1987–2027

Greenwich University

school_of computing

Greenwich Works

BUILD BLOCK BRIEF · FALL 2026–27

Systems Build STUDIO LANE

Project menu session 5 · this brief session 5 · project chosen session 6 · build from session 7 · 38 students · 8 teams at the final cut · courses: GCCO432, GCDS433, GCDS435, GCLA431, GCAG311, GCDD323, GCMC325, GCPF312, GCDS436, GCPF317

What your team is building

A working system built from first principles — hardware logic, data structures, algorithms, mathematics — that solves a measured public problem; the working system and its evaluation go to the authority.

Your block's convener. Adeel Karim.

ONE PROJECT, SEVERAL GRADEBOOKS

You submit **one** piece of work, and each course that marks it looks at a different dimension, out of 15. **At most eight courses mark one team file.** A course you take that falls outside those eight sets you a **lens note** instead — an individual piece on the same project from that course's angle, 3,000 words, same rubric, out of 15, with a viva out of 5. No student carries more than two: from a third, that course marks your viva out of 20 instead.

YOUR MARKS FROM THIS PROJECT

30 sessional work — a team mark of 15 from each course that marks your file, plus your own viva of 5, held in class in the Presentations & Viva week, plus your teacher's quizzes and assignments 10
30 the mid-term
40 the final

This replaces most coursework, not classes.

The projects in this block

Your team chooses one of these in session 6, with your convener. **At most two teams take the same project, and only on different sites or areas.** The full question, the work and the required pieces for each project are in the Ideas Book. Each line below says what your team leaves behind by December, and the skill you take away.

PROJECT	WHAT EXISTS BY DECEMBER	SKILL
The Outage Logger Reports to: NEPRA	A working low-voltage outage logger run in 4–6 households and a public outage dashboard, with a report handed to NEPRA.	building and testing an embedded data logger
Air Quality on the Cheap Reports to: Sindh EPA	Three to five working particulate sensor units, a calibration report and a small public map of the sites, handed to Sindh EPA.	calibrating a low-cost sensor
Queue Simulator for the Campus Counter Reports to: Greenwich University Admissions Office · Greenwich University Finance Office	A working queue simulator and an evidenced counter layout, handed to the Admissions and Finance Offices for use if they accept it.	modelling and simulating a queue

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PROJECT	WHAT EXISTS BY DECEMBER	SKILL
The Traffic Signal Optimiser Reports to: Karachi Traffic Engineering Bureau	**A traffic simulator and recommended signal timings for three junctions**, set beside the current timings, handed to the Karachi Traffic Engineering Bureau.	optimising a system under constraints
A Low-Cost Braille Cell: What Does It Really Cost? Reports to: Sindh Dept of Empowerment of Persons with Disabilities	**A bench-tested single Braille cell with measured pin force**, refresh time and unit cost, tested with adult readers where a host and the panel agree, its costed note handed to Sindh's Department of Empowerment of Persons with Disabilities.	building and bench-testing an assistive device
Water Tank Monitor Reports to: KWSC · Cantonment Board Clifton	A low-voltage level sensor and alert unit running in 3–5 households for five weeks, with a water-saving estimate handed to KWSC and Cantonment Board Clifton.	building a sensor and alert unit
The Exam Seating Planner Reports to: Greenwich University Examinations Office	A seating-plan program tested on one past examination day and on the mid-term seating, handed to the Examinations Office with a read-me, used if accepted.	writing and benchmarking software for a real office
Solar Yield for a Campus Roof Reports to: Greenwich University Administration	A program predicting hour-by-hour yield for one campus roof, with a costed yield note handed to University Administration.	modelling solar yield from the sun's geometry

What each course marks

CODE	COURSE	WHAT THIS COURSE MARKS — 15 MARKS
GCCO432	**Computer Organization & Assembly Language** Ume Farwa	This course marks the machine-level account of the team's program: the disassembly read and annotated, the register and stack usage explained, the memory-access pattern measured, and the gap between the predicted cost and the time the machine actually took. 15 marks, team.
GCDS433	**Discrete Structures** Haris Yaseen	**This course marks the proof:** the loop invariant and the induction that establishes correctness, the recurrence set up for the chosen algorithm and its solution, the counting argument behind the search space, and whether the bound claimed is the bound proved. 15 marks, team.

