

**UNIVERSITY OF MALTA
FACULTY FOR THE BUILT ENVIRONMENT
DEPARTMENT OF THE BUILT HERITAGE**

**MASTER of SCIENCE IN
CONSERVATION TECHNOLOGY FOR MASONRY BUILDINGS**

STUDY-UNIT DESCRIPTIONS

Code	MAS 5101
Title	History and Theory of Conservation
Type	Lectures and seminars
ECTS credits	4
Year in which it is being offered & Semester	1 st year, 1 st semester
Pre-requisite study –unit	None
Method of assessment	Assignment
Result	Percentage mark & grade
Attendance	
Lecturer	Arch. K. Buhagiar Arch. S. Cefai Arch. C. Busutil
Description	This set of lectures will discuss the history and theory of conservation, starting with definitions of the most important terms. It will go on to discuss the attitudes of different eras, including the neo-classical period, the development of restoration in England and France, and the philosophies of some of the important names in the field, as well as the modern school of thought of restoration. Case studies will also be used. International Charters and Conventions will be discussed.
Reading List	<p>Essential reading</p> <p>Boito C. 1893. <i>Questioni Pratiche di Belli Arti</i>. Hoepli, Milano.</p> <p>Brandi C. 2005. <i>Theory of Restoration</i>. Trans. by C. Rockwell. Firenze, Nardini. In Italian: G. Basile (ed.) 2000. Istituto Centrale per il Restauro, Italy.</p> <p>Caple C. 2000. <i>Conservation Skill: Judgement, Method and Decision Making</i>, London, Routledge.</p> <p>Carbonara G. 1997. <i>Avvicinamento al Restauro – Teoria, Storia, Monumenti</i>. Liguori Editori, Italy.</p> <p>Ceschi C. 1957. <i>Teoria e Storia del Restauro</i>. Mario Bulzoni Editore, Italy.</p> <p>Earl, John. 2003. <i>Building Conservation Philosophy</i>, Donhead, Shaftbury.</p> <p>Jokilehto J. 1999. <i>A History of Architectural Conservation</i>. Butterworth-Heinemann.</p> <p>Stanley Price N., Kirby Talley Jr M. and Melucco Vaccaro A. 1996. <i>Historical and Philosophical Issues in the Conservation of Cultural Heritage</i>. The J. Paul Getty Trust.</p> <p>Roth L 2006. <i>Understanding Architecture: Its Elements, History and Meaning</i>. Icon Editions.</p> <p>Ruskin J. 1989. <i>The Seven Lamps of Architecture</i>. Dover Publications, New York.</p> <p>Woodward C. 2002. <i>In Ruins</i>. Vintage, UK.</p> <p>ICOMOS 1931. <i>The Athens Charter for the Restoration of Historic Monuments</i>.</p>

http://www.icomos.org/athens_charter.html Viewed March 2009.
ICOMOS 1964. *International Charter for the Conservation and Restoration of Monuments and Sites - The Venice Charter*.
http://www.icomos.org/venice_charter.html Viewed March 2009.
Council of Europe *European Charter of the Architectural Heritage - The Declaration of Amsterdam 1975*. <http://www.icomos.org/docs/amsterdam.html>
Viewed March 2009.

Further reading

Brandi C. 1962. *Carmine o della Pittura*. Giulio Einaudi Editore, Torino.
Cellini B. 2007. *Autobiography of Benvenuto Cellini*. Penguin.
Chaoy F. 1997. *L'Allegorie du Patrimoine*. SEUIL.
Doblin A. 1929. *Berlin Alexander Platz*. Letras Universales / Universal Writings.
Donkin L. 2001. *Crafts and Conservation: Synthesis Report for ICCROM*.
http://www.iccrom.org/eng/02info_en/02_04pdf-pubs_en/ICCROM_doc02_CraftsandConservation.pdf Viewed March 2009.
Eugène Viollet-le Duc. 1866. *Dictionary of French Architecture from 11th to 16th Century (1854–1868)*. Paris, Bance et Morel.
Evans J.D. 1971. *The Prehistoric Antiquities of the Maltese Islands: A Survey*. London, Athlone Press.
Feilden B.M. 2003. *Conservation of Historic Buildings*. 3rd edn. Architectural Press, UK.
Gibbon E., Mueller H.-F., Piranesi G.B. & Boorstin D.J. 2003. *The Decline and Fall of the Roman Empire* in 6 volumes. Modern Library Classics.
Giovannoni G. 1931. *Vecchie Citta'*. ed Edilizia Nuova. Torino.
Heymann J. 1998. *Structural Analysis - A Historical Approach*. Cambridge University Press.
Leon Battista Alberti. 1755. *The Ten Books of Architecture*. Leoni.
Macaulay R. 1953. *Pleasure of Ruins*.
Mason D. and Shacklock V. 1995. *Restoration to Conservation. The Study and Treatment of Historic Buildings and Monuments in Britain*. In: *Journal of Architectural Conservation*, vol. 1, no. 1, pp. 8-24.
Mostafavi M. & Leatherbarrow D. 1993. *On weathering – the life of buildings in time*. The Mitt Press, Cambridge.
Neret G. 1994. *Auguste Rodin: Sculptures and Drawings*. Taschen, Koln.
Palladio A. 2002. *The Four Books of Architecture*. MIT Press. Trans. By R. Tavernon and R Schofield.
Penny N. and Haskell F. 1981. *Taste and the Antique*. Yale University Press.
Ruskin J. 1900. *The Stones of Venice*. 3 vols. London, Routledge.
Ruskin J. 1964. (Kenneth Clark - ed.) *Ruskin Today*. London.
Sennett R. 1992. *The Fall of Public Man*. Penguin Books, UK.
Sterling J. 2005. *Postmodernism and Critical Theory*. In: *Making Sense of International Relations Theory*. Sterling-Folker J. and Rienner L. (eds). USA.
Var. 1992. *Le Corps en Morceaux*. Terrain. No 18. Mars.
Vasari G. 1987. *Lives of the Artists*. Penguin.
Welby Pugin A. 1841. *Contrasts and True Principles of Christian or Pointed Architecture*. 2nd ed.

