



SCAN2HBIM - From 3D Survey to BIM for Cultural Heritage

Virtual component: 18-30 September 2026 | Physical mobility: 25-29 September 2026

Pescara (Italy)

The programme gives priority to the theoretical and practical foundations of 3D survey, photogrammetry, laser scanning, point-cloud processing and three-dimensional BIM/HBIM modelling. The virtual component prepares the international teams and the survey/modelling strategy before arrival, supports collaboration during the on-site phase, and concludes with a short online follow-up. The field campaign is scheduled for 27 September; BIM/HBIM modelling in Revit or Archicad starts on 28 September after the acquired datasets have been checked, registered and prepared.

Complete blended calendar (virtual + physical)

Date / time	Mode	Activity	Main contents / expected output
Fri 18 Sep 14:00-20:00	Online: BIP kick-off, case study and international team formation Meeting-Join Microsoft Teams	BIP kick-off, case study and international team formation (prof. Massimiliano Pepe)	Presentation of SCAN2HBIM objectives, learning outcomes, heritage case study, expected outputs and working methods. Formation of international teams and introduction to the complete survey-to-HBIM workflow.
Sat 19 Sep 14:00-20:00	Online: Online lecture - From images and scans to point clouds Meeting-Join Microsoft Teams	Online lecture - From images and scans to point clouds (prof. Massimiliano Pepe – prof. Vincenzo Saverio Alfio – Dr. Donato Palumbo)	Photogrammetric image networks, terrestrial/mobile laser scanning, registration, georeferencing, cleaning and quality assessment.
Mon 21 Sep 14:00-20:00	Online: Managmet of the point cloud Meeting-Join Microsoft Teams	Online lecture – Management of the point cloud (prof. Massimiliano Pepe – Dr. Donato Palumbo)	Management of the point cloud in Cloud Compare and in Pointcab software.
Tue 22 Sep 14:00-20:00	Online: Online lecture/workshop and pre-field briefing - From point clouds to BIM and survey strategy Meeting-Join Microsoft Teams	Online lecture/workshop and pre-field briefing - From point clouds to BIM and survey strategy (prof. Emmanuel Maravelakis – prof. Massimiliano Pepe)	Interpretation and segmentation of registered point clouds for BIM/HBIM; definition of modelling criteria, reference geometry, tolerances and level of information need; import/linking of point clouds and reference products in Revit or Archicad; introduction to the scan-to-BIM modelling workflow. The second part of the session is devoted to the final preparation of the on-site survey: software and data checks.
Wed 23 Sep 14:00-20:00	Online: From point clouds to BIM of complex structures Meeting-Join Microsoft Teams	Online lecture - From point clouds to BIM of complex structures (prof. Massimiliano Pepe – Prof. Alfredo Garofalo Restuccia – prof. Vincenzo Saverio Alfio)	Illustration of a series of case studies of historic masonry buildings and bridges. Artificial Intelligence in BIM modeling.
Fri 25 Sep – Tue 29 Sep	Pescara, in person	Physical mobility - lectures, laboratories, field survey and HBIM modelling (prof. Massimiliano Pepe; dr. Donato Palumbo; PhD student Ahmed Dewedar; prof. Vincenzo Saverio Alfio; Prof. Alfredo Garofalo Restuccia)	Five-day intensive programme detailed below. Strong focus on 3D survey theory and practice, full-day field campaign on 27 September, 3D data processing on 28 September and BIM/HBIM modelling in Revit or Archicad from 28 September onward.
Wed 30 Sep 15:00-20:00	Online: Final follow-up, feedback and coordination of outputs Meeting-Join Microsoft Teams	Final follow-up, feedback and coordination of outputs	Short presentations of preliminary results, discussion of survey and modelling issues, peer feedback, assessment guidance and coordination of the final digital dossier and dissemination activities.

All times for online sessions are indicative and refer to Central European Summer Time (CEST). The detailed online links and speakers will be circulated to consortium partners before each session.



