic Standing.'

First Academic Probation

Students who are already issued an 'Academic Warning' will be placed on 'First Academic Probation' if they fail to return to 'Good Academic Standing' by the end of the semester in which they were given the 'Academic Warning.' A student will return to 'Good Academic Standing' if they meet the requisite conditions, as defined under 'Good Academic Standing.'

Students on 'First Academic Probation' must meet with their academic advisor in OAP and their faculty advisor to revise the Academic Success Plan. During the probation period, students should expect close academic supervision and must meet with their OAP and faculty advisors as highlighted in the Academic Success Plan.

Final Academic Probation

Students will be placed on 'Final Academic Probation' if they fail to achieve 'Good Academic Standing' by the end of the semester in which they were placed under 'First Academic Probation.' Students on 'Final Academic Probation' will remain actively enrolled but under the direct supervision of OAP and the relevant program director.

Students on 'Final Academic Probation' will not be allowed to enroll in more than twelve (12) credit hours and in any new course(s) unless their required repeat courses are not available. Students will enroll only in the courses suggested by their faculty advisor and OAP. They will also undergo any additional intervention plan mandated by the Office of Academic Performance and the relevant faculty advisor and program director(s). Students will return to 'Good Academic Standing' if they meet the required conditions, as defined under 'Good Academic Standing.'

Students on 'Final Academic Probation' must meet with their academic advisor in OAP and their faculty advisor to revise their Academic Success Plan. During the 'Final Academic Probation' period, students should expect close academic supervision and must meet with their OAP and faculty advisors as highlighted in the Academic Success Plan. Students on 'Final Academic Probation' must achieve a CGPA of 2.33 to return to the status of 'Academic Warning' for an additional semester.

Academic Dismissal

Students will be dismissed from the University if they fail to achieve the CGPA required to maintain 'Good Academic Standing' by the end of their 'Final Academic Probation' period. Additionally, students who refuse to follow the mandated course plan during 'Final Academic Probation' may also be dismissed from the University. Students dismissed for academic reasons are not eligible for readmission to the University or a tuition refund.

Academic Standing of Students Changing Major

The academic standing of students who change their Major will be determined using the GPA of courses which are relevant to their new Majors.

Withdrawals

Occasionally, it may be necessary for students to withdraw from one or more courses during a semester due to personal reasons. It should be used only when, in consultation with a student's academic advisor, there is no other alternative.

Administrative/Non-Voluntary Withdrawal

Habib University reserves the right to administratively withdraw a student from classes.

The University may at any time decide to administratively withdraw a student if it finds such action is needed to maintain a campus environment that is conducive to its educational purpose, to maintain order, and/or to protect the rights and safety of its community members. To this end, officials may order the involuntary withdrawal of a student from the University and/or from its residence facilities in accordance with institutional policy.

This policy will cover behaviors as described herein and that occur on University premises or at organizationally sponsored activities, but it also may address off-campus behavior if the University determines that the behavior has otherwise damaged the University, its property, or that of another community member irreparably; likewise, if the continued presence of the student is seen to impair, obstruct, interfere with or adversely affect the mission, process, or functions of the institution; or if they engage or threaten to engage in behavior that poses a danger or physical harm to oneself or others at any time.

Procedures Under this Policy

This policy should not be seen as a substitute for appropriate disciplinary action as outlined in the Code of Conduct and procedures herein may run concurrently with those processes. This procedure may be implemented at any time in consultation with the competent authority, or if the Head of Student Life deems it necessary to do so.

Upon receiving a referral or report of an issue involving a student that could fit under this policy, the Office of Community Values and Standards (OCVS) will conduct a review of the information provided. If warranted, an immediate meeting with the student may be requested. After the meeting, the appointed official may take one or more of the following actions:

- Determine that the guidelines have not been met for involuntary withdrawal and terminate the process entirely;
- Determine that the guidelines have not been met and refer the case to the student conduct process;
- Require that the student schedule an evaluation by a qualified, licensed, mental health professional outside of the University at the student's cost;
- Invoke an interim suspension pending further investigation and/or the outcome of a student conduct case;
- Impose additional requirements on the student that must be met in order to continue enrollment;
- Allow a student who meets the conditions herein to voluntarily withdraw from the University and waive the right to further procedures under this policy and any privilege to enroll in the University again;
- Proceed with an immediate administrative withdrawal.

Student's Failure to Comply

A student may, with an immediate effect, be involuntarily withdrawn and/or disciplined under the policy and forfeits any right to appeal for any of the following conditions:

- Failure to attend any required meeting;
- Failure to schedule and/or appear for any directives as associated with this process;
- Failure to adhere to any conditions placed on the continued privilege to enroll in the institution.

Forced Withdrawal

Until a particular case of alleged misconduct has reached a final decision, the student shall retain all privileges to attend classes, use campus facilities, and otherwise be present on campus. As an exception to this shall be in cases where, in the view of the competent authority, a threat to the teaching/learning environment at the University, or the safety of community members is at risk. The University will take steps to ensure the protection of University property, and the University may decide to invoke an interim withdrawal of these privileges at any time. When in the opinion of the University an interim withdrawal/suspension is to be imposed, notification to the student may come in either verbal or written form. Within three (3) business days of an interim action, a student should be notified in writing of any formal allegations. The student will be given the opportunity to resolve the issue, either formally or informally, within ten (10) business days according to the policies and procedures contained herein or in any other University publication.

Appeals

A student may appeal an involuntary withdrawal using the same procedures as outlined in the student conduct process and the grievance policy.

Family Emergency and Medical Withdrawal

On rare occasions, a student may have an emergency in the family or a medical reason that prevents them from completing a term. The student or student's family should notify the Office of the Registrar as soon as possible to request a Family Emergency or a Medical Withdrawal. It may be asked that proper documentation is submitted along with a 'Medical Leave of Absence' application.

In cases where the onset of the issue at hand was sudden and/or the student or family were unable to notify the University, the University may grant a retroactive Family Emergency or Medical leave. In such cases, a written request clearly stating the reasons and documentation should be submitted as soon as possible to the Office of the Registrar.

Appropriate documentation for a withdrawal in this category consists of a letter from the student's attending medical provider that specifies the following:

- Date of onset of illness or other issues;
- Dates under professional care;
- General nature of the medical condition or other issue and why/how it has prevented the student from completing coursework;
- Date the student was last able to attend school;
- Date of anticipated return to school.

Grading after Withdrawal

All withdrawals completed after the course drop period will be noted on the transcript with a 'W' grade. Signed course withdrawal forms must be turned in to the Office of the Registrar before the deadline as stated in the academic calendar for the current year.

Interim Withdrawal/Leave of Absence

A request for a leave of absence will be granted if a student is not able to register for classes for more than one regular semester for a documented reason. Students should consult with the academic advisor and the Office of Academic Performance before applying for Interim Withdrawal/Leave of Absence from the University.

A leave of absence is good for up to one academic year and may be renewed only once for up to one more year. To file for a leave of absence, an Interim Withdrawal/Leave of Absence Request Form may be obtained from the Office of the Registrar and must be signed by the academic advisor and the concerned assistant dean of the school. In the event that the student has not declared a major, the Director of Academic Performance will approve the application.

Students taking Interim Withdrawal/Leave of Absence must bear in mind that the Higher Education Commission (HEC) requires students to be enrolled in at least eight (8) regular semesters in order to complete a four-year Bachelor's degree. Hence students proceeding on Leave of Absence will have to complete the required semester count as one of the degree requirements.

Summer Semesters

Summer semesters are offered at Habib University in addition to the regular semesters. The semester dates, course offerings, and enrollment are announced and handled by the Office of the Registrar. Fulltime students at Habib University may enroll in courses offered in Summer semesters to:

- Repeat a course if an 'F' or 'W' grade was awarded for that course previously;
- Improve grade for a previously attended course;
- Attend any additional courses other than those required to fulfill requirements of a major program offered at Habib University, e.g., to fulfill requirements of a minor.

Students may enroll in a maximum of two (02) courses (or 08 Credit Hours) in a Summer semester at the University. All University academic policies and regulations including the Attendance and Academic Standing policies will apply as in the regular semesters. All financial policies for a Summer semester, including tuition, fees (if applicable) and discounts are announced by the Office of Student Finance.

Further details are available in the University's Summer Semester Policy.

University Records

Habib University maintains students' educational records and ensures their right to access and privacy of information maintained in these records. The following guidelines provide procedures for maintenance of and access to student educational records held by the University.

Definitions

For the purpose of these guidelines, the terms used herein are defined as follows:

Education record – any record, document, or material maintained by the University (either directly or through a third party) that contains information directly related to the student which is recorded on any medium including, but not limited to, handwriting, print, audio, video, tapes, or electronic storage.

However, the definition of education record does not include:

- Records that are maintained by University officials in their personal capacity and are not available to others;
- Records established and maintained by campus security;
- Employment records of the students employed by the University;
- Records maintained by the Health and Wellness Center when the records are maintained solely for the purpose of treatment of the student;
- Records that are maintained after the person is no longer a student, such as Alumni records.

Parent – the natural parent, guardian, or an agent nominated by the parent/guardian to act as such.

University Official – an individual employed by the University in an administrative, supervisory, academic, research, or support staff position; a member of the Board of Trustees; an individual performing special tasks for the University, such as an attorney, or an auditor; a contractor, consultant, volunteer, or other outside party providing institutional services; and an individual serving on an official University committee, such as the disciplinary committee, or assisting the University in the performance of official tasks.

Personally Identifiable Information – any information linked or linkable to a student that, alone or in combination, would allow an individual of the campus community, who does not personally know the student, to identify the student with reasonable certainty.

Legitimate Educational Interest – an individual has a legitimate educational interest in education records if the information or record is relevant and necessary to the accomplishment of some employment or other institutional tasks, service, or function.

Disclosure – to permit access to, to release, to transfer, or to communicate students' education records, or personally identifiable information contained in those records.

Disclosure to Parents

The University reserves the right to release educational records to parents of students as per the University's 'Parental Access and Notification' Policy. The University does not require a student's consent to disclose information related to

- The student's violation of local or federal laws,
- The policies of the University,
- Information about academic standing of the student,
- Any disciplinary action taken against the student.

Disclosure to Third Party

The University does not disclose information to any third party without written consent of the student or otherwise covered in this policy. Some examples of requests for which the University does not require written consent of the student are listed below:

- If requested by a University office for legitimate educational use;
- If requested by another school where the student seeks or intends to enroll, or is already enrolled;
- Under Judicial Order or lawfully issued notice in a litigation against the University, or for disciplinary action against the student;
- In connection with the Financial Aid Program as necessary to determine eligibility for amount or conditions of the aid, or to enforce the terms and conditions of the aid;
- Needed for a collection of financial obligations to the University in case of delinquency of payment by the student;
- In case of threat of harm to self or others.

Student General Grievance Policy and Procedure

Habib University is committed to providing a method of redress for legally impermissible, arbitrary, or discriminatory practices. This procedure is meant to provide students an avenue for addressing their concerns not mentioned in other University policies and/or procedures. If in light of the investigation and resolution an alleged violation of policy, procedure, or law is seen to have occurred, the University reserves the right to adjudicate the alleged violations through the appropriate procedure(s) as are applicable. Where the department or unit in which the violation allegedly occurred has written procedures for student grievances, students should first attempt to resolve the matter through those procedures.

Grievance Resolution Process

Before filing a formal complaint under this policy, a student should attempt to resolve the matter informally with the person alleged to have committed the violation and/or with the head of the department or unit in which the alleged issue occurred. The student may contact the Office of Community Values and Standards, in case of non-academic grievance, or Office of Academic Performance, in case of academic grievance, for assistance with informal resolution. Attempts to resolve the matter informally should be completed within thirty (30) calendar days from the time at which the student knew or could reasonably be expected to have known of the violation.

If the incident is not resolved at the informal and/or departmental level, the student may file a formal grievance. Any formal grievance must be filed within sixty (60) calendar days of the incident regardless of the progress of the informal and/or department level process.

Student grievances must be in writing and signed by the student. Grievances must contain the ID number, University e-mail address, physical address, and phone number of the person filing the complaint. It is the responsibility of the complainant to update all current contact information in order for it to be used throughout the grievance process. All official communication regarding the complaint will be sent via the University's official means of communication. The complainant should also provide a detailed statement of the specific action being grieved, the approximate date when the action took place, the resulting injury or harm, the specific law, policy, or rule alleged to have been violated, a description of the evidence supporting the claim, whether informal procedures were available and completed, and the remedy or relief requested. All grievances of an academic nature, including but not limited to grade appeals or instructor complaints, should be filed at the Office of the Registrar. Cases originating outside of academics and all cases of discrimination, harassment, or assault, should be filed at the Office of Community Values and Standards (OCVS).

Upon receipt of a formal grievance, the Head of the relevant office or designee shall review the grievance and make an initial determination regarding whether the grievance is complete, timely, within the jurisdiction of the Student Grievance Procedure, and alleges facts that, if true, would constitute a violation of University policy and/or law. If the grievance is untimely or deemed outside the jurisdiction, or factually insufficient, the grievance will be dismissed and the complainant will be notified of the decision with a written explanation of the basis for the dismissal within ten (10) calendar days.

If the grievance is accepted in full or in part, the relevant office shall initiate an investigation. At the completion of the investigation, a written determination of the case will be sent to both parties. Either party may appeal the decision which will be heard by the University Appeals Committee (UAC). The decision of the UAC shall be final and binding on all parties.

For academic-related grievances, the Office of the Registrar shall inform the student in writing of the decision within ten (10) business days. The decision may follow the UAC's recommendation or be a modification upon it. If it is a modification, the file record must show the Office of the Registrar's reasoning behind the modification.

* If the program director or the concerned assistant dean is the primary faculty disputant, the student shall be permitted to request informal mediation from the Office of Academic Performance.

Official Communication with Students

Official communication with students will be through the University email.

Students are responsible for checking their University-provided email accounts frequently and consistently and for adhering to deadlines contained in emails from the University and/or its faculty or staff members.

The University will not respond to a student via a non-University email account.

Communication with parents will be through courier, or through the phone. It is the student's responsibility to ensure all contact information is kept current by reporting any changes to the Office of the Registrar.

Mid-Term and Final Exam Policies

Final Examinations

Final examinations are given at the end of each semester during the exams weeks designated in the University's academic calendar and are regulated either by the University's 'Examination Policy' or 'Online Examination Policy' as the case may be. The final examination schedule is announced by the Office of the Registrar.

All students registered in a course for which a final exam is given must attempt the exam at the scheduled time unless an exception is approved by the Dean of Faculty.

Midterm Examinations

The schedule of midterm exams, be they within or outside the scheduled class hours, are announced by the instructor and conducted during the midterm week announced by the Office of the Registrar before the start of each semester. For courses in which more than one midterm exam is administered, one midterm exam will be scheduled during the allocated week for mid-term exams. Examinations are announced in the course syllabus distributed to the class during the first week of classes.

Missed Examination

All students are expected to complete their assessments, including exams, within the specified time frame and by the dates communicated to them by their course instructors, as indicated in the course syllabi or as indicated in the exam schedules published by the Office of Academic Systems and Registrar. Students may request a make-up exam on the basis of religious obligation, serious illness, or family emergency.

Examinations will not be rescheduled to accommodate travel, family plans, or employment commitments. Generally, a student who misses an exam without a pre-approved alternate arrangement will receive a zero (0) mark in that exam. All make-up exams must be given before the official close of the semester.

Religious Accommodation

Habib University recognizes that the examination schedule may conflict with some religious observations. In such cases, the University will make reasonable efforts to accommodate the affected students by providing alternative times or methods to attempt examinations.

Students should review the syllabus for each of their courses at the beginning of each semester to determine if personal religious observance may conflict with the scheduled exam(s). In the case of a conflict with a midterm examination, the student must submit to the instructor a statement describing the nature of the religious conflict, specifying the dates and times of conflict by the end of the semester enrollment period. If a suitable arrangement cannot be worked out between the student and the instructor, they should consult the concerned dean of the school.

In case of a religious conflict with a final examination, the student must submit a written statement to the instructor, the concerned program director, and to the Office of the Registrar. In such a case, any approved make-up exam may be scheduled after the final exams period. If a student fails to follow this procedure or fails to give a timely notice of conflict and subsequently misses the exam, no make-up exam will be given and the student will receive a grade of zero in that exam.

Special Needs Policy

Habib University is committed to ensuring that all students have the opportunity to take part in educational programs and services and that no individual with special leaning needs or medical condition shall, solely by reason of the disability, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity. The University aims to provide this opportunity in a manner that meets national and international best practices. For more details and application procedure, refer to the Habib University's 'Reasonable Accommodations for Students with Special Needs' Policy.

Graduation Requirements

A student applying for graduation must satisfy all University requirements regardless of degree or major in which they are enrolled. Besides University requirement, they are required to fulfill program specific requirements identified by their respective programs.

Curricular Requirements

- University Liberal Core: A student must complete all requirements of the Habib Liberal Core, as described in the Course Catalog of the induction year.
- Minimum Cumulative Grade Point Average (CGPA): Students must have a minimum cumulative GPA of 2.33 at the time of graduation.
- Minimum Credit Hours Requirement[1]:

Program / Major	Minimum Credit Hours Requirement
Social Development and Policy	129
Communication and Design	128
Comparative Humanities	124
Computer Science	130
Computer Engineering	137
Electrical Engineering	137

- Transfer of Credits: All transfer of credits must be processed in accordance with the Habib University Transfer of Credits Policy by the last day of enrollment of in the Spring semester of the fourth year.

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[1] Subject to the requirements of the accreditation bodies, the minimum credit hour requirements may change for specific batches.

For other curricular and program-specific requirements, please refer to the graduation requirement grid of the program in this catalog.

Road to Graduation (R2G) Program Requirements

Students entering their junior/senior year must fulfill the R2G requirements to ensure their readiness for their transition to the job market, graduate schools, or to launch their entrepreneurial venture. R2G requirements can be met by:

- Attending mandatory workshops, events, and activities organized by the Office of Academic Performance and the Office of Career Services;
- Developing the tools essential for their career transition.

Intent to Graduate Submission Deadline

The deadline to submit the 'Intent to Graduate' form is the last day of enrollment in the Fall semester of the fourth year.

Declaration of Minor(s) Submission Deadline

The deadline to file a Declaration of Minor(s) is the last day of enrollment in the Fall semester of the fourth year together with the 'Intent to Graduate' form.

Good Standing

In addition to the aforementioned University requirements, a student must be in:

- Good Academic Standing as defined in the Academic Standing Policy stated in the Course Catalog and any subsequent addendums;
- Good Conduct Standing as defined in the Conduct Standing Policy.
- Good Financial Standing as defined by the Financial Standing Policy.

Using Habib University Technology Services

Habib University has on board the top-notch technologies to fulfill the pedagogical, instructional research, administrative and mission development needs alongside an eye on the future to ensure continual improvement.

The use of technology resources (infrastructure and service) is a privilege that is extended to members of the University community. The IT resources mainly include a digital card for access to campus spaces, a unique digital ID (single ID and password for all applications), dedicated WiFi network, local area network, personal computers in labs and the library, unified communication system (skype for business), student portal (gateway to technology systems and collaboration), Oracle PeopleSoft Campus Management Solution (manage academic administration needs), Sakai (virtual learning environment), Turnitin (formative feedback and originality checking system), Koha (library management system), audio/visual equipment, printers/photocopiers, IT policies/guidelines, and a service desk (central point of contact for queries and issues pertaining to facilities provided by the institution).

As a user, students have access to valuable University IT resources, to sensitive data, and to internal and external networks. Consequently, it is important for students to act in a responsible, ethical, and legal manner. In general, acceptable use means respecting the rights of other computer users and the integrity of the physical facilities.

The University encourages the use of electronic communications to share information and knowledge in support of the University's mission of education, research, and public service, and to

conduct the University's business. To this end, the University supports and provides interactive electronic communications services and facilities for telecommunications, mail, publishing, and broadcasting. A safe and civil environment is necessary for students to be successful in their educational pursuits.

Cyber-bullying by any member of the HU community toward another individual constitutes conduct that disrupts the educational environment of the University. Examples of cyber-bullying include, but are not limited to, harsh text messages or emails, rumors sent by email or posted on social networking sites, and embarrassing pictures, videos, websites, or fake profiles. Cyber-bullying is prohibited by state law, and jurisdictions throughout the international community and subject to disciplinary action.

In order to make the best use of the IT resources, an IT handbook (available on the Student Portal), and a dedicated webpage are accessible through University website to guide students through the essential IT systems and services which can be used on any device, anywhere at any time to excel beyond the bounds.

The Habib University Liberal Core

The classic liberal arts model demands that the total undergraduate experience includes exposure to a broad and inclusive range of existing forms of knowledge. Through the Habib University Liberal Core Curriculum, we ensure that all of our students, regardless of major, conform to this high educational aspiration. No well-educated person should remain ignorant of the insight and perspective offered by the humanities and social sciences, or inarticulate about the wonder of scientific and mathematical inquiry.

Habib University has chosen the Liberal Arts and Sciences model of education because of its commitment to the development of leadership as an essential goal. At the core of our institutional identity is our flagship Habib Liberal Core Curriculum that seeks to fulfill our motto of *Yohsin*: 'The worth of all humans is in the measure of their thoughtful self-cultivation.' As students mature, the Habib Liberal Core enables them to reflect on and articulate the most critical aspects of their experience in the world they inherit.

The Core begins with the systematic development of reading, interpretation, analysis, communication, and presentation skills that will continue to be honed throughout the students' undergraduate careers. The humanities and social sciences component of the curriculum is built around a multidisciplinary engagement with the history, structures, and features of the modern world. From colonialism to nationalism and the nation-state, from war to the global political economy, from the growth of modern media to science and technology, our Liberal Core is committed to a rigorous analysis and critical evaluation of modernity in all its complexity. An encompassing historical understanding is essential to a classic liberal education – one that our core curriculum provides with a critical modern edge.

The principle of *Yohsin* tells us that the cultivation of thoughtful self-awareness is an ancient and universal aspiration. What makes Habib University's Liberal Core unique is its simultaneous focus on Pakistan's distinctive intellectual inheritance and the enduring legacy of Western knowledge. To illustrate this commitment, all students are required to complete at least one course in a regional language. A mandatory Liberal Core course, *Jehan-e-Urdu* ('The World of Urdu'), investigates modern Urdu literature and criticism in order to illuminate crucial aspects of our modernity.

Finally, no modern education is complete without engagement with scientific thought. Science and scientific methods pervade all forms of inquiry as well as our everyday lives. The Habib University Liberal Core Curriculum includes mandatory courses in deductive and quantitative reasoning, natural scientific method and analysis, as well as the nature and place of science in modern societies.

The expanse and logic of the Habib Liberal Core are built on the seven *Forms of Thought/Action*. The seven *Forms of Thought/Action* that govern the Habib Liberal Core Curriculum have been adapted from Stanford University's Breadth Governance model to reflect the regional context. Below are brief descriptions and justifications of the *Forms of Thought/Action* that reflect and govern the curricular logic at Habib. All students are required to take a determined minimum of courses under each form of thought/action.

Historical and Social Thought (02 courses)

The extraordinary significance of historical and social knowledge in modern times arises from the unprecedented pace of change in modernity, as well as the growing complexity of modern societies.

Across the disciplines, Habib University's faculty also demonstrate a remarkably coherent historical approach to both social scientific and humanistic knowledge. All students will be required to take a minimum of two (02) courses in *Historical and Social Thought*.

Philosophical Thought (02 courses)

The study of philosophy has traditionally been at the heart of all liberal core curricula. Philosophical thought serves to enhance the reflective powers of the student, which is essential to concept-generation and innovation in all fields. Furthermore, an understanding of the philosophical depth of a tradition is crucial to a shared sense of inheritance. The Habib University faculty also widely share an interest in philosophy/theory. All students will be required to take a minimum of two (02) courses in *Philosophical Thought*.

Language and Expression (02 courses)

The development of linguistic and expressive abilities is widely recognized to be a key benefit of a liberal arts education, and language and literature have traditionally been as central to liberal core curricula as philosophy. Communicative power is one key to achieving success in all fields and disciplines. All students will be required to take a minimum of two (02) courses under this rubric.

Formal Reasoning (01 course)

Deductive thinking is crucial across fields and disciplines in both science and engineering, as well as the social sciences and humanities, and a deductive reasoning requirement is standard in higher and liberal education. Such a requirement also reflects the strength of our science and engineering faculty at the University. All students will be required to take a minimum of one (01) course in *Formal Reasoning*.

Quantitative Reasoning (01 course)

Numbers and quantities are an essential part of modern civilization and its forms of knowledge. Quantitative reasoning is the ability to interpret and contextualize large amounts of data, and is an essential skill in virtually all professions. All students will be required to take a minimum of one (01) course in *Quantitative Reasoning*.

Natural Scientific Method and Analysis (01 course)

The development of scientific method and analysis is a fundamental feature of modernity and its forms of knowledge. A natural science requirement is standard in higher educational and liberal institutions. To ensure the scientific literacy of all our graduates, students will be required to take a minimum of one (01) course in *Natural Scientific Method and Analysis*.

Creative Practice (01 course)

Creativity is increasingly recognized as an important indicator of success, and it is often a required feature of the best higher educational curricula. Given the nature of our programs and faculty in both the School of Arts, Humanities, and Social Sciences (AHSS) and the Dhanani School of Science and Engineering (DSSE), we have an excellent opportunity to make creative practice a distinctive feature of the HU experience. All students will be required to take at least one (01) course under this rubric.

The above core requirements are fulfilled through a combination of compulsory and elective courses. Given the University's unique pedagogical mission, we are committed to a common curricular experience for the HU student body.

The Habib Liberal Core Curriculum requirements are fulfilled through the following courses.

Forms of Thought	Courses
Historical and Social Thought **(02 courses)**	CORE 102 What is Modernity? CORE 201 Pakistan and Modern South Asia
Philosophical Thought **(02 courses)**	CORE 202 Hikma I CORE 301 Hikma II Or any other course designated by the University to fulfill this Form of Thought.
Language and Expression **(02 courses)**	CORE 101 Rhetoric and Communication CORE 121 Jehan-e-Urdu
Quantitative Reasoning **(01 course)**	SCI 101 Introduction to Sustainability ENVS 101 Climate Change and Us MATH 106 Music and Mathematics ENVS 121 Water is for fighting over SDP 202B Quantitative Research Methods MATH 310 Probability and Statistics EE 354 Introduction to Probability and Statistics ENER 104/ENER 104L Renewable Energy (Lecture and Lab) MATH 107 Lie Detector: An Introduction to the Practice of Statistics SCI 122 Inventing the Information Age Or any other course designated by the University to fulfill this Form of Thought.
Formal Reasoning **(01 course)**	CS 101 Programming Fundamentals CORE 111 Logical Problem Solving Or any other course designated by the University to fulfill this Form of Thought.
Natural Scientific Method and Analysis **(01 course)**	CORE 200 Scientific Methods CORE 203 Scientific Methods: A Biology Perspective Or any other course designated by the University.
Creative Practice **(01 course)**	All students are expected to take a University approved course in Creative Practice.

COURSE DESCRIPTIONS

CORE 101 Rhetoric and Communication

The command of language and the ability to communicate effectively in speech and writing is essential to leadership. This is why eloquence in the broadest sense is one of the most highly valued benefits of a liberal arts education. The opening course in our Liberal Core is designed to develop the reading and presentation skills that our students will need throughout their lives. Our curriculum nurtures our students' rhetorical abilities throughout their college career, especially through the Liberal Core. *Rhetoric and Communication* is designed to first identify the different aspects of expression and eloquence as distinct and essential abilities, and to develop and improve them through application and practice.

Explaining the combination of powers involved in the ancient division of rhetoric into invention, arrangement, style, memory, and delivery, the Roman orator Cicero says in his classic text on rhetoric, De Oratore: "Since all the activity and ability of an orator falls into five divisions, he must

first hit upon what to say; then manage and marshal his discoveries, not merely in orderly fashion, but with a discriminating eye for the exact weight as it were of each argument; next go on to array them in the adornments of style; after that keep them guarded in his memory; and in the end deliver them with effect and charm."

The material, classroom experience, and exercises of *Rhetoric and Communication* are designed to cultivate all five of these critical abilities, together with sophisticated reading skills. Class content will focus on compelling and relevant texts that anticipate the themes of the larger Liberal Core, and they are chosen to elicit opinion and encourage discussion and debate. As they develop their powers of reading seminal texts, students will practice and improve communication skills through regular writing assignments as well as presentations. *Rhetoric and Communication* will also feature the ethics of discourse and communication, so that tact and respect for the other become an essential part of students' experience and understanding of rhetorical ability.

CORE 102 What is Modernity?

No one in the medieval world thought they were 'medieval.' The belief that we live in a distinct period of world history – that of 'modernity' – sets us apart from all pre-modern peoples. It is a defining aspect of who we are, essential to our modern identities. It is thus imperative to the task of understanding ourselves and our world, and it is essential to the task of thoughtful self-cultivation. Habib University's pedagogical charter of *Yohsin* requires us to ask the questions: What is it to be modern? What is modernity?