1932 Movie *Grand Hotel*

1935 Movie *Mutiny on the Bounty*

1984 Remake *The Bounty*

Code	MAS 5102
Title	Studies in Conservation
Type	Lectures, seminars and visits
ECTS credits	4
Year in which it is being offered & Semester	1 st year, 1 st semester
Pre-requisite study –unit	None
Method of assessment	Assignment
Result	Percentage mark & grade
Attendance	
Lecturer	Arch. S. Cefai Visiting Lecturers
Description	<p>This study-unit will include a series of lectures on themes which are of fundamental importance in the conservation of historic buildings. It will consist of discussions on the importance of ethics in conservation, including the danger of “fashion” ethics. Also discussed will be the issues of values and sustainability. Historiography will be introduced as a tool to understanding 'history of history' before any intervention is carried out on a building, and will include information on various schools. One common use of a historic building is as a museum – lectures on museum studies will give the student the background knowledge required for the correct presentation of buildings and their contents, the importance of understanding the needs of different visitors to a museum, and how to cater for them.</p>
Reading List	<p>Essential reading</p> <p>Ambrose T. and Paine C. 2003 (reprinted). <i>Museum Basics</i>. Routledge.</p> <p>Brand Stewart. 1999. <i>The Clock of the Long Now Time and Responsibility</i>. Phoenix.</p> <p>Clarke K. 2001. <i>Informed Conservation Understanding historic buildings and their landscapes for conservation</i>. English Heritage.</p> <p>Clarke K. Editor. 1999. <i>Conservation Plans in Action</i>. Proceedings of the Oxford Conference. English Heritage.</p> <p>English Heritage. 2000. <i>Power of Place The future of the historic environment</i>. http://www.english-heritage.org.uk/server/show/nav.9236 Viewed March 2009.</p> <p>Avrami Erica, Randall Mason and Marta de la Torre. 2000. <i>Values and Heritage Conservation: Research Report</i>. Getty Conservation Institute, Los Angeles. http://www.getty.edu/conservation/publications/pdf_publications/ Viewed March 2009.</p> <p>Miles R. S., Alt M. B., Gosling D. C. et al. 2001 (reprinted). <i>The design of educational exhibits</i>. Routledge, London.</p> <p>Read P. 1996. <i>Returning to Nothing The meaning of lost places</i>. Cambridge University Press.</p> <p>Smith L. 2006. <i>Uses of Heritage</i>, London: Routledge. 2006.</p> <p>Further reading</p> <p>Arestizabal I. and Piva A. 1991. <i>Musei in trasformazione</i>. Mazzotta.</p> <p>Barzun J. 1992. <i>The Modern Researcher</i>. Henry F. Graff.</p> <p>Burke P. (ed) 1973. <i>A new kind of history from the writings of Febvre</i>. London, Routledge and Kegan Paul. First Edition.</p> <p>Carpenter R.H. 1995. <i>History as Rhetoric: Style, Narrative and Persuasion</i>. Columbia,</p>

University of South Carolina Press.

Department of Culture, Media and Sport (UK). December 2001. *The Historic Environment: A Force for Our Future*.

Jenkins K. 1997. *The postmodern history reader*. London, Routledge.

Kitson Clark G. 1967. *The critical historian*. London, Heinemann.

Munslow A. 1997. *Deconstructing History*. Routledge, London and New York.

Poster M. 1997. *Cultural History and Postmodernity*. New York, Columbia University Press .

Veyne P. 1984. *Writing History*. Wesleyan University.

