

ENOSH SCIENCE CENTER

in collaboration with Enoshmink Technology and

2026

INTERNATIONAL STUDENT DESIGN COMPETITION

Acoustic, Architectural, and Spiritual Design of a Contemporary Mosque Complex

PRESENTED BY

ENOSH SCIENCE CENTER

Introduction

ENOSH Science Center, in collaboration with Enoshmink Technology and _____, is pleased to announce the 2026 International Student Design Competition dedicated to the acoustic, architectural, and spiritual design of a contemporary mosque complex.

The competition is intended to encourage students in Architecture, Acoustics, Electrical/Electronic Engineering, Physics, and other curriculums involving building design and/or acoustics to demonstrate their command of architectural acoustics and environmental noise control by producing a schematic design in which acoustic performance is inseparable from the building's spiritual and architectural intent.

Unlike a concert hall or theatre, a mosque's primary acoustic purpose is to support congregational prayer and Qur'anic recitation in a manner that reinforces a contemplative, spiritual experience — while resolving two opposing site-noise pressures at once: intrusive traffic noise arriving at the site's principal road frontage, and outgoing call-to-prayer (Adhan) and event sound that must not disturb an adjacent elderly care home. Entrants are asked to treat these constraints as the generative core of their design, not as an afterthought.

General Information

Entry Requirements

Entries may be submitted by individual students or teams of up to three (3) students. Each participant may submit only once and may not join more than one team. Undergraduate and graduate students are equally encouraged to participate; participants must have been registered as students during a portion of the 2025–2026 academic year. Interdisciplinary teams — combining Architecture, Acoustics, Electrical/Electronic Engineering, Sound Arts, and Islamic Studies — are welcome and encouraged. A faculty advisor may be consulted but is not a requirement for entry.

Registration

Teams must register by e-mail by 1:00 PM (Cairo time), [registration deadline — to be confirmed], to the competition chair at [ENOSH Science Center registration e-mail — to be confirmed]. The e-mail should include the following, as text or an editable file — please do not attach as a PDF:

1. Name, school/university affiliation, and e-mail address of each team member.
2. Name, institution, and e-mail address of the faculty advisor, if any.
3. Whether the project is being completed for studio-class credit, non-studio class credit, or as an extracurricular project.
4. The designated primary contact for the team.
5. Whether the team intends to bring a printed submission to the award session, or requires shipping instructions.

Judging and Awards

Entries will be evaluated by a panel of practicing acoustic consultants and architects on: (1) room-acoustic design quality and its support of the intended spiritual and recitation experience; (2) resolution of the site's opposing noise-isolation and noise-emission problems; (3) architectural integration of acoustic measures; (4) technical rigor of calculations and stated criteria; and (5) clarity of presentation.

Proposed awards (final amounts and funding to be confirmed by ENOSH Science Center):

- One First Honors award
- Up to four Commendation awards

Winners will be announced at the ENOSH Science Center annual technical session, with awards distributed following the event.

Design Scenario

A charitable foundation wishes to construct a new mosque complex on a 4,600 m² urban infill site. The complex is to serve as the neighborhood's primary place of congregational prayer, and additionally as a center of Islamic and general education, media production, and community life.

The site fronts a principal road carrying heavy commercial/truck traffic along its main façade — the same façade that will carry the building's primary public entrance and, presumably, the minaret and main Adhan loudspeaker array. Directly behind the site, sharing a common rear boundary, are a low-rise residential neighborhood and an elderly care home (مسنين دار). The design must therefore resolve two acoustic problems simultaneously: keeping intrusive road-traffic noise out of the prayer hall and recitation/recording spaces at the front of the site, while controlling outgoing Adhan and amplified event sound so that it serves the community without disturbing the elderly residents at the rear — particularly during the pre-dawn (Fajr) call to prayer.

The main prayer hall must accommodate 3,000 worshippers for regular daily and Friday (Jumu'ah) prayer. On the two annual Eid holidays (Eid al-Fitr and Eid al-Adha), attendance is expected to substantially exceed this figure; the brief therefore requires that the site's parking garage be designed so it can convert into supplementary covered/open-air prayer space on Eid days — in the same way a lawn or overflow area is used for peak-attendance events at a performance venue.