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CODE	COURSE	WHAT THIS COURSE MARKS — 15 MARKS
GCDS435	**Data Structures** Dr Nasreen	**This course marks the implementation:** the structure chosen and the case made for it, the correctness of the operations under edge cases, the measured time and space against the predicted bound, and the quality of the test set the team wrote. 15 marks, team.
GCLA431	**Linear Algebra** Zaeem Farooqui	**This course marks the mathematics:** the matrix model set up for the team's problem, the method chosen to solve it, the account of conditioning and numerical error, and whether the results the program produces are the results the model predicts. 15 marks, team.
GCAG311	**Calculus & Analytic Geometry** Zaeem Farooqui	**This course marks the continuous mathematics:** whether the model is set up correctly, whether the limits, derivatives and integrals are right, whether the geometry is represented properly in coordinates, and whether the team can justify every step by hand. 15 marks, team.
GCDD323	**Digital Logic Design** Adeel Karim	**This course marks the hardware:** the truth table and state diagram derived from the model, the minimisation and the case made for it, the Verilog implementation and its testbench, and the timing analysis that shows the circuit meets its clock. 15 marks, team.
GCMC325	**Multivariable Calculus** Asif Rehman	**This course marks the continuous model:** the function set up for the team's problem, the derivatives and integrals computed from it, the optimisation carried out and its constraints, and whether the numbers the model produces are defensible. 15 marks, team.
GCPF312	**Programming Fundamentals** Yahya Rashidi	**This course marks the code itself:** whether the program the team ships actually runs, whether the logic is correct at the boundaries, whether the structure is readable by someone who did not write it, and whether the student can explain any line of it. 15 marks, team.

What to hand in

- **GCCO432 Computer Organization & Assembly Language** — By session 11, an annotated machine-level report on the team's program — disassembly of the hot function, a hand-written assembly version of it, cache and timing measurements — submitted with AI declaration.

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- **GCDS433 Discrete Structures** — By session 12, a written proof document for the team's program — invariants, an induction for correctness, the recurrence and its solution, and the asymptotic bound — submitted with AI declaration.
- **GCDS435 Data Structures** — By session 11, a working program that solves the cluster problem four ways behind a common interface, with a benchmark harness and timing results, the test suite, and AI declaration.
- **GCLA431 Linear Algebra** — By session 12, the linear-algebra note for the team's program — the matrix formulation, the solution method with its cost, an error and conditioning analysis, and verification against a reference computation — with AI declaration.
- **GCAG311 Calculus & Analytic Geometry** — A worked bench file by session 12 — the problem stated, the calculus solved by hand, the geometry drawn, the numerical check attached and the hand-off note to the Digital Logic team — submitted together with AI declaration.
- **GCDD323 Digital Logic Design** — By session 11, a working Verilog design of the circuit with a self-checking testbench, simulation waveforms, a gate-count and delay summary, and an FPGA demonstration where hardware allows — with AI declaration.
- **GCMC325 Multivariable Calculus** — By session 12, the modelling note for the cluster problem — the function and its domain, the gradient and Hessian analysis, the constrained optimisation, one integral quantity computed, and a sensitivity check — with AI declaration.
- **GCPF312 Programming Fundamentals** — By session 11 the team files the working program with its source, a short read-me saying how to run it, the test cases it passes and the ones it fails, and a note on what was written by hand and what was generated.

How big the file is

The written file is **3,000 words for every member**, plus or minus ten per cent — 15,000 words for a team of five, 12,000 for four, 9,000 for three — plus the artefacts: the evidence or data log with its instrument, interview notes and consent log, any program with its tests, the pitch deck, the AI declaration, the draft-to-final revision log, the two-page brief for the body the project reports to, delivered by the team, and the handover page (data, methods, what next year's team should do). In the venture and client lanes the live thing itself is the largest artefact. Each member owns one section of 3,000 words with their name on it, one artefact they built, and one part they can defend alone at viva. A lens note is 3,000 words on the same project. The full format is in "The Folio — required format", in the portal.