Code	MAS 5103
Title	Urban, Legislative and Economic Contexts of Conservation
Type	Lectures and seminars
ECTS credits	4
Year in which it is being offered & Semester	1 st year, 1 st semester
Pre-requisite study –unit	None
Method of assessment	Assignment
Result	Percentage mark & grade
Attendance	
Lecturer	Various
Description	<p>This study-unit will deal with legislative and economic aspects of conservation. The legal context will be explained through a discussion of the local past and present laws which directly relate to our cultural heritage. Students will be exposed to existing local planning legislation in general and in more detail on aspects of the law and planning process which regulate our cultural heritage both architectural and archaeological. The unit will include an overview of how the local built environment has evolved through history, helping the student identify various urban patterns by using a number of tools. The built environment is however continually developing, and an important factor here is the economic context. Thus, the importance of economic value, discussing the potential sources of revenue such as tourism, commerce, use and amenities, forms part of this study-unit. This includes also lectures on cost-benefit analysis, financial analysis and economical analysis.</p>
Reading List	<p>Essential reading</p> <p>Aquilina K. 1999. <i>Development Planning Legislation - The Maltese Experience</i>. Mireva Publications.</p> <p>Cost Analysis - The Economic Value of Benefits Resulting from Environmental Restoration http://www.edc.uri.edu/restoration/html/tech_sci/socio/benefits.htm Viewed March 2009.</p> <p>Cost Analysis - Overview of Benefit-Cost Analysis http://www.edc.uri.edu/restoration/html/tech_sci/socio/bca.htm Viewed March 2009.</p> <p><i>Cost Benefit Analysis for the Cultural Built Heritage: Principles and Practice</i>. http://www.international.icomos.org/publications/93econom2.pdf Viewed March 2009.</p> <p>Curk I. <i>Economics in the Conservation Process. Several experiences from Slovenia</i>. http://www.international.icomos.org/publications/93sy_eco2.pdf Viewed March 2009.</p> <p><i>Cultural Heritage Act</i> 2002. Amended 2005. http://docs.justice.gov.mt/lom/legislation/english/leg/vol_14/chapt445.pdf Viewed March 2009.</p> <p><i>Development Planning Act 1992</i> and subsequent amendments 1997 and 2001. http://docs.justice.gov.mt/lom/legislation/english/leg/vol_9/chapt356.pdf Viewed March 2009.</p>

Malta Structure Plan. 1990.

http://www.mepa.org.mt/planning/index.htm?pln_fbk_str_pln.htm&1 Viewed
March 2009.

Malta Development Control Guidelines for Urban Conservation Areas. 1995.

Code	MAS 5104
Title	Documentation and Research
Type	Lectures, seminars and visits
ECTS credits	4
Year in which it is being offered & Semester	1 st year, 1 st semester
Pre-requisite study –unit	None
Method of assessment	Assignment
Result	Percentage mark & grade
Attendance	
Lecturer	Dr N. Vella Visiting lecturers
Description	<p>This set of lectures on documentation and research will deal with the importance, purposes and objectives of documentation. It will discuss approaches and techniques, including also carrying out the initial survey, preserving the record and analytical recording. An important part of this unit will be on the location of archival information and other sources of information. Other aspects to be dealt with include process and tools for the compilation of a document, including specialised instruments for documentation, the methodology of archiving documents, and documentation of landscape archaeology.</p>
Reading List	<p>Essential reading Bowden J. 1997. <i>Writing a Report: a step-by-step guide to effective report writing</i>. 4th edition. Oxford: How To Books Ltd. Docci M. and Maestri D. 1994. <i>Manuale di Rilevamento Architettonico e Urbano</i>. Laterza, Roma-Bari. Fairbairn G. J. and Winch C. 1998. <i>Reading, Writing and Reasoning: A Guide for Students</i>. 2nd edition. Buckingham, Open University Press. ICOMOS. 1990. <i>Guide to Recording Historic Buildings</i>. Butterworth.</p> <p>Further reading Borg C. 1993. <i>Methodical Guide to Recording Historic Buildings</i>. B.E.&A. Unpublished Dissertation, University of Malta. De Angelis D'Ossat G. 1974. <i>Guide to the Methodical Study of Monuments and Causes of their Deterioration</i>. ICCROM, Rome. Feilden B.M. 2003. <i>Conservation of Historic Buildings</i>. Architectural Press. Rosen L. J. and Behrens L. 2004. <i>The Allyn & Bacon Handbook</i>. 5th edition. Boston, Allyn & Bacon. Saint Aubin J.P. 1999. <i>Il Rilievo e la rappresentazione dell'architettura</i>. In: Baratin L. and Selvini A. (ed), Moretti & Vitali.</p>