Program Description

The mosque will operate at several distinct levels of use. On an ordinary day, the prayer hall serves routine daily prayers and Qur'an study at modest attendance. On Fridays, attendance rises to near full capacity for the Jumu'ah sermon and prayer. On the two Eid holidays, attendance is expected to exceed the indoor hall's 3,000-person capacity substantially, requiring the parking garage — and potentially an adjoining courtyard or forecourt — to convert into additional covered and open-air prayer area, served by its own amplified-sound coverage.

The mosque desires a prayer-hall acoustic environment that supports natural, largely unamplified congregational recitation and clear perception of the Imam's voice for worshippers near the front, while an electro-acoustic sound reinforcement system provides even, intelligible coverage of the Imam's voice and Qur'anic recitation to all worshippers, including those in overflow/Eid areas.

Beyond the prayer hall, the Islamic Cultural Center wing will host Qur'an memorization (Tahfeez) classes, women's educational lectures, computer/programming instruction, and recreational activities for youth, alongside professional audio and video production of Qur'an recitation, religious radio content, and podcast-style programming — each with its own acoustic-isolation and internal-noise requirements, several of them directly adjacent to the main prayer hall.

Program Details

The following is the architectural program statement for the complex, as desired by the foundation, for the purposes of this design competition. Suggested areas are design-basis targets; entrants may adjust them with justification.

Main Prayer Hall (Musalla)

- Total congregational capacity: 3,000 worshippers (suggested split — approximately 2,500 men at grade and 500 women on a mezzanine or separate gallery; entrants may propose an alternative split).
- Suggested net prayer-floor allowance: 0.75–0.85 m² per worshipper (rows for standing, bowing, and prostration), i.e. approximately 2,250–2,550 m² of net prayer floor.
- Mihrab (prayer niche) and Minbar (pulpit) at the qibla wall.
- Room-acoustic design (volume, RT, STI) optimized for spoken Arabic Qur'anic recitation and sermon delivery — not for music — and calibrated to produce a contemplative, non-echoing spiritual atmosphere.
- Electro-acoustic reinforcement for the Imam's voice/recitation, with defined loudspeaker mounting locations (system design in full engineering detail is not required — see Technical Requirements).

Ablution (Wudu) Facilities

- Separate men's and women's ablution areas adjacent to their respective prayer-hall entrances.
- Acoustic separation from the prayer hall sufficient to prevent flowing-water and pump noise from being audible during prayer.

Minaret and Outdoor Adhan System

- One minaret with a primary Adhan loudspeaker array.
- Loudspeaker aiming and coverage designed to project intelligibly toward the community-facing frontage while minimizing spill toward the rear residential zone and the elderly care home, especially for the Fajr (pre-dawn) Adhan.

Parking Garage / Eid Overflow Prayer Space

- Structured or basement parking garage sized per local code for daily/Friday congregational parking.
- Floor plate laid out on a grid compatible with prayer rows, with a flat, unobstructed, non-slip surface, so it can convert into additional covered prayer space for Eid al-Fitr and Eid al-Adha.
- Suggested additional Eid-day capacity: 2,000–4,000 worshippers at 0.75–0.85 m²/person (entrants may propose an alternative figure with justification).
- Independent or extendable sound-reinforcement zone for the Eid overflow area, coordinated with — but separately controllable from — the main hall system.
- Vehicular ramps and entries arranged so that daily parking and periodic Eid pedestrian/prayer use do not conflict.

Islamic Cultural Center (Da'wah and Education Wing)

- Qur'an Memorization (Tahfeez) Classrooms: 4 rooms, approx. 30 m² each.
- Women's Lecture/Education Rooms: 2 rooms, approx. 40 m² each.
- Computer & Programming Instruction Labs: 2 rooms, approx. 60 m² each.
- Youth/Recreation Room: 1 room, approx. 100 m².
- Library/Reading Room (optional): approx. 60 m².