Our 'modernity' is the very air we breathe. It encompasses, at an ever-gathering pace, all aspects of our lives. This is why the question of modernity has been a central concern across the range of disciplines and fields of the arts, humanities, and social sciences. This course will address the most important elements of our global and regional modernity today. Beginning with an investigation of the emergence of this unique *world-historical identity*, we then turn to the historical formation of key structures and features of the modern in the following domains: political modernity, economic modernity, modernity and ecology, and modernity and religion. By the end of the semester the historical character and specificity of these foundational spheres of our present will be visible.

CORE 121 Jehan-e-Urdu (The World of Urdu)

This course is designed to fulfill our commitment to the vernacular, as well as to reap the potential of modern Urdu literature and criticism to illuminate decisive aspects of our modernity. Jehan-e-Urdu is a pedagogically dynamic course that will rapidly advance students' appreciation and knowledge of Urdu through engagement with powerful texts of prose and poetry selected to speak to the concerns of the student today, opening up Urdu as a living world of insight and thought.

CORE 200 Scientific Methods

How do we make decisions? How do we evaluate information? Should we trust all information? How should we decide which information is trustworthy? How do we recognize the limitations of a claim? These matters are not only for practicing scientists but form an important part of our daily lives. At a time when information is more easily accessible than ever before, how do we intelligently utilize available information in making choices? How should we develop our evidence-based decision-making skills? This course builds on the foundations of scientific methods of inquiry and works to apply them to our everyday lives. Utilizing a wide array of examples, it illustrates scientific methods and their applications.

CORE 201 Pakistan and Modern South Asia

Nation-states – including that of Pakistan – emerged in the region of South Asia in the middle of the 20th century. How did such a world-historical event come about? What has it meant for the peoples

of this region? In short, what is the history of our present – what is the history of our regional modernity?

This question takes on a particular urgency in Pakistan as the region passes through the current period of crisis and change. With a significant focus on the emergence and trajectory of Indo-Muslim nationalism and the creation of Pakistan, this course will be an overview of the modern history of South Asia from the immediate pre-colonial historical scene, through the colonial period, including the rise of anti-colonial nationalism and decolonization, to the Cold War and the contemporary period of transformation and turmoil.

Apart from the main outlines of the history of modern South Asia, students will also learn to place the region's colonial modernity within the larger framework of modern history. Students will learn to identify major features of the colonial economy, politics, and society under which – especially after the Great Rebellion of 1857 – regional religious and other social reform movements emerged, nationalisms formed, and the dramatic transformation of regional languages and traditions took place, processes that continue into the present.

Students will learn to see contemporary conflicts, ideologies, identities, and structures as specific to the modern period rather than as natural cultural expressions, and they will begin to see regional cultures and societies themselves as historical entities.

CORE 202 Hikma I – History of Islamic Thought

After the interrogation of modernity in Core 102 and 201 in particular, Core 202 turns to a second metatheme of the Habib Liberal Core Curriculum: *the question of inheritance.* Ranging across philosophy, literature, history, law, and the arts, *Hikma I* is an encompassing survey of Islamic thought that seeks to give a sense of the historical and philosophical complexity and depth of the tradition, with significant reference to the region of South Asia.

In the module on 'Religion & Modernity' in CORE 102, and subsequently in our historical survey of socio-religious as well as nationalist reform and revivalist movements in the colonial period in CORE 201, students study the dramatic transformation and discursive constitution of 'religion' and 'culture' in the colonial-modern period. Both regionally, as well as in the global modern generally, 'Islam' and its cultures and societies, have also become particularly sensitive and difficult regions of the discursive landscape.

CORE 203 Scientific Methods: A Biology Perspective

There are millions of problems in the natural world around us. Despite our best efforts, our perceptions of the problems and proposed solutions can be deceiving without facts and data to back it up. As a responsible member of the society it is our duty to ascertain what is good for the planet and the human race and in order to make rational decisions, a scientific approach is invaluable. This course cultivates a step by step understanding and application of the scientific methods approach, predominantly from a biological science perspective. Using these skills, students get an opportunity to investigate and develop explanations for an original and relevant natural science research question.

SCHOOL OF ARTS, HUMANITIES & SOCIAL SCIENCES

Social Development and Policy

BSc (Honors) Social Development and Policy

FACULTY

Aaron Patrick Mulvany	Associate Professor and Program Director
Shama Dossa	Associate Professor
Aqdas Afzal	Assistant Professor
Noman Baig	Assistant Professor
Sahaab Bader Sheikh	Assistant Professor
Mohammad Moeini Feizabadi	Senior Lecturer
Qazi Muhammad Zulqurnain ul Haq	Lecturer
Sadia Mehboob	Lecturer
Sana Khalil	Lecturer
Tajreen Midhat	Lecturer
Ana Tawfiq Husain	Dean's Fellow and Lecturer
Mahso Gichki	Dean's Fellow and Lecturer
Zaineb Makati	Dean's Fellow and Lecturer

VISION

 "Development" has become a principal idea of our times and an object of aspiration for individuals, communities, and governments alike. One of the key questions we grapple with in the program is "How can we examine and engage with development as a multi-faceted process of social, economic, and political transformation while attending to context and ethical practice?" Responding to this key concern, the central vision of the Social Development and Policy (SDP) program at Habib University is to nurture an inter-disciplinary and comprehensive understanding of development and social change— one that is firmly rooted in an ethic of care and grounded in a sense of place. A careful, place-based understanding is deeply connected to the love of knowledge. Moreover, this sensibility is fundamentally tied to Habib University's philosophy of *Yohsin*, the practice of thoughtful self-cultivation.

To fulfill this vision, the undergraduate major in Social Development and Policy combines rigorous classroom training in the social sciences and humanities with reflective, experiential learning through a practicum and practice-based courses. The first program of its kind in Pakistan, it aims to give students new ways to approach the challenges of development at home and abroad. Students are exposed to seminal ideas in social and economic thought that will enable them to understand and critique the processes of economic growth, development, and social change. They explore how major development concerns such as poverty, gender inequality, urbanization, and human rights are

shaped by historical forces and processes of political power, while also examining the role of states, development institutions, markets, and civil society in shaping human well-being.

The program integrates perspectives and skills drawn from a wide range of disciplines, including anthropology, history, economics, sociology, political science, religious studies, philosophy, literature, and Environmental Studies. In this way, the program equips students with interdisciplinary thinking and analytical skills that will allow them to understand and tackle a range of problems and challenges in their professional and scholarly careers.

Offering critical insights into the core values of development and progress, the SDP major will train a new generation of social scientists who – like the best development practitioners – incorporate lived experience and vernacular sensibilities into policy design at the national and international levels.

PROGRAM LEARNING OUTCOMES

Students who graduate with a degree in Social Development and Policy will be able to:

1. Apply quantitative and/or qualitative research skills, including research design, methods, analysis, and reporting, as well as coding textual data and/or interpreting fundamental statistics for social sciences.

2. Communicate clearly and concisely in a discipline-appropriate manner, in written, oral, visual and mixed media and to "produce" and "translate" development issues for varied audiences.

3. Demonstrate understanding of, and the ability to document, the complex interconnections between humans and their environment, integrating multiple factors including economics, social and political organization, natural resources, and infrastructures, along with the challenges of sustainable management, considering the interdependency of human culture and the built environment with nature/ecosystems.

4. Frame complex development problems, conduct needs assessments and analyses from interdisciplinary vantage points, along with the ability to design projects, and implement plans, programs, and interventions as well as monitoring/evaluation, in response to local/global problems with social development and policy implications.

5. Demonstrate engagement and a comprehensive understanding of the conditions imposed by formal (policy, laws, regulations) and informal (norms, traditions, beliefs, mores) structures that regulate/organize societies and human interactions within these.

6. Articulate considerations on the implications of class, race/ethnicity, gender, religion, among other axes of social differentiation, as well as assess their intersectional effects, with due considerations towards human rights, social justice, quality of life and working conditions.

7. Demonstrate a critical awareness of one's own relationship to the field and one's work within it. Reflexive practice locates the researcher as an object within the field under study worthy of consideration itself rather than as a separate, dispassionate observer.

REQUIREMENTS FOR THE MAJOR - CLASS OF 2025

All students majoring in Social Development and Policy are required to complete a total of 37 courses (129 credit hours). Students must maintain a minimum grade of C+ (2.33 GPA) in SDP major credit requirements in order to graduate with this degree.

The courses are divided in the following categories:

University Requirements

All students are required to take **ten** courses spanning seven forms of thought and action, called the Habib Liberal Core. Some courses in the major can also be counted towards meeting requirement of certain forms of thought in the core. For more details, please see the section on Habib Liberal Core in the catalog.

Social Development & Policy Program Core

All SDP majors must complete the Social Development & Policy core curriculum consisting of **nine** courses.

Summer Practicum

All SDP majors are required to complete a Field Practicum, which is an application of the skills and competencies learned in the SDP program. This practicum must be a minimum of six weeks and can be broadly construed in consultation with an assigned practicum adviser.

Capstone / Research Seminar

Students majoring in SDP will have complete at least one (1) Senior Research Seminar coded at the 400-level, successful completion of the requirements of this course (with a Capstone Report or Thesis Proposal) will fulfill the capstone requirement.

Thesis

Students desiring more rigorous research may pursue a thesis, which will be completed as in independent, supervised study in their final semester provided they meet the predetermined criteria.

Regional Language Requirements

All SDP students must fulfill a vernacular language requirement by successfully completing at least three sequential courses in a single language, for example Sindhi, Punjabi or Pushto. For full language offerings, refer to the Comparative Humanities section of this Catalog.

Requirements for the Social Development & Policy Major (Class of 2025)

Course Category	Course	No. of Courses
University Requirements	Habib Liberal Core	10
Social Development &	SDP 101 Development and Social change	01
	SDP 201 Quantitative Research Methods/ Core	*Counted in Habib Liberal Core**

Course Category	Course	No. of Courses
Policy Program Core	Quantitative Reasoning	
	SDP 202 Qualitative Research Methods	01
	SDP 1xx Social Theory I	01
	SDP 2xx Social Theory II	01
	SDP 3xx Public Policy I	01
	SDP 3xx Public Policy II	01
	SDP 3xx/4xx International Political Economy Elective	01
	SDP 302 Data Analytics	01
Program Electives	Lower-level Electives (maximum 04 courses)	04
	Upper-level Electives (minimum 02 courses)	02
Summer Practicum	FP/SDP 302 Field Practicum	01
Capstone / Research Seminar	Research Seminar + Capstone Report/Thesis Proposal	01
Thesis or Elective	Thesis Report (IS) or Upper-level Elective	01
Regional Language Requirement	Three sequential courses in a vernacular language	03
Electives	AHSS Electives (non-SDP)	02
	University-wide Free Electives	05
Overall		**37**

*SDP 202 Quantitative Research Methods fulfils Quantitative Reasoning Form of Thought requirement of the Habib Liberal Core.

SOCIAL DEVELOPMENT AND POLICY MINOR

All Habib University students choosing to pursue the SDP minor must complete a minimum of 5 courses totaling at least 18 credits. Requirements to complete the minor can be found in the 'Minors' section of the Course Catalog.

COURSE DESCRIPTIONS

Required Courses

SDP 101 Development and Social Change

Credit Hours: 4
Fulfils: SDP Core

This is an introductory course in social development and provides an overview of ideas, theories, and concepts as well as a discussion on critical development challenges. This includes issues of urbanization, food security, migration, intersectionality and gender, as well as wars disasters and conflict. The purpose of this course is to answer key questions about development and social change by introducing students to the history, theory, and the contemporary practice of development. The concept of 'development' will be defined within the broader field of social sciences. We will be shifting the analytic focus from instrumental outcomes of development policies to the meanings, implications, and consequences they have as expressions of societal beliefs and values.

SDP 201 Qualitative Research Methods

Credit Hours: 4
Fulfils: SDP Core

Combining theory and hands-on practice, this course will expose students to key approaches and methodologies of qualitative research methods in the social sciences. Students will understand when and how qualitative research methods are used and combined. They will learn and practice a variety of methods and tools including participant-observation, interviews, focus groups, and discourse analysis. Alongside, they will study and debate the ethical complexities of conducting scholarly research and implementing both research and development projects.

SDP 202 Quantitative Research Methods

Credit Hours: 4
Fulfils: SDP Core

Quantitative Research Methods will introduce various techniques of quantitative analysis used within social sciences. This is a foundational course to teach basic mathematical and statistical techniques used in social science research. Students will cover several topics including functions, graphs, mathematical relationships, and statistics and probability, among others, to best equip students with analytical methods for use both in the classroom and the field with a specific focus on survey research. This course will also prepare students to take higher level quantitative research methods courses offered in the program.

SDP 203 Social Theory

Credit Hours: 4
Fulfils: SDP Core

This course introduces students to foundational concepts and theories in the social sciences. Starting with enlightenment thinking and the emergence of positivism and empiricism, this course tackles this major transition in the way social order is conceptualized and theorized. Students will be exposed to key social theorists, including Marx, Weber, Durkheim, Fanon, and

Freire as well as some of their legacies. Students will tackle different levels of analysis, understand structural forces and societal dynamics, and engage in social interaction analysis from a social-psychology perspective in contrast to the grand theory tradition.

SDP 301 Public Policy

Credit Hours: 4
Fulfils: SDP Core
Prerequisites: SDP 101, SDP 201, or SDP 202

The purpose of this course is to introduce students to the world of public policy. The concepts of "public" and "policy" will be critically defined within the broader field of governance. Students will engage in an analysis of the genealogy, conditions of existence, and effects of specific policies in various sectors. Our approach to this course will be anchored on mixed methods, including critical humanist, and positivist approaches. Students will be exposed to reading material from a wide variety of disciplines. We will consider the empirical dimensions of policy building and impact from the perspective of multiple interpretive communities.

International Political Economy Elective

Credit Hours: 3
Fulfils: SDP Core
Prerequisites: SDP 101, SDP 201 or SDP 202

Students majoring in SDP will have to fulfil this requirement as a mandatory elective, by completing one third-year elective course, which tackles the dynamics of *International Political Economy*. Various options will be offered yearly to allow students to complete this requirement.

SDP 302 Practicum

The major purpose of the practicum is to enable students to acquire skills and competencies in their interaction with individuals, communities, development agencies, and organizations. Moreover, students are expected to contextualize their learning as the practicum allows students to select agencies working on a range of thematic areas. Students will complete a specified number of hours and meet other practicum requirements. Although every practicum experience will be different, learning outcomes will include building networks, engaging in advocacy, and working with various stakeholders.

SDP Electives

ANT 101 Introduction to Cultural Anthropology

Credit hours: 3
Fulfils: SDP Elective & AHSS Free Elective

The course introduces students to the intricacies of human cultures and highlights the interlacing of cultural patterns with the forces of modernity. For instance, how do gift-exchange practices of local communities help us understand the politics of international aid? How do rituals of magic explain the commodity fetishism of capitalism? Does understanding cultural theories of identity help us rethink notions of the modern developmental subject? Does tribal social organization undergird or conflict with the modern nation-state? Addressing questions like these will provoke students to think critically of culture as an important tool for making sense of patterns of contemporary social development.

ANT 400 Anthropology of Trade

Credit hours: 4
Fulfils: SDP Senior Research Seminar/ Capstone

The trade has a long history in human civilization. From camel caravans to economic corridors, from shipping to air cargo, trade has been seen as a social and an economic process of connecting people, places, and ideas together. While it has formed a complex web of commodity flows in the last two hundred years, trade has also brought misery and agony to millions. The infamous 'Triangular Slave Trade,' for example, that operated from 16th to 19th century in the Atlantic was the darkest period of abduction, ransom, and looting, that human has ever seen. In the last few decades, especially with a massive Chinese One Belt One Road project, we are witnessing a renewed significance of trading. In Pakistan, the Chinese Pakistan Economic Corridor known as CPEC has already generated an imagination for a better future among the middle class of the country. It has become a mantra among the ruling elite the more we exchange things the more peace it will bring. For instance, trading is dubbed as a panacea for India Pakistan rivalry. While such macro level trading happens between states, the more grounded trade such as khaip in South Asia, kula ring in Micronesia, and potlatch in British Columbia shows different modalities of exchange at an everyday level. These exchanges are not always guided by rational economic models of self-maximization. Rather it operates on a different principle of reciprocity that does not get easily mapped onto economic principles.

Within this context, this course seeks to explore a cultural logic of exchange. It investigates what noneconomic factors, apart from monetary gains, shape exchange of things. Under which value system do people reciprocate? The objective of the course is to rethink the ways in which economics has been practiced on an everyday basis. In the first few weeks, students will read some of the classical anthropological scholarship on exchange. The second module focuses on historical trade networks, and explores how commercial networks have been shaping the cultural and geographical imaginations in the region. Finally, in the last few weeks, students will investigate trade through commodities such as "people," sugar, and cotton.

ANT 425 Queer/ing Theory in South Asia

Credit hours: 3
Fulfils: SDP Senior Research Seminar/ Capstone

Building from a foundation of key texts in feminist, critical race and queer theory, this course will provide students the opportunity to engage deeply with contemporary currents of intersectional and queer theory in South Asia, providing both a framework for understanding its history and development as well as a forum for students to practice its application. Together we will critically

assess the consequences of certain intellectual traditions and the ramifications on culture, policy, and academia in the subcontinent and beyond.

DEV 200 Development and Environmentalism

Credit Hours: 3
Fulfils: SDP Elective

This is an introductory course and it will provide an introduction to ideas, and theoretical debates about environmentalism and how it is variously perceived and understood. The course critically examines the development of environmentalism as a global issue, and its implications for economic and social development in the 'South'. This course will not look at environmental problems from the lens of physical environmental science. Instead, it will be a political analysis of environmental problems and the implications on social and economic development in the South.

DEV 229 Gender Inclusion & Analysis in Development Policy

Credit Hours: 3
Fulfils: SDP Elective

Why are females head of the states so popular in fighting with the COVID pandemic? Why is there so much resentment against inclusion of women in economic life in developing world? As Policy makers what are we missing as a developing country in terms of gender in policy making? In order to answer these and many other important questions related to gender and development policy, this course explores the gender dimensions of economic life by introducing students to the rich body of research on gender-aware analyses of household economics, violence against women, work (paid and unpaid), labor markets, poverty, inequality, public policy, markets development, formal and informal employment; policies addressing work-family life balance and social issues by looking at developed and developing countries as examples. The focus of this course will be on history of women empowerment and inclusion or exclusion of gender in mainstream policy making, how the 21st Century policy making is tackling these issues in development practice and how fruitful are the results. In short, this course will equip you to look at policy making at micro level by introducing you to very important issues of gender and how to fight them.

ECON 101 Principles of Microeconomics

Credit Hours: 3
Fulfils: SDP Elective & Free Elective

Economics studies the social construction of the material side of our life. A focus on production and exchange distinguishes economics from other social studies focused on culture (the concern of anthropology), government and state policy (political science), or social networks (sociology). Focusing on the social organization of production and exchange distinguishes economics from engineering and psychology. Economics examines production as a social process where people work with each other, often exchanging or sharing the products of their labor. In microeconomics, we focus on how individual economic decision makers -- households, firms, workers, and the government – make economic choices and how these decision makers interact with each other through markets and other social institutions such as class. Our goal in this course is to take some initial steps towards understanding how each part of the economic system works, how the parts work together, and to apply this knowledge to a broad range of social and economic issues.

ECON 222 Environmental and Natural Resources Economics

Credit hours: 3
Fulfils: SDP Elective
Prerequisite: SDP 101 Development and Social Change

According to Global Climate Risk Index (2017), Pakistan was the seventh most-affected country by extreme weather events for the period 1996-2015. At the same time, Pakistan's environment and natural resources are facing a lot of pressure from the country's significant population growth. Linkages between climate change, the ecology, natural resources and economic growth necessitate a careful analysis of how humans utilize natural resources—drawn from the ecological system—for economic production so that the rate of climate change can be mitigated, while also ensuring the conservation of the ecology as well as natural resources. This course will focus on using an economic perspective to carefully analyze the mentioned linkages. Some topics that will be covered include: climate change, resource and pollution management models, sustainable development and economic growth.

ECON 300 The Economy of Modern Sindh

Credit hours: 3
Fulfils: SDP Elective

Sindh is one of the richest provinces of the federation. Its share in the national gross domestic product (GDP) is estimated at around 30% while its share in the population is around 23%. On the other hand, Punjab is the most populous province with a share in the population of around 53% while it contributes 54% to the national economy. These two provinces account for more than four-fifths of the national income. However, various reports including the Sindh Growth Strategy by the World Bank have shown that the per capita income of the province has been declining over time. The course aims to build understanding around Sindh's economic position in the national economic spectrum. It will draw from the history of Sindh and trace its performance over time along with studying spatial economic differences across various districts. The course will also delve into the socio- economic problems that have beset the province's potential and collectively draw possible strategies to address these challenges. It will also look at various policies adopted by the Sindh government over the years and critically analyse their impact in comparison to Punjab and national performance. The course will simultaneously draw from international and established literature to ground understanding of economic discourses in a broader sphere while narrowing down their relevance on a provincial level.

ECON 301 Marxian Economics

Credit hours: 3
Fulfils: SDP Elective & Free Elective
Prerequisite: ECON 101 Principles of Microeconomics

The course will introduce students to the study of the capitalism as a social formation, the core of which is capitalist mode of production. The course will try to weave two separate but related strands together into a coherent narrative about capitalism: one, a theoretical analysis of the capitalist mode of production, and two, a historical account of the emergence of capitalism from the womb of the feudal mode of production in Western Europe. After a historical overview, we will begin the concept of primitive accumulation, and then we will continue with an analysis of the commodity, and in the next step, we will move on to studying capital and surplus value. Understanding how surplus value is generated and appropriated under capitalist social relations will be one of the main goals of this course. The process of circulation will occupy us in the next part of the course, which we will close with a discussion of the theory of capitalist crises. We will end the course with a brief discussion of alternatives to capitalism.

ECON 313 Political Economy of Development

Credit Hours: 3
Fulfils: SDP Core & SDP Elective
Prerequisite: SDP 202B Quantitative Research Methods

"Development" has come to signify different concepts for different people. Where some economists and development experts consider development to be primarily composed of economic growth, others, like Amartya Sen, focus on linking development with enhancing human "capabilities." At the same time, experts have highlighted different mechanisms through which development objectives can be achieved. Where some promote a free market or "invisible hand" approach, others argue for state-led or "statist" economic growth and development policies. In other words, development cannot be separated from the political and economic dimensions and thus it is extremely important to understand the political economy context of development–why do experts prescribe the policies they do? Are there any hidden agendas? In this course, students will examine and analyze various ways in which development has been interpreted. Students will also develop a purchase about the political economy of development as well as the economic challenges faced by emerging economies (read: developing countries). This course will cover topics such as historical and contemporary theories of development, climate change, environment, balance-of-payments issues etc., while exposing students to the role of states, nongovernmental organizations corporations, and communities in charting the development trajectories of different nations.

POLI 102 Introduction to Political Science

Credit hours: 3
Fulfils: SDP Elective & AHSS free Elective

The course aims to provide an introduction to the study of politics. It will address first the main concern of the discipline, i.e., the analysis of the nature and features of social power and the features of some of the most important contemporary political institutions. The subfield of Comparative Politics informs the approach of this course, as it deals with political regimes and issues across different countries. More specifically, the course addresses themes such as the nature of social power, state and civil society, regime types (authoritarianism, democracy, hybrid regimes), democratic institutions and democratization, security, political ideologies, political economy, and contentious politics (revolutions, political mobilization, etc.)

POLI 200 Pakistan Institutions and Youth

Credit hours: 3
Fulfils: SDP Elective

Pakistan Institutions and Youth will provide students a comprehensive and critical understanding of institutional structures in Pakistan. The course will draw from Pakistan's political, administrative and constitutional history and build students' understanding of their current functioning and significance. The course will further build the concept of citizenship and youth political participation to enable students understand their agency against state structures. This course will also provide students insights into state procedures ranging from federal to provincial and later to local level institutions in detail. Without a sound understanding of institutions and citizenship, one cannot completely comprehend social development.

SDP 411 Advanced Topic in Qualitative Research Design

Credit hours: 3
Fulfils: SPD Senior Research Seminar/ Capstone
Prerequisite: SDP 202B Quantitative Research Methods

This Course aims to provide a clear link for students between developing a research question; a theoretical lens; methodology; data analysis and representation. It is assumed that those registering for this course have relatively clear research question formulated which they think can be answered by a qualitative methodological approach. This year the theme for the course in Youth and Social Development so I encourage those interested in the theme to register.

SOC 201 Socialization and Cultural Identities

Credit Hours: 3
Fulfils: SDP Elective

This is an interdisciplinary course, which combines conceptual and theoretical notions drawn from psychology and sociology (social psychology), and the broader foundations of cultural studies and social philosophy. This is a fundamental course for those interested in understanding the processes that shape our ways of being, thinking, acting. It looks at the construction of the self, first in clinical terms, and moving on to intellectual, moral and social terms. Questions such as "Who are we?" and "Why we are the way we are?" are at the core of our inquiry into the formation of individual and collective identities. The toggles between nature and nurture, and between structure and agency, represent the constant negotiation of individuals and collectives in defining themselves, usually according to parameters consisting of socially produced categories, institutional practices, norms, expectations, traditions, ideological discourses, and a complex system of rewards and constraints, which are produced and experienced in context, as the general conditions of one's "located" existence. Those interested in identity politics, mental health, marginality and "deviance," social roles, conformity Versus difference, power dynamics, relational hygiene, counseling, or "caring" and "healing" work, will find this course useful.

Course Synopsis: This course is based on a thematic progression, which introduces students to the topics of socialization, infancy and stimuli/exposure, the unconscious/subconscious, behavior and the learning of patterns of practice, family socialization and parenting in cultural contexts, cognitive development and knowledge, schooling and peer socialization, gender conditioning and morality, the self, identity and life stages, habitus (dispositions) and forms of capital, language socialization, religious socialization, national identities and globalization, consumer socialization, as well as mass media and social control. All these themes will be the subject of student presentations, coupled with class debate and followed by exercises of introspection and sharing/writing, either individually, in pairs or small groups. The classroom must be a safe place and great emphasis will be placed on ethics, and on the privacy of confidential information shared in the class. Students will be exposed to the work of Freud, Skinner, Piaget, Kohlberg, Gilligan, Bourdieu, Chomsky, Berger and Luckman, among many others.

SOC 411 Methodology, Fieldwork & Thesis Composition

Credit hours: 3+1
Fulfils: SPD Senior Research Seminar/ Capstone

The knowledge production in all sciences, requires rigor and a systematic approach, substantiated by a commitment to ontological coherence, feasibility, reliability of information, and validity of conclusions. To this end, clarity in language, in the scope of the project (breadth and depth) and in the planned data gathering and analytical processes, are crucial elements in sociological research. The course aims to guide seniors in the preparation and conduct of a final year research project, whether formally a capstone or thesis, or any other research project. SOC 411A is the first part of a

two-part course, extending from the Fall to the Spring term. Students will develop research questions, design research methodologies and instruments, carry out data gathering through either or both primary and/or secondary research, and work on writing a research proposal and literature review in the Fall semester, and an annotated plan, a research portfolio, as well as a complete draft of the research paper, in the Spring semester.

Communication and Design

BA (Honors) Communication and Design

FACULTY

Zain Saeed	Assistant Professor and Program Director
Marco Grosoli	Assistant Professor
Haya Fatima Iqbal	Assistant Professor of Practice
Rakhshaan Qazi	Assistant Professor of Practice
Zahra Malkani	Assistant Professor of Practice
Ahsen Ali	Lecturer
Isma Gul Hasan	Lecturer
Manahil Huda	Lecturer
Hira Zuberi	Playground Associate
Sehel Khandwala	Playground Associate
Syed Ali Hussain	Assistant Professor (Visiting Faculty)
Kumail Shareef	Adjunct Faculty
Mariam Aziz	Adjunct Faculty
Mirza Muhammad Amir	Adjunct Faculty
Momin Zafar	Adjunct Faculty
Muneera Batool	Adjunct Faculty
Priya Pinjani	Adjunct Faculty
Rafay Mahmood	Adjunct Faculty
Samya Arif	Adjunct Faculty
Taha Munir	Adjunct Faculty
Zuha Siddiqui	Adjunct Faculty

VISION

The program in Communication and Design allows students to construct an interdisciplinary major in the arts and humanities that integrates historical investigation, critical analysis, aesthetic practice and social engagement. Our faculty are committed to engaging students in a conversation as much about the histories, theories and praxis of communication and design as about critical contemporary challenges that define our future.

Foundational courses in Communication and Design introduce students to a range of texts, movements, theorists, artists, designers, filmmakers, and writers from diverse cultures and historical periods, thereby training them in the close, comparative study of different artistic, cultural, and social forms. Studio practice – broadly understood through the hands-on production of film and photography, illustration and type, animation and new media – forms an essential component of the first two years of coursework so that students can learn how to craft image and idea even as they refine their critical and historical sensibilities. Our graduates will be alive to the transformative

capacities of media and design, and will learn to apply their expertise with deliberate care, purpose, and responsibility.