Code	MAS5201
Title	History of Technology and Building
Type	Lectures and visits
ECTS credits	4
Year in which it is being offered & Semester	1 st year, 1 st semester
Pre-requisite study –unit	None
Method of assessment	Assignment
Result	Percentage mark & grade
Attendance	
Lecturer	Prof. A. Torpiano Arch. C. Busutil Visiting lecturers
Description	<p>This set of lectures will discuss the history of technology and building, including a history of trades and tools used for building purposes, particularly traditional ones used locally. The unit will also include lectures on the history of technology and structural design, illustrated with particular case studies. Development of the structural form and constructional techniques, particular those applicable to local historic buildings, will also be discussed.</p>
Reading List	<p>Essential reading Borg J.G. 1975. <i>Is-Sengha Tal-Bini</i>. 2nd edition. Progress Press, Malta. Buhagiar K. and Cassar J. 2003 “Fort Chambray: The genesis and realisation of a project in eighteenth-century Malta.” In: <i>Melita Historica</i>, Malta, Vol. XIII, no. 4, pp. 347-364. http://www.geocities.com/melitahistoricab/19942.html Viewed March 2009. Spiteri S. 2008. <i>The Art of Fortress Building in Hospitaller Malta</i>. BDL Publishing, Malta</p> <p>Further reading Adam J.P. 1988. <i>Arte di Costruire presso i Romani, Materiali e Tecniche</i>. Milan. Alberti L.B. (J. Rykwert Ed.) 1986. <i>The Ten Books of Architecture</i>. Dover Publications. NY. Davey N. 1961. <i>History of Building Materials</i>. Phoenix House. Daumers M. (ed) 1969. <i>A History of Technology and Invention</i>. John Murray. Duffy C. 1996. <i>Fire and Stone, the Science of Fortress Warfare 1680-1860</i>. 2nd edition. New York, Stackpole Books, London. Heyman J. 1998. <i>Structural Analysis – A Historical Approach</i>. Cambridge University Press. Hoppen A. 1979. <i>The Fortification of Malta by the Order of St. John (1530-1798)</i>. Edinburgh. Hughes Q. 1991. <i>Military Architecture</i>. Hants. Krauzberg M. and Pursell C.W. (eds) 1969. <i>Technology in Western Civilization</i>. Oxford University Press. Palladio A. 1965. <i>The Four Books of Architecture</i>. Dover Publications. NY. Parsons W.B. 1968. <i>Engineers and Engineering in the Renaissance</i>. MIT Press, Cambridge. Skola Glormu Cassar. Reprint 2004. <i>Il-Bennej</i>. DOI, Malta.</p>

Spiteri S. 1994. *Fortresses of the Cross; Hospitaller Military Architecture 1136-1798*. Heritage Interpretation Services, Malta.

Straub H. 1952. *History of Civil Engineering*. MIT Press, Cambridge MA.

Timoshenko S.P. 1983. *History of Strength of Materials*. Dover Publications. NY.

Code	MAS5202
Title	Masonry Materials and Structures
Type	Lectures, seminars and visits
ECTS credits	4
Year in which it is being offered & Semester	1 st year, 1 st semester
Pre-requisite study –unit	None
Method of assessment	Assignment
Result	Percentage mark & grade
Attendance	
Lecturer	Prof. J. Cassar Ms R. De Angelis Prof. A. Torpiano
Description	<p>This set of lectures introduces the student to the wide range of materials, usually inorganic ones, traditionally used in buildings. These include stone, mortars and plasters. There will be an introduction to minerals and more general lectures on rocks, with emphasis being placed on the ones commonly used as building materials, particularly local ones. Another part of this unit will focus on mortars and renders traditionally used in the construction of historic buildings and their repairs, including the composition and properties of the most common constituent materials used for the production of traditional mortars. Also discussed in this unit will be the structural aspects of historic buildings, particularly local ones.</p>
Reading List	<p>Essential reading Ashurst J. 1983. <i>Mortars, Plasters and Renders in Conservation: A Basic Guide</i>. EASA. Ashurst J. and Dimes, F. G. 1990. <i>Conservation of Building and Decorative Stone</i>. Butterworth-Heinemann. Cassar J. 2004. “Composition and property data of Malta’s building stone for the construction of a database.” Cassar, J. In: <i>Architectural and sculptural stone in cultural landscape</i>. Prikryl, R., and Siegl, P. (eds) pp. 11-28. Cassar, J. 2007. “Malta: buildings, materials and deterioration.” In: <i>STONE Newsletter on stone decay</i>, No 2. Aug 2007, 3-4. http://www.qub.ac.uk/geomaterials/weathering/newsletter/issue_2.pdf Viewed March 2009. Cowper A.D. 1927 (reprinted 1998). <i>Lime and Lime Mortars</i>. Donhead. Elert, K., Rodriguez-Navarro, <i>et al.</i> 2002. Lime Mortars for the Conservation of Historic Buildings. In <i>Studies in Conservation</i> 47: 62-75. Feilden B. 2003. <i>Conservation of Historic Buildings</i>. Architectural Press. Heyman J. 1997. <i>The Stone Skeleton. Structural Engineering of Masonry Architecture</i>. Cambridge University Press. Mainstone R. 1975. <i>Development of Structural Form</i>. Allen Lane, London. Pedley M., Hughes Clarke M. and Galea, P. 2002. <i>Limestone Isles in a Crystal Sea: The Geology of the Maltese Islands</i>. P.E.G. Ltd., Malta. Rothert, E., Eggers, T., Cassar, J., Ruedrich, J., Fitzner, B., and Siegesmund, S. 2007. “Stone properties and weathering induced by salt crystallization of Maltese Globigerina Limestone.” In: <i>Building stone decay: from diagnosis to conservation</i>, Geological Society, London, Special Publications 271, 189-198. http://www.stone.rwth-aachen.de/publicat.htm Viewed March 2009. Torraca G. 1982. <i>Porous Building Materials</i>. ICCROM, Rome. Trench, L. (ed.) 2000. <i>Materials and Techniques in the Decorative Arts</i>. The University of Chicago Press.</p>