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Dates

Session 5	12 Oct	Your personal brief, with your claim code, in class. The project menu — twenty minutes of class: your block's projects, each with its title, its problem in one line and who it is for; your team notes the three it likes. And the full projects, the same week: this brief, the Ideas Book and the format sheet, in the portal. Read your three projects in full.
Guest session	Session 4 or 5	A practitioner from outside the university speaks to your school, on whichever of those two sessions the speaker can make. Attendance is compulsory. Each student writes one page on it for their own file; it is not marked.
Session 6	19 Oct	Your team makes its final choice of project with your convener and names itself. Sealed prediction: before any data, your team writes what it expects to find, signs it and seals it with your convener. Your convener opens it at your team's first viva. It carries no marks. Straight after, your team fills in the ethics screening sheet in class (the ethics sheet and any field plan are due Sat 24 Oct). Then design the instrument or find the client, and split the sections.
Sessions 6–7	19 Oct – 8 Nov	Data collection may begin once your team's ethics screen is cleared. The mid-term (26 Oct – 1 Nov) comes between the two sessions. The build itself starts in session 7.
Session 7	2 Nov	One-page plan uploaded to the portal by Sat 7 Nov: the question, the instrument or the client charter, who owns what. Not marked — it is the gate. This week the convener merges the marking courses' requirements into the file's sections, so the team writes one document and not eight. Clients matched to teams; field plans signed. Build starts: rubric issued, roles confirmed, team charter uploaded by Sat 7 Nov. Build-with-AI workshop for venture and client teams.
Session 8	9 Nov	Iqbal Day, Mon 9 Nov, is a holiday; Monday classes are made up on Tue 10 Nov. Scope agreed with the convener. Client or subject confirmed. Your school arranges its industrial visit for some point between now and session 11.
Session 10	23 Nov	Draft review, inside a normal class: each course teacher sees the teams in their own section for about ten minutes each — show what exists, not what you plan. The convener samples three files per block.
Session 11	30 Nov	The artefact goes live or reaches its first complete state.
Session 12	7 Dec	The last class. Final file uploaded in the Folio submission window, Sat 12 – Wed 16 Dec, with its AI declaration, the two-page brief written for the body your project reports to, and the handover page (data, methods, what next year's team should do). Venture teams evidence the first paying customer. The whole window is on time; nothing is accepted after Wednesday 16 December.
Presentations & Viva	14–19 Dec	No new teaching. Vivas in class: each course holds its own, team by team, in its class in the Presentations & Viva week — about three minutes per student, on your own part as that course sees it. Alumni viva panels sit through the week; the main panel day is Sat 19 Dec.

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The Karachi Review	Mon 21 Dec	Your team exhibits at its own table, across the campus, all day. The day opens with a thirty-minute handover of studies to the public bodies who asked for them; press and industry attend. Eleven panels — a teacher and an alumnus each — circulate the exhibition and score you at your table, about eight minutes a team. Not marked separately; the panel sheet goes to every course marking the file.
Weekend	–	Weekend cohorts hold all of the above in their Saturday and Sunday slots; the Karachi Review runs on a weekend afternoon.

Rules for this lane

What counts as done

A finished piece of work — not a plan for one, not a prototype that only runs on your machine — with the process behind it documented.

Craft

The standard is what a competent professional would accept, at the level of your year. Unfinished work presented as finished is marked as unfinished.

Sources and rights

Anything you did not make yourself is credited. You may not use material you have no right to use, and asset licences are recorded in the file.

If your work involves people

Consenting adults only, with an information sheet, a consent form and a debrief. Mock cases where the subject is clinical. No real patient, client or examinee material, ever, and none of it into an AI tool.

Marks

Craft carries the weight, but the reasoning behind your choices carries the rest. Be able to say why you did it that way.

Two teams to a project, at most

No project is taken by more than two teams, and two teams share one only on different sites or areas. Your convener records your choice in session 6 and may refuse a third team.

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Before you leave campus

Whatever your lane: no team collects data before its ethics screen is cleared, and no team leaves campus before the fieldwork gate opens on Saturday 10 October, the duty phone exists and the team has signed out on the sign-out sheet. The duty number is on your field card.

Using AI

You are expected to use Claude and similar tools — to research, to build, to draft, to model numbers. Three rules. Check everything a tool gives you before you use it, and record the check. Declare what you used in the AI declaration bound into the file, as the HEC *Framework on the Use of Generative AI Tools* (2026) requires. Be able to explain, at the viva, everything your team built. **Work you cannot explain is not credited to you.** Undeclared use, or use to fabricate data, references or results, is academic misconduct. Never put real client, patient or examinee data, or anything identifying a real person, into a tool.

BLOCK CONVENER

PROGRAMME HEAD

DATE ISSUED