In short, our mission is to train thoughtful, articulate, sophisticated practitioners who exercise critical judgment in the creation of work that challenges preconceptions and generates discussion that effects positive change in the lived world.

PROGRAM LEARNING OUTCOMES

Students who graduate with a degree in Communication & Design will be able to:

1. Demonstrate an understanding of different practice-based approaches to developing appropriate interventions;
2. Deploy a diversity of research and methodological skills and tools to understand complex social and technological milieus,
3. Demonstrate a capacity to think beyond disciplinary epistemes and work collaboratively with other peers; and,
4. Demonstrate an awareness and sensitivity to the deeper and long-term systemic, praxical, ethical and political implications of their work through their exposure to theory.

REQUIREMENTS FOR THE MAJOR – Class of 2025

A BA (Honors) in Communication & Design (CND) requires completion[1] of 39 courses and with a minimum CGPA of 2.33. The program offers two concentration tracks (Primary and Secondary) – Design and Communication. If the primary concentration is in **Design**, then the secondary concentration will be in **Communication** and vice versa.

All students majoring in **CND with primary concentration in Communication and secondary concentration in Design,** are required to complete a total of **39** courses (37 + 1 summer practicum + 1 internship), 130 credit-hours requirements.

All students majoring in **CND with primary concentration in Design and secondary concentration in Communication,** are required to complete a total of **39** courses (37 + 1 practicum + 1 internship), 128 credit-hours requirements.

The courses are divided in the following categories:

University Requirements

All students are required to take **ten** courses spanning seven forms of thought and action, called the Habib Liberal Core. Some courses in the major can also be counted towards meeting requirement of certain forms of thought in the core. For more details, please see the section on Habib Liberal Core in the catalog.

Communication & Design Program Core

Foundation Year

Communication and Design students, regardless of concentration take the same set of **five** core courses during their first year,

Directed Study / Practicum

At the end of their second year, students from both concentrations do a one-credit summer Directed Study/Directed Practicum with a professor or industry professional.

Internship

At the end of their third year students from both concentrations will undertake an 8-week internship at a partner organization or with an industry professional approved by the program.

Final Year Capstone

In the final year, all CND majors will be expected to complete their final year capstone or thesis project.

Primary and Secondary Concentrations

All CND majors will have a primary concentration in one area (either in Communication or Design), as well as a specialized secondary concentration in the other area. The primary concentration includes **eight** required courses and the secondary concentration requires **four** courses.

Capstone Project

All CND students will be required to complete a capstone project where they will take on a project of significant scope to work with through the final year of their major.

Requirements for the Communication & Design Major (Class of 2025)

Course Category	Course	No. of Courses
University Requirements	Habib Liberal Core	10
CND Core - Foundation Year	CND 101 Materials and Practices	01
	CND 102 Ideation and Processes	01
	CND 103 Introduction to Design and Media	01
	CND 104 Performing Narrative	01
	CND 106 Forms of Inquiry	01
Primary Concentration in <u>one</u> of the two areas (Years 2 & 3)	**Primary Concentration in Communication**	
	COM 201 Production Fundamentals I & COM 202 Production Fundamentals II	02
	CND 126 Communication and Culture	01
	CND 311 Elements of Aesthetics I & II	02
	COM xxx New Media and Journalism	01
	COM xxx Digital Media and Post-Production	01
	COM xxx Contextualizing Media	01
	Primary Concentration in Design	
	DES 201 Designing for Interactions	01
	DES 202 Design, Technology and Society	01
	DES 301 Designing For and with People	01
	DES xxx Design Studies Seminar	01
	DES xxx Systemic Design	01
	DES xxx Design and Social Change	01
	DES xxx Design Fictions and Provocations	01
	DES xxx Design Politics and Ethics	01

Course Category	Course	No. of Courses
CND Core – Summer Requirements	Directed Study/Directed Practicum[2] (Year 2)	01
	Summer Internship/Summer Research Project[3] (Year 3)	01
Secondary Concentration electives in <u>one</u> of three areas	**Secondary Concentration in Communication** *(in any one area)*	
	Visual Design	04
	Design Studies and History	04
	UX/UI Design [1]	04
	Secondary Concentration in Design *(in any one of the following areas)*	
	Film	04
	Media Studies and History	04
	Creative Writing	04
Electives	University-wide Free Electives	07
CND Core – Year 4	CND 402 Transdisciplinary Practicum	01
	CND 401 Design Research I (Capstone I) & CND 429 Design Research II (Capstone II)	02
	Overall	**39**

[1] The requirements may be altered to enhance the learning experience.

[2] Directed Study/Directed Practicum (1 Credit-hour) – 4-week apprenticeship with an industry professional or an individual media project. OR a 4-week research assistantship with a Habib professor.

[3] Summer Internship/Summer Research Project (2 CRH) – an 8-week internship with an approved industry organization or professional with a tangible plan and goal. OR an 8-week research project under the supervision of a CND professor (or approved external practitioner/ academic).

COMMUNICATION AND DESIGN MINOR

All Habib University students from the Class of 2025 onwards can pursue the Communication and Design minor. Requirements of the minor can be found in the 'Minors' section of the Course of the Course Catalog.

COURSE DESCRIPTIONS

CND 101 Materials and Practices

Credit Hours: 4
Fulfils: CND Core

Fundamental to practice in the creative art and design disciplines is the ability to see phenomenon in the real world differently, to be able to use observation as the basis for imagination and creative insight, and to materialize both observed and imaginary phenomenon into basic material and visual artifacts, or prototypes. This studio course aims to give incoming freshmen students the foundational skills, tools, and techniques in creative observation, ideation, and prototyping that they will build on in subsequent semesters in more advanced courses.

Students will be introduced to a range of drawing and prototyping techniques through a range of mediums. The course will start from basic 2D drawing and will transition after mid-semester towards technical drawing and crafting 3D models from various materials. Students will also cover

foundational concepts and frameworks in working with gestalt relations, perspective, light, texture, color, framing etc., and engage with readings and important critical texts that introduce them to discourses in design around these concepts.

CND 102 Ideation and Processes

Credit Hours: 4
Fulfils: CND Core

In this class, we will investigate and explore the creative process in order to generate ideas for art, tech and design projects and more. The course will show how different concepts, techniques, and methods can inspire, inform, and bring depth to what one ultimately creates and prototypes. Students will expand their arsenal of design and research skills, learn how to think critically about their audience, content, form, and processes, as well as, understand the importance of utilizing more than one research and design strategy. The course will introduce a number of tools and techniques through hands-on exercises and assignments to really drive home how iterative, messy and exciting the creative process can be!

CND 223 (Re)Covering Ethnicities

Credit Hours: 3
Fulfils: CND Elective

This is a journalism course focused around covering Karachi in the backdrop of its ethnic diversity. Students will get firsthand experience of going into the field and reporting news stories and features, as well as producing photo features. Sophomores, juniors and seniors who love roughing it out on the streets of the city are most welcome. This course's workload relies heavily on fieldwork and time management.

CND 231 Bollywood and the Construction of Masculinity

Credit Hours: 3
Secondary Concentration: Film, Creative Writing

The course aims to introduce the students to the concept of masculinity and how media shapes our understanding of gender. The focus lies on examining how Bollywood has shaped the idea of masculinity for its viewers especially the South-Asian audience. We will be watching mainstream Bollywood movies (and Pakistani) and reading their screenplays that have captured the imagination of the Bollywood audience in the last 40 years. We will identify and analyze different kinds of masculinities that Bollywood movies projects, represents and shapes. We will also examine the specific social, cultural, and historical contexts from which these movies and types of masculinities emerge.

Moreover, the course aims to turn the students into conscientious storytellers as they'll be pitching and writing a 10-page script as their final project with a central character representing the kind of masculinity, they feel the audiences need to watch. Lastly, the course wants to turn the students into critical thinkers and develop their analytical skills as they engage with the texts.

CND 301 Designing for and with People

Credit Hours: 4
Primary Concentration: Design

Through this studio student will develop an understanding of core concepts of Human Centered Design (HCD) and basics of Service Design. This introductory level course through a series of major projects will lead students through the processes of human centered and participatory design, with

different methods (observational, interview, self-reporting and generative) being encouraged, with a range of outcomes for tangible and digital products, spaces and platforms.

CND 311 Elements of Aesthetics

Credit Hours: 3
Primary Concentration: Communication

A philosophical bridge between "Communication and Culture" and "Thinking Media", "Elements of Aesthetics" will answer the question "what is the aesthetic experience?" by focusing on some of the frameworks underlying aesthetic experience as well as the creative process making it possible. Each of the three modules is named after one of these frameworks: "mimesis", "perception", "frame", in that the aesthetic experience as well as the creative process are informed by the way things are represented, perceived and framed.

Therefore, the purpose of the course is to increase the students' familiarity with the aesthetic experience and creative process in the arts and the media, by answering the following questions: "what does it mean 'to represent' things and how did it evolve through time?", "what is the place for subjective perception in the artistic or media object and how did it evolve through time?", "what does it mean 'to frame' things and how did it evolve through time?".

These ideas will be explored by taking a very close look at a variety of artworks and media products (literature, Films, paintings, VR, installations, TV series etc.) from a variety of eras. Each module is a journey through a selected range of art and media examples, from several centuries ago to our present day. In this way, students will be trained to think creatively and critically "through" some of the main categories of the Aesthetics, with a special awareness of the historical layers that are embedded in the present-day ways we think of them.

CND 401 Design Research I (Capstone 1)

Credit Hours: 4
Fulfils: CND Core

In this class, we will seek to investigate the processes involved in transforming our ideas via research and practice into things that exist in the world. We will dive deep into research in art, media and design, with the intention of using them to come up with novel ideas that complicate our understanding of the world, provide a solution to a problem, or simply help manifest our deepest obsessions in the form of representation in the physical world. We will seek to create a community within this classroom, as we discuss, argue, and reflect on the ideas of others with generosity, rigor, and in the spirit of encouragement, building up towards a comprehensive final research proposal for a project that will then be completed in Design Research II.

CND 429 Design Research II

Credit Hours: 4
Fulfils: CND Core

This course is the follow-up to DR I, and is designed to aid students build upon the theoretical foundations of their research in that class, culminating in their final capstone projects.

MUS /COM 111 Music Production 101

Credit Hours: 3
Secondary Concentration: Film

The purpose of this course is to empower students with the basic knowledge they will need to work with the audio component of media production among media professionals in ad agencies, broadcast channels, production houses/studios and marketing teams. One of the main factors that set apart a good production from a poor one is audio: sound design and music. The skillset that the students will have developed in this course will enable them to create basic projects and transcribe ideas that can easily be collaborated on, or transferred to a professional studio to be finished in.

COM 201 Production Fundamentals I

Credit Hours: 4
Primary Concentration: Communication

Production Fundamentals I is the first of two foundational courses designed for students who have chosen media and communications as their concentration, in the fundamentals of media production.

Both courses will be divided into modules that focus on individual film production skills that constitute the various steps in the entire production workflow. Along with practical on set experience, these introductory modules will also cover some foundational theory. The modules cover media production disciplines that are common to film, television and digital media.

This course will help lay a foundation for future courses including Production Fundamentals 2, Digital Media & Post Production, Capstone 2, Film Direction III, Advance Cinematography and Advance Editing: Theory & Practice.

COM 209 Thinking Media

Credit Hours: 2

This course introduces students of communication and media studies to central themes, issues and debates of our discipline, as well as to the stakes of historical inquiry and media analysis. Students will learn different possibilities of conceptualizing media and relating them to society. Starting with the broadest possible definition of medium as the difference of loosely/strictly coupled elements, they will be introduced to different media types and concepts, from storage media to dissemination to success media, and explore the consequences of language, writing, the printing press, the optical media, and the internet on society.

PHIL/COM 219 Tragic Philosophy and Film

Credit Hours: 3
Secondary Concentration: Film

Since the ancient Greeks, the philosophical relevance of tragedy as a dramatic form has always been readily recognized. Tragedy is about the limits of man: only by acknowledging these limits, man can find his place in society and in the world. In the Anthropocene, the evidence of the limits of human agency and the trouble with human hybris (i.e. the insolent transgression of those limits) is inescapable; for this and many other reasons, tragedy has still a lot to say to 21st century humanity. This course investigates the idea of the tragic, as it appears in the dramatic form known as "tragedy", in the writings of philosophers, and as a fundamental feature of human experience. Particular attention will be given to political economy, a field variously interrelated with tragedy.

Cinema will play a major role in this course, catering to CND/COM as much as CH, and conceived as an occasion of dialogue and intersection between the two programs' agendas. A selection of eight

films, chosen among the very many cinematic iterations of tragedy as a dramatic form, will be discussed in-depth during the course. They will, however, be something more than mere illustrations of the tragic as a dramatic form. They will show how the classical tropes of tragedy can still speak to a number of concerns of our contemporary world: the boundaries of freedom, the inseparability between civilization and violence, the clash between individuality and institutions, the difficult possibility for a truly ethical act, and so forth.

COM / LIT 221 Journalism, History and the American Novel

Credit Hours: 3
Secondary Concentration: Media Studies and History

This course will trace historical connections between journalistic and literary traditions. It will focus on a group of novelists and literary figures with strong connections to the world of journalism – from Daniel Defoe to Joan Didion – and will trace their contributions to the English literary canon beginning in the long eighteenth century (when the novel and the periodical — i.e. the Spectator and the Tattler — were emerging as powerful cultural forces in England) right up to the late twentieth century and the emergence of "new journalism" in America.

The course has been divided into four broad sections: the long eighteenth century (the era of the "birth of the novel"), the nineteenth century explosion of the printing press ("Penny Press" newspapers, and McClure's and Collier's in America), the Algonquin Round Table years of the early twentieth century, and the emergence of "new journalism" in the 1960s and 1970s.

COM 331 Writing the Web Series

Credit Hours: 3
Secondary Concentration: Creative Writing

The course aims to provide students with the tools necessary to pitch, develop, and write a Web series (5-episodes: 5-7 minutes long each episode). The bibles of current web series (American/Indian/Pakistani) will be analyzed.

The class will replicate as much as possible the atmosphere of the "writers' room" on a web series during production. As with a real web series staff, the class will offer constructive criticism of each other's work. The various roles in the writer's room will also be explored. Students will pitch an idea for a Web series and work with other writers on developing a script.

At the end of the term students will submit the scripts of all 5 episodes, the pitch, and a series bible of the Web series.

COM 411 Direction for Film

Credit Hours: 4
Secondary Concentration: Film

Direction for Film is designed for students who have chosen media and communications as their concentration, in the fundamentals of media production. The two main aims for this course is for students to learn how to Analyze a screenplay and Execute a Director's Vision by shooting multiple short film projects. This course will equip students with the tools to breakdown story, character, screenplay and create a unique director's vision for their films. This course will help lay a foundation for other courses including Digital Media & Post Production, Capstone 2, Advance Cinematography and Advance Editing: Theory & Practice.

DES 201 Designing for Interactions

Credit Hours: 4
Primary Concentration: Design

Interaction design lies at the intersection of many different disciplines and methodologies. Therefore, it is only natural that designers learn principles that are extracted from disciplines like Industrial Design, Engineering and Communication Design. Historically, especially in Pakistan design in general has had the reputation of offering 'cosmetic' value to works of engineers, writers and now technologists. Design traditionally only comes up towards the end of the project. Although this thinking has been changing, the shift is painfully slow. Besides a shift in thinking of the business and corporate world this shift will come from designers themselves. Only designers who see design as an integral part of everyday life, innovation, systems, technology and resulting solutions will be able to create that shift.

This course will be a glimpse of this journey for students where they see, understand and practice design that has its effects from individuals to larger groups. This understanding will come through developing an understanding of how humans interact with the world around them, their physical and mental processes and limitations.

The principles of interaction (Affordances, Mental Models, Metaphors, Visibility, Consistency, Mapping, etc.), psychology and human factors will serve as the theoretical framework with practical work built on top of it. The first half of the course focuses on non-digital interactions while the second half will explore digital products and interactions and Affordances through non-digital and digital products and artefacts.

This course will be complimented by the lab and seminar course offered in parallel to this studio course.

DES 201L Designing for Interactions (LAB)

Credit Hours: 1
Primary Concentration: Design

The Lab will cover the following aspects:

- Basics of drawing (lines, shapes etc.)
- Intro to different mediums such as pencils, markers, ball point etc.
- Intro to different types of paper and how it affects drawing.
- Drawing hands & storyboarding (intro) (so that when they are designing an interactive product, they are also able to visualize how someone is going to interact with it)
- Drawing app wireframes by hand (how to approach wire framing, using markers + pencils together)
- Basics of color theory.
- Basics of Illustrator
- Getting used to the interface
- Making and editing vector shapes
- Basic typography
- Drawing wireframes in illustrator
- Editing and tweaking icons downloaded from websites like noun project or flaticon.

DES 202 Designing, Technology and Society

Credit Hours: 2
Primary Concentration: Design

As humans (designers, engineers, business managers, computer scientists, marketers) shape products, services and technologies around us; these products, services and technologies shape us in turn. Technology affects how we live, how we behave, how we interact with other humans, and even how we perceive the past, present and future. In 2021, two decades into the 21st century, living in a metropolitan city that Karachi is, we are surrounded by technology. Whether that is our

smartphones, fans, refrigerators, cars, laptops, ATMs, card POS machines, there is barely an hour spent without interacting with some kind of tech. This course aims to critically analyze this relationship of *humans* with design and technology; and also of *designers* with technology. The course also tries to draw comparisons with the worldwide view of technology compared to how technology is perceived in Pakistan and the Subcontinent.

This is a seminar course designed for two 50 minute sessions per week, for a total of 15 weeks. The initial few weeks focus on understanding the meaning of design, society, culture, technology and interactions individually. For the rest of the semester, there is focus on connecting the dots between the aforementioned topics and their relationships with each other, with our context and with the future.

DES 311 Narrative Illustration

Credit Hours: 3
Secondary Concentration: Visual Design

This course is designed to equip the students with concepts of visual communication as they relate to illustration, and the skills needed for effective execution. Students will learn more about narrative illustration, and the elements and applications of illustration in communication and design. Students will also be introduced to the conceptualizing process and the importance of sketching and using self-generated reference material to assist with Image creation and the role of design elements in construction of an image.

DES 312 Visual and Spatial Politics

Credit Hours: 3
Secondary Concentration: Visual Design

The course is premised on the relation between content and form, on the notion that, some things are only thinkable or sayable in particular forms. In that, it examines the intersections between the visual, spatial and material - how these contested interactions capture [our] politics of the everyday. The course argues that everyday objects in space become visualisations of capital and authorities, and help to make, and regulate our urban spaces. Throughout the class we navigate the paradox of examining these non-verbal dimensions of politics, embedded in the cities we inhabit, through their Spatialities and Visualities.

The class begins with sites and sightings of power asking what does authority look like? How is it maintained, challenged and changed by visual and spatial means? Topics covered include the gaze, (il/) legibility and dissidents; migration and borders, race and class, gender and space, religion and capital, will be discussed as well. We will use Karachi as an urban laboratory to study all the above, and relate theory to practice. The theoretical discussions will be mapped, tested, and elaborated by considering how we might rethink specific political issues visually and spatially.

The course is designed to be a Seminar/Studio one, i.e. the theories must be brought to practice. Throughout the course, readings and assignments will be drawn from across the social sciences. visual arts and site observations. 'Watching' assignments will also be required alongside readings. Classic materials are mixed with contemporary works, and contextual with foreign.

Comparative Humanities

BA (Honors) Comparative Humanities

FACULTY

Muhammad Haris	Assistant Professor and Program Director
Najeeb Jan	Associate Professor
Nauman Naqvi	Associate Professor
Syed Afzal Ahmed	Associate Professor (Professor of Practice)
Inamullah Nadeem	Assistant Professor (Professor of Practice)
Jessica Marie Werneke	Assistant Professor
Ryan Davidson	Assistant Professor
Basharat Issa Khan	Lecturer
Daniyal Ahmed	Lecturer
Kainat Jalaluddin	Lecturer
Marcelo Alves de Paula Lima	Lecturer
Sadaf Habib	Lecturer
Haniya Habib	Dean's Fellow and Lecturer
Muzammil Patel	Dean's Fellow and Lecturer
Noman ul Haq	Visiting Distinguished Professor
Irfan Muhammad	Adjunct Faculty
Sahar Shah	Adjunct Faculty
Shahid Hamid	Adjunct Faculty
Tahir Zaland	Adjunct Faculty
Tanveer Anjum	Adjunct Faculty
Zainab Saleem	Adjunct Faculty
Zulfiqar Ali	Adjunct Faculty

VISION

Comparative Humanities offers students an exciting opportunity to study several disciplines in the humanities both critically and comparatively. Our areas of concentration include Philosophy, History, Literature, and Religious Studies. In teaching students to move fluidly across disciplines, we aim to cultivate not only breadth and depth, but an intellectual mindset attuned to the shared problems we face today as global citizens. CH will challenge students to reflect on a range of theories about human nature and society — drawing from diverse cultures, histories, and traditions — and in doing so heighten their sensitivity to the way our rapidly globalizing age of transnational capital has reshaped our understanding of concepts such as self, identity, obligation, community, and nation.

Students who pursue a CH major will learn to think both locally and globally, will learn to examine problems through a number of intellectual frameworks and traditions, and practice honing the skills

of humanistic inquiry that continue to make the comparative humanities essential to the dynamic and multidimensional job markets of tomorrow. Learning to think comparatively within the humanities means learning to think flexibly and differently about the many problems we encounter in various professional domains.

It also means knowing how to use a critical framework to think through a difficult problem and, more crucially, knowing how to articulate and assess that problem in language that is at once cogent and graceful. A CH degree, therefore, clearly has both direct and indirect relevance to future pursuits in academia, media, journalism, management, government, law, and medicine, among the many other civic and international sectors in leadership where an insightful, perceptive, agile mind is an obvious mark of distinction.

PROGRAM LEARNING OUTCOMES

Students who graduate with a degree in Comparative Humanities will be able to:

1. Work comparatively and critically across several disciplines and traditions.
2. Discuss the genealogy and development of major figures, periods and ideas in the disciplines of History, Literature, Philosophy and Religion.
3. Synthesize multiple points of view in working with a series of thematically related texts, traditions, or disciplinary perspectives.
4. Apply a range of ethical, critical and theoretical frameworks to contemporary intellectual concerns.
5. Produce a theoretically informed close reading of a central work in dialogue with several other works and traditions.
6. Navigate databases and assess primary and secondary materials.

REQUIREMENTS FOR THE MAJOR – CLASS OF 2025

All students majoring in **Comparative Humanities (CH)** program are required to complete a total of minimum **37** courses **(124 credit hour)** requirements. The courses are divided in the following categories:

University Requirements

All students are required to take **ten** courses spanning seven forms of thought and action, called the Habib Liberal Core. Some courses in the major can also be counted towards meeting requirement of certain forms of thought in the core. For more details, please see the section on Habib Liberal Core in the catalog.

Comparative Humanities Program Core

The Comparative Humanities Core curriculum consists of **five** courses in a broadening and deepening sequence, and **two** other required courses that highlight the practical implications of an education in the humanities.

Primary and Secondary Concentrations

All CH majors will be required to have one primary concentration and one secondary concentration. The concentrations are designed to cultivate depth of knowledge, command of methodology, grasp of theory and analytical skills within specific disciplines within the humanities. The primary concentration will require **six** courses and the secondary concentration will require **four** courses.

The four areas of concentration include: (i) History, (ii) Literature, (iii) Philosophy and (iv) Religious Studies.

Capstone Project and Final Thesis

All CH majors will be required to complete a capstone project. In most cases this will involve a significant revision of one of their best research papers. The final thesis is an alternative capstone option and is not a requirement for all students in the program.

Requirements for the Comparative Humanities Major (Class of 2025)

Course Category	Courses	No. of Courses
University Requirements	Habib Liberal Core*	10
Comparative Humanities Core Sequence	HUM 101: Critical Inquiry and the Humanities	01
	HUM 200: World Historical Figures: Statesmen, Leaders, Judgement	01
	HUM 201: Conceptual Genealogies	01
	HUM 300: Criticism, Dissent and the Ethics of Disagreement	01
	HUM 301: Comparative Hermeneutics I (Major Works and Traditions Seminar)	01
	HUM 401: Comparative Hermeneutics II (A Major Work in Context Seminar)	01
	HUM 402: Capstone Research Seminar	01
Primary Concentration in one of the four areas (Philosophy, Literature, History and Religious Studies)	**Primary Concentration in Philosophy**	
	PHIL 200: What is Philosophy? or PHIL 122: Introduction to Western Philosophy	01
	PHIL Elective Any Level	03
	PHIL 3xx / 4xx Level Elective	02
	Primary Concentration in Literature	
	LIT 1xx/2xx What is World Literature?	01
	LIT 225: Introduction to Literary Theory and Criticism	01
	LIT Elective Any Level	02
	LIT 3xx / 4xx Level Elective	02
	Primary Concentration in History	
	HIST 1xx / 2xx Global Histories	01
	HIST 3xx/4xx - Understanding Histories: Historiography and Historical Methods	01
	HIST Elective Any Level	02
	HIST 3xx / 4xx Level Elective	02
	Primary Concentration in Religious Studies	
	RELS 1xx Introduction to World Religions / What is World Religion?	01
	RELS Elective Any Level	03
	RELS 3xx / 4xx Level Elective	02

Course Category	Courses	No. of Courses
Secondary Concentration in one of the four areas (Philosophy, Literature, History and Religious Studies)	**Secondary Concentration in Philosophy**	
	PHIL 200: What is Philosophy? or PHIL 122: Introduction to Western Philosophy	01
	PHIL Elective Any Level	02
	PHIL 3xx / 4xx Level Elective	01
	Secondary Concentration in Literature	
	LIT 1xx/2xx What is World Literature?	01
	LIT 225: Introduction to Literary Theory and Criticism	01
	LIT Elective Any Level	01
	LIT 3xx / 4xx Level Elective	01
	Secondary Concentration in History	
	HIST 1xx / 2xx Global Histories	01
	HIST 3xx/4xx - Understanding Histories: Historiography and Historical Methods	01
	HIST Elective Any Level	01
	HIST 3xx / 4xx Level Elective	01
	Secondary Concentration in Religious Studies	
	RELS 1xx Introduction to World Religions / What is World Religion?	01
	RELS Elective Any Level	02
	RELS 3xx / 4xx Level Elective	01
Other Requirements	Comparative Humanities Electives	02
	Free Electives	08
	Overall	**37**

Minors Offered by the Comparative Humanities Program

S. No	Minors	Offered by	Offering School	No. of Courses	No. of Credit Hours
1	Comparative Literature	Comparative Humanities (CH)	SAHSS	06	18
2	Philosophy			05	15
3	Religious Studies			05	15
4	History			05	15
5	South Asian Music	South Asian Music Center & CH Program		05	15
No single Habib Liberal Core course can count towards fulfilling requirements towards completion of more than one of CL, HIST, RELS, and PHIL Minors.					

Requirements for each minor can be found in the 'Minors' section of the Course Catalog.

COURSE DESCRIPTIONS

HUM 101 Critical Inquiry and the Humanities: Love and Desire

Credit Hours: 4

This is the first course in the core sequence of the new Comparative Humanities major. The course is team-taught and consists of four units, one for each of the major concentration areas in the program: History, Literature, Philosophy and Religious Studies. Using the central organizing theme for this course, which is love and desire, we will explore how each of these disciplines frames and examines some aspect of a broad complex issue that transcends a single academic discipline. We will consider what sorts of questions historians, scholars of literature, philosophers and religious studies scholars ask about love and desire, and how they analyze the topic and pursue answers to the questions they ask. By bringing together these four major disciplinary fields in the humanities, you will both learn something about how each discipline works and also about how intellectual discourse crosses traditional disciplinary boundaries. This facility for interdisciplinary and transdisciplinary inquiry is an important outcome for this major and yields the distinctive abilities in critical thinking for which the graduates of humanities programs have long been distinguished and valued. Through this course you will also develop a deeper appreciation for differing perspectives.

HUM 301 Comparative Hermeneutics I: What it Means to Be Human: Hermeneutics of the Self

Credit Hours: 4

In this first iteration of 'Comparative Hermeneutics', we have chosen to focus on the 'Comparative Hermeneutics of the Self' across three ancient civilizational traditions, broadly defined: Greek antiquity, Islamic antiquity, and Indic antiquity. These traditions will then be juxtaposed against the dominant understanding of the modern sovereign, liberal subject. Antiquity is not just of concern to antiquarians: we all continue to be perpetually addressed by our antiquities into the present: antiquity is alive – even if not necessarily well. Traditions of interpretation of the self and self-interpretation are at the heart of traditions of hermeneutics in general – and continue to be deeply effective into the modern period: however, distorted or transformed.