Further reading

- Adam J.P. 1994. *Roman Buildings, Materials and Techniques*. Indiana University Press.
- Allen G. et. al. 2003. *Hydraulic Lime Mortar*. Donhead.
- Ashurst J. and Dimes, F. G. 1984. *Stone in Building*. The Stone Federation. Swindon Press Ltd.
- Ashurst J. and Ashurst N. 1988. *Practical Building Conservation. Vol. 3. Mortars, Plasters and Renders*. Gower Technical Press.
- Buyts S. and Oakley V. 1996. *The Conservation and Restoration of Ceramics*, Butterworths-Heinemann.
- Cassar J. 2004. "Comparing visual and geochemical classification of limestone types: the Maltese Globigerina Limestone." Cassar, J. In: *Stone 2004, 10th International Congress on Deterioration and Conservation of Stone*, 27 June – 2 July 2004, Stockholm, Sweden, pp. 569-577.
- Cassar J. 2001. "Petrographical and Chemical Research on the Stone of the Megalithic Temples". In: *Malta Archaeological Review*, Issue 5, pp. 40-45.
- Cassar, J. and Vella A. 2003. "Methodology to identify badly weathering limestone using geochemistry: case study on the Lower Globigerina Limestone of the Maltese islands." *Quarterly Journal of Engineering Geology and Hydrogeology*, 36, pp. 85-96.
- Forti, G. 1993. *I quaderni di Giorgio Forti: Intonaci Storici e non*, Safra, Verona.
- Gaetani, M.C., Santamaria, U. 1998. I Materiali di Restauro: le Malte da Iniezioni. In *Diagnosi e Progetto per la Conservazione dei Materiali per l'Architettura*, Edizioni De Luca: 357-375.
- Heyman J. 1982. *The Masonry Arch*. Ellis Horwood, Chichester.
- Howe J.A. 1910 (reprinted 2001). *The Geology of Building Stones*. Donhead.
- Lal Gauri K. and Bandyopadhyay J.K. *Carbonate Stone. Chemical Behaviour, Durability and Conservation*. John Wiley and Sons Inc., 1999.
- Ling, R. 1990. *Roman Painting*, Cambridge University Press: 199-220.
- Mora L., Mora P. 1978. Cariche. In *DIMOS*, parte I, modulo 1, Istituto Centrale per il Restauro: 129-145.
- Mora, P., Mora, L., Philippot, P. 1983. *Conservation of wall paintings*, Butterworth
- Siegesmund S., Weiss T. and Vollbrecht A. (eds.) 2002. *Natural stone, Weathering Phenomena, Conservation Strategies and Case Studies*, Geological Society, London, Special Publications, **205**.
- Tassios T.P. 1988. *Meccanica delle Murature*. Liguori Editore.
- Vella, A. J., Testa, S. and Zammit, C. 1997. "Geochemistry of the soil facies of the Lower Globigerina Limestone Formation, Malta." *Xjenza*, Malta Chamber of Scientists, **2**, 27 - 33. http://home.um.edu.mt/science/xjenza/articles/02/xjenza_vol02_1997_1.pdf Viewed March 2009.
- Warland E.G. 1986. *Modern Practical Masonry*. Reprint. Stone Federation. Pitman Books Ltd.
- Warren, J. 1999. *Conservation of Earth Structures*, Butterworth-Heinemann
- Winkler E. M. *Stone: Properties, Durability in Man's Environment*. Springer-Verlag, 1973.