Media Production Suite

- Qur'an Recitation & Radio Recording Studio: control room plus isolated recording booth, approx. 35–45 m² combined, designed to broadcast-quality background-noise criteria.
- Podcast/Video Production Studio: small studio with basic acoustic treatment and isolation, approx. 25–35 m².

Administration

- Imam's Office: approx. 20 m².
- Management/Administration Offices: 2–3 offices, approx. 15 m² each.

Support Spaces

- Restrooms (men's and women's, separate from ablution areas): sized per code.
- General storage (furnishings, Ramadan/Eid equipment, etc.): approx. 150–200 m².
- Mechanical Equipment Room (MER): approx. 60–80 m², housing air handling, pumps, and electrical equipment serving the prayer hall and cultural center.

Note: the 4,600 m² site is compact relative to this program. Entrants are expected to resolve this through a multi-level scheme — e.g., basement or podium parking, a mezzanine women's gallery, and a stacked or wrapped cultural-center wing — rather than a single-storey layout.

Site and Noise Considerations

The site is bounded on its principal (public) façade by a main road carrying heavy commercial/truck traffic; this façade also contains the main public entrance, forecourt, and minaret. The rear boundary of the site is shared with a low-rise residential neighborhood and an elderly care home. Please see the attached site plan (provided separately by the design competition organizers).

Representative Heavy-Truck Traffic Noise (Design Basis)

Octave Band Center Frequency (Hz)	63	125	250	500	1000	2000	4000
Assumed worst-case SPL, dB re 20µPa*	80–88	76–84	71–78	66–73	62–69	58–65	53–60

**Illustrative “worst-case” assumed levels for heavy diesel-truck traffic at a road-adjacent façade during peak periods, provided here as a design basis for this academic competition. These are assumed values, not field measurements; entrants pursuing this brief as a real project should substitute actual site-measured data.*

Adhan and Outgoing-Noise Constraint

Unlike a conventional noise-control problem in which the site is only a receiver of external noise, this brief also requires the building to be treated as a noise source: the Adhan and any amplified Eid-day sound must remain intelligible across the community-facing frontage while producing negligible disturbance at the rear boundary, particularly at Fajr. Entrants should address directivity control of the minaret loudspeaker array (or the use of multiple lower-output distributed loudspeakers in place of a single high-output horn), time-of-day level management, and the role of building massing and the rear façade in shielding the elderly care home.

Technical Requirements

Design competition entries should emphasize general building acoustics — room acoustics, sound isolation, and environmental noise control — and its integration with the overall architectural and spiritual design intent, with particular emphasis on:

6. Room-acoustic design of the main prayer hall to support intelligible, spiritually resonant Qur’anic recitation and sermon delivery (natural acoustics for near-field listening; electro-acoustic reinforcement for uniform coverage), including proposed RT and STI/speech-intelligibility design targets.
7. Sound isolation of the prayer hall, Tahfeez classrooms, and Media Production Suite from heavy-truck traffic noise arriving at the site's principal road frontage.

8. Outdoor sound control of the Adhan and Eid-day amplified sound, engineered to serve the community frontage while minimizing impact on the rear residential zone and the elderly care home.
9. Acoustic and functional design of the parking garage as a dual-use daily-parking / Eid-overflow prayer facility, including a sound-reinforcement coverage strategy for the overflow congregation.
10. Acoustic isolation and internal noise criteria (NC/RC) for the Qur'an recording studio and podcast/video studio, appropriate to broadcast-quality recording.
11. Speech privacy and airborne/impact sound isolation (STC) between concurrent activities in the Islamic Cultural Center wing (classrooms, lecture rooms, recreation room).

Entrants may reference ENOSH proprietary construction systems as one possible technical approach — for example, ENOSH Wall Damping Construction and ENOSH Acoustic Door assemblies at the road-facing façade and entry vestibules; ENOSH Floating Floor System and ENOSH Ceiling Damping Construction between the cultural-center classrooms; ENOSH HVAC Silencer Box at the Mechanical Equipment Room; and an ENOSH RFZ Layout for the recording studio's control room. Use of these systems is illustrative, not mandatory.