What is the self? Is there such a thing at all? Is it the only thing? If there is such a thing, of what does it comprise? Is it a substance (a soul) or a relation? What are the measures of mind and body in it and how are they related, and to what end? What are its limits and possibilities? What is its relationship to the world, to the outside, to the beyond, to divinity and the broader question of what it means to be human? How might the self be transformed, even converted? What role does negation play in the transformation and conversion of the self?

These are some of the questions that we will explore as we chart the comparative hermeneutics of the self in the antiquities that address us today.

HIST 1xx Introduction to the History of Science and Math: Discovery, Myths, and Misconceptions

Credit Hours: 3

There are many myths that prevail in the history of science and math. Some stories celebrated as bright moments of discovery or insight are the result of the proliferation of popular myths. The theorem that bears Pythagoras's name, Darwin's finches, Franklin's kite experiments: many narratives surrounding scientific and mathematical innovation have acquired mythical status around the world. But are these (hi)stories "true?" And does it matter if they are not?

For much of human existence, science and mathematics were inextricably tied to the humanities, particularly history, philosophy, and religion. For this reason, it is imperative that they not be considered in isolation from, but part and parcel of, the history of human thought. As such, this course has three main goals: to provide an overview of the history of science and math; to sharpen your independence of thought; and to improve your academic writing skills. We will pay special attention to debunking myths associated with the history of science and math. But we will also investigate the notion of discovery, and why this seemingly innocuous concept is so problematic.

HIST/SDP 1xx (Global Histories) Military Regimes in South Asia and South America

Credit Hours: 3

In line with Habib's emphasis on the postcolonial world and on a global approach of History, the purpose of this course is to analyze and understand the history of military regimes in South Asia and South America. The main concern of this course will be to encourage students to identify a common background that led to the emergence of military regimes in both regions. The Cold War bipolarity, U.S. efforts to prevent the dissemination of left-wing regimes in the periphery, and a widespread anticommunist imaginary that transcended borders are all significant parts of this common background

that will be contemplated by the readings and class discussions. Hence, rather than seeing these military regimes as sole products of local or regional politics, this course encourages us to think them as parts of a broader international picture of the Cold War in which the Third World was a stage of clashes between the United States and the Soviet Union.

The course will begin with readings on how the Cold War unfolded in South Asia and South America, as well as the role played by these regions in North American foreign policy. The second module encompasses military regimes in Pakistan. We will understand the circumstances that triggered the military coups of 1958 and 1977, as well as the main aspects of these regimes. The third and last module approaches the History of military regimes in Argentina, Brazil, and Chile, highlighting their differences and similarities.

HIST/LIT 2xx Class, Conscience and the Intelligentsia: Russian Literature and History of the 19th and Early 20th Century

Credit Hours: 3

In many ways, the history of 19th Century Russia is the history of the birth of a distinctly Russian

intellectual tradition in literature, shaped by the Russian intelligentsia's aversion to both autocracy and the birth of modern democratic political trends in the "West." In this course we will be exploring connections between literature, philosophy and social activism amongst the elite in 19th and early 20th Century Russian history. Roughly, the chronology of this course is 1825 to 1945. Looking at important works of literature from the same period, we will concretize the impact of major historical developments and how they relate to literary culture. In some way, each of the events of the period from the Decembrist Uprising to Stalin's Social and Cultural Revolution were inspired or influenced by Russian literature. As such, we will be examining some of these seminal literary texts (Lermontov, Dostoevsky, Bulgakov) alongside the intellectual history of Russian radicalism (Herzen, Belinsky, Chernyshevsky, Lenin), beginning with the birth of the Russian intelligentsia to the establishment of a new elite in the Soviet Union under Stalin. Other topics covered include the emergence of the Nihilist movement, the Populist turn in Russian history, the intellectual disillusionment that led to the establishment of terrorist organizations in Imperial Russia, and the Russian Revolutions.

HIST/SDP 329 The Global Post-colony

Credit Hours: 3

Post-colonialism is much more than a chronological category to describe what took place in the aftermath of independences. It is a critical response to the legacy of colonialism and imperialism in History, Art, Literature, and other fields of knowledge. In line with one of the intellectual imperatives of Habib University, i.e., the interest in post-colonial legacies across the developing world, the main purpose of this course is to bring some key readings to understand post-colonial and de-colonial studies. Rather than an exhaustive analysis of post-colonialism, the course aims to bring an introductory approach to the writings of important intellectuals writing about different post-colonial societies in Africa, Asia, and Latin America, allowing us to understand how they have faced the challenges posed by the postcolonial legacies in their respective regions. Hence, this is a course on the History of ideas that discusses how colonialism has shaped the way different intellectuals interpret History and society. Despite all the diversity encompassed by countries from such continents, their postcolonial condition is an important common ground that unites them and provides us with insightful generalizations about their histories, politics, economies, and societies. Considering that historians should not be concerned only with isolated facts, but also with attaching such facts to a broader chain of meanings, this course is a good opportunity to find patterns in postcolonial legacies across the world. As diverse as Asian, African, and Latin American countries may be, by analyzing their postcolonial conditions, we ought to identify many similar dilemmas, challenges, and aspirations, thus allowing us to see the general in the specific.

On the other hand, the course will also encourage students to see the differences in these postcolonial legacies and delve into the reasons for these differences. The differences and similarities between Asian and African postcolonial studies, on the one hand, and Latin American De-colonial studies, on the other, are of special interest to us. Far from disavowing the concept of post-colonialism, these differences actually denote the richness encompassed by such concept. The course modules were divided according to Robert J. C. Young's notion of tricontinentalism, that encompasses all continents that engaged in anti-colonial and anti-imperialist struggles: Asia, Africa, and Latin America. Each module will be dedicated to authors who delved into one of these continents. This division, however, was purposely set just to be challenged by a global approach to be encouraged throughout the course.

The first lectures of each module encompass discussions on the assigned readings. The two last meetings of each module will be dedicated to students' oral presentations. Each group will be asked to watch a previously assigned movie and discuss that movie under the light of the assigned readings. In these presentations, students ought to show the class how that movie helps us shed some light on the readings or how the readings help us understand the movie. The movies must be watched by everyone before class, and not only by those who are presenting it. It is expected that each group shows the most relevant scenes of the movie during their oral presentation. All the movies are either available on YouTube or will be provided by the instructor.

LIT 104 What is World Literature? Introduction to the Study of World Literatures

Credit Hours: 3

This course is an introduction to literary study that develops students' critical reading skills through the analysis of poetry, prose, drama, and/or film. Themes of the course will focus on the ways different individuals, societies, and cultures represent themselves in literature, and how we read and interpret those forms of representation through the application of basic critical literary tools and theories.

LIT 205 "Kon Sitare Chhoo Sakta Hai"- A Detailed Study of Metaphors

Credit Hours: 3

This course is about the tradition of Urdu poetry in general and the history of similes, metaphors and symbols frequently used throughout the centuries in particular. So the point of focus will be the Urdu poetic diction to find evidence for the claim that essence of poetry lies in the language used and in the poet's understanding of the associations of words with each other. The elements of Urdu poetic diction will be traced from as far back as the eighteenth century to the present to show how some words and their associations have persisted and some have been used to create poetry by their deliberate violations.

This course will train the students to appreciate Urdu poetry through interpretation of similes, metaphors and symbols as employed by major classical, modern and contemporary poets. It will also provide a creative impulse to the aspiring Urdu poets among the students.

COM / LIT 221 Journalism, History and the American Novel

Credit Hours: 4

This course will trace historical connections between journalistic and literary traditions. It will focus on a group of novelists and literary figures with strong connections to the world of journalism – from Daniel Defoe to Joan Didion – and will trace their contributions to the English literary canon beginning in the long eighteenth century (when the novel and the periodical — i.e. the Spectator and the Tattler — were emerging as powerful cultural forces in England) right up to the late twentieth century and the emergence of "new journalism" in America.

The course has been divided into four broad sections: the long eighteenth century (the era of the "birth of the novel"), the nineteenth century explosion of the printing press ("Penny Press" newspapers, and McClure's and Collier's in America), the Algonquin Round Table years of the early twentieth century, and the emergence of "new journalism" in the 1960s and 1970s.

LIT 225 Introduction to Literary Theory and Criticism

Credit Hours: 3

This course explores the major theories of reading and interpreting literature that developed throughout the twentieth century. Literary theory and criticism attempts to answer a range of questions central to the nature of literary experience. It examines the production of value and meaning in works of art, grapples with the mediating power of history and culture in framing how we understand those works, and highlights the role of tropes and formal elements like imagery, metaphor, symbol, genre, and narrative in shaping how we experience texts aesthetically. Literary theory also explores questions of authorship and intertextuality, gender and agency, and language and representation. In reflecting on these questions, students will engage critically with some of the most influential theorists, schools of thought, and conceptual problems that have come to define literary studies in the past century, ranging from practical criticism to semiotics to post structuralism. As a final project, students will undertake a theoretically informed reading of a text of their choice.

LIT 326 A Journey through Urdu Novella

Credit Hours: 3

Urdu fiction includes not only short stories and novels but also a large number of novellas; we can also call them short novels or long short stories. The syllabus for this course consists of seven novellas by master Urdu fiction writers. After completing the course of Jehan-e-Urdu, the students need to be exposed to longer pieces of fiction which require longer periods of time and more

concentrated reading. The selected seven novellas present stories in different settings both rural and urban in terms of space and different periods in terms of time. The course will provide the students an opportunity to learn to appreciate and critically analyze the elements of fiction and to visualize a great variety of cultural and historical worlds set in these novellas.

MUS 101 Music of South Asia: Style & Structures

Credit Hours: 3

This course will introduce students to the rudiments of South Asian music; its melodic and rhythmic bases and the various existing styles of performance. From understanding structural differences between genres such as folk, ghazal, thumri and khayal to recognizing stylistic differences between practitioner groups, this course will be an immersion into a musical realm that is largely unfamiliar to young listeners. With a mandatory practice component through the Khawaja Mashooqullah Music Room, audio-visual resources, and readings to provide context, the course will serve as a foundation for pursuing more advanced studies in music.

MUS 222 Sound and Subjectivity: Listening to the Other

Credit Hours: 4

Every known human culture and community has produced music or exhibited sonic practices that can be classified as 'music'. Music is immensely meaningful and moving for the communities that it belongs to. However, the experience of listening to sound and music from cultures and contexts that are unfamiliar to us, can be both blissful and elating, as well as bizarre and alienating. The affect produced by strange sounds and foreign musical structures is determined by the subjectivities that constitute our own ways of listening. What then, is the nature of listening? How should we listen to, engage with, and understand music from other cultures, contexts, and traditions? How have disciplines like anthropology, musicology, and ethnomusicology historically addressed and understood nonwestern music? What are the variety of meanings- social, cultural, religious, and political- that music continues to be imbued with? What does our experience of listening to the Other tell us about ourselves? These questions form the core basis of inquiry in this course. This is a survey course of selected musical cultures and traditions of the world that is organized through an aural geography that takes the subjectivity of our listening as its point of departure.

MUS 2xx Khayal Gayeki: The Aesthetics and Evolution of a Vocal Form

Credit Hours: 3

Khayal Gaeyeki is a highly developed and evolved form of South Asian music, still venerated and loved globally today. This form and genre has a fascinating historical beginning, within the syncretic and artistically thriving courtly context of 15th century Mughal India. The early history marks the coming together of diverse traditions; the legacy of the 13th century poet, inventor, musician and sage, Amir Khusrao, the pre-Mughal 'Sanskritic' courtly musicians called Kalavants and the musical influence of Sufi Khanqah's and sama gatherings. By the 18th century, this genre was the most popular courtly genre and by the beginning of the 20th century, in a post-colonial landscape, it went through a reformist wave and was integrated into modern educational institutions in India.

The form of Khayal has gone through many changes vis a vis diverse forms of patronage, societal contexts and artistic legacies. Post 20th century, musical knowledge related to theory and aesthetics is transmitted through guilds called gharanas. The primary aspects of Khayal that have continued from pre-modernity to current times include Raga exploration, compositional aesthetics, defined musical ornamentation, melodic improvisation, performance architecture and stylistic lineages.

PHIL 122 Introduction to Western Philosophy

Credit Hours: 3

This course aims to provide a systematic introduction to the main problems of metaphysics, epistemology, ethics and aesthetics, as addressed in the Western philosophical tradition. It familiarizes students with central debates in Western philosophy and permits them an overview of the works of some of the discipline's most pertinent thinkers. It does so by pointing out long term traditions of Western philosophical thought as well as their implications for contemporary intellectual discourse. It engages with several important issues concerning the nature of knowledge, truth, self, reality, consciousness, morality, language, and God. Along with reading texts by classic figures such as Plato, Descartes, Hume, and Kant, students will also get to study modern and contemporary thinkers such as Simone de Beauvoir, Ludwig Wittgenstein, Edmund Husserl, Hannah Arendt, Martha Nussbaum, and Derrida. Students will learn to engage with various philosophical issues critically, to compare them analytically, and to translate what they mean for the present. In so doing, students will acquire the critical analytical vocabulary to understand our current socio-political predicament in a reflected and philosophically-informed way.

PHIL 200 What is Philosophy?

Credit Hours: 4

Taking a comparative approach to the subject matter, this course investigates the original writings of a range of contemporary philosophers, where they have problematised and responded to the "what is philosophy?" question. The writings under consideration help us grapple with differing frameworks and conceptual lenses for understanding approaches to the complex, fundamental question of philosophy, and the process, work, purpose, and history of philosophy. This course calls for consistent focus on careful reading, writing, research, presentation assignments, and intensive class participation commitment. The philosophers whose writings we consider this semester include: Noam Chomsky, Anne Dufourmantelle, Martha Nussbaum, Jacques Derrida, Alain Badiou, Louis Althusser, Gilles Deleuze, Jean Francois Lyotard, and Reza Negarestani.

PHIL/COM 219 Tragic Philosophy and Film

Credit Hours: 3

Since the ancient Greeks, the philosophical relevance of tragedy as a dramatic form has always been readily recognized. Tragedy is about the limits of man: only by acknowledging these limits, man can find his place in society and in the world. In the Anthropocene, the evidence of the limits of human agency and the trouble with human hybris (i.e. the insolent transgression of those limits) is inescapable; for this and many other reasons, tragedy has still a lot to say to 21st century humanity. This course investigates the idea of the tragic, as it appears in the dramatic form known as "tragedy", in the writings of philosophers, and as a fundamental feature of human experience. Particular attention will be given to political economy, a field variously interrelated with tragedy.

Cinema will play a major role in this course, catering to CND/COM as much as CH, and conceived as an occasion of dialogue and intersection between the two programs' agendas. A selection of eight films, chosen among the very many cinematic iterations of tragedy as a dramatic form, will be discussed in-depth during the course. They will, however, be something more than mere illustrations of the tragic as a dramatic form. They will show how the classical tropes of tragedy can still speak to a number of concerns of our contemporary world: the boundaries of freedom, the inseparability between civilization and violence, the clash between individuality and institutions, the difficult possibility for a truly ethical act, and so forth.

PHIL 221 Medieval Islamic Philosophy

Credit Hours: 3

This course takes a historical, textual and analytical approach to examine problems related to ethics, metaphysics, human nature, psychology and the philosophy of religion discussed by both, the

Medieval Islamic philosophers and the Kalam theologians. The broad purpose of the course is to make students aware that while the compatibility of reason and religion may still be a topic of debate amongst contemporary intellectuals, the rich intellectual traditions of Islam valued rational faculty and logic to a greater extent in understanding the creation, the creator and their relationship.

PHIL/RELS 327 Spirituality, Philosophy and Science

Credit Hours: 3

Knowledge never is a definitive achievement and its production is determined by multiple factors (political domination, social and cultural conditions, fashions, inertia,). This course aims at offering a fresh analysis of the complex interactions between three dynamic fields of knowledge: science, philosophy and spirituality. Numerous scientific questions have stemmed from philosophical or spiritual reflection, and conversely many scientific results have called for philosophical insights.

Historically intertwined, the three have become distinct from each other in the past few centuries. The calls for a dialogue between them have allowed numerous epistemological issues to be recently addressed. By embracing different perspectives across disciplines and regions (as traditions of thought both East and West have interacted and been plural), this course will call into question rationalism and materialism by introducing students to works, authors and research programs proposing alternative ways of looking at the world and man.

The philosophical issues that bear on spiritual beliefs have recently attracted the growing curiosity of philosophers and scientists on key topics such as free will, the nature of consciousness, healing or the physical nature of reality. Many think that a joint effort between disciplines could benefit knowledge in the broader sense of the term. Without positing a miraculous reconciliation, this course will offer a space for the discussion and re-assessment of the relationships between science, spirituality and philosophy. Didn't the Physicist Abdus Salam claim that Rumi inspired the theory that made him win the Nobel Prize? « All atoms dance like a single sun »

RELS 102 An Introduction to World Religions

Credit Hours: 3

This is the required foundational course for both the primary and secondary concentrations in Religious Studies for majors in the Comparative Humanities (CH) program. It is also the required gateway course for students in any other major at Habib who wish to complete a minor in Religious Studies. Finally, this course may also be taken as a lower level elective by any student who is simply curious to learn something about the major world religions.

The course is designed to fulfill two critical objectives. The first objective is to develop a sound introductory level understanding of five great world religions (Buddhism, Christianity, Hinduism, Islam and Judaism). Collectively, these five religions account for 6.1 billion of the world's 7.79 billion people. Of the 1.69 billion people not covered by these five major world religions, 1.19 billion people are classified as "secular," "nonreligious" or "agnostic/atheist." It's important to emphasize the word "introduction" in the title of this course. It would be easy to spend a lifetime studying each of these religions, so no one course can do more than scratch the surface. It's also important to stress that no religion can be distilled down to some essential core, and one of the recurring themes of this course will be the tension between unifying aspects of the tradition and the tremendous diversity that exists within all religions. Similarly, religions don't exist in the abstract, they exist in the context of specific times and cultures, which both shape and are shaped by religion.

A second objective of this course is that it is also designed to introduce you to the scholarly humanistic study of religion. What does this mean? First, let's consider what the humanities are. They are an interrelated series of academic disciplines that explore what it means and has meant to be human across both time and geographical space. And, as we'll discuss in greater detail in a moment,

from our earliest historical records of abstract human thought, religion seems to have been universally central to human expressions of meaning.

Therefore, at its most basic level, we can say that the humanistic study of religion understands religion as a fundamental and irreducible dimension of human experience and expression. Because religion has been so central to human expression of meaning, especially to understandings of ultimate meaning, religion has long and often been fiercely contested – both within and across religious traditions. Thus, it's important to understand that humanistic scholars of religion strive neither to privilege nor to denigrate any religion. Their purpose is to understand the critical role that religion has and continues to play in expressing human meaning. However, we must also acknowledge from the outset that it has not always been this way.

RELS/HIST 233 Religion in Modernity: Adaptation and Reinvention

Credit Hours: 3

This course offers students the opportunity to apply the concepts learned in What is Modernity? to the study of religion. It will emphasize the heterogeneity of the impact of modernity on religiosity and religions by looking at the various processes of resistance, adaptation and reinvention in Hinduism, Islam, Judaism and beyond (rise of atheism, magic and the divine feminine). Indeed, world religions are some of the most enduring institutions in history but they are far from being immutable monoliths: if religious forces impact the world, conversely world-building forces have shaped religions and religiosity. The latter have been (and still are) in the process of multiple changes in the face of wider

cultural, social and political transformations (colonialism, capitalism, nation-state, secularization, globalization, etc.). Resistance to modernizing trends (from Orthodox Jews to Islamists) is just one of the many possible reactions adopted by groups belonging to all faith communities. Others have tried to reinvent their tradition on a more universalistic and/or New Age mode (from the Kabbalah to Westernized gurus). True to the overall philosophy of the PCH program, this attempt to understand religion's relationships to modernity will be transdisciplinary with recourse to leading specialists mainly in sociology and anthropology (Fox, Altglas, Eisenstadt, Haenni, Howell, Voix…) and history (Zachariah,

Meyer, Clark, Lapidus…) but also psychology or philosophy of religion. It will also be comparative, in order to show both the heterogeneity (within faith communities) and the congruence (between world religions).

RELS / ANT 252 Anthropology of Religion

Credit Hours: 3

In Pakistan, when it comes to the study of religion, it is generally associated with Islamic Studies or commonly known as Islamiyat (a compulsory subject/course in a school, college and even a university) and a Madrassa. Normally, it is seen as a religious responsibility or something that is an interest of "religious people" or people who are interested in religion. Hence, producing and provoking heated feelings and strong opinions based on an understanding of religion which is generally a static entity or a singular essence. In this course we will be deconstructing such an understanding and we will learn to explore religion not as a reified or static entity but as a living experience with more than just a

singular essence. Since religion is one of the important topics in anthropology, we will focus on the themes that guide anthropology to look at religion, its role and expression in different societies. The aim is to develop the idea of the anthropological approach toward religion. To achieve the aim, we will not only focus on major conceptual approaches and debates in the study of religion but will also

explore religious life in specific socio-cultural and political contexts using different ethnographic studies.

Regional Languages

LANG 101 Sindhi Sikhiya I

Credit Hours: 4

The knowledge gained through this course will help students to appreciate the enormous culture, heritage, and literature of Sindhi language. The students start as beginners to equip themselves with skills of understanding/learning a certain degree of a new language is important. So, pursuing new Language new skills, new knowledge can associate to an important five to ten-thousand-year old ancient language, culture, and its music thriving in modern world.

LANG 102 Punjabi Rachna I

Credit Hours: 4

The Course aims to enable the students to develop a basic understanding of Punjabi language in context to Punjabi culture, idiom, linguistic and literature. This course initiates a learning module, which will evolve in three semesters; each interlinked in a systematic row starting with emphasis on linguistics to literature and finally history of Punjabi language. This is the Elementary level of this course. Contents of the course have been designed to ensure that the students may acquire the following fundamental skills with special emphasis on:

Speaking: Simple language interaction with correct pronunciation, intonation and appropriate expression.

Listening: Familiarities with alphabets, articulation of sounds, correct pronunciation, vowel harmony including phrases and expressions.

Reading: Correct reading for understanding Punjabi language script.

LANG 104 Introduction to Pashto - Pashto Pohana I

Credit Hours: 4

The purpose of this course is to provide students a critical and rigorous introduction to the world of Pashto Language. This involves understanding the Geographical and Historical context of Pashto and Pashtoonwali, fundamentals of Central Asian languages and key debates on the development, implementation and evaluation of Pashto. First, we will try to understand the emergence of the studies of this Central Asian language within the broader field of social sciences, its unique orientation, and its relationship to the practice of Social life.

Second, this purpose would enable them to understand the rational relationship of the language Pashto to the Ancient languages. Contents of the course have been designed to ensure that the students may acquire the skills with special emphasis on speaking, interaction with correct pronunciation, intonation and appropriate expression with the major geographical dialects. Familiarities with alphabets, articulation of sounds, correct pronunciation, vowel harmony including phrases and expressions, Correct reading for understanding Pashto language script Short paragraphs, situational dialogues and simple compositions.

LANG 201 Sindhi Sikhiya II

Credit Hours: 4

This intermediate course enhances students' reading and writing skills in the Sindhi language. Students will be exposed to folklore rhymes, folk songs, fables and tales, and poetry. The course will introduce major Sindhi language Sufi poets and prose writers from 1843-1947. At this level, students will learn to contextualize readings in a larger Sindhi cultural context.

LANG 202 Punjabi Rachna II

Credit Hours: 4

The Course aims to enable the students to develop a basic understanding of Punjabi language in context to Punjabi culture, idiom, linguistic and literature. This course initiates a learning module, which will evolve in three semesters; each interlinked in a systematic row starting with emphasis on linguistics to literature and finally history of Punjabi language. This is the **intermediate** level of this course. Contents of the course have been designed to ensure that the students may acquire the following fundamental skills with special emphasis on:

Speaking: Simple language interaction with correct pronunciation, intonation and appropriate expression.

Listening: Familiarities with alphabets, articulation of sounds, correct pronunciation, vowel harmony including phrases and expressions.

Reading: Correct reading for understanding Punjabi language script.

Writing: Short paragraphs, situational dialogues and simple compositions.

LANG 301 Sindhi Sikhiya III

Credit Hours: 4

Sindhi Sikhiya is an optional course. Sindhi Sikhiya III is for all those students who has passed Sindhi Sikhiya II at Habib University. The objective of this course is to help students comprehend, read and write Sindhi language. It is expected that students will be at different levels of skill in reading and writing Sindhi. In addition to the lectures and discussion groups, tutorials organized to facilitate the students in reading, comprehending, and contextualizing the texts on the reading list.

LANG 302 Punjabi Rachna III

Credit Hours: 4

The course aims to enable the students to develop a basic understanding of Punjabi language in context to Punjabi culture, idiom, linguistic and literature. This course initiates a learning module, which will evolve in three semesters; each interlinked in a systematic row starting with emphasis on linguistics to literature and finally history of Punjabi language. This is the **advanced** level of this course. Contents of the course have been designed to ensure that the students may acquire the following fundamental skills with special emphasis on speaking.

Speaking: Simple language interaction with correct pronunciation, intonation and appropriate expression.

Listening: Familiarities with alphabets, articulation of sounds, correct pronunciation, vowel harmony including phrases and expressions.

Reading: Correct reading for understanding Punjabi language script.

Writing: Short paragraphs, situational dialogues and simple compositions.

DHANANI SCHOOL OF SCIENCE & ENGINEERING

Computer Science

BS in Computer Science

FACULTY

Abdul Samad Khan	Assistant Professor and Program Director
Shah Jamal Alam	Associate Professor
Waqar Saleem	Associate Professor
Akhlaque Ahmad	Assistant Professor
Ayaz ul Hassan Khan	Assistant Professors
Muhammad Mobeen Movania	Assistant Professor
Muhammad Nadeem	Assistant Professor
Syed Sohaib Ali	Assistant Professor
Syeda Saleha Raza	Assistant Professor
Maria Samad	Lecturer
Nadia Nasir	Lecturer
Abid Butt	Adjunct Faculty
Asma Sanam Larik	Adjunct Faculty
Mohsin Nagaria	Adjunct Faculty
Muhammad Qasim Pasta	Adjunct Faculty
Muhammad Saeed	Adjunct Faculty
Musabbir Abdul Majeed	Adjunct Faculty

VISION

Computer Science (CS) is the study of computation - what can and cannot be computed, how can computation be made more efficient, how to build machines that can compute, and which spheres of human activity can benefit from computational approaches. It is deeply rooted in logic and mathematics. Theoretical Computer Scientists push the frontiers of computation by inventing new computational approaches. Practical Computer Scientists apply the theory of Computer Science to different application areas like science, finance, medicine, business, transportation, entertainment, education, communication, engineering, art, and the humanities.

Interventions stemming from CS are just beginning to disrupt and reinvent Pakistani society. The CS program provides students the intellectual and technical foundation to assess these interventions and to contribute meaningfully and thoughtfully to the transition of our society to the information age. With an education grounded in the Liberal Arts, our graduates have an unrivaled understanding of our society and the ethical ramifications of technology.

A major with the program educates students in the theory, systems, and applications of CS so that they are able and willing to make impactful contributions to society and are prepared for success in the industry, entrepreneurship, and higher education.

PROGRAM EDUCATIONAL OBJECTIVES

Computer Science program at Habib University aims to produce competent computer scientists who:

1. Have strong foundational knowledge of mathematics and computer science, and the accompanying skills both in breadth and in depth, to position themselves equally well in the Information Technology industry, as technology entrepreneurs and/or in graduate programs in Computer Science or other technical and scientific fields.

2. Have a hands-on approach to self-learning and research, and will continually update their knowledge, skills and technical know-how.

3. Will be able to assess the societal, cultural, social, religious, legal, environmental, local, and global impact of their actions and will choose an ethical course of action in their professional, personal, and daily lives.

4. Will be able to effectively communicate and collaborate with people from diverse backgrounds and in a variety of settings.

PROGRAM LEARNING OUTCOMES

Students who graduate with a degree in Computer Science will be able to:

1. **Analysis**: analyze a given situation and reduce it to one or more problems that can be solved via computer intervention.

2. **Design**: design one or more computer-based solutions of a given problem and select the solution that is best under the circumstances.

3. **Programming**: program a given solution in a variety of programming languages belonging to different programming paradigms.

4. **Implementation**: design and implement software systems of varying complexity.

5. **Tools**: work with the latest tools that support development, e.g., IDE's, version control systems, debuggers, profilers and continuous build systems.

6. **Self-learning**: research, learn and apply the requirements needed to implement a solution for a given high-level problem description.

7. **Ethics and Awareness**: foresee both the impact and possible ramifications of computing practices.

8. **Communication and Teamwork**: Communicate effectively in both writing and oral communications and work effectively in inter-disciplinary teams

REQUIREMENTS FOR THE MAJOR – Class of 2025

All Habib University students majoring in Computer Science (CS) must complete a minimum of 130 credits hours, with a minimum grade of **C+** in each CS Foundation and Kernel course in order to graduate with this degree. Students must also meet all other requirements set by Habib University and by the Dhanani School of Science and Engineering. Some of these may overlap. The courses are divided in the following categories:

University Requirements

All students are required to take 10 courses spanning seven forms of thought and action, called the Habib Liberal Core. Some courses in the major can also be counted towards meeting requirement of certain forms of thought in the core. For more details, please see the section on Habib Liberal Core in the catalog.