Code	MAS5203
Title	Ancillary Materials in Buildings
Type	Lectures, seminars and visits
ECTS credits	4
Year in which it is being offered & Semester	1 st year, 1 st semester
Pre-requisite study –unit	None
Method of assessment	Assignment
Result	Percentage mark & grade
Attendance	
Lecturer	Dr J. Betts Dr J. Buhagiar Dr S. Golfomitsou Ing. Arch. G. Tampone
Description	This set of lectures introduces the student to the wide range of ancillary materials, used in historic buildings. In this study unit, the composition and properties of wood, ceramics, glass and metals will be discussed. An introduction to organic materials, such as polymers, oils and waxes, used for conservation/restoration purposes will also be given.
Reading List	<p>Essential reading</p> <p>Bravery A. F. and Carey J. K. 2003. 3rd edition. <i>Recognising wood rot and insect damage in buildings</i>. BRE Publications, Watford.</p> <p>Buys S. and Oakley V. 2002. <i>Conservation and Restoration of Ceramics</i>. Butterworth-Heinemann.</p> <p>Conservation Unit, Museums & Galleries Commission. 1992. <i>An Introduction to Materials/ Science for Conservators</i>.</p> <p>Davison S. 2003. <i>Conservation and Restoration of Glass</i>. Butterworth-Heinemann.</p> <p>Diamant R. M. E. 1970. <i>The chemistry of building materials</i>. Business Books Ltd., London.</p> <p>Everett A. rev. by Barritt C.M.H. 5th Ed. 2000. <i>Mitchell's Building Series – Materials</i>. Longman.</p> <p>Forbes R.J. 1957. <i>Studies in Ancient Technology</i>. Leiden.</p> <p>Horie C.V. <i>Materials in Conservation</i>. London: Butterworths, 1988.</p> <p>Petterson Douglas. 1988 5th edition. <i>Commercial Timbers of the World</i>. Gower Technical Press, Hants.</p> <p>Scott D. et al. 1994. <i>Ancient and Historic Metals: Conservation and Scientific Research</i>, Getty Conservation Institute.</p> <p>Singer C., Holmyard E.J., Hall A.R. (eds.) 1954. <i>A History of Technology</i>. Oxford.</p> <p>Weaver M.E. 1997. <i>Conserving Buildings, A Manual of Techniques and Materials</i>. John Wiley and Sons.</p> <p>Further reading</p> <p>Agricola G. (translated by H.C. Hoover and I.H. Hoover), 1950. <i>De Re Metallica</i> Dover Publications.</p> <p>Ashurst J. and Ashurst N. 1988. <i>Practical Building Conservation</i>. English Heritage Technical Handbook series. 5 vols. New York: Halsted Press, John Wiley & Sons.</p> <p>Blair C. 1987. <i>The History of Silver</i>. New York.</p> <p>Ceyson B. et al. 1999. <i>Sculpture: From the Renaissance to the Present Day</i>.</p>

Taschen.

Duby G. & Daval J.L. 1999. *Sculpture: From Antiquity to the Middle Ages*.
Taschen.

Forbes R.J. 1950. *Metallurgy in Antiquity*. Leiden.

Forbes R.J. 1957. *Studies in Ancient Technology*. Leiden.

Hibbard H. 1977. *Masterpieces of Western Sculpture. From Medieval to Modern*.
Thames & Hudson.

Leoni M. 1984. *Elementi di metallurgia applicata al restauro delle opere d'arte*.
Opus Libri, Firenze.

Newey C. and Weaver G. 1991. *Materials Principle and Practice*. Butterworth
Heinemann. Chapter 4.

La terracotta e la maiolica ai tempi dei della Robbia

<http://www.cronologia.it/cronorob.htm> Viewed March 2009.

Code	MAS 5301
Title	Environment and Monitoring
Type	Lectures and practical work
ECTS credits	4
Year in which it is being offered & Semester	1 st year, 2 nd semester
Pre-requisite study –unit	None
Method of assessment	Assignment
Result	Percentage mark & grade
Attendance	
Lecturer	Dr J. Schembri Dr E. Sinagra Dr V. Buhagiar Visiting lecturers
Description	<p>The aim of this study unit is to integrate the variations in the local climate with the physical elements of the urban landscape. The course first gives a general overview of the important indicators that mark out a climate, the proceeds to present the general conditions of the Mediterranean climate and the main features of Maltese climatic environment. A discussion on atmospheric pollution will follow, including the physical structure and chemistry of the atmosphere, agents of change in the atmosphere and sources, fates and environmental effects of some important gaseous and particulate pollutants, including both inorganic and organic species. These two themes will be then linked to the built environment through lectures on the effects of climate and microclimate on traditional Maltese architecture, thermo-hygro conditions in buildings, including environmental monitoring and passive systems vs HVAC systems in historic buildings: an energy sensitive approach.</p>
Reading List	<p>Essential reading Cassar M. (ed.) 1994. <i>Museums Environment Energy</i> . HMSO. Jeftic L., Keckes S. and Pernetta J.C. 1996. <i>Climatic change and the Mediterranean</i>. 2 Vols. London. Arnold. Manahan S. E. 2000. <i>Fundamentals of Environmental Chemistry</i>. 2nd ed. Lewis Publishers. Moore K. (ed.) 1994. <i>Museum Environment</i>. London, Routledge. Pacione M. 1999. <i>Applied geography: principles and practice</i>. London, Routledge. Thomson G. 19... <i>The Museum Environment</i>..... Torfs K., Van Grieken R. and Cassar J. 1996. "Environmental effects on deterioration of monuments: case study of the Church of Sta. Marija Ta' Ċwerra, Malta." In: <i>Origin, Mechanisms and Effects of Salt on Degradation of Monuments in Marine and Continental Environments</i>, Proceedings of the European Commission Research Workshop. Protection and Conservation of the European Cultural Heritage Research Report No. 4, Bari, Italy, pp. 441-451. Torfs K., Van Grieken R. and Cassar J. 1996. "Monitoring of environmental parameters to explain stone deterioration: Church of Sta. Marija Ta' Ċwerra, Malta." In: <i>Deterioration and Conservation of Stone</i>, Proceedings of the 8th International Congress, Berlin, Germany, Vol. 1, pp. 265-271. Warren A. and Goldsmith F.B. (eds) 1974. <i>Conservation in Practice</i>. John Wiley and Sons, Chichester. Wauh D. 2000. <i>Geography: an integrated approach</i>. 3rd ed. Cheltenham, Nelson.</p>

Wythe I.D. 1995. *Climatic change and human society*. London, Arnold.