As with the acoustic design of any large public-assembly building, entrants are not required to fully design mechanical/electrical noise control in detail, though noise criteria and a general vibration-isolation strategy for major MEP equipment should be indicated. Entrants are also not required to engineer the electro-acoustic sound reinforcement system in full detail — it is sufficient to identify loudspeaker mounting/aiming locations for the main hall, the Eid overflow area, and the minaret Adhan array, and to describe the design intent (e.g., distributed versus central cluster, directivity control) supporting the brief's noise-control goals.

Presentation Format and Submission Procedure

Submissions must include a digital version for judging prior to the in-person session, and a printed copy for display at the ENOSH Science Center annual technical session where winners will be announced.

Digital posters shall be PDFs, with maximum dimensions of three (3) poster boards of 22 × 28 in (56 × 71 cm) per board. Additional material beyond this area may not be included.

Text and images must be legible from 3 ft (1 m). Body text may be no smaller than 24-pt; captions no smaller than 18-pt. Font size, narrative length, and number of graphics should suit poster viewing, allowing a thoughtful review in about 10 minutes. If information is illegible (e.g., text too small or pixelated), no credit will be given for that content. The competition language is Arabic and/or English.

Required Submission Boards (3)

Each entry must be mounted on exactly three (3) boards, one per required theme below. Boards should read as a coherent set but each must stand on its own as a complete statement of its theme.

- **Board 1 — Architectural Concept:** site integration, massing, and the architectural design intent of the complex, illustrated through plans, sections, elevations, and renderings.
- **Board 2 — Acoustic Concept:** room-acoustic design intent for the prayer hall and Eid overflow space, target RT/STI criteria, and the isolation and noise-control strategy resolving the site's two-sided noise problem (traffic ingress at the front façade / Adhan and event-noise egress toward the rear elderly care home).
- **Board 3 — Systems Integration & Modern Technology:** integration of the electro-acoustic sound-reinforcement system, minaret Adhan loudspeaker array, and other modern acoustic/AV and smart-building technologies with the architectural design and MEP systems.

Digital Submission

- Submit one version with no identifying team names or school affiliation, for judging.
- Submit a second copy with all entrants' names and school affiliation included, for publication on the ENOSH Science Center website.
- Include a separate text file (.doc or similar — not a PDF) with names, e-mail addresses, school affiliations, and advisor(s) of all team members. Identifying information will not be revealed to the judges.
- Preliminary digital submission deadline: 9 August 2026, 1:00 PM (Cairo time).

Hard Copy Submission

- Bring or mail a hard copy for display and judging at the ENOSH Science Center technical session on 9 September 2026 (evaluation date).
- Submissions are to be mounted on the three (3) required boards described above, maximum 22 × 28 in (56 × 71 cm) per board.

Suggested References

- Architectural Acoustics, 2nd Edition (2014) — Marshall Long
- Architectural Acoustics (1988, reprinted 2007) — M. David Egan
- Architectural Acoustics Illustrated (2015) — Michael Ermann
- Design guidance and standards on speech intelligibility and the Speech Transmission Index (STI) for large-volume speech spaces
- Published research on the acoustics of mosques and other worship spaces, including reverberation-time and speech-intelligibility studies for spoken Arabic Qur'anic recitation — entrants are encouraged to conduct their own literature review as part of the design research
- ENOSH Science Center technical notes on architectural acoustics and noise control (available on request)

Timeline Summary

- July 2026 — Design Competition announced
- [Date TBD] — Registration due, 1:00 PM Cairo time
- 9 August 2026 — Preliminary digital submission due, 1:00 PM Cairo time
- [Date range TBD] — Mailed hard-copy submissions to arrive off-site, in advance of the evaluation date
- 9 September 2026 — Evaluation date: non-mailed hard copies delivered on-site (30 minutes before the session) and judging of the three required boards
- 9 September 2026 — Exhibition of submissions at the ENOSH Science Center technical session
- 10 October 2026 — Announcement of winners
- [Month, Year TBD] — Distribution of awards

Contact Information

ENOSH Science Center

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Additional information may also be obtained through Enoshmink Technology, ENOSH Science Center's acoustic consultancy partner.

Appendex