Natural Science and Mathematics

These courses are offered by the program on Integrated Science and Mathematics and are described in the program's section below. Students pursuing a CS major are required to complete any 02 Natural Science courses, at least one of which must include a lab component. They are also required to complete the following Mathematics courses.

- MATH 101 Calculus I
- MATH 102 Calculus II
- MATH 202 Engineering Mathematics
- MATH 205 Linear Algebra
- MATH 310 Introduction to Probability and Random Variables

Entrepreneurship

This requirement is currently met by the following course which is described further below*:

- MGMT 301 Technology Management and Entrepreneurship

*More courses may be added to this list.

Computer Science Foundation

CS Foundation prepare students coming out of high school to build a sound foundation of CS concepts. It comprises of the following 03 required courses:

- CS 101 Programming Fundamentals
- CS 102 Data Structures and Algorithms
- CS 113 Discrete Mathematics

Computer Science Kernel

CS Kernel covers concepts, skills, and techniques that are fundamental to the pursuit of most disciplines and practices within CS. It comprises of the following required courses.

- CS 201 Data Structures II
- CS 212 Nature of Computation
- CS 224 Object Oriented Programming and Design Methodologies
- CS 232 Operating Systems
- CS 353 Software Engineering
- CS 355 Database Systems
- CS 412 Algorithms: Design and Analysis

Other Computer Science Requirements

CS students must complete the following 2 courses.

- CS 100 Computer Science Freshman Seminar
- CS 290 *Khidmat* (field practice)

Computer Science Electives

Students are required to complete at least five (05) courses that explore various disciplines and practices within CS. Some courses that fulfil this category are (other courses might be added to this list):

- CS 261 Understanding Social Networks
- CS/SDP 262 Introduction to Computational Social Science

- CS 311 Introduction to Cryptography
- CS 314/PHY 300 Quantum Computing
- CS 316 Introduction to Deep Learning
- CS 317 Combinatorial Machine Learning
- CS 326 Mathematics for Machine Learning
- CS 336 Introduction to Computer Security
- CS 340 Geometrical Modelling and Analysis
- CS 342 Game Development
- CS 351 Artificial Intelligence
- CS 363 Networks, Games, and Collective Behavior
- CS 370 Web and Mobile Development
- CS 400 CS Senior Seminar
- CS 415 Computational Complexity Theory
- CS 416 Algorithms for Machine Learning
- CS 421 Compiler Construction
- CS 432 GPU Accelerated Computing
- CS 440 Computer Graphics
- CS 451 Computational Intelligence
- CS 457 Data Science Techniques
- EE 424 Data Communications and Networking
- EE 451 Digital Image Processing
- EE 442 Embedded Systems
- EE 375 Microcontrollers and Interfacing

Final Year Capstone Project

CS students in their final year undertake a year-long project as the culmination of their studies in the CS major. This is completed as the following 02 courses.

- CS 491 Kaavish I
- CS 492 Kaavish II

Free Electives

Any course offered at Habib university can be attempted as a free elective.

Requirements for the Computer Science Major (Class of 2025)

Course Category	No. of Courses [+]	No. of Credit Hours*
University Requirements		
Habib Liberal Core	10	35+
Natural Science and Mathematics Requirement		
Natural Science	02	07
Mathematics	05	16
Computer Science Requirements		
CS Foundation	03	10
CS Kernel	08	28
CS Electives	05	15^

Course Category	No. of Courses +	No. of Credit Hours*
Final Year Capstone Project (*Kaavish*)	02	06
Other Requirements		
Khidmat (field practice)	01	Non-credited
Digital Logic and Design	01	04
CS Freshman Seminar	01	01
Entrepreneurship	01	03
Free Electives	05	15*
Overall	**44**	**142***

* *Courses in the various categories may overlap leading to a different total number of courses and credit hours.*

+ *A minimum of 35 credits are required of HLC. Some of the HLC courses may overlap to fulfil the program requirements.*

^ *Student must enroll in the lab of every 4 credit CS Elective.*

- *A minimum of 130 credits are required for graduation. A sufficient number of extra courses must be taken to meet any credit shortfall.*

- *Students are advised to consult their faculty advisor or the Office of Academic Performance regarding choice of courses.*

COMPUTER SCIENCE MINOR

All Habib University students choosing to pursue the CS minor must complete a minimum of 7 courses totaling at least 21 credits. Requirements to complete the minor can be found in the 'Minors' section of the Course Catalog.

COURSE DESCRIPTIONS

Required Courses

CS 100 Computer Science Freshman Seminar

Credit Hours: 1+0
Prerequisite: None
Fulfils: CS Major Requirement

Computer Science is a rich field. Rooted in mathematics and logic, it is intellectually stimulating and its applications continue to enable the realization of diverse ideas that touch our lives in a multitude of ways. This seminar provides a broad overview of the theory and practice of Computer Science through a series of weekly seminars by researchers and practitioners.

CS 101 Programming Fundamentals

Credit Hours: 2+1
Prerequisite: None
Fulfils: CS Foundation; Formal Reasoning

Motivates computer programming as a means to solve problems; introduces the basic components of problem solving: repetition, decision making, data storage and manipulation, input/output, modularity, top-down design; develops expertise in the corresponding constructs – variables, data types, iteration, conditionals, functions, file and console I/O, and recursion – in a high level programming language.

CS 102 Data Structures and Algorithms

Credit Hours: 3+1
Prerequisite: CS 101
Fulfils: CS Foundation

Motivates the design of algorithms by exploring various algorithms for a single task: linear search and binary search, bubble sort, insertion sort, selection sort, merge sort, quick sort; introduces techniques to reason about and compare algorithms: asymptotic analysis and notation, Master theorem; introduces frequently used data structures: list, tree, graph, stack, queue; discusses and analyzes basic operations on the data structures: infix, postfix, and prefix traversal, breadth-first and depth-first search, computation of graph properties.

CS 113 Discrete Mathematics

Credit Hours: 3+0
Prerequisite: None
Fulfils: CS Foundation; Formal Reasoning

Equips students with essential mathematical tools that will be encountered in future Computer Science courses; develops a capacity for formal mathematical manipulation and abstract thought; topics include: propositional logic, predicate and quantifiers, sets, functions, sequences, summations, relations, partial orderings, proofs, mathematical induction, pigeonhole principle, permutations and combinations, graphs, graph isomorphism, Euler and Hamiltonian paths, and trees.

CS 201 Data Structures II

Credit Hours: 3+0
Prerequisite: CS 102 and CS 113
Fulfils: CS Kernel

Imparts proficiency in the use of commonly used data structures; introduces a few higher level data structures; develops critical judgment regarding the choice of data structures for a given situation; topics include: abstract data type, complexity, stack, queue, list, amortized analysis, array-list, linked list and skip list, hashing, binary tree, binary search tree (BST), randomized BST and treap, self-balancing in trees, AVL tree, B-tree, red-black tree, binary heap and meldable heap, Fibonacci heap, graphs and their representations, graph algorithms, trie, inverted index.

CS 212 Nature of Computation

Credit Hours: 3+0
Prerequisite: CS 113
Fulfils: CS Kernel

Develops the foundations for theoretical computer science; investigates fundamental challenges at the frontiers of theoretical computer science; provides opportunities to develop rigorous mathematical arguments; engages with classical ideas from theoretical computer science; topics include: proofs, languages, finite automata, grammars and push-down automata, Turing machines and the halting problem, oracles and computability, Gödel's completeness and incompleteness theorems, circuit complexity, polynomial time and its justification, reduction, P, NP, and NP-

completeness, Cook-Levin theorem, hardness of the P versus NP problem, randomness, P versus BPP, interactive proofs, zero-knowledge proofs, quantum computing, DNA computing, biological computing, physical limits of computation.

CS 224 Object Oriented Programming and Design Methodologies

Credit Hours: 3+1
Prerequisite: CS 102
Fulfils: CS Kernel

Introduces object oriented and related memory concepts; motivates C++ as the language of choice; topics include: pointers and structs, objects, heap allocation, data encapsulation, classes, namespaces, constructors and destructors, virtual functions and destructors, operator overloading and standard input/output, inheritance and polymorphism, templates, standard library containers, and software design using UML 2.0.

CS 232 Operating Systems

Credit Hours: 3+1
Prerequisite: CS 102
Fulfils: CS Kernel

The student will be taught principles of modern operating systems. In particular, the course will cover details of concurrent processes, multi-threads, CPU scheduling, memory management, file system, storage subsystem, and input/output management. This will be accomplished by integrating theory and practice through coordinated lecture and lab hours.

CS 330 Computer Architecture

Credit Hours: 3+1
Prerequisite: CS 130
Fulfils: CS Systems Elective

Studies the architecture of RISC-V processor that enables general purpose computing; develops hands-on expertise in developing complex logical components; topics include: instruction set architecture, addressing modes, processor design and computer arithmetic, pipelining, memory systems, fetch-execution cycle, processor implementation on FPGA using Verilog HDL.

CS 353 Software Engineering

Credit Hours: 3+0
Prerequisite: CS 224 and CS 355
Fulfils: CS Kernel

Approaches software engineering as the study and practice of a collection of concepts, techniques and tools which enable programmers to design, build, and maintain large software systems in a reliable and cost effective way; develops skills and understanding that function as the basis for many of the more advanced analysis and design practices encountered in the industry; topics include: systems development process, stakeholders and their roles, systems development project needs, software process methodologies, spiral and RUP, software analysis and requirement discovery, data modelling, SAD and OOAD, UML, use case diagrams, software project management, project scope, network diagrams and CPM, agile methodologies, XP, Scrum and FDD, class diagrams, realization of use cases, object oriented design, sequence diagrams, activity diagrams, state transition diagrams, user interface design, software testing, software construction and maintenance.

CS 355 Database Systems

Credit Hours: 3+1
Prerequisite: CS 102
Fulfils: CS Kernel

Explores in detail the theoretical and practical aspects of Relational Database Management Systems (RDBMS); develops an understanding of database modeling, relational algebra, structured query language (SQL), components of Database Management System (DBMS), transaction management and concurrency control, database fine-tuning via indexing and partitioning, and database connectivity with front-end applications; discusses administrative aspects of database systems including database security, database management vs data warehousing vs data mining, and big data and its challenges.

CS 412 Algorithms: Design and Analysis

Credit Hours: 3+0
Prerequisite: CS 201 and MATH 310
Fulfils: CS Kernel

Develops tools and techniques that aid in designing correct, efficient algorithms for computational problems and analyzing their correctness and running time; some of the discussed techniques are: greedy method, divide-and-conquer, dynamic programming, hashing, randomization, network flows, linear programming, Fast Fourier Transform, and techniques for thinking about solving problems in parallel; analysis tools include: recurrences, probabilistic analysis, amortized analysis, and potential functions.

CS 491 Kaavish I

Credit Hours: 0+3
Prerequisite: CS 353
Fulfils: Capstone Project

Self-directed final year project carried out under the supervision of a faculty member; emphasizes solving a real-world problem; integrates knowledge and skills accumulated over the entirety of the degree; first of a 2-part sequence.

CS 492 Kaavish II

Credit Hours: 0+3
Prerequisite: CS 491
Fulfils: Capstone Project

Self-directed final year project carried out under the supervision of a faculty member; emphasizes solving a real-world problem; integrates knowledge and skills accumulated over the entirety of the degree; second of a 2-part sequence.

Elective Courses

CS/SDP 262 Introduction to Computational Social Sciences

Credit Hours: 3+0
Prerequisite: None
Fulfils: CS Elective

Social systems are sources of complexity in themselves in the sense that interactions between individuals may give rise to unexpected and unpredictable outcomes at the system's level. Recent technological advances coupled with the availability of faster and cheaper internet services have opened new research frontiers and challenges for social and behavioral scientists in understanding human social interaction – one way of understanding the interplay of such interactions is through simulating (some) aspects of the target system, whether it is from real or a virtual world. Agent-based social simulation is a modeling technique that is suitable for analyzing such systems, by capturing individual behavior (micro-level) and observing the generated behavior at the macro-level.

CS 316 Introduction to Deep Learning

Credit Hours: 3+1
Prerequisite: MATH 101, MATH 205, and MATH 310
Fulfils: CS Elective

The goal of this course is to give learners an understanding of modern neural networks, their applications in different domains such as computer vision, natural language processing, etc. This course aims to provide expertise to develop intelligent systems using deep learning from scratch, using best practices to solve real world problems.

CS 326 Mathematics for Machine Learning

Credit Hours: 3+0
Prerequisite: MATH 205 and MATH 310
Fulfils: CS Elective

Machine learning is turning the Artificial Intelligence dream into reality. The understanding and creation of machine learning algorithms requires Linear algebra concepts as key. This course reviews Linear Algebra with applications to probability, statistics and optimization- and above all a full explanation of deep learning.

CS 340/MATH 321 Geometrical Modelling and Analysis

Credit Hours: 3+0
Prerequisite: MATH 205, MATH 202, and CS 224
Fulfils: CS Elective

This course will cover the foundations of geometrical modelling and analysis, with examples from elasticity, electrostatics, and computer science. The course content can broadly be divided into three categories: fundamentals of geometrical modelling, discretizing a partial differential equation, and stability of solutions.

CS 351 Artificial Intelligence

Credit Hours: 3+0
Prerequisite: CS 201 and CS 224
Fulfils: CS Elective

Studies the major areas of artificial intelligence (AI): problem-solving, decision-making, learning, planning, and reasoning; topics include: intelligent search techniques, games and adversarial search

using minimax and alpha-beta pruning, supervised learning via decision trees, naive Bayes, artificial neural networks, K-means clustering, reasoning via first-order logic, Bayesian networks, evolutionary algorithms; explores the areas of computer vision, robotics, and deep learning; applies the covered AI techniques to real-world problems.

CS 363 Networks, Games, and Collective Behavior

Credit Hours: 3+0
Prerequisite: CS 102 and CS 113
Fulfils: CS Elective

Studying network dynamics has become increasingly important in understanding the transient dynamics of multi-relational networks, in which human society is embedded. From an engineering point of view, it touches upon the design of autonomous and multi-agent systems, whereby agents make strategic choices when forming network ties to exhibit collective behavior and solve complex problems in a distributed environment. This course brings an interdisciplinary perspective by combining foundations of network science, game theory, and computational social choice, to study networked systems exhibiting collective behavior and thus aims at exploring the micro-macro link from a theoretical and an applied lens.

CS 370 Web and Mobile Development

Credit Hours: 2+1
Prerequisite: CS 224 and CS 355
Fulfils: CS Elective

Develops expertise in current web and mobile development tools; topics include: HTML, CSS, JavaScript, building an HTML website, animation and effects, Visual Studio and C#, .NET and MVC, views, controllers, models, working with databases, authentication and authorization, security, mobile development, Ionic.

CS 3xx Advanced Programming in Java

Credit Hours: 3+0
Prerequisite: None
Fulfils: CS Elective

Real-world software projects are large scale and needed to be robust and optimized, such project use efficient data structures, provide graphical interface, deploy a complex database, and communicate over network. This is a rigorous programming course aimed to develop advance programming skills using various libraries provided by Java, which is the backbone and foundation for numerous software tools. It is widely used for both open-source and commercial software projects due to its strengths: platform independent, multi-threaded, object oriented, secure and robust. A sound understanding of object-oriented concepts is essential.

CS 400 Computer Science Senior Seminar

Credit Hours: 1+0
Prerequisite: None
Fulfils: CS Elective

Computer science continues to spawn new areas that generate a lot of research and find interesting applications in our lives. To eventually contribute to this growing body of knowledge, students of computer science must be equipped with the skills and practices to approach, understand, and communicate research papers. This seminar provides students a broad overview of selected topics in computer science while developing their skill to read, understand, and present research papers and presentation.

CS 432 GPU Accelerated Computing

Credit Hours: 3+0
Prerequisite: CS 232 and MATH 205
Fulfils: CS Elective

This course teaches the fundamental tools and techniques for accelerating C/C++ applications to run on massively parallel GPUs with CUDA®. Students will learn how to write code, configure code parallelization with CUDA, optimize memory migration between the CPU and GPU accelerator, and implement the workflow that they have learned on a new task—accelerating a fully functional, but CPU-only, particle simulator for observable massive performance gains.

CS 440 Computer Graphics

Credit Hours: 3+0
Prerequisite: CS 224, CS 412, and MATH 205
Fulfils: CS Elective

This course presents some of the basic techniques in Computer Graphics and focuses on two particular rendering approaches: pipeline rendering using a graphics API and realistic rendering using ray tracing.

CS 451 Computational Intelligence

Credit Hours: 3+0
Prerequisite: CS 351
Fulfils: CS Elective

Studies different nature-inspired computational methods; provides hands-on experience of applying these techniques to solve complex optimization problems; topics include: evolutionary computation, swarm intelligence, reinforcement learning, fuzzy logic, and artificial neural networks.

CS 457 Data Science Techniques

Credit Hours: 3+0
Prerequisite: CS 355 and MATH 310/EE 354
Fulfils: CS Elective

Develops the skills to leverage statistics and programming to make predictions, optimize outcomes, and help guide business decisions using data; explores techniques for drawing conclusions and predicting outcomes from data; provides hands-on exposure to an ecosystem of powerful tools that apply data science techniques to real data sets; topics include: data manipulation, data visualization, supervised and unsupervised learning, descriptive and inferential statistics, and data visualization.

CS 4xx Applied Digital Image Processing

Credit Hours: 3+0
Prerequisite: CS 102 and CS 224
Fulfils: CS Elective

This course will teach applied digital image processing to senior undergraduate students. The course will take a project-based approach. Students will be able to apply and learn by doing things practically in (preferably) MATLAB or Python/C++, whichever is available.

Electrical and Computer Engineering

BS in Electrical Engineering
BS in Computer Engineering

FACULTY

Basit Memon	Assistant Professor and Program Director
Aamir Hasan	Associate Professor
Mohammad Shahid Shaikh	Associate Professor
Shafayat Abrar	Associate Professor
Abdullah Bajwa	Assistant Professor
Ahmad Usman	Assistant Professor
Ishtiyaq Ahmed Makda	Assistant Professor
Muhammad Farhan	Assistant Professor
Muhammad Moiz Anis	Assistant Professor
Muhammad Umer Tariq	Assistant Professor
Owais Talaat	Assistant Professor
Junaid Ahmed Memon	Lecturer
Saad Baig	Lecturer
Tariq Mumtaz	Lecturer
Haseeb Shaikh	Dean's Fellow and Lecturer
Adnan Aslam Chaudhary	Adjunct Faculty
Muhammad Wamiq	Adjunct Faculty

VISION

The two disciplines of Electrical Engineering and Computer Engineering have reshaped the way we live and think about our lives today, be it in the form of electronic devices, computers, or communication networks in our use, or new technologies in transport, agriculture, medicine, manufacturing, or commerce. Ideas from Electrical and Computer Engineering are even enhancing our understanding of other disciplines, such as Biology, Finance, and Economics. In upcoming decades, Electrical and Computer Engineers will play a pivotal role in tackling key challenges faced by our present society, such as the need for affordable and clean sources of energy and transport, advancements in health, resilient infrastructure, or imagining future of industry, to name a few.

Keeping this state in view, the vision of the Electrical and Computer Engineering program is to shape electrical engineers and computer engineers who will assume a leadership role in pursuit of tackling these key challenges faced by our society. To fulfill this vision, the academic training of both majors is based on a rigorous multidisciplinary curriculum, which aims to build strong theoretical fundamentals, practical problem-solving skills, design capabilities to make sense of complex

multidimensional problems, and provides a number of instances to create and solve actual problems in community. Students are required to take courses in natural sciences, mathematics, computing, humanities, social sciences, management, entrepreneurship, foundational courses in ECE, courses exposing them to the breadth of Electrical Engineering or Computer Engineering, a number of courses to establish depth in their chosen major, and even engineering disciplines outside their major.

PROGRAM EDUCATIONAL OBJECTIVES

The Electrical and Computer Engineering program at Habib University aims to produce competent electrical engineers and computer engineers who:

1. Exhibit broad-based **technical excellence** in their engineering practice and in other professional dealings.
2. Are aware of the impact of their work on **society and environment**.
3. Are capable of leading through a **pluralistic approach**.
4. Engage in the lifelong process of **independent and reflective learning**.

PROGRAM LEARNING OUTCOMES

The Program Learning Outcomes (PLO) are designed to prepare graduates to attain the program educational objectives and subsume the PLOs of Pakistan Engineering Council (PEC) and Accreditation Board for Engineering and Technology (ABET).

The ECE program at Habib University aims to produce electrical and computer engineers who, at the time of graduation, have

1. an ability to apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems;
2. an ability to identify, formulate, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering;
3. an ability to design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations;
4. an ability to investigate complex engineering problems in a methodical way including literature survey, design and conduct of experiments, analysis and interpretation of experimental data, and synthesis of information to derive valid conclusions;
5. an ability to create, select and apply appropriate techniques, resources, and modern engineering tools, including prediction and modelling, to complex engineering activities with an understanding of the limitations;
6. an ability to apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solution to complex engineering problems;
7. an ability to understand the impact of professional engineering solutions in societal and environmental contexts, and demonstrate knowledge of and need for sustainable development;
8. the ability to apply ethical principles and commit to professional ethics, responsibilities, and norms of engineering practice;
9. an ability to work effectively, as an individual or in a team, on multifaceted and/or multidisciplinary settings;

10. an ability to communicate effectively, orally as well as in writing, on complex engineering activities with the engineering community and with society at large;

11. an ability to demonstrate management skills as a member and/or leader in a team, to manage projects in a multidisciplinary environment;

12. an ability to recognize importance of, and pursue lifelong learning in the broader context of innovation and technological developments.

BS in Electrical Engineering

REQUIREMENTS FOR THE ELECTRICAL ENGINEERING MAJOR – Class of 2025

All students majoring in *Electrical Engineering* are required to complete 42 courses and a minimum of 137 credit hours of coursework, and achieve a minimum CGPA of 2.33. The courses are divided in the following categories:

University Requirements

All students are required to take 10 courses spanning seven forms of thought and action, called the Habib Liberal Core. Some courses in the major can also be counted towards meeting requirement of certain forms of thought in the core. For more details, please see the section on Habib Liberal Core in the catalog.

Engineering Sciences and Computing

These courses in Mathematics, Physics, other Natural Sciences, and Computer Science provide the foundations for future Electrical Engineering courses as well as expand multidisciplinary breadth of students. Some of these courses can be counted towards minors in Mathematics, Physics, or Computer Science.

Electrical Engineering Foundation

This set of courses prepares students in the requisite analysis techniques and abstract methods required to understand and design all Electrical Engineering systems.

Electrical Engineering Core

Electrical Engineering is an immensely vast discipline and offers a diverse set of exciting sub-disciplines: Energy and Power Systems, Digital Electronics, Analog Electronics, Electronic Devices, Instrumentation, Communication, Control Systems, Robotics, Signal Processing, Embedded Systems, Optics, Power Electronics, Bioengineering, Microwave Engineering, to name a few. The core ensures that students take at least one course in a number of these sub-disciplines. Additionally, the Electrical Engineering seminar is offered in students' junior year to expose them to a diverse set of sub-disciplines within EE. Students also take five electives to develop greater breath or depth in one or more of these areas.

Design in Engineering

This set of courses on equipping students with design tools necessary to be a designer of effective solutions. Students will receive training on design processes, practice human-centered design, explore systems thinking to construct a big picture of complex systems, and apply these ideas on real-world systems and problems in communities.

Other Requirements

The interdisciplinary nature of engineering problems today require that Electrical Engineers are aware of and can work together with engineers from other disciplines. So, students are also required to take courses in engineering disciplines other than ECE, such as Mechanical, Civil, Aerospace, Environmental, to expand their knowledge base across disciplines and courses for their professional development, in disciplines including but not limited to Economics, Management, Entrepreneurship.

Requirements for the Electrical Engineering Major (Class of 2025)

Course Category	Number of Courses	Credit Hours
University Requirements		
Habib Liberal Core [1]	10	30
Engineering Sciences and Computing		
Computing [2]	03	11
Mathematics [3]	04	13
Natural Sciences [4]	02	07-08
Electrical Engineering Foundation		
Introduction to Electrical and Computer Engineering	01	04
Circuit Analysis [5]	02	08
Systems Theory [6]	01	04
Probability [7]	01	03
Electrical Engineering Core		
Electrical Engineering Seminar	01	01
Electronics [8]	01	04
Digital Systems Design [9]	01	04
Electromagnetic Theory [10]	01	03
Embedded Systems [11]	01	04
Communication and Control [12]	02	08
Power and Energy Systems [13]	02	08
Electives (300 level or higher) [14]	05	17 – 20
Other Requirements		
Interdisciplinary Engineering Elective	01	03
Professional Practice (Economics, Entrepreneurship, Management)	02	05-06
Design in Engineering		
Engineering Workshop	01	01
Engineering Innovation and Design [15]	01	02
Senior Capstone Design Project	02	06

Course Category	Number of Courses	Credit Hours
Overall	42	137 - 142

[1] Course credits may differ depending on the offerings. Details of courses are provided in the section above on the Habib Liberal Core.

[2] CS 101 Programming Fundamentals, CS 102 Data Structures & Algorithms, and CS 224 Object Oriented Programming. CS 101 can also be counted towards meeting the university form of thought requirement in Formal Reasoning.

[3] MATH 101 Calculus I, MATH 102 Calculus II, MATH 202 Engineering Math, and MATH 205 Linear Algebra.

[4] PHY 101 Mechanics and any natural science elective offered by ISciM Program.

[5] EE 111 Electric Circuit Analysis and EE 212 Electric Network Analysis.

[6] EE 252 Signals and Systems.

[7] EE 354 Probability and Statistics can also be counted towards meeting the university form of thought requirement in Quantitative Reasoning.

[8] EE 213

[9] EE 172 Digital Logic Design.

[10] EE 241Electromagnetic Theory.

[11] EE 375 Microcontrollers and Interfacing.

[12] EE 322 Analog and Digital Communication and EE 361 Feedback Control Systems.

[13] EE 331 Electrican Machines and EE 335Power Generation, Transmission and Distribution.

[14] Elective courses could be offered with or without labs (3 or 4 credits). Labs are mandatory, if offered, and at least two out of five electives should be with lab.

[15] EE 391 Engineering Innovation and Design. This course can also be counted towards meeting the university form of thought requirement in Creative Practice.

The ECE program aims to offer electives in all possible sub-disciplines within Electrical Engineering, but there is a specific focus on the following areas. Students can concentrate their degree in one of these areas, by appropriately choosing electives in that area. The elective courses can be selected in consultation with their academic advisor.

Information Systems and Robotics

Information systems area forms a bridge between information processing systems and physical systems. It includes areas such as Control, Signal Processing, and Vision-based systems. Signal Processing focuses on analyzing, modifying, and synthesizing information. Control theory helps us understand systems with feedback signals, and essentially allows us to design means to control them and make them behave in the desired manner. Robotics is, in fact, an interdisciplinary area involving Electrical Engineering, Computer Engineering, Mechanical Engineering, and Computer Science. Robotic systems are increasingly being employed in all areas of life. With the ever-increasing utilization of robotic systems, the demand for properly trained engineers in robotics is also increasing.

Electronics and Embedded Systems

Electronic systems are ubiquitous in today's consumer, industrial, automotive, medical, commercial, and military devices. Even traditional mechanical systems today, such as automobiles, cannot function without electronics. This trend of 'electronification' of society in the form of smart homes, smart cities, smart grids, coupled with the availability of inexpensive but powerful embedded systems, opens up a huge valley of opportunities for well-trained electronic engineers and entrepreneurs.

Power and Energy Systems

The ready availability of electrical power at a reasonable price is essential for a country's economic development. To come out of the current energy crisis, Pakistan needs thoughtful electrical

engineers with technical expertise in the area of energy systems (power generation, transmission, distribution, renewable energy, power electronics), and the contextual awareness to develop the best possible solution to our crisis.

Telecommunications & Networks

Cellular mobile phone networks, satellite and fiber-optics communication systems, and global positioning systems play a fundamental role in increasing the quality of life and improving the efficiency of the service sector. A well-knit telecommunications infrastructure is essential for the economic development of a country. In Pakistan, we are witnessing the introduction of 4G LTE and 5G cellular phone systems, the proliferation of data networks, and a shift towards electronically facilitated services by both the public and private sector. Telecommunications thrust is intended to sustain the positive growth in this industry by providing adequately trained technical managers, leaders, and entrepreneurs.

BS in Computer Engineering
REQUIREMENTS FOR THE COMPUTER ENGINEERING MAJOR – Class of 2025

All students majoring in *Computer Engineering* are required to complete 42 courses and a minimum of 137 credit hours of coursework, and achieve a minimum CGPA of 2.33. The courses are divided in the following categories:

University Requirements

All students are required to take 10 courses spanning seven forms of thought and action, called the Habib Liberal Core. Some courses in the major can also be counted towards meeting requirement of certain forms of thought in the core. For more details, please see the section on Habib Liberal Core in the catalog.