Further reading

Camuffo D. 1998. *Microclimate for Cultural Heritage*. Elsevier.

Camuffo D. and Jones P. 2002. *Improved Understanding of Past Climatic Variability from Early Daily European Instrumental Sources* Springer Publishers Netherlands. Volume 53, Numbers 1-3 / April, 2002.

Camuffo D., Monte M. and Sabbioni C. 1983. Origin and growth mechanisms of the sulfated crusts on urban limestone. In: *Water, Air, & Soil Pollution*. Volume 19, Number 4 / May, 1983 Springer NL.

Cassar M. 1985. Checklist for Establishment of a Microclimate. In: *The Conservator* 9, p.14-16.

Cassar M. 1985. Case Design and Climate Control: a Typological Analysis. In: *Museum*, XXXVII, p. 104-107.

Conservation Unit, Museums & Galleries Commission. 1992. *An Introduction to Materials/ Science for Conservators*.

Matulionis R.C. and Freitag J.C. (eds) 1991. *Preventative Maintenance of Buildings*. Van Nostrand Reinhold. New York, NY.

Code	MAS 5302
Title	Deterioration of Masonry Materials
Type	Lectures, seminars and visits
ECTS credits	4
Year in which it is being offered & Semester	1 st year, 2 nd semester
Pre-requisite study –unit	None
Method of assessment	Assignment
Result	Percentage mark & grade
Attendance	
Lecturer	Prof. J. Cassar Prof. A. Torpiano Visiting lecturers
Description	<p>This study-unit will introduce the student to the deterioration of traditional building materials. This will include porous inorganic buildings materials such as stone, mortars and plasters. The deterioration of concrete will also be tackled. The various causes of deterioration, both intrinsic and extrinsic, will first be covered, followed by examples of the manifestation of deterioration and an understanding of how the various causes contribute to decay. Mapping of deterioration forms as an aid to the understanding of deterioration will also be discussed.</p>
Reading List	<p>Essential reading Ashurst J. and Dimes, F. G. 1990. <i>Conservation of Building and Decorative Stone</i>. Butterworth-Heinemann. Cassar J. 2002. "Deterioration of the Globigerina Limestone of the Maltese Islands." In: Siegesmund, S., Weiss, T. and Vollbrecht A. <i>Natural Stone, Weathering Phenomena, Conservation Strategies and Case Studies</i>. Geological Society, London. Special Publications, 205, pp. 33-49. Fitzner, B. and Heinrichs, K. 2004. <i>Photo Atlas of Weathering Forms on Stone Monuments</i>. http://www.stone.rwth-aachen.de/atlas.htm Viewed March 2009. Lazzarini L. 2001. "General issues on the deterioration of stone." In: <i>The Building Stone in Monuments</i>, Proceedings of Interdisciplinary Workshop, Athens, November 9, pp. 149- 160. NORMAL 1/88 <i>Alterazioni Macroscopiche dei Materiali Lapidari: Lessico</i>. ICR – CNR, Rome, Italy. UNI-NORMAL. Rothert E., Eggers T., Cassar J., Ruedrich J., Fitzner B., and Siegesmund S. 2007. "Stone properties and weathering induced by salt crystallization of Maltese Globigerina Limestone." In: <i>Building stone decay: from diagnosis to conservation</i>, Geological Society, London, Special Publications 271, 189-198. http://www.stone.rwth-aachen.de/publicat.htm Viewed March 2009. Siegesmund S., Weiss T. and Vollbrecht A. (eds) 2002. <i>Natural stone, Weathering Phenomena, Conservation Strategies and Case Studies</i>, Geological Society, London, Special Publications, 205. Taliana, C., Cassar, J., Vella, A. J., and Ventura, F. 1994. "Factors causing deterioration of frescoes within a medieval church in Malta and a proposed solution." In: <i>Conservation of the Relics of Medieval Monumental Architecture</i>, International Symposium, Warsaw-Lednic, Poland, 24-26 May 1994, pp. 125-130.</p>

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Zeza F. (ed) 1996. *Origin, Mechanisms and Effects of Salts on Degradation of Monuments in Marine and Continental Environments.* EU Research Workshop, Bari.

Further reading

Amoroso G.G. 1995. *Il restauro delle pietre nell'architettura monumentale.* Dario Flaccovio (ed.).

Baer N.S. and Snethlage R. (eds) 1996. *Saving our architectural heritage: the conservation of historic stone structures.* Report of the Dahlem workshop, Berlin, March 3-8. John Wiley and Sons.

Cassar J. 2007. "Malta: buildings, materials and deterioration." In: *STONE Newsletter on stone decay*, No 2. Aug 2007, 3-4. http://www.qub.ac.uk/geomaterials/weathering/newsletter/issue_2.pdf Viewed March 2009.

