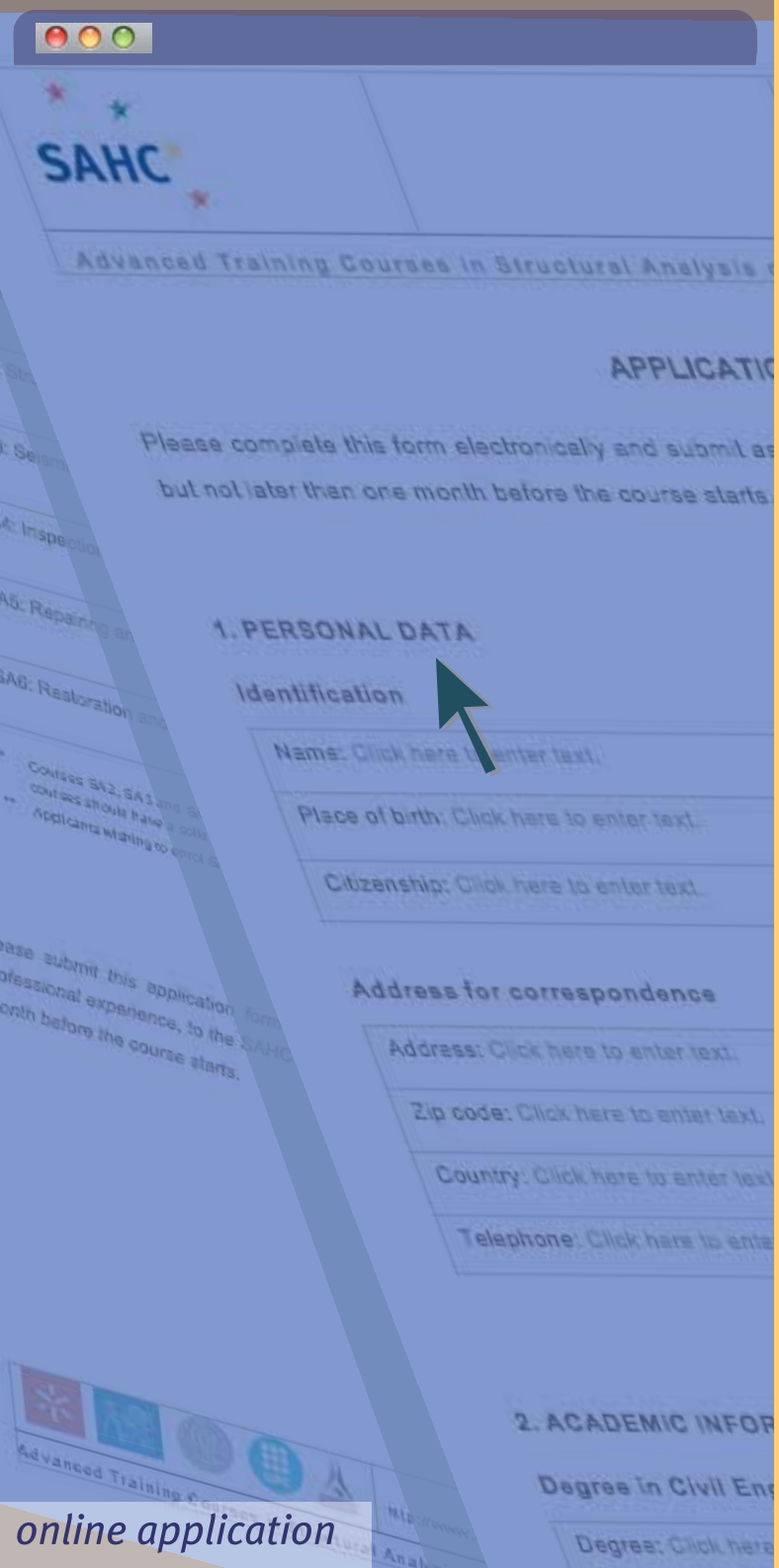



## HOW TO APPLY

Interested candidates to enrol in one or more advanced courses should fill the form downloable from www.msc-sahc.org and prepare the Curriculum Vitae, detailing academic studies and professional experience to support the application. These elements should be submitted in English to the SAHC secretariat (secretariat@msc-sahc.org) as soon as possible, but no later than one month before the course starts.
Admission is subjected to the approval of the Managing Board.

## TUITION FEE

The fee for each course is of 1000 Euro. All successful attendees receive a certificate issued by the SAHC Consortium attesting the course and ECTS credits earned.

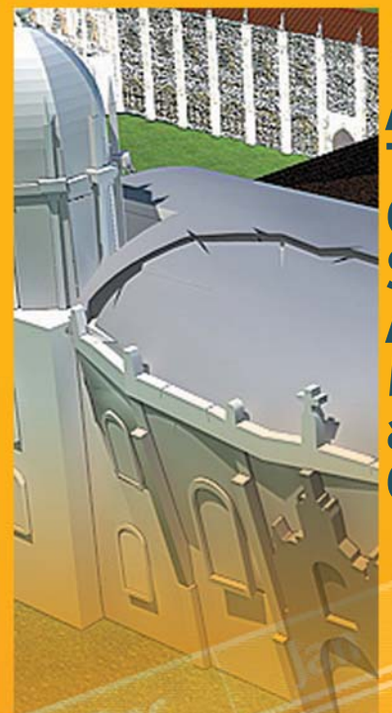
## COST OF LIVING AND VISA ISSUES

The cost of living is variable, depending on the course location. On average terms, minimum monthly expenses (including accommodation and meals) are about 600 Euro in Guimarães (Portugal), 800 Euro in Prague (Czech Republic), and 1000 Euro in Barcelona (Spain) and Padova (Italy).
Assistance with Visa procedures (if applicable), accommodation and other bureaucratic issues is provided by the SAHC Secretariat.