Engineering Sciences

These courses in Mathematics, Physics, or other Natural Sciences provide the foundations for future Computer Engineering courses as well as expand multidisciplinary breadth of students. Some of these courses can be counted towards minors in Mathematics, Physics, or other natural sciences.

Computer Engineering Foundation

These are foundational courses in both Electrical Engineering and Computer Science. The Computer Science courses lay the basis for understanding the theory of computation and software, while the Electrical Engineering courses cover the methods and tools of analysis required to understand and design hardware of computing systems.

Computer Engineering Core

The core courses introduce the students to the different sub-disciplines in Computer Engineering. These include courses in design of computing systems, embedded systems, networks, software design, systems resource management, signal processing, and algorithms. The electives enable Computer Engineering majors to acquire in-depth knowledge of their discipline. Students are required to take four electives in this category. These electives could be in the areas of Computer Architecture, Computing Systems Design, Embedded Systems, Software and Systems Engineering, Networks, Security, Signal Processing, Machine Learning, or Robotics. Additionally, the Computer Engineering seminar is offered in students' junior year to expose them to a diverse set of sub-disciplines within CE.

Design in Engineering

This set of courses on equipping students with design tools necessary to be a designer of effective solutions. Students will receive training on design processes, practice human-centered design, explore systems thinking to construct a big picture of complex systems, and apply these ideas on real-world systems and problems in communities.

Other Requirements

The interdisciplinary nature of engineering problems today require that Computer Engineers are aware of and can work together with engineers from other disciplines. So, students are also required to take courses in engineering disciplines other than CE, such as Electrical, Computer Science, Mechanical, Civil, Aerospace, Environmental, to expand their knowledge base across disciplines and courses for their professional development, in disciplines including but not limited to Economics, Management, Entrepreneurship.

Requirements for the Computer Engineering Major (Class of 2025)

Course Category	Number of Courses	Credit Hours
University Requirements		
Habib Liberal Core [1]	10	30
Engineering Sciences		
Mathematics [2]	03	10
Natural Sciences [3]	01	03-04
Computer Engineering Foundation		
Electrical Engineering Foundation [4]	03	12
Computer Science Foundation [5]	02	06
Computer Engineering Core		
Algorithms and Software Design [10]	04	15
Computer Engineering Seminar	01	01
Computing Systems Design [6]	04	15
Embedded Systems Design [7]	01	04
Networks and Security [8]	01	04
Information Processing [11]	02	06
Signal Processing [9]	02	08
Electives [12]	04	12-16
Design in Engineering		
Engineering Innovation and Design [13]	01	02
Senior Capstone Design Project	02	06
Engineering Workshop	01	01
Multidisciplinary Requirements		
Multidisciplinary Engineering Elective	02	06-08
Professional Practice (Economics, Entrepreneurship, Management)	02	05-06
Overall	**43**	**137-145**

[1] Course credits may differ depending on the offerings. Details of courses are provided in the section above on the Habib Liberal Core.

[2] MATH 101 Calculus I, MATH 102 Calculus II, and MATH 205 Linear Algebra.

[3] Any natural science elective offered by ISciM program.

[4] CE 101 Introduction to Electrical and Computer Engineering, CE 111 Electric Circuit Analysis, and CE 211 Basic Electronics.

[5] CS 101 Programming Fundamentals and CS 113 Discrete Math. CS 101 Programming Fundamentals can also be counted towards meeting the university form of thought requirement in Formal Reasoning.

[6] CE 171 Data Structures and Algorithms, CE 272 Object Oriented Programming, CE 373 Databases, and CE 374 Systems and Software Engineering

[7] CE 301 CE Seminar

[8] CE 222 Digital Logic and Design, CE 321 Computer Architecture, CE 324 Operating Systems, and CE 325 Digital Systems Design.

Course Category	Number of Courses	Credit Hours

9 CE 331 Microcontrollers and Interfacing.

10 CE 341 Data Communication and Networking

11 CE 361 Probability and Statistics and MATH 362 Statistics and Inferencing. CE 361 Probability and Statistics can also be counted towards meeting the university form of thought requirement in Quantitative Reasoning.

12 CE 251 Signals and Systems and CE 352 Digital Signal Processing.

13 Elective courses could be offered with or without labs (3 or 4 credits). Labs are mandatory, if offered.

14 CE 391 Engineering Innovation and Design. This course can also be counted towards meeting the university form of thought requirement in Creative Practice.

The ECE program aims to offer electives in all possible areas of Computer Engineering. The following descriptions will provide information about the broader threads considered in the Computer Engineering curriculum. Students can choose to concentrate on one or more of these threads by appropriately choosing electives in these areas. These elective courses can be selected in consultation with their academic advisor.

Computing Systems Design

Invention of transistor and possibility of very large-scale integration (VLSI) has opened gateways for solving computing limitations of the world. Today, the smartphone in your pocket has more computing power than fastest supercomputers from 80s, and is smaller in size and less power hungry. This concentration aims to train students to design computing systems that are efficient in terms of speed, area, throughput, power and energy. Students work on various levels of design, including (but not limited to) devices, integrated circuit (IC) design, digital system design, computer architecture design, and high-performance computing. Perhaps, you'll be the person to design the next generation of Intel, AMD, or Apple computing chip.

Embedded Systems Design

In the form of desktop computers, laptops, tablets, and smart phones, most people are familiar with computers that process information for human consumption. However, the vast majority of computers in use, today, are much less visible. They run the engine, brakes, and airbags in a modern car; they let you control your household appliances, microwave, TV, etc.; they control robots on a factory floor, generators in a power plant, medical devices in a hospital, and traffic lights in a city. These less visible computers are called Embedded Systems. Compared to the general-purpose computing systems, the principal difference in designing and analyzing embedded systems stems from their interaction with physical processes in addition to human operators. Our Computer Engineering Program takes a systematic approach to embedded systems education through its focus on state-of-the-art modeling, design, implementation, and analysis tools for embedded systems.

Networks and Security

It is estimated that by 2025, we'll have an average of 9.27 connected devices per person in the world. This exponential increase in the number of connected devices has created new and interesting challenges for networks, including dealing with heterogeneous devices (varied availability of power and correspondingly varied computing capabilities of devices) over the network, especially in the Internet of Things (IoT); the increasing need for network security; the increasing demand for faster and reliable data transfer especially with inclusion of real-time devices such as tele-operated surgical robots on the network. The development of new standards as 5G and successful instances of network functions virtualizations are paving the way for addressing these challenges and creating a more seamlessly connected world. The Computer Engineering program at Habib University focuses on exposing you to foundational principles and networking, and current trends in networks and security.

Signal and Information Processing

Signal and Information Processing models and analyzes data representations of physical events. Signal and Information processing is at the heart of our modern world, powering today's entertainment and tomorrow's technology. You'll find it in your phones in form of compression when storing your audio and videos, when applying filters on your images or audio, or running analytics on those audio and video signals; in hospitals imaging our bodies; in autonomous vehicles making sense of environment so that vehicle can make safe decision; or behind technology used for speech recognition, detecting fraud, or stock market analysis in the form of Machine Learning algorithms. Signal and Information processing is the science behind our digital lives and this concentration will enable you to perhaps develop the next technology that enriches our everyday lives.

Software and Systems Engineering

The modern world is full of complex engineered systems that involve many component subsystems working in unison to deliver a useful service to consumers. These systems help us keep in touch with our friends and family, navigate the traffic of our city, access essential services such as electricity. With every passing day, computers and software are playing an increasingly import role in the successful implementation and operation of these complex engineered systems. When such systems fail, people get annoyed in the best case or seriously hurt and injured in the worst case. The fields of software engineering and systems engineering help us manage the complexity of these software-centric complex systems by providing a systematic approach to development and operation of these systems in a cost-effective and robust manner. Computer Engineering Program at Habib University incorporates software and systems engineering education to ensure that its graduates are equipped to lead the development and operation of the complex engineered systems of the modern world.

ELECTRICAL & COMPUTER ENGINEERING MINOR

All Habib University Students choosing to pursue ECE minor must complete a minimum of seven courses totaling at least 22 credits. Requirements of the minor can be found in the 'Minors' section of the Course Catalog.

Elective Courses

1. EE/CE 213/211 Basic Electronics
2. EE/CE 172/222 Digital Logic and Design
3. EE212 Electric Network Analysis
4. EE241 Electromagnetic Theory
5. EE/CE 252/251 Signals and Systems
6. EE331 Electrical Machines
7. EE322 Analog and Digital Communication
8. EE361 Principles of Feedback Control
9. EE/CE 371/321 Computer Architecture
10. EE/CE 373/331 Microcontrollers and Interfacing
11. EE335 Power Generation, Transmission, and Distribution
12. EE365 Industrial Instrumentation and Measurement
13. EE366 Introduction to Robotics
14. CE 325 Digital Systems Design
15. EE468 Mobile Robotics
16. EE451 Digital Image Processing
17. EE452 Computer Vision
18. EE/CE 453/352 Digital Signal Processing
19. EE422 Wireless and Mobile Communication
20. EE/CE 424/341 Data Communication and Networking

21. EE427 Cellular Internet of Things in 5G
22. EE441 Antennas and Wave Propagation
23. EE432 Power Electronics
24. EE433 Power Electronics – System Design
25. EE442 Embedded Systems

COURSE DESCRIPTIONS

Required Courses

EE/CE 101/101 Introduction to Electrical & Computer Engineering

Credit Hours: 3+1
Fulfils: EE foundation, CE foundation, ECE Minor foundation
Corequisite: CS 101

Through a series of projects, this course aims to expose the students, having little or no prior exposure, to the fascinating world of electrical and computer engineering. The course will allow the students to gain an appreciation for the history and possible futures of various disciplines within electrical and computer engineering. Students will spend most of their time in the lab working on these projects with classroom instruction for support. The course will introduce basic electrical concepts including charge, voltage, current, energy, power, resistance, capacitance, inductance, and Kirchoff's laws. Practical digital and analog electronic systems will also be introduced to illustrate advanced topics that are treated completely in subsequent electrical engineering courses.

EE/CE 111/111 Electric Circuit Analysis

Credit Hours: 3+1
Fulfils: EE Foundation, CE Foundation, ECE Minor Foundation
Prerequisite: None

This course introduces basic DC and AC steady-state analysis for linear circuits. Topics discussed in this course include circuit elements, Ohm's law and Kirchhoff's laws, node and mesh analysis, energy storage elements, Thevenin and Norton theorems, Phasors and sinusoidal steady state analysis. Computer applications in circuit simulation and numerical solution is also discussed.

EE/CE 172/222 Digital Logic and Design

Credit Hours: 3+1
Fulfils: EE Core, CE Core, ECE Minor Concentration Foundation
Prerequisite: None

Introduction to the design of digital hardware, realization of computation with logic gates; Boolean algebra, design of combinational logic circuits, and analysis and design of clocked sequential logic circuits, circuits for arithmetic operations; introduction to hardware description language and its application to logic design. (Cross-listed with CS 130.)

EE 212 Electric Network Analysis

Credit Hours: 3+1
Fulfils: EE Foundation, ECE Minor Concentration Foundation
Prerequisite: EE 111

This course is a continuation of EE 111, Electric Circuit Analysis. The course discusses DC and AC transient analysis, sinusoidal steady state analysis of RC, RL, and RLC circuits, AC circuit power

analysis, polyphase circuits and magnetically coupled circuits. The course then introduces the students to s-domain analysis techniques and ends with a discussion of frequency responses.

EE/CE 213/211 Basic Electronics

Credit Hours: 3+1
Fulfils: EE Core, CE Foundation, ECE Minor Concentration Foundation
Prerequisite: EE 111

The course aims to introduce students to semiconductor devices, with emphasis on application of these devices in realizing analog and digital electronic circuits. The course starts with an introduction to semiconductors, energy bands, valence bonds, doping, n-type and p-type semi-conductors. The electronic devices, such as PN junction diode, bipolar junction transistor (BJT) and Metal-oxide semiconductor field-effect transistor (MOSFET), along with their applications are discussed in detail. Biasing circuits, single transistor amplifiers and their frequency are also discussed. Circuit simulations using PSpice (OrCAD) forms an important bridge between the theory discussed in class and lab experiments.

EE 241 Electromagnetic Theory

Credit Hours: 3+0
Fulfils: EE Core, ECE Minor Elective
Prerequisite: MATH 202

The study of electrostatic and magneto-static fields in free and material spaces; solving boundary-value problems; extension of static fields to time-varying fields and electromagnetic waves; Maxwell's equations; propagation of electromagnetic waves through different types of media (unbounded media and guided structures) and their behavior at the interfaces.

EE/CE 252/251 Signals and Systems

Credits Hours: 3+1
Fulfils: EE Foundation, CE Core, ECE Minor Concentration Foundation
Prerequisite: MATH 101

The topics covered in this course include types of signals; unit impulse and unit step functions; linear time invariant (LTI) systems and their properties; convolution sum and convolution integral; Fourier series, Fourier, Laplace and Z transforms; analysis and characterization of LTI systems using various transforms, Sampling.

ENGR 291 Engineering Workshop

Credit Hours: 0+1
Fulfils: EE Design, CE Design, ECE Minor Foundation
Prerequisite: None

This course aims to introduce students to hands-on engineering skills, necessary for creating their own prototypes. Topics covered in this course include introduction to engineering design process, shop safety, engineering drawing, solid modeling (CAD), 3D printing, effective use of basic hand tools such as saws and files, machining (Lathe, Milling, Drill press), CNC machining, soldering techniques, and PCB design and printing. The course work emphasizes practical skills through lab activities and project. Students will be required to work with different materials including metal, wood, and plastic.

EE 322 Analog and Digital Communication

Credit Hours: 3+1
Fulfils: EE Core, ECE Minor Elective
Prerequisite: EE 252

Introduction to fundamental principles underlying the analysis, design and optimization of analog and digital communication systems; modulation techniques for analog and digital communication; effects of interference and noise and their suppression.

EE 331 Electrical Machines

Credit Hours: 3+1
Fulfils: EE Core, ECE Minor Elective
Prerequisite: EE 212, EE 241

This is the first course on DC and AC electromechanical systems. Specific topics include single-phase and three-phase transformers, general structure and physical principles underlying electric drive systems, brushless, stepper and switched reluctance DC motors, DC generators, Induction and Synchronous AC motors and generators, torque-speed characteristics of motor drives. Mathematical modeling and speed control of electrical machines will also be discussed.

EE 335 Power Generation, Transmission, and Distribution

Credit Hours: 3+1
Fulfils: EE Core, ECE Minor Elective
Prerequisite: EE 211, EE 212

The development of electrical power systems has immensely contributed to the technological advances of the humankind over the past century. Electrical power provides clean and convenient energy to the modern society, which is necessary for the realization of the luxuries we are enjoying in this world today. In summary, the modern world and society does not exist without the availability of electricity. The purpose of this course is to provide the students with a complete flavor of the full-spectrum of electric power generation, transmission, and distribution systems.

EE/CE 354/361 Introduction to Probability and Statistics

Credit Hours: 3
Fulfils: EE Foundation, CE Core
Prerequisite: MATH 102

Set theory and counting principles, axiomatic definition of probability, independence and conditional probability, Bayes' theorem; random variables (RVs) and their cumulative distribution function, probability mass functions, probability density functions and moments; joint RVs; limits theorems; statistics; applications.

EE 361 Principles of Feedback Control

Credit Hours: 3+1
Fulfils: EE Core, CE MDEE, ECE Minor Elective
Prerequisite: EE 252, MATH 202

Topics include: Models of dynamic systems, linear time-invariant (LTI) and transfer function models; impulse, step, transient and steady-state response; root locus technique, Bodé plots, Nyquist criterion; gain and phase margins, Nichols charts, lead, lag compensation; state-space techniques; simulation and controller design using MATLAB and Simulink.

EE/CE 371/321 Computer Architecture.

Credit Hours: 3+1
Fulfils: EE elective, CE Core, ECE Minor Elective
Prerequisite: EE 172

Studies the architecture of processors that enable general purpose computing and develops hands-on expertise in developing complex logical components. Topics include instruction set architecture, addressing modes, processor design and computer arithmetic, pipelining, memory systems, fetch execution cycle, processor implementation on FPGA using Verilog HDL.

EE/CE 375/331 Microcontrollers and Interfacing

Credit Hours: 3+1
Fulfils: EE Core, CE Core, ECE Minor Elective
Prerequisite: EE 172

Microcontrollers play a central role in modern life, controlling everything from the engine of a car, to domestic and office machinery. Microcontroller fundamentals including architecture, assembly language programming, and interfacing. Applications of industry-standard microcontrollers in embedded systems. Employs software design tools, simulators, and hardware trainers. Will focus on interfacing the ARM RISC processor to motors, actuators and sensors.

EE/CE 391/391 Engineering Innovation and Design

Credit Hours: 2+0
Fulfils: EE Design, CE Design
Prerequisite: None

This course aims to cultivate skills needed to produce great designs, be a more effective engineer, and communicate with high emotional and intellectual impact. This is accomplished by working on projects centered around a locally contextualized wicked problem and students are expected to develop a solution to their identified problem by the end of semester. During the course of the semester, students will study and apply techniques suited for various steps of the design process. Students will come to appreciate that a design problem involves multiple stakeholders, come to terms with the ambiguity that shows up in design problems, make decisions in presence of multiple conflicting objectives and constraints, handle uncertainty, think as part of a team, learn how to manage the progress of their project, and communicate their design effectively.

EE/CE 424/341 Data Communication & Networking

Credit Hours: 3+1
Fulfils: EE Elective, CE Core, ECE Minor Elective
Prerequisite: None

It is the first course on networking therefore no prior background is expected. This course will not only introduce students to the basics of the communication of data in the networks of computer but will also enable to develop some insight towards the core issues related to the communication models and different network devices.

EE/CE 453/352 Digital Signal Processing

Credit Hours: 3+1
Fulfils: EE Elective, CE Core, ECE Minor Elective
Prerequisite: EE 252

Introduction to digital signal representations in time and frequency domains; signal manipulations via filters and resampling; signal creation and capture and processing with real-time computing machinery.

EE/CE 491 Capstone Project I

Credit Hours: 3
Fulfils: Design in Engineering, Design Project
Prerequisite: EGR 291, EE 375, EE 391, Approval from respective capstone committee

EE/CE 492 Capstone Project II

Credit Hours: 3
Fulfils: Design in Engineering, Design Project
Prerequisite: EE/CE 491

This year-long sequence represents the culmination of study towards the BS degree. Students work individually or in small teams on a project in which they utilize the knowledge acquired during the first three years of education. Each project is closely supervised by a faculty member and each team produces a comprehensive report at the end of the project.

Elective Courses

EE 366 Introduction to Robotics

Credit Hours: 3+1
Fulfils: EE Elective, CE Elective, ECE Minor Elective
Prerequisite: MATH 205

Robotics is a multi-disciplinary area involving ideas from mechanical engineering, electrical and computer engineering, and computer science. This course is a breadth-first course designed to be the first course in the series of robotics courses. The goal of the course is to acclimatize the students with the area of robotics and to get them started on building robots. Topics covered include: forward and inverse kinematics, velocity kinematics, singularities, trajectory generation, actuation mechanisms, robot vision, feedback control, motion planning, control architectures, perception, localization, and locomotion.

EE 365 Industrial Instrumentation & Measurements

Credit Hours: 3+1
Fulfils: EE Elective, CE MDEE, ECE Minor Elective
Prerequisite: EE 111

In this course, students will learn measurement techniques applied to instruments used both in laboratory and industry with more focus on fundamentals principles which are key to modern day instrumentation. This course will introduce the function, operation, and application of common electrical/electronic instruments, measurement principles, and statistical analysis. Students will investigate the fundamental limitations of data acquisition systems and recognize and predict aliasing and quantization errors associated with the digital representation of analog signals

EE 422 Wireless and Mobile Communication

Credit Hours: 3
Fulfils: EE Elective, ECE Minor Elective
Prerequisite: EE 322

This course aims to introduce wireless communication to EE students. The route to this introduction is through the concepts of the most pervasive wireless communication system - Cellular Mobile Networks. The course comprises of wireless communications basics, systems standards, architecture and topologies. The course includes cellular concepts, traffic engineering, radio waves propagation, study of different propagation Models and coverage analysis under different types of channel models, fading and Multipath scenarios.

EE 427 Cellular Internet of Things in 5G

Credit Hours: 3+1
Fulfils: EE Elective, CE Elective, ECE Minor Elective
Prerequisite: None

This course is designed to introduce and deepen student's understanding on the essentials of Internet of Things (IoT) Devices communicating with and without being attached to the cellular Networks, specifically with the Fifth Generation (5G) Cellular Networks. Moreover, dealing with IoT devices as the terminals, would expose students to the entire stack of protocols i.e from Physical to the Application layer. The course is aimed to inculcate a deep understanding about the Cellular Internet of things (IoT) Networks, lay the foundation of Machine Type Communications (MTC) by framing different IoT scenarios and expose students to evolution of MTC into a massive MTC use case for 5G.

EE 432 Power Electronics

Credit Hours: 3+1
Fulfils: EE Elective, ECE Minor Elective
Prerequisite: EE 111, EE 211

This course aims to familiarize students with the power semiconductor devices (power diodes and transistors), their construction, electrical characteristics, operating-principle, and their various industrial and commercial applications. Along with good mathematical skills, students must be familiar with the fundamental understanding of electronic components; for instance, an inductor and a capacitor. The topics covered in the course are: Power Semiconductor Devices; AC to DC Converters (Uncontrolled Rectifiers); AC to DC Converters (Controlled Rectifiers); AC to AC Converters; DC to DC Converters; DC to AC Converters (Inverters).

EE 433 Power Electronics – System Design

Credit Hours: 3+0
Fulfils: EE Elective, ECE Minor Elective
Prerequisite: None

Power electronics is widely used in automotive, industrial and renewable energy applications; for instance, electrical vehicles, uninterruptible power supplies, and fuel-cell application. High-efficiency, low cost, and small size are some of the important design goals for any converter design; however, they of course need to comply with the electromagnetic interference (EMI) requirements. High efficiency in power converters can only be achieved by means of optimized converter design (specially the magnetic components) which then further calls for a well-engineered EMI filters. This course is mainly divided in to two parts. The first part deals with the basic circuit operations of various well-known power converters, and their analysis and design. Next, EMI noise issues in power

converters will be treated in extensive details. EMI noise models for isolated power converters will be established and analyzed to build optimized EMI filters.

EE 451 Digital Image Processing

Credit Hours: 3+1
Fulfils: EE Elective, CE Elective, ECE Minor Elective
Prerequisite: CS 224

This course is developed for EE, CE, and CS students to introduce them the fundamental concepts, principles and techniques of digital image processing and their applications to solve real world problems. After completing the course students will be familiar with the key components of image processing system starting from image acquisition to image enhancement and restoration to morphological processing and segmentation till image representation, description and object classification. The course offers great opportunities in Final Year Projects

EE 452 Computer Vision

Credit Hours: 3+0
Fulfils: EE Elective, CE Elective, ECE Minor Elective
Prerequisite: EE 451, MATH 205

Have you ever wondered how a machine or computer is made capable of understanding, interpreting and giving semantics to an image/video? Have you ever thought how image/video could be used to automate processes in a wider application domain ranging from industry to biomedicine? The answer lies in image processing and computer vision. This course is a continuation of Digital Image Processing. In this course, the aim is to explore the field of computer vision and pattern recognition from an application perspective where the main focus will be on visual recognition and classification using deep neural networks. The students will learn and implement the state-of-the-art algorithms and techniques for gaining high-level understanding from images and videos. The course requires knowledge of linear algebra, probability and statistics along with the basics of image processing. The course contents are planned in a manner that enables students to undertake research projects.

EE 468 Mobile Robotics

Credit Hours: 3+0
Fulfils: EE Elective, CE Elective, ECE Minor Elective
Prerequisite: EE 354 or equivalent

Robotics is the science of perceiving and manipulating the physical world through computer-controlled mechanical devices. In the field of robotics, regardless of the nature of applications, we inherently deal with machines that move. Real world is not ideal or deterministic in nature; it is full of uncertainties, and exhibits a stochastic or random behavior. Thus, it is important to offer a course to make ECE students understand this challenging task of state estimation in engineering applications. In short, we would introduce the classic and state-of-the-art estimation results and probabilistic algorithms for estimating state of robots in linear/nonlinear systems corrupted by Gaussian/non-Gaussian measurement noise for localization and mapping applications

EE 441 Antennas and Wave Propagation

Credit Hours: 3+0
Fulfils: EE Elective, ECE Minor Elective
Prerequisite: EE 241

The course is broadly divided into two major sections i.e., "Transmission Lines and Wave propagation" and "Antenna Theory". This course teaches the fundamentals of antenna and propagation and shows the application in practical examples. The course covers the theory of radiation, fundamental antenna parameters and concepts, wire antennas such as dipoles and loop antennas, antenna arrays, aperture antennas (e.g. horns), microstrip antennas, numerical analysis, communication & radar systems and propagation effects.

EE 472 Embedded Systems

Credit Hours: 3+1
Fulfils: EE Elective, CE Elective, ECE Minor Elective
Prerequisite: EE 375

The basic aim of this course is to make students be able to demonstrate their abilities to design and develop an embedded system-on-chip. The goal is to introduce students a hardware description language (HDL) which they can use to develop embedded hardware on Field Programmable Gate Array (FPGA) chips. Furthermore, they will be introduced with the architecture of an ARM Cortex processor and how a software and hardware communicate at embedded level. This understanding can help the graduates of ECE/CS to become a part of a team of design engineers and developers of embedded applications in any organization.

ENVS 301 Introduction to Environmental Engineering

Credit Hours: 3+0
Fulfils: EE IDEE. CE MDEE
Prerequisite: None

Environmental problems represent one of the gravest global challenges of the 21st century. Engineering sustainable solutions to these environmental issues is one of our most pressing needs. In this course, students will learn fundamental science and engineering principles needed for environmental engineering. Students will apply these principles to problems such as water supply and treatment systems, sewage treatment of municipal and industrial wastewaters, stream and air pollution, and disposal of solid waste materials. In addition, this course will provide an overview of major themes in contemporary environmental engineering, including environmental impacts of socioeconomic changes, energy consumption and production, water supply and treatment, air pollution and global climate change.

ME 302 Engineering Thermodynamics

Credit Hours: 3+0
Fulfils: EE IDEE, CE MDEE
Prerequisite: None

The course deals with the aggregate thermodynamic properties of matter and extends it to principles which govern the design and functioning of energy convertors, thermodynamic cycles and heat pumps. A brief interlude into Statistical Thermodynamics would also be provided. This course will cover the fundamental aspects of classical thermodynamics with a focus on understanding the principles to design, implement and sustain a thermodynamic system. This course will also provide

a rudimentary introduction to statistical mechanics to understand the connection between thermodynamics quantities and microscopic behavior of a many-particle system.

ME 291 Computer Aided Engineering

Credit Hours: 3+0
Fulfils: EE IDEE, CE MDEE
Prerequisite: None

Fundamentals of Computer Aided Engineering (CAE) will be taught with the aim to equip students with modern design tools needed to effectively create, analyze, improve, and communicate their designs. The skills acquired will help students in their capstone projects and other future design projects. The course will be divided into three main portions: fundamentals of engineering drawing, mechanical analysis techniques to evaluate the performance of the designed product, and using a Computer Aided Design (CAD) program to design parts and assemble them into required assemblies while being cognizant of practical design considerations like manufacturability and ease of assembly. The course, being an engineering design course, will have a heavy "hands-on" tilt, whereby student performance will depend on the successful completion of various project-based design assignments. A major (end-of-semester) project will require students to design and analyze a practical contraption that satisfies functional and design requirements provided to them.

ECON 302 Engineering Economics

Credit Hours: 3+0
Fulfils: Professional Practice
Prerequisite: None

Topics include: Application of economic principles to engineering solutions, time value of money, cash flow analysis, quantization of profitability, methods of evaluating investments, comparison of alternative investments, inflation, depreciation, resource depletion, economic analysis of projects, economic management of engineering projects.

MGMT 304 Fundamentals of Intellectual Property

Credit Hours: 3+0
Fulfils: Professional Practice
Prerequisite: None

Intellectual Property (IP) has grown from a narrowly specialized legal field into a major force in global social and economic life today. Topics include: managing technological transitions, intellectual property, creating and managing an innovative organization, managing research and development, organizational learning, economist and sociologist views of entrepreneurship, the process and management of entrepreneurship, the importance of innovation, teamwork, financial and marketing aspects, product quality; study will be supplemented with case studies.

MGMT 321 Engineering Project Management

Credit Hours: 3+0
Fulfils: Professional Practice
Prerequisite: None

Topics include: fundamentals of Project Management, the processes, tools and techniques, modern tools, such as, MS Project, Agile (Scrum) applied to virtual project, soft skills, such as, Communication, leadership, team building, time management.