Time	Session / format	Main contents and expected output
DAY 1 - Friday, 25 September 2026 Survey concepts, requirements and photogrammetry		
Fri 25 Sep 09:00-09:45	Opening, case study and scan-to-HBIM workflow	Welcome, team formation, presentation of the heritage asset, expected outputs and overview of the workflow from survey planning to the final HBIM model.
Fri 25 Sep 09:45-11:30	Lecture 1 - Planning a 3D survey for cultural heritage	Purposes of documentation; survey and information requirements; scale, accuracy, resolution and level of detail; reference systems, control points, metadata, accessibility and risk assessment.
Fri 25 Sep 11:30-13:00	Lecture 2 - Introduction to the complete close-range photogrammetric workflow using commonly available photogrammetric software	Image import and organisation; camera calibration and image quality; feature detection and image matching; image alignment and camera orientation; sparse and dense point-cloud generation; scaling and use of control points; basic mesh and texture generation; evaluation of reprojection errors and reconstruction quality.
Fri 25 Sep 14:00-18:00	Practical laboratory - Survey design and image-quality assessment on a specific case study	Participants work in teams to define camera positions, image overlap, baselines, shooting distances, target and scale-bar distribution, and acquisition sequences for architectural surfaces and complex heritage geometries. Test image datasets are acquired and processed to identify insufficient overlap, weak network geometry, blurred or poorly exposed images, occlusions and other potential sources of error.
DAY 2 - Saturday, 26 September 2026 Laser scanning, point clouds and data quality		
Sat 26 Sep 09:00-10:30	Lecture 3 - Terrestrial, mobile and SLAM laser scanning	Measurement principles, range and incidence angle, resolution and noise; scan-position planning, targets, loop closure, indoor/outdoor integration and selection of the appropriate sensor for heritage assets.
Sat 26 Sep 10:30-13:00	Lecture 4 - Practical laboratory - Point-cloud management in CloudCompare	Import and visualisation of point-cloud datasets; coordinate systems and basic georeferencing checks; cloud registration and alignment; cropping, segmentation and cleaning; noise and outlier removal; subsampling and density management; computation of distances and cloud-to-cloud/cloud-to-mesh comparisons; extraction of sections, profiles and basic geometric measurements.
Sat 26 Sep 14:00-18:00	Lecture 5 - Practical laboratory - Point-cloud management in Pointcloud	Import and organisation of registered point clouds; project orientation and coordinate management; generation of orthographic views, floor plans, elevations and cross-sections; definition of clipping areas and working views; extraction of measurements and geometric references; optimisation of point-cloud outputs for use in Revit, Archicad and other BIM environments.
DAY 3 - Sunday, 27 September 2026 Full-day field survey of the selected heritage asset		
Sun 27 Sep 09:00-13:00	Field survey - Acquisition session I	Plan the activities. Photogrammetric image acquisition and terrestrial/mobile laser scanning; establishment and measurement of targets/control points; acquisition of general geometry, facades, interiors and circulation spaces.
Sun 27 Sep 14:00-16:30	Field survey - Acquisition session II	Completion of coverage, targeted acquisition of architectural details and areas affected by occlusion, supplementary measurements and condition/conservation documentation linked to the survey.
Sun 27 Sep 16:30-18:00	On-site completeness check, backup and debrief	Rapid alignment and image review, scan-coverage and density checks, verification of control observations, structured backup of raw data and metadata, and approval of the dataset for processing.



Time	Session / format	Main contents and expected output
DAY 4 - Monday, 28 September 2026 3D data processing and start of BIM/HBIM modelling		
Mon 28 Sep 09:00-13:00	Lecture 6 - Practical laboratory - From reality-based data to an HBIM model in Revit or Archicad workflow	Modelling objectives, level of information need, tolerances and simplification; segmentation and interpretation of heritage geometry; traceability of assumptions; native BIM elements versus custom parametric objects.
Mon 28 Sep 14:00-18:00	Lecture 7 - Practical laboratory - From reality-based data to an HBIM model in Revit or Archicad workflow	Walls with variable thickness, vaults, arches, roofs, openings and decorative components; custom families/objects, profiles and adaptive strategies; mesh/NURBS-to-BIM decisions and preservation of measurable evidence.
DAY 5 - Tuesday, 29 September 2026 3D/HBIM modelling, enrichment and validation		
Tue 29 Sep 09:00-13:00	Individual work and/or team works	Students will carry out individual and/or group activities aimed at applying the knowledge and skills acquired during the course. Activities may include analysis, discussion, problem-solving, case studies, practical exercises, and the development of a final output or presentation.
Tue 29 Sep 14:00-18:00	Assessment, feedback and closing	Remarks.

Indicative blended component and learner workload (18-30 September 2026)

Phase	Activities	Hours
Virtual component - 18 to 23 September	Synchronous kick-off, online lectures/workshops, team formation and pre-field technical briefing; asynchronous introductory materials; software/data preparation; review of the case study and preliminary survey/modelling strategy.	30
Physical mobility - 25 to 29 September	Lectures, demonstrations, practical laboratories, full-day field survey, 3D-data processing, Revit/Archicad modelling, validation, presentations and peer review as detailed above.	40
Virtual follow-up - 30 September	Online presentation of preliminary outputs, peer feedback, assessment guidance, reflection and coordination of final submissions/dissemination.	5
Total indicative workload	Equivalent workload supporting the award of 3 ECTS credits.	75

Expected joint outputs: survey plan and field records; organised raw dataset and metadata; registered/georeferenced point cloud and photogrammetric reference products; BIM/HBIM model developed in Revit or Archicad; model-validation notes; drawings/views and final team presentation.

Note: The timetable is provisional and may be adjusted to the selected heritage asset, access conditions, weather, available sensors, software licences and participants' prior experience. Equivalent indoor datasets and exercises will be available as a contingency.