## FURTHER INFORMATION

For further information, please contact the Course Secretariat at secretariat@msc-sahc.org. Information on the Master Course is available at http://www.msc-sahc.org.

# SAHC



# Advanced Training Courses in Structural Analysis of Monuments and Historical Constructions

## COURSES OFFERED AND CONTENTS

All courses are arranged as a mix of theory and application, with lessons every morning and independent individual/group every afternoon. Laboratory works and site visits are planned for several of the courses. The duration of each course is about one month. The courses detailed next are offered, focusing on building materials and techniques, and load bearing systems.

History of Construction and of Conservation (SA1) includes traditional building materials and techniques, historical load bearing systems, classical limit analysis, damage and collapse mechanisms, history of conservation and study of case studies.

Structural Analysis Techniques (SA2) includes the FE method, nonlinear incremental FE analysis, geometrical nonlinearity, elastoplastic models, masonry modeling and blocky masonry analysis, with a clear focus on engineering applications.

Seismic Behaviour and Structural Dynamics (SA 3) includes seismology and seismicity, analysis of SDOF and MDOF systems, analysis using FE analysis, response spectrum and history analysis, dynamic, push-over and macro-block analysis, with a clear focus on engineering applications.

Inspection and Diagnosis (SA4) includes documentation, geotechnical on site investigation, on site testing of timber, steel, masonry and concrete structures, load proof tests, monitoring systems, cyclic effects and modal testing.

Repairing and Strengthening Techniques (SA5) includes repair and strengthening basics, strengthening of foundations, design bases for timber and masonry structures, concrete, masonry and timber structures strengthening.

Restoration and Conservation of Materials (SA6) includes binders and mortars, degradation of historic materials, salts, cleaning of façades, consolidation, repair and restoration materials and techniques, and protective and coating layers.

## WHO SHOULD ATTEND

The courses are of interest to those interested in the conservation, repair and strengthening of the built heritage, be it monuments, other cultural heritage buildings or existing buildings in general. This includes mainly civil engineers and architects, but also art historians, archaeologists and other interested in cultural heritage buildings, interested in complementing or updating their knowledge with the best professional and scientific approaches and techniques.
The attendants can be professionals such as consultants, employees in building contractors, building material producers and suppliers, heritage authorities and others, as well as graduate students (MSc or PhD) enrolled in other programs. Courses SA2, SA3 and SA5 require a good quality degree in Civil Engineering or equivalent qualifications. Architects wishing to follow these courses should have a solid background in structures. Applicants are expected to have a higher education degree with four or five years. Exceptionally, a higher education degree with three years will be accepted. Applicants wishing to enrol SA3 are strongly recommended to enrol also SA2 in order to get the most benefit from the SA3 course.

## CALENDAR

Courses start in middle September and finish in middle March, according to the following schematic calendar, in four different countries in Europe:

Portugal / Italy

| Sep | Oct | Nov | Dec | Jan | Feb | Mar |
|---|---|---|---|---|---|---|
| SA1 | SA2 | SA3 | | SA4 | SA5 | SA6 |

Czech Republic / Spain

| Sep | Oct | Nov | Dec | Jan | Feb | Mar |
|---|---|---|---|---|---|---|
| SA6 | SA1 | SA2 | | SA3 | SA4 | SA5 |

Courses are offered in each location every second year, and applicants can select any location freely. The maximum number of course attendants is twenty.

## PARTNERS

The Advanced Training Courses in Structural Analysis of Monuments and Historical Constructions are jointly offered by:

| | |
|---|---|
| University of Minho | (Guimarães, Portugal) |
| Czech Technical University in Prague Inst. Theoretical Applied Mechanics | (Prague, Czech Republic) |
| Technical University of Catalonia | (Barcelona, Spain) |
| University of Padova | (Padova, Italy) |

The relationship of the partners with the ICOMOS International Scientific Committee for Analysis and Restoration of Structures of Architectural Heritage ascertains the possibility of benefiting from the contact and collaboration of experts from over the world, taking into consideration their experience, and world-regional conservation problems and practices. The partnership includes the Editors of the International Journal of Architectural Heritage and the Organizers of the series of conferences on Structural Analysis of Historical Constructions, since 1995. The partners are also involved in relevant technical committees and enjoy a proven record of R&D&I external funding and top professional experience on aspects such as inspection, diagnosis, monitoring, structural analysis and restoration of world architectural heritage.

## LECTURERS

Lecturers are from all partners institutions, with half of the courses given by an international team and half of the courses given by local expert lecturers.

## LANGUAGE

The language of instruction, examination, course materials and counselling is English.

## OTHER RELEVANT INFORMATION

The advanced courses are linked to an advanced master course run by the partnership. Acquired credits can be recognized for the Advanced Master on Structural Analysis of Monuments and Historical Constructions and PhD programmes (if applicable).