MGMT 322 Operations Management

Credit Hours: 3+0
Fulfils: Professional Practice
Prerequisite: None

Topics include: concepts such as bottleneck measurement, process improvement and synchronization, process measurement, service improvement, six sigma approaches, lean management, statistical quality control techniques and decision trees. Therefore, this course will essentially help to inculcate skills to produce well rounded engineering professionals.

Integrated Sciences and Mathematics

Minor in Mathematics
Minor in Physics

FACULTY

Humaira Qureshi	Assistant Professor and Program Director
Anzar Khaliq	Associate Professor
Abdullah Khalid	Assistant Professor
Aeyaz Jamil Keyani	Assistant Professor
Ahmed Umer Ashraf	Assistant Professor
Hassaan Furqan Khan	Assistant Professor
Humaira Jamshed	Assistant Professor
Sameena Shah Zaman	Assistant Professor
Rameez Raghib	Lecturer
Sajal Sohail Rana	Lecturer
Yousuf Kerai	Lecturer

VISION

Integrated Sciences and Mathematics (iSciM) at Habib University offers a diverse range of rigorous foundational and research-based courses that allow students from all disciplines to broaden their understanding of natural science and mathematics. Our interdisciplinary offerings profiting from various forms of design and community based projects allow students to develop essential hard and soft skills required to understand and address complex problems. Key thrust areas for the program include Energy, Environment, Climate Change, Infectious Diseases, Global Health, Theoretical Physics and Applied Mathematics. The program currently offers two academic minors in Physics and Mathematics.

DEPARTMENT GOALS

Through iSciM, based on their course selection, the graduating Habib students will:

1. Understand the foundations and the applications of the scientific method
2. Understand the fundamentals of energy, environment, and global warming and learn key skills to address issues of present times
3. Develop experimental skills in physics, chemistry, and biology; develop a strong foundation in physics, chemistry, bio-sciences, environmental science, energy, and mathematics
4. Understand the human body functions at cellular and molecular level and the effects of nutrition, microorganisms and environment on human health and society

5. Develop strong skills in data analysis with an ability to use various software tools
6. Develop a strong grasp on scientific writing
7. Develop the ability to understand current research in various fields of science

MINORS OFFERED BY THE iSciM PROGRAM

The program offers minor in (i) Physics and (ii) Mathematics. Requirements of both the minors can be found in the 'Minors' section of the Course Catalog.

COURSE DESCRIPTIONS

Natural Sciences

PHY 101 Mechanics and Thermodynamics

Credit Hours: 3+0
Fulfils: Natural Science requirement; mandatory for EE
Prerequisite: None

Mechanics and Thermodynamics Topics include: Units and physical quantities, vectors, motion in 1-dimension, motion in more than 1-dimension, Newton's laws of motion and their applications, work and energy, potential energy and conservation law of energy, momentum and impulse, rotation of rigid bodies, dynamics of rigid bodies, gravitation, thermal properties of matter, laws of thermodynamics.

PHY 101L Mechanics and Thermodynamics Lab

Credit Hours: 1+0
Fulfils: Natural Science requirement; mandatory for EE
Prerequisite: PHY 101

Experiments include: simple harmonic motion observed through webcam, waves and oscillations, standing waves, resonance, moment of inertia of a tennis ball, rotational mechanics, rotational inertia, rotational friction, conservation of energy, latent heat of liquid nitrogen, heat capacity of solids, determined from boil-off of liquid nitrogen, conservation of momentum - elastic and inelastic collision, rotational motion, mass on a spring, basics of uncertainty analysis, Maxwell's wheel, light polarization, heat transfer, conduction, convection, Newton's law of cooling, temperature oscillations, Fourier analysis.

PHY 102 Electricity and Magnetism

Credit Hours: 3+0
Fulfils: Physics Minor Foundational Course
Prerequisite: PHY 101

Electricity & Magnetism Topics include: Electromagnetism and electrostatics, electric charge, Coulomb's law, electric field, Gauss's law, electrostatic potential, magnetic fields, Biot-Savart law and Ampere's law, magnetic materials, time-varying fields and Faraday's law of induction, Hall effect, displacement current and Maxwell's equations.

PHY 102L Advanced Physics Lab

Credit Hours: 1+0
Fulfils: Physics Minor Foundational Course
Prerequisite: PHY 102

Experiments include: determination of Curie point of a Ferro-magnet by controlled electric heating, observing Hall effect in semiconductors, magnetic moment of a conductor loop in a magnetic field, determining Verdet's constant, Frank-Hertz Meter, determination of Planck's constant from the spectrum of a tungsten light bulb, optical activity of a chiral (sugar) solution, imaging electron trajectories using a magic eye, image analysis, Lenz's Law, band gap measurement of pure Ge, magnetic pendulum, exploring phase portraits, chaos, bifurcations, Spectral Lines of different gasses.

PHY 104 Introduction to Nano Science

Credit Hours: 3+0
Fulfils: Natural Science requirement and university wide free elective
Prerequisite: None

Nano-Science is a significant area of science which deals with the understanding of the properties of materials at nano-nanoscale—the world where atoms, molecules (atoms joined together), proteins, and cells rule the roost. It is the place where science and technology gain an entirely new meaning. This course offers a basic introduction to understand nanoscience and explore its applications through nanotechnology: where we can put the science into action to solve our problems.

PHY 201 Modern Physics

Credit Hours: 3+0
Fulfils: Physics Minor Foundational Course
Prerequisite: PHY 101, PHY 102, MATH 102, MATH 203

Topics include: Review of basic mechanics, introduction to special relativity, relativity and Physics, Planck's radiation law, photo electric effect, Compton scattering, pair production, Bohr's theory of Hydrogen atom, basics in quantum mechanics, Schrodinger's equation and its applications, ideal gas equation, Maxwell's distributions, Boltzmann's distributions, Identical particles.

PHY 202 Quantum Mechanics

Credit Hours: 3+0
Fulfils: Physics Minor Foundational Course
Prerequisite: PHY 101, PHY 201, MATH 203

Topics include: Particle aspects of radiation, wave aspects of particles, quantum systems and indeterminacy, quantization rules, wave packets, mathematical tools of quantum mechanics, postulates of quantum mechanics, one-dimensional problems in quantum mechanics, angular momentum, more than 1-dimensional problems, rotations and addition of angular momenta, time dependent and independent approximation methods in quantum mechanics, scattering theory.

PHY 300/CS 314 Quantum Computing

Credit Hours: 3+0
Fulfils: CS Theory Elective; Physics Minor
Prerequisite: MATH 101, MATH 102, MATH 205, Data Structures and Algorithm, OR PHY 202 OR instructor permission

Quantum computers are physical devices that exploit the laws of quantum mechanics to solve certain problems faster than Turing machines, and in doing so negate the extended Church-Turing thesis, a fundamental conjecture in traditional computer science. Computer science students will learn a new and promising model of computation, and physics students will learn to analyze physical theories in terms of information and computation.

PHY 301 Classical Mechanics

Credit Hours: 3+0
Fulfils: Physics Minor Elective Requirement
Prerequisite: PHY 101, MATH 203.

This is an advanced course in the area of Mechanics which employs a different approach to studying mechanical systems. The course focuses on LaGrangian and Hamiltonian approaches to understanding and modeling mechanics systems. It starts with reconsidering physical systems already familiar to the reader, such as simple harmonic motion, free particles, rotations, spring systems etc. using Lagrange formalism which is one of the most widely used approaches in a number of areas of Physics. Later on, it further generalizes the formalism and eventually the formalism is applied to continuous systems, hence field theory

PHY 302 Mathematical Methods for Physics

Credit Hours: 3+0
Fulfils: Physics or Math Minor Elective requirement
Prerequisite: MATH 101, MATH 102, MATH 202, MATH 205 or instructor permission

Learning advanced Physics requires mastery of a variety of mathematical techniques. This course covers some of the most common and useful of these techniques, thereby preparing students to take higher-level courses in Physics. Grappling with advanced mathematics, will turn students into more mature mathematicians, and equip them to become proficient scientists and engineers.

Students should come prepared knowing the fundamentals of single- and multi-variable calculus, the solutions of standard differential equations, and linear algebra. Building upon these fields, we will learn tensor calculus, operator theory, advanced techniques for solving differential equations, and calculus of variation. There will be an emphasis on proofs and understanding why theoretical techniques are able to yield solutions to applied problems.

No background knowledge of Physics is required for this course. However, Physics problems will sometimes be discussed in class, but students will not be tested on their modeling ability. Therefore, Electrical Engineering and Computer Science students, will be able to derive full value from this course.

PHY 351 Introduction to Statistical Mechanics

Credit Hours: 3+0
Fulfils: This course is designed as an **independent study** to meet the elective requirement for a Physics minor.
Prerequisite: PHY 201, PHY 202, PHY 301 MATH 202, MATH 205, ME 302 Engineering Thermodynamics, EE 354/MATH 310

Statistical mechanics links the microscopic properties of physical systems to their macroscopic properties. Thermodynamics, which describes macroscopic properties, can then be derived from statistical mechanics with a few well motivated postulates. It leads to a microscopic interpretation of thermodynamic concepts, such as thermal equilibrium, temperature and entropy. In this course, the basic principles of statistical mechanics will be introduced with applications to the physics of matter.

PHY 352/MATH 352 Group Theory for Physicists

Credit Hours: 3+0
Fulfils: Physics minor, Mathematics Minor, Free Elective
Prerequisite: MATH 101, MATH 205 OR Instructor Permission

This course introduces students to group theoretic methods that allow them to analyze physical systems using symmetries. These methods are wide applicability in various branches of physics, as well as in Engineering and Computer Science. The identification of symmetries often lets one simplify a problem, and solve it in mathematically and conceptually elegant ways.

PHY 401 Quantum Mechanics II

Credit Hours: 3+0
Fulfils: Physics Minor Elective Requirement
Prerequisite: PHY 301, PHY 202, PHY 302, Partial Differential Equations

The course specifically serves as one of the prerequisites for research in quantum field theory, particle physics, cosmology, and related areas. The course is designed to bridge the knowledge in Lagrangian (and Hamiltonian) approach, mathematical physics, and quantum field theory.

The course is designed to expose students to some of the very active research areas in theoretical physics at its most fundamental scale. It is expected to enable students to learn the basics of quantum field theory which is among the irreplaceable prerequisite for any research being currently pursued in quantum field theories, particle physics, string theory, supersymmetry etc.

ENER 104 Renewable Energy: Why, What and How?

Credit Hours: 4
Fulfils: This course meets Natural Science requirements for DSSE students and can count as a free elective to students from all other majors.
Prerequisite: None

Our reliance on energy systems has been increasing consistently since the industrial revolution. This reliance has increased greatly with the ongoing revolutions of InfoTech and biotech. While multiple alternate sources of energy are being used and researched, coal, oil and gas continue to be the world's top energy sources accounting for about 65% of global demand. This over reliance on fossil fuels has resulted in an unprecedented emission of CO_2 and other greenhouse gases which has triggered the first man made geological age which can threaten the existence of all living species on earth. It is not likely that we will reduce our energy needs anytime soon which makes it critical to find alternate energy sources that can fuel our energy needs while avoiding any negative impact on our environmental ecosystems. Through this course, we will explore why do we need renewable energy sources, what's wrong with the current energy systems and what are the options available to us outside of regular sources of coal, oil and gas. We will study the operation of various renewable energy sources including, wind energy, solar energy, hydropower, biogas, hydrogen fuel cells and tidal energy. While using the current energy production and consumptions patterns, we will try to speculate the energy needs of Pakistan in the coming decades with a focus on energy needs by 2047. The course is supported through a lab where students will get to work with multiple renewable devices and analyze their functioning and limitations.

BIO 101+BIO 101 L Cell Biology & Public Health

Credit Hours: 3+1
Fulfils: Natural Science Requirement
Prerequisite: None

This course provides an introduction to cellular and molecular biology and builds its connection with human biological processes; there will be a prime focus on developing skills to communicate biological concepts to laymen. Topics include: Prokaryotic and eukaryotic cells, structure and function of cellular organelles, cells tissues and organ systems, movement across cell membranes, cellular reproduction, DNA replication, transcription and translation, Mendelian genetics, blood groups, introduction to the immune system and vaccines, dengue viral infection, and cancer development. Workshops on communication design in public health will be integrated

BIO 102+BIO 102 L The Secret World of Microbes

Credit Hours: 3+1
Fulfils: Natural Science requirement
Prerequisites: None

This course explores the vast realm of tiny, clever little beings that are present everywhere but are easily ignored as they are not visible to the naked eye. Microbes are microscopic living organisms that were the first to colonize earth. They are present everywhere; in the soil, air, water, food, even on our bodies. In fact, you can find more microbes on your hand than there are people on the entire planet. Albeit tiny, their role is so much more important. Without them, we couldn't digest our food, garbage wouldn't decay, our ecosystems would collapse. Even NASA has a team researching on the microbial life that can survive in space. Understanding microbes is essential to understanding the past and the future of ourselves and our planet. The reason bacteria serve as a valuable model system is because: a) they are easy and relatively cheaper to maintain, b) they take just 20-30 minutes to divide so generations can be studied in a short amount of time and c) they possess simpler biological systems reflective of complex organisms.

The lab component of this course is meant to be easy and fun! Discover how many microbes reside on your cell phone, laptop, bean bags of student lounge, or in the cafeteria food! Test which hand sanitizer or detergent works best, or who provides the most hygienic '*gola ganda*' (ice candy) in town!

ENVS 102 Introduction to Environmental Systems

Credit Hours: 3
Fulfils: Natural Science Requirement
Prerequisites: None

Environmental change as a result of human activities has emerged as the most pressing global challenge of our times, one with profound ecological, social and political implications and dire consequences. Addressing this challenge requires a rigorous understanding how natural systems operate and how human societies interact with these natural systems.

This survey course is designed to introduce students to the various environmental systems that enable life on earth and their linkages with human society. It is intended to be useful for both a broad-based introductory class on environmental science and as a useful supplement to specialist courses which wish to review the environmental systems dimensions of their areas of study. By covering a wide range of topics, review questions, case studies, and links to further resources, students will become conversant in the language and concepts of sustainability, and will be equipped for further study in sustainable management, planning, policy, economics, climate, ecology, infrastructure, and more.

BIO 121+BIO 121L Introduction to Biochemistry

Credit Hours: 3+1
Fulfils: Natural Science Elective
Prerequisite: None

Biochemistry is the study of life. This fascinating natural science will provide insights into the chemical processes driving the biological systems. This course will immerse you in the sub-cellular world to understand the processes that are integral for life. You will develop an appreciation of the basic principles of biochemistry and workings of the biological networks. Since the field of biochemistry is continually evolving, through this course you will be introduced to the biochemistry underlying some concepts such as molecular biology, genetics, evolutionary biology, plant biology, human physiology and the current advancements in the field of medicine. You will develop problem solving, critical thinking and analytical skills. The class and lab sessions will embrace variable teaching and learning strategies for audio and visual learners, including but not limited to flip classes, discussions, think-pair-share, activities, and video sessions, etc. Lab will include a combination of wet lab and virtual lab where the topics would range from detection and analysis of macromolecules, to isolating DNA from cells, testing blood sugars, and optimizing enzyme catalyzed reactions etc.

BIO/CND 151 Learning BioScience through Movies

Credit Hours: 3
Fulfils: Natural Science Elective, Free elective, Cross-listed with CND fulfills the 100-level-elective course requirement of the bioscience minor
Prerequisite: None

Science helps us solve problems, and art helps us cope with the problems. This is good because science often takes a long time to solve, and in the meantime, we have to cope.

So tell me, are you interested in the art of movies? Are you interested in the science of life? Perhaps both of them. This course intends to mitigate the dichotomy between the two fields and offers an integrated experience. The underlying theme of the course is to comprehend a variety of biological concepts via a popular medium of creative expression, in this case selected films on scientific topics. The course will provide insights into a myriad of biological processes governing our world. You will appreciate the power of movies in developing an understanding of various biological phenomena. The central focus will be on the following themes: 1) Infections, 2) Human/animal experimentation and ethics, and 3) Plant biology. Within these themes, you will learn about the scientific method, evolution and survival of the fittest, ecological sustainability, genetic engineering, disease infections and immunity, plant's defense mechanisms, plants communication, exobiology and much more. While inspecting the subject matter in these films, you will develop critical thinking and analytical reasoning, which will help develop a deeper understanding and appreciation of the world around you. You will learn to express your thoughts through blogs and vlogs, and to communicate efficiently in written and verbal discussions.

BIO/LIT 201 Digitally Yours Visual Novels About Diseases

Credit Hours: 3
Fulfils: Natural Science Requirement
Prerequisite: None

This interdisciplinary course explores digital narrative techniques focusing on key areas of disease/cell biology and empathy through storytelling. It examines the relationship between the afflicted and the caregivers, the reader and the sufferer through a mix of bio scientific knowledge and creative writing. The bio component of the course focuses on molecular and cellular functions during infectious and non-infectious diseases of contextual relevance. The course reconnoiters the rhetoric of empathy and the elucidations of science and art through the modern technology of Augmented

Reality and Ren'Py (visual novels) and how that has changed our perceptions in a global, connected world.

BIO 211 Understanding the Human Body- The Physiology of Everyday Life

Credit Hours: 4
Fulfils: Natural Science Elective
Prerequisite: None

In this course you will learn how we use our body every day to respond to an ever-changing environment, and the fascinating ways we deal with physical, emotional, and biological threats. You will understand how our heart and vessels work together to circulate the blood, all the amazing things our blood is capable of doing (from maintaining homeostasis to fighting infection), how our brain and nerves protect us, and how hormones ensure proper growth, development, and repair. You will explore our role in some of the common health problems afflicting mankind today, and develop a systematic, integrated understanding of how the body functions.

In the labs part, you will see these systems in action, and apply the concepts first hand by measuring blood pressure and heart rate, and relating it to exercise physiology. You will examine the blood composition and blood types, witness the microbes on and around you and test them against antibiotics, gather and interpret data on sleep quality, anxiety levels, eating behaviors, and traits such as focus, flexibility, and adaptability.

This course is for a diverse student pool and will be particularly interesting for individuals who are intrigued by the human body. There are no prerequisites and students with a non-biology background will equally enjoy the experience.

ENV 200 Water is Fighting Over

Credit Hours: 3
Fulfils: Quantitative Reasoning and Natural Science requirement
Prerequisite: Basic Math

This course will expose students to important concepts in water resources policy and management. It is designed to help students majoring outside of science and engineering develop an informed perspective on 21st century water challenges, and by extension, natural resource allocation problems. No pre-requisites are needed for this course.

ENVS 201 Science of Sustainability

Credit Hours: 3
Fulfils: Natural Science Requirement
Prerequisite: None

Environmental change as a result of human activities has emerged as the most pressing global challenge of our times, one with profound ecological, social and political implications and dire consequences. Addressing this challenge requires a rigorous understanding how natural systems operate and how human societies interact with these natural systems.

This survey course is designed to introduce the essential scientific concepts pertaining to sustainability. It is intended to be useful for both a broad-based introductory class on sustainability and as a useful supplement to specialist courses which wish to review the sustainability dimensions of their areas of study. By covering a wide range of topics, review questions, case studies, and links to further resources, students will become conversant in the language and concepts of sustainability, and will be equipped for further study in sustainable management, planning, policy, economics, climate, ecology, infrastructure, and more.

ENVS/SDP 251 Water: Science, Society and Policy

Credit Hours: 3
Fulfils: Natural Science Requirement
Prerequisite: None

Should water be released from a reservoir to generate electricity or be stored and used later for agriculture? Should river flows be maintained to preserve ecosystems or does domestic water consumption take precedence? How do droughts and shortage of freshwater exacerbate tensions between countries sharing water resources?

Water serves a diverse set of societal needs (economic, ecologic, cultural etc.), and in an increasingly water-stressed world affected by climate change, these needs are often in conflict. In this three-part course, we will tackle the afore-mentioned questions. Students will first be introduced to hydrological processes in the environment (aka the 'water cycle'). Next, we will focus on how various societies interact with the environment around them and in so doing, how they alter the hydrology around them. This will be done using case studies from around the world to investigate how changing hydrology due to climate change, and the various ways different societies use water, lead to conflicts. Finally, in the third part, students will learn about various stakeholder perspectives on Karachi's water system. They will then use this information to present an equitable plan to better manage the City's water system.

This course will expose students to important concepts in water resources policy and management. It is designed to help students develop an informed perspective on 21st century water challenges, and by extension, natural resource allocation problems. No pre-requisites are needed for this course.

ENVS 301 Introduction to Environmental Engineering

Credit Hours: 3
Fulfils: Natural Science requirement
Prerequisite: MATH 202

Environmental problems represent one of the gravest global challenges of the 21st century. Engineering sustainable solutions to these environmental issues is one of our most pressing needs. In this course, students will learn fundamental science and engineering principles needed for environmental engineering. Students will apply these principles to problems such as water supply and treatment systems, sewage treatment of municipal and industrial wastewaters, stream and air pollution, and disposal of solid waste materials. In addition, this course will provide an overview of major themes in contemporary environmental engineering, including environmental impacts of socioeconomic changes, energy consumption and production, water supply and treatment, air pollution and global climate change.

BTEC 101 Introduction to Biotechnology

Credit Hours: 3
Fulfils: Natural Science Requirement
Prerequisite: School / college level biology or chemistry, or permission of instructor

This course provides an introduction to the fundamentals of biotechnology and its applications. Topics include: an overview of biotechnology and its current importance in society, rapid growth of biotechnology in agriculture, environment, industry, and medicines, antibiotics/antibodies biotech. Emphasis will be placed on DNA manipulation sciences including genetic engineering, gene cloning, plasmids as cloning vectors, restriction enzymes, DNA ligase, PCR, biotransformation, E. coli host as model system, mutagenesis, manipulation of expression of desired DNA, strategies of protein purification, stem cell biotech, and ethics of biotechnology.

BTEC 101L Biotech Laboratory Practices

Credit Hours: 1+0
Fulfils: Natural Science Requirement
Corequisite: BTEC 101

This laboratory course provides practical insights into the role of DNA sciences in achieving and improving the technological applications to develop products to improve quality of life. Topics include: basic operations used in biotech labs, DNA extraction from living organisms, DNA cut and clone, making lots of copies of DNA, overproduction of protein, purification, plasmid isolation, DNA manipulation by PCR, transformation of E. coli with a recombinant plasmid, DNA purification and quantification, calorimetric detection of DNA, visualizing of DNA on gel electrophoresis and DNA fingerprinting.

BIO 111 + BIO 111L Food and Nutrition

Credit Hours: 3+1
Fulfils: Natural Science Requirement
Prerequisite: None

The course covers a wide range of knowledge from the basics of nutritional science to the use of food for preservation and management of health. It provides an overview of the social and cultural shifts in food consumption that contributed to the modern epidemics of chronic conditions such as obesity, diabetes and cardio metabolic disorders.

The overarching aims of this elective course are following:

- Provides an introduction to food sciences and nutrition research
- Evoke global thinking and international mindedness
- Critique on how you know what you know
- Experience the scientific method in action: Observe/Explore, Re-search, Conclude, Repeat
- Instill life-long learning

BIO/SDP 103/301 Global Health and Disease

Credit Hours: 3
Fulfils: Natural Science Requirement
Prerequisite: Free elective (cross-listed with SDP); Fulfills bioscience minor requirement of a higher-level course

This course offers an opportunity to explore health and disease issues crossing national boundaries and disciplinary confines. With unrestrained infections conveniently crossing borders leading to international catastrophes, and the growing burden of non-communicable diseases affecting both the developing and developed worlds, we should critically evaluate the effectiveness of the strategies in place. Non-health sector issues such as climate change, natural disasters, complex humanitarian emergencies, and trade have dramatic worldwide effects on health. Science and technology impact global economic and social development. These are just a few challenges requiring global thinking, international mindedness, integration, collaboration, and coordination across disciplines. This course provides a platform where you access these issues and others such as human rights, culture, and research ethics, systems thinking, one health, and how it links environment and nutrition to adolescent, women, and child health.

SCI 101 Introduction to Sustainability

Credit Hours: 3
Fulfills: This course is part of the Habib Liberal Core and meets the requirements for Quantitative Reasoning, and Natural Science courses.
Prerequisite: None

This course is designed to introduce the essential concepts of sustainability. This subject is of vital importance as it seeks to uncover the principles of the long-term survival and welfare of all the inhabitants of our planet. The course is intended to be useful for both a broad-based introductory class on sustainability and as a useful supplement to specialist courses which wish to review the sustainability dimensions of their areas of study. By covering a wide range of topics, review questions, case studies, and links to further resources, students will become conversant in the language and concepts of sustainability, and will be equipped for further study in sustainable management, planning, policy, economics, climate, ecology, infrastructure, and more.

BIO 102+BIO 104L Introduction to Ecology and Evolutionary Biology

Credit Hours: 3+1
Fulfills: It fulfills Natural Science requirement for SSE students.
Prerequisites: None

Understanding how nature functions is necessary in order to develop environmental protection, conservation and resource management policies that work. The goal of this course is to familiarize students to ecological and evolutionary concepts that govern natural systems, so that they are able to make informed decisions on pressing social issues in Pakistan, such as global climate change, conservation of biodiversity, human population growth and resource management. This course is divided into two sections: 1) Evolution and Adaptation, and 2) Ecology and Biodiversity. Each lecture (3 hours) will be accompanied by a laboratory session (3 hour) where students will discuss and explore the concepts learned during lecture.

BIO/SDP 114+BIO 114L Biodiversity in the city

Credit Hours: 3+1
Fulfills: It fulfills Natural Science requirement in University's Habib Liberal Core, cross listed with SDP.
Prerequisites: None

Habitat alteration as a result of human activity is one of the leading threats to global biodiversity. Urbanization as a process significantly alters temperature, noise, air quality, hydrology as well as many abiotic factors. In this course, we will explore and document the communities of organisms that exist in Karachi alongside humans. We will investigate the consequences of urban environments and human social behavior on ecological systems and discuss factors such as nutrient cycling, behavior, phenology, disease, and patterns and process of biodiversity in urban systems, and importance of ecosystem services provided by these communities. In addition, we will discuss best practices in urban planning and development for promoting and preserving biodiversity and ecosystem processes. A significant component of this course will involve discussion of current scientific literature. This course will have a lab component where students will perform biodiversity surveys of plants, arthropods, and birds in their *mohallas*, examine the impacts of different urban activities on ecological communities and develop plans for protecting and promoting biodiversity across Karachi.

CORE 100 Climate Change and Us

Credit Hours: 3
Fulfills: This course falls under the Form of Thought of Quantitative Reasoning. It also fulfils Natural Science requirement for SSE students.
Prerequisites: None

We live in a world where climate change has become an inescapable reality. It's like the dice has been rolled and we can now only wait and see what consequences it brings. Climate change is starting to influence all areas of our lives from food production, melting icecaps to frequent natural disasters. This course will develop a conceptual understanding of all the issues and impacts related to climate change and provide an opportunity to develop sustainable adaptation plans.

This course is designed to provide an introduction to climate change and its impacts on various aspects of our lives. The topic of climate change will be explored from different lenses such as its effects on humans, water, food, melting glaciers, and oceans among others. The course hopes to not only engage student learning through traditional teaching strategies but to bring in the expert knowledge that documentaries, case studies and guest speaker sessions offer us to fully cover every aspect of this global issue.

SCI/CS 122 Inventing the Information Age

Credit Hours: 3
Fulfils: Natural Science elective, CS elective
Prerequisite: None

Our current era is often referred to as the information age, because of the widespread use of information processing capabilities that are used for human benefit in a wide variety of ways. This era is enabled by a number of scientific and technological inventions such as computers and communication technologies. The effect of these inventions has been felt through significant social, economic and political change.

This course surveys the key physics, mathematics and computer science inventions that enable the information age. We will study the basics of important physical constraints and phenomena that are used to build information processing devices. We will understand how coding theory allows us to reliably transmit, store and compute information on error prone physical devices. We will also discuss essential cryptographic techniques to securely transmit and store important information. The course will end with an outlook of future innovations that will further enhance humanities' information processing capabilities.

SCI 221 Design thinking for Sustainability

Credit Hours: 3
Fulfills: "This course falls under the Form of thought of Creative Practice"
Prerequisites: Introduction to Sustainability / Energy / Climate Change and Us

This course provides an introduction to the principles of design thinking and allows an opportunity to deploy these principles for solving a sustainability challenge. Design thinking offers a systematic approach to unleash the innovative and creative forces of individuals in a collaborative space. It applies methodologies of design to solve challenges to the environment and society and at the same time provides a more engaged and practical learning opportunity.

The course will involve a human-centered design process where the students will learn and work in a team-based community project throughout the semester. Their learning will be supported through readings, workshops, videos, discussions, in-class activities and reflection assignments. Students will also spend a significant amount of time observing, listening, analyzing, discussing, reflecting and

engaging with their classmates as they design, develop and implement meaningful and innovative projects on sustainability.

Mathematics

MATH 012 Pre-Calculus

Credit Hours: 3
Prerequisite: High school mathematics of any level.

Topics include: A revision of the number systems and relations, functions, and polynomials with symbolic and graphic representations. These topics will cover a wide range of subtopics to bridge the gaps in high school mathematics, like rational functions, inverse functions, logarithmic and exponential Functions followed by trigonometric Functions with an extensive treatment in the course. As a learning outcome, students are expected to be able to analyze functions and their behaviors symbolically, numerically and graphically.

MATH 101 Calculus I

Credit Hours: 4
Fulfils: This course meets requirements for EE, ECE and CS majors and Mathematics Minor for non-DSSE students.
Prerequisite: None

The course covers important pre-requisite content related to functions, their behavior, and multiple contexts for which they serve as an important modelling tool. This course fulfills a foundational mathematics course requirement for the Electrical Engineering, Computer Engineering and Computer Science majors. It is also a mandatory requirement for all non-DSSE students wishing to pursue a Mathematics Minor.

MATH 102 Calculus II

Credit Hours: 3
Fulfils: This course meets requirements for advanced courses in EE, ECE and CS majors and Mathematics & Physics Minor for non-DSSE students.
Prerequisite: MATH 101

Calculus is a very important part of Applied Mathematics which in turn serves as an important tool in Science and Engineering. In Calculus I you studied the fundamental concepts of function and the techniques of differentiation and integration. Calculus II builds upon the concepts of calculus learned in the previous course and extends them to other areas of Applied Mathematics such as multivariable functions and vectors.

MATH 105 The Art of Mathematics

Credit Hours: 3
Fulfils: Elective for Math Minor and fulfils Quantitative Reasoning requirement for AHSS students
Prerequisite: None

This course will explore multiple theorems, arguments, and quantities that have been relevant to a variety of fields through history, such as art, architecture, astronomy, and the physical sciences. Tracing the birth of geometric reasoning from the time of Euclid to looking at the birth of trigonometry as a tool for astronomical calculations and models, students will be introduced to geometry, algebra, and topology through various contexts. Students will be expected to use these concepts to create culminating projects using design and mathematical software.

Note: This course will also fulfil one (01) of the math requirements for the students pursuing a Communication and Design major.

MATH 106 Music and Mathematics

Credit Hours: 3
Fulfils: This course meets requirements for a Quantitative Reasoning elective and is a required course for the completion of a South Asian Music Minor.
Prerequisite: None

This course serves as a bridge between two areas of learning that are not popularly associated with each other. However, music and its development in various cultures around the world have often relied upon mathematical frameworks. The study of mathematical concepts behind musical ideas is a classic example of interdisciplinary learning in the liberal arts model.

This course will introduce the rudiments of Western and South Asian musical theory, with a focus on the mathematics incorporated in their development and overall structure. The course will explore the properties of the twelve-tone scale, the historical evolution of tuning and temperament, the idea of combinational tones and consonance, and the physics behind the construction of musical 96 instruments. Looking primarily at South Asian and Western musical genres, students will also analyze the mathematics involved in music composition, for both melody and rhythm.

MATH 107 Lie Detector: An Introduction to the Practice of Statistics

Credit Hours: 3
Fulfils: It fulfills quantitative reasoning requirements for AHSS and SSE students
Prerequisite: None

In the age of big data, it is difficult to differentiate knowledge from misinformation. Statistics, as a field, is concerned with quantifying uncertainty. Statistics are tools to summarize and describe patterns in reality and to explore the causal processes leading to these patterns. Understanding how statistics are used and misused is vital for assessing and assimilating information in any field. The goal of this course is to help students understand the philosophy of inference, develop a scientific process for posing questions, collecting and interpreting relevant data, and familiarize them with common statistical tools so that they can apply evidence-based decision making in their lives. We will review core principle and concepts in probability and statistics, using project-based learning to focus on practical application rather than theory. All students are expected to attend three-hour computer labs every week where they will be using the R statistical language to review statistical concepts and principles learned during lecture. This course is aimed at all SSE and AHSS students, especially those who are intimidated by mathematics, working with numbers or programming.

MATH 202 Engineering Mathematics

Credit Hours: 3
Fulfils: Mandatory Math requirement for all DSSE students
Prerequisite: MATH 102

Topics include: Vector Calculus (vector functions, line and surface integrals). Elementary methods for solving first order ODEs (direct integration and substitution) with geometric interpretation and classification, separable ODEs, method of integrating factors. Vector algebra (including matrix algebra, eigenvalues and eigenvectors, quadric surfaces). Dynamical systems (linear systems of ODEs, stability and phase portraits of dynamical systems). Second, order ODEs - elementary methods including their classification, reduction of order techniques, linear second order ODEs with constant coefficients, and finding particular solutions. Orthogonal functions and Fourier series solutions (generalized and trigonometric methods), convergence in the mean and pointwise convergence, odd

and even expansions, half-range expansions. Partial differential equations (PDEs) (wave, heat and Laplace equations), solutions using Fourier series and Laplace transforms, and Schr dinger equation.

MATH 203 Advanced Differential Equations

Credit Hours: 3
Fulfils: Math Minor Elective
Prerequisite: MATH 202 for CS and EE students; MATH 102 with min 70% score for non-engineering students in MATH Minor.

Topics include: A brief revision of first- and second-order ordinary differential equations (ODEs) with constant coefficients. Differential operators, Wronskian and linear independence. Numerical solution methods for ODEs: Euler method, Taylor series solution up to 2nd order, Runge-Kutta methods up to 2nd order; Cauchy-Euler equations; Power series and Frobenius' methods including Ordinary points, singular points, regular points, analytic functions, indicial equation. Bessel function and Bessel's equation, Legendre equations. Boundary value problems for homogeneous linear 2nd order ODEs: Boundary values, Sturm-Liouville problem, Eigen functions and corresponding eigenvalues, Fourier Bessel series. Inner products and norms of functions. Self-adjoint operators, and Schro dinger equation.

MATH 205 Linear Algebra

Credit Hours: 3
Fulfils: Mandatory Math requirement for all DSSE students
Prerequisite: MATH 202

Topics covered: A brief revision of vector algebra including lines and planes in 3D and matrices, Determinants, Symmetric matrices, and quadratic forms; Elementary row and column operations of a matrix; Systems of linear equations and their solutions, existence, and uniqueness of solutions; Vector spaces; Inner products and ortho-normalisation; Orthogonal transformations and rotations; Linear transformations, orthogonality, QR factorization, Hermitian and Unitary transformations; Least squares analysis and approximations; Singular value decomposition; Direct sum decomposition; and Caley-Hamilton Theorem.

MATH 304 Real Analysis

Credit Hours: 3
Fulfils: This course meets elective requirements for EE and CS programs as well as minor in Mathematics.
Prerequisite: MATH 101, MATH102

In this course, we try to understand and appreciate the rigor that mathematics is known for. For all its applications, we must be able to say with absolute certainty that, given a small set of axioms and the rules of logic, our mathematics is consistent.

The course is intended to expose the students to the basic ideas of Real Analysis. Some of the questions that we address are as follows:

- What are real numbers?
- Is there a largest real number?
- What is the real number that comes directly after 0?
- Are there any 'holes' in the real number line?
- Even numbers and odd numbers add up to form natural numbers, does that mean even numbers are less than natural numbers? What about the size of real numbers compared to the size of natural numbers? Are there more than one infinities?
- What are sets? Functions? Measure and distance? Continuity?

MATH 305 Complex Analysis

Credit Hours: 3
Fulfils: Math Minor Elective
Prerequisite: MATH 101, MATH 102

Specific topics covered in this course are: Complex Algebra and the Complex Plane and its Motivation, Polar Form, Complex Exponential, deMoivre's Theorem, Powers and Roots, Sets of Points, Complex Functions and Linear Mappings ,Limits and Continuity for Real and Complex Functions, Differentiability and Analyticity, Cauchy-Riemann Equations, Harmonic Functions, Elementary functions (Exponential, Trigonometric and Logarithmic Functions and Complex Powers), Line & Contour Integrals, Complex Integration, Cauchy's Integral Formulas, Sequences and Series , Taylor Series, Power Series, Convergence, Laurent Series, Zeros and Poles, Newton's Method and Fractals, Residues and Residue Theorem

MATH 333 History of Number Theory

Credit Hours: 3
Fulfils: Math Minor Elective
Prerequisites: N/A

Number Theory, or arithmetic/higher arithmetic, as it was called in ancient times, is one of the oldest and most popular branches in mathematics, as its problems are easy to comprehend, yet sometimes incredibly hard to solve. Brahmagupta concluded over 2500 years ago, when studying arithmetic, that "These problems arestated merely for pleasure. The wise man can devise a thousand rules or he can solve the problems of others by the rules given here. As the sun obscures the stars so does the man of knowledge eclipse the glory of other mathematicians in an assembly of people by proposing algebraic problems and still more by solving them."

Positive integers are seen to be the first mathematical creation of humans and we are going to start the course by introducing different ancient number systems in various civilizations and the first arithmetic operations. After this introduction we are going to focus on mathematics in ancient Greece, mainly under Plato, Euclid and Diophantus and in particular the connection between geometry and number theory that they established (It will also be highlighted if similar discoveries were made for example in India).

The course will then continue with medieval Islamic mathematics, their appropriation of Greek, Indian and Persian texts resulting in the Hindu-Arabic number system and further studies on 'special' numbers, such as perfect numbers, primes, amicable numbers and their properties and the influence of al-Khwarizmi's introduction of Algebra on number theory problems. This will then segue into Europe in the late Renaissance, thanks to a renewed study of the works of Greek antiquity (often arriving in Europe in Arabic).

MATH 351 Topology

Credit Hours: 3
Fulfils: This course meets elective requirements for CE, EE and CS programs as well as the minor in Mathematics.
Prerequisites: MATH 101, MATH 102

The independent study is designed to be a first introduction to Point-Set Topology. The last few weeks are dedicated to understanding the basics of another aspect of topology, namely Algebraic Topology. The topics are particularly chosen in such a way as to equip the students to later diverge into different streams within topology according to their interests.

EE 354/MATH 310 Introduction to Probability and Random Variables

Credit Hours: 3
Fulfils: This course meets program requirements and Quantitative Reasoning (QR) forms of thought for EE, CE & CS majors.
Prerequisites: MATH 102

In the present world, we encounter situations where we have to make decisions on the basis of incomplete or imperfect information. The theory of probability helps provide a formal mechanism for understanding, quantifying, and dealing with uncertainty, which is ever present in our lives, pure science, or engineering applications. Simply, by uncertainty we mean the condition when outcomes or future are not completely determined or can be captured by a deterministic function; they depend on a number of factors and perhaps just on pure chance. A lot of our present day technologies will not be possible without an understanding of how to make decisions in presence of uncertainty. These technologies include all forms of wireless communication, servers, speech processing systems, network systems and so many more. Equipping yourself with tools to deal with uncertainty will help you with whatever you wish to pursue in life.

This course will cover the foundations of probability, random variables and statistics, with a plethora of examples from electrical engineering, computer engineering, computer science, and everyday life. The course content can broadly be divided into three categories: -

1. Fundamentals of probability,
2. Common probability models,
3. Inferences & statistics.

MINORS

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 University

S. No	Minors	Offering Program	Offering School	No of Courses	Credit Hours+
1	Comparative Literature	CH	SAHSS	06	18
2	Philosophy	CH	SAHSS	05	15
3	Religious Studies	CH	SAHSS	05	15
4	History	CH	SAHSS	05	15
5	South Asian Music	Center for South Asian Music and CH	SAHSS	05*	15*
6	Communication and Design	CND	SAHSS	05	15
7	Social Development & Policy	SDP	SAHSS	05	18
8	Physics	iSciM	DSSE	07**	20
9	Mathematics	iSciM	DSSE	07	20
10	Computer Science	CS	DSSE	07	21
11	Electrical & Computer Engineering	ECE	DSSE	08	22

+ 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

1. Comparative Literature (CL)

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

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

All Habib University students (class of 2023 onwards), except those majoring in the CH program, are eligible to declare and pursue the CL Minor.

Requirements for the Comparative Literature Minor (Class of 2025)

Courses	Credit Hours	No. of Courses
Core Courses		
LIT/CND 203 Reading, Writing, Thinking Literature, **or** LIT 107 Dystopian, Apocalyptic, & Post-Apocalyptic Novels, **or** LIT 233 Prose Poems. *(or another approved course that satisfies the requirement)*	03-04	01
LIT 225 Intro to Literary Theory and Criticism	03	01
CORE 121 Jahan-e-Urdu*	04	01
LIT Electives Two upper division Literature electives		

Courses	Credit Hours	No. of Courses
300-level elective	03-04	01
400-level elective	03-04	01
Free Elective One course within the area of concentration - South Asia or World Literature		
CH Elective (excluding from the Habib Liberal Core)	03-04	01
Overall	**18 min**	**06**

- Students must take all the 06 courses as specified above to qualify for the CL minor.
- Minimum 18 credits.
- Courses cleared with C minus / passing grade can go on the grid for CL Minor.
- *Can be double counted in both HLC & minor

2. Philosophy

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

1. 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.
2. 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.
3. 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.
4. 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.

All Habib University students (class of 2023 onwards), except those majoring in the CH program, are eligible to declare and pursue the Philosophy Minor.

Requirements for the Philosophy Minor (Class of 2025)

Courses	Credit Hours	No. of Courses
Core Courses		
PHIL 200: What is Philosophy? **Or** PHIL 122 Introduction to Western Philosophy **or** Introduction to Philosophy *(or another course that satisfies the requirement).*	03-04	01
Either Hikma 1, or, Formal Reasoning (i.e., either CORE 111 Logical Problem Solving or CS 101 Programming Fundamentals)	03-04	01
Intermediate Courses		
Either Epistemology or Ontology courses	03-04	01
Electives		
Any two advanced level (300 or 400 level) electives in PHIL.	06-08	02
Overall	**15-20**	**05**
- Students must take all the 05 courses as specified above to qualify for the Philosophy minor. - Minimum 15 credits. - Courses cleared with C minus / passing grade can go on the grid for Philosophy Minor.		

3. Religious Studies

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

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

All Habib University students (class of 2023 onwards), except those majoring in the CH program, are eligible to declare and pursue the Religious Studies Minor.

Requirements for the Religious Studies Minor (Class of 2025)

Courses	Credit Hours	No. of Courses
Core Courses		
Introduction to World Religions **or** Making of Modern World Religions.	03-04	01
Hikma 1 – History of Islamic Thought.	04	01
Intermediate Courses		
Theories and Methods in Religious Studies, **or** RELS 223: Comparative Approaches, **or** Methods and Key Issues in the Study of Religion *(or any approved course that satisfies the requirement)*	03-04	01
Electives		
Any two advanced level (300 or 400 level) electives in RELS.	06-08	02
Overall	**15-20**	**05**

- Students must take all the 05 courses as specified to qualify for the Religious Studies Minor.
- Minimum 15 credits.
- CORE 302: Hikma II can be one of two electives provided the student is not already counting Hikma II for the second philosophical thought requirement in the Habib Liberal Core.
- Courses cleared with C minus / passing grade can go on the grid for Religious Studies Minor.

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

1. Appreciate the interconnectedness of histories of various parts of the world.
2. Critically analyze the historically crucial role of conceptual and discursive shifts and transformations across historical mentalities and spaces.
3. Conduct historical research and craft arguments that resonate with diverse audiences
4. Navigate historiographical debates, historical methodologies and interpretive frameworks

All Habib University students (class of 2023 onwards), except those majoring in the CH program, are eligible to declare and pursue the History minor.

Requirements for the History Minor (Class of 2025)

Courses	Credit Hours	No. of Courses
Core Courses		
Global History: 1500 to the Present. *(or another course that satisfies the requirement)*	03-04	01
Pakistan and Modern South Asia (PAMSA)	04	01
Intermediate Courses		
Historical Being, Being Historical: Historicity & Historical Method, **or** HIST 227: Understanding Histories: Historiography and Historical Methods *(or another course in Historiography/ Theory of History/ Methods in History/ Philosophy of History)*	03-04	01
Electives		
Any two advanced level (300 or 400 level) HIST electives.	06-08	02
Overall	**16-20**	**05**

- Students must take all the 05 courses as specified above to qualify for the History minor.
- Minimum 15 credits.
- Courses cleared with C minus / passing grade can go on the grid for History Minor.

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

1. 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).*
2. 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.
3. Articulate the mathematics inherent to musical forms and the mathematics used to generate musical ideas
4. 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.
5. 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.

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

Requirements for the South Asian Music Minor (Class of 2025)

Courses	Credit Hours	No. of Courses
Core Courses		
MUS 101 Music of South Asia: Styles and Structures	03	01
MATH 106 Music and Mathematics	03	01
MUS 222 Sound and Subjectivity	03	01
MUS 221 Humari Meeras: History and Discourse in South Asian Music	03	01
Elective in History, Theory or Practice		
One elective course	03	01
Others		
Three semesters of practicum in Music Lessons offered through the Center for South Asian Music.*		
Overall	**15**	**05**

- Students must take all the 05 courses (3 credits each) and 3 semesters of enrollment in the Music Room Lessons
- Minimum 15 credits.
- The student should have a C+ or higher grade in all the 5 courses plus 85% attendance in the Music Room lessons for the 3 semesters.
- * 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 Center for South Asian Music.

6. Communication and Design

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

By taking this minor, students will be able to

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

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

Requirements for the Communication and Design Minor (Class of 2025)

Courses	Credit Hours	No. of Courses
Required Courses		
CND 105 Forms of Inquiry or COM 202 Communication and Culture or COM 201 Thinking Media	02	01
CND 201 Elements of Aesthetics or COM 204 Elements of Aesthetics I or CND 301 Transdesign Practicum or DES 203 Designing for and with People	03-04	01
Elective Courses		
Any CND, COM or DES Electives	09-12	03
Overall	**15-18**	**05**
- Minimum Grade: C minus / HU passing grade in all courses for the minor - Double counting is not allowed - Transfer of credits is allowed only with the approval of the program		

8. Social Development and Policy

Offered by: Social Development and Policy (SDP) Program
Students from all majors except those majoring in SDP can pursue the SDP minor.

Requirements for the Social Development & Policy Minor (Class of 2025)

Courses	Credit Hours	No. of Courses
Required Courses		
SDP 101 Development and Social Change	04	01
SDP 201 Qualitative Research Methods or SDP 202 Quantitative Research Methods	04	01
SDP 301 Public Policy	04	01
SDP Electives		
SDP Elective (any level)	03-04	01
Upper level SDP Elective (300 or 400 level)	03-04	01
Overall	**18**	**05**

MINORS OFFERED BY DHANANI SCHOOL OF SCIENCE AND ENGINEERING

1. 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.
Students from all programs at Habib University can pursue the Physics Minor.

Requirements for the Physics Minor (Class of 2025)

Courses	Credit Hours	No. of Courses	Prerequisite(s)
Foundational Courses			
PHY 101 Mechanics and Thermodynamics	03	01	None
PHY 201 Modern Physics	03	01	PHY-101 Mechanics and Thermodynamics
PHY 202 Quantum Mechanics	03	01	PHY 201 Modern Physics PHY 101 Mechanics and Thermodynamics
PHY 241/EE 241 Electromagnetic Theory	03	01	MATH 202 Engineering Mathematics or equivalent
PHY 101L Mechanics Lab	01	01	-
PHY 102L Advanced Physics Lab	01	01	-
Electives			
Electives (300 or 400 level)	06-12	03	
Overall	**20-26**	**09**	

- Students must take all the foundational courses specified above to qualify for the Physics minor.
- Students must earn a minimum of 20 credits.
- Students must earn a C grade or higher in all Students must earn a C grade or higher in all *mandatory* courses (foundation courses) to continue with the minor.

Electives offered by the program that can fulfil the minor requirements:

- ME 342 Introduction to Nanotechnology
- PHY-301 Classical Mechanics
- PHY-302 Mathematical Methods for Physics (also valid for Mathematics Minor)
- PHY-351 Introduction to Statistical Mechanics
- PHY-401 Quantum Mechanics II
- PHY-441/EE-441 Antennas and Wave Propagation
- PHY-360/ME-302 Engineering Thermodynamics

Please note that the offering of electives is subjected to the availability of faculty and is contingent on the number of students enrolled. 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.

2. 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.

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

Requirements for the Mathematics Minor (Class of 2025)

Courses	Credit Hours	No. of Courses	Prerequisite(s)
Foundational Courses			
MATH 102 Calculus II	03	01	MATH 101 Calculus I
MATH 202 Engineering Mathematics	03	01	MATH 101 Calculus I
MATH 205 Linear Algebra	03	01	MATH 202 Engineering Mathematics
MATH 310/ EE 354 Probability and Statistics	03	01	None
Electives			
Electives	09-12	03	
Overall	**20**	**07**	

- Students must take all the foundational courses specified above to qualify for the Mathematics minor.
- Students are required to take at least two (out of 3) 300 or higher level electives.
- Students must earn a minimum of 20 credits.
- Students must earn a C grade or higher in all the foundational courses to continue with the minor.

Note:

1. DSSE students have a mandatory requirement of MATH 101 but it cannot be double counted towards the minor.
2. SAHSS students can count MATH 101 towards the minor.
3. Students are free to choose electives either from Pure Mathematics or Applied Mathematics or both.
4. 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.
5. 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.

Electives offered by the program that can fulfil the minor requirements:

- MATH-101 Calculus I (Only for SAHSS students)
- MATH-106 Music and Mathematics
- MATH-104 History of Mathematics
- MATH-105 The Art of Mathematics
- MATH-113/CS-113 Discrete Mathematics

- MATH-320/CS-326 Mathematics of Machine Learning
- MATH-413/CS-413 Graph Theory

3. Computer Science

Offered by: Computer Science Program

Habib University students from all majors, except those majoring in CS are eligible for the CS minor.

Requirements for the Computer Science Minor (Class of 2025)

Courses	Credit Hours	No. of Courses
CS Foundation		
CS 101 Programming Fundamentals	2+1	01
CS 102 Data Structures and Algorithms	3+1	01
CS 113 Discrete Mathematics	3+0	01
CS Kernel Any two 200 or above higher level courses from the CS Kernel. *(CS Kernel courses cover concepts, skills and techniques that are fundamental to the pursuit of most disciplines and practices within CS)*		
CS Kernel Courses include: • CS 201 Data Structures II • CS 212 Nature of Computation • CS 224 Object Oriented Programming and Design Methodologies • CS 232 Operating Systems • CS 353 Software Engineering • CS 355 Database Systems • CS 412 Algorithms: Design and Analysis	03-04	02
Upper-level CS Electives		
Two CS courses (300 level or higher)	06-08	02
Overall	**21**	**07**

- Students must take all the 07 courses as specified above to qualify for the Computer Science minor.
- Students pursuing a minor are advised to consult the CS program director regarding the choice of courses taken in fulfilment of the minor.
- A minimum grade of C+ is required for all courses.

4. Electrical and Computer Engineering (ECE)

Offered by: Electrical and Computer Engineering 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

A student successfully completing the minor requirements will be able to:

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

Habib University students from all majors except those majoring in EE & CE are eligible for the ECE Minor. The ECE minor requires successful completion of a minimum of 22 credit hours of coursework and seven (7) courses as described below.

Requirements for the Electrical & Computer Engineering Minor (Class of 2025)

Courses	Credit Hours	No. of Courses	Prerequisite(s)/Corequisite(s)
ECE General Foundation			
EE 101 + EE 101L Introduction to Electrical and Computer Engineering	3+1	01	CS 101 Programming Fundamentals (Co-requisite)
EE 111 + EE 111L Electric Circuit Analysis	3+1	01	None
ENGR 291 Engineering Workshop	0+1	01	None
ECE Concentration Foundation Any one of the following courses			
EE 213 + EE 213L Basic Electronics	3+1		EE 111 Electric Circuit Analysis
EE 172 + EE 172L Digital Logic and Design	3+1		None
EE 212 + EE 212L Electric Network Analysis	3+1	01	EE 111 Electric Circuit Analysis MATH 101 Calculus I
EE 252 + EE 252L Signals and Systems	3+1		MATH 101 Calculus I
Additional Courses (Electives)			
Two ECE courses (300 level or higher)	06-08	02	
One ECE course (any level)	03-04	01	
Overall	**22-25**	**07**	

- A minimum grade of C+ is required for all four foundation courses.
- Only one out of two 300 level courses can also be counted towards student's major.
- The exact number of credit hours will depend on the nature of electives 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.

HABIB UNIVERSITY: INSTITUTIONAL FACTSHEET 2021-2022

STRATEGIC MILESTONES

The University's current five-year strategic plan, adopted in 2020, has three key objectives to advance its vision, mission and values. These include:

1. Outstanding Student Success: To achieve outstanding student outcomes as measured by excellent employment opportunities and graduate studies fellowship offers to prestigious global institutions.

2. Institution of Choice: To become an institution of choice for the most talented students, faculty and staff.

3. Sustainability: To secure the financial resources needed to ensure that the University will be able to realize its mission to make a world-class liberal arts education available to the most talented students regardless of their personal capacity to pay for it.

PARTNER INSTITUTIONS

- Carnegie Mellon University
- Texas A&M University
- Claremont Colleges *(Harvey Mudd College, Pitzer College & Pomona College)*
- Stanford University
- University of California, at Berkeley
- University of Michigan, at Ann Arbor

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Mr Rafiq M Habib

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President
Mr Wasif A Rizvi

Vice President, Academic Affairs & Dean of Faculty
Dr Aamir Hasan *(interim)*

Vice President, Operations & Finance
Mr Shahnoor Sultan

Associate Dean, Academic Systems & Registrar
Dr M Shahid Shaikh

Associate Dean, Teaching & Learning
Dr Anzar Khaliq

Associate Dean, Undergraduate Education & Accreditation
Dr Aamir Hasan

President's Chief of Staff & Director, Global Engagement
Ms Tatheer Hamdani

Director, Academic Operations & Strategic Planning
Mr Salman Khimani

Director, Human Resources
Mr Noman M Zaidi

Director, Institutional Research
Ms Gohar Bilal

Director, Resource Development
Ms Lubna Ahmed

Director, Student Life
Mr Shamez Mukhi

Director, Student Success
Ms Yasmeen Bano

ACCREDITATION

The University is chartered by the **Sindh Higher Education Commission**, and is recognized by the **Higher Education Commission of Pakistan**.

Habib University and **Habib University Foundation** are certified as non-profit organizations by the **Pakistan Centre for Philanthropy**.

The **Computer Engineering** and **Electrical Engineering** programs are recognized by the **Pakistan Engineering Council**.
The Computer Science program is recognized by the National Computing Education and Accreditation Council.

HABIB UNIVERSITY: INSTITUTIONAL FACTSHEET 2021-2022

SCHOOLS

School of Arts, Humanities & Social Sciences (SAHSS)
Assistant Dean: Dr Muhammad Haris

Dhanani School of Science & Engineering (DSSE)
Assistant Dean: Dr Abdul Basit Memon

PROGRAMS

SCHOOL OF ARTS, HUMANITIES & SOCIAL SCIENCES

Communication and Design
Degree offered: BA (Hons) Communication & Design
Associate Program Director: Mr Zain Saeed

Comparative Humanities
Degree offered: BS (Hons) Comparative Humanities* *(launched in 2019)*
Program Director: Dr Muhammad Haris

Social Development and Policy
Degree offered: BSc (Hons) Social Development & Policy
Program Director: Dr Aaron Mulvany

DHANANI SCHOOL OF SCIENCE & ENGINEERING

Computer Science
Degree offered: BS Computer Science
Program Director: Dr Abdul Samad

Electrical and Computer Engineering
Degrees offered: (1) BS Electrical Engineering, (2) BS Computer Engineering *(launched in 2019)*
Program Director: Dr Abdul Basit Memon

Integrated Science and Mathematics
(Non-degree granting program)
Director: Dr Humaira Qureshi

ACADEMIC CENTERS

- Arzu Center for Regional Languages & Humanities
- Center for Media & Design (CMD)
- Center for South Asian Music
- Center for Transdisciplinarity, Design & Innovation (playground)
- Interdisciplinary Development Research & Action Center (IDRAC)

FACULTY PROFILE

- **Gender ratio**: 67% male, 33% female
- **56%** full-time faculty at HU hold terminal degrees**.**

FACULTY SIZE *(Fall 2021)*

Program	FT	Adj.
Communication & Design	11	10
Comparative Humanities	14	07
Computer Science	11	06
Electrical & Computer Engineering	15	02
Integrated Sciences & Math	11	-
Social Development & Policy	13	-
University Total	**75**	**25**

STUDENT PROFILE

- Gender ratio: **45% male, 55% female**
- **12.3:1** overall **student-faculty ratio**

STUDENT ENROLMENT *(Fall 2021)*

Communication & Design	205
Computer Science	353
Comparative Humanities	26
Computer Engineering	41
Electrical Engineering	119
Social Development & Policy	285
Undeclared / Undecided	07
University Total	**1036**

ALUMNI

Class of 2018	93
Class of 2019	134
Class of 2020	175
Class of 2021	154
Total Graduates	**556**

Of the overall alumni*,

- **66%** are currently **employed**
- **10%** are attending **graduate school**
- **4%** are engaged in personal or family **entrepreneurial ventures**

Based on information available in Spring 2021