De Angelis R., Cassar J., and Kakoulli I. 2005. "Degrado e problematiche conservative di un dipinto ad olio su pietra a Malta." In: *Sulle Pitture Murali Riflessioni, Conoscenze, Interventi.* Scienza e Beni Culturali XXI. Atti del Convegno di Studi Bressanone. July 2005, pp. 135-145.

Fassina, V., Mignucci, A., Naccari, A., Stevan, A., Cassar, J. and Torpiano, A. 1996. "Investigation on the moisture and salt migration in the wall masonry and on the presence of salt efflorescences on stone surface in the Church of Sta. Marija Ta' Cwerra at Siggiewi, Malta." In: Zeza, F. (ed) *Origin, Mechanisms and Effects of Salt on Degradation of Monuments in Marine and Continental Environments.* Proceedings, European Commission Research Workshop on Protection and Conservation of the European Cultural Heritage, Bari, Italy. Research Report No. 4, 291-308.

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Fitzner, B., Heinrichs, K. and Volker, M. 1996. "Model for salt weathering at Maltese Globigerina Limestones." Zeza, F. (ed.) *Origin, Mechanisms and Effects of Salt on Degradation of Monuments in Marine and Continental Environments.* Proceedings, European Commission Research Workshop on Protection and Conservation of the European Cultural Heritage, Bari, Italy. Research Report No. MDDS *Masonry Damage Diagnostic System* <http://www.compass-salt.org/mdds%20site/mddsonline.htm> Viewed March 2009.

Lal Gauri K. and Bandyopadhyay J.K. 1999. *Carbonate Stone. Chemical Behaviour, Durability and Conservation.* John Wiley and Sons Inc.

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Weathering features tutorial

<http://www.qub.ac.uk/geog/documents/research/weathering/weathering%20features.htm>

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Taliana, C., Cassar, J., Vella, A. J., and Ventura, F. 1994. "Factors causing deterioration of frescoes within a medieval church in Malta and a proposed solution." *International Symposium on the Conservation of the Relics of Medieval Monumental Architecture*, Warsaw-Lednic, Poland, 24-26 May 1994, pp. 125 - 130.

Vannucci S., Alessandrini G., Cassar J., Tampone G. and Vannucci M.L. 1994. "I templi megalitici preistorici delle isole maltesi: cause e processi di degradazione del Globigerina Limestone." Proceedings of the 3rd International Symposium, *The Conservation of Monuments in the Mediterranean Basin*, Venice, Italy, pp. 555-565.

Winkler E. M. 1973. *Stone: Properties, Durability in Man's Environment*. Springer-Verlag.

Code	MAS 5303
Title	Deterioration of Ancillary Materials
Type	Lectures, seminars and visits
ECTS credits	4
Year in which it is being offered & Semester	1 st year, 2 nd semester
Pre-requisite study –unit	None
Method of assessment	Assignment
Result	Percentage mark & grade
Attendance	
Lecturer	Dr. J. Betts Dr. S. Golfomitsou Dr. J. Buhagiar
Description	<p>This study-unit will introduce the student to the deterioration of traditional ancillary building materials and will the materials metals, ceramics, glass and wood. The objectives of the course are to describe the degradation of materials used for architectural applications, including fired products and glass. The various causes of deterioration, both intrinsic and extrinsic, will be covered. Major types of corrosion of metals with typical examples will also be included. This series of lectures will also include information on the deterioration of wood, including biodeterioration.</p>
Reading List	<p>Essential reading</p> <p>Ashurst J. and N. 1988. <i>Practical Building Conservation. Volume 4: Metals</i>. Gower Technical Press.</p> <p>Ashurst J. and N. 1988. <i>Practical Building Conservation. Volume 5: Wood, Glass and Resins</i>. Gower Technical Press.</p> <p>Bravery A. F. and Carey J. K. 2003. 3rd edition. <i>Recognising wood rot and insect damage in buildings</i>. BRE Publications, Watford.</p> <p>Buys S. and Oakley V. 2002. <i>Conservation and Restoration of Ceramics</i>. Butterworth-Heinemann.</p> <p>Davison S. 2003. <i>Conservation and Restoration of Glass</i>. Butterworth-Heinemann.</p> <p>Shreir L.L., Jarman R.A. and Burstein G.T. (eds.) 1994. <i>Corrosion</i>. Butterworth-Heinemann.</p> <p>Weaver M.A. 1993. Conserving Buildings. A Guide to Techniques and Materials. Chap.4. <i>Restoring and Repairing Old Wooden Structures</i>, pp.13-48.</p> <p>Weaver M.A. 1993. Conserving Buildings. A Guide to Techniques and Materials. Chap. 6. <i>Architectural Ceramics</i>, pp. 99-132.</p> <p>Weaver M.A. 1993. Conserving Buildings. A Guide to Techniques and Materials. Chap. 9. <i>Architectural Metalwork</i>, pp. 175-199.</p> <p>Weaver M.A. 1993. Conserving Buildings. A Guide to Techniques and Materials. Chap. 11. <i>Architectural Glass</i>, pp. 232-237.</p> <p>Further reading</p> <p>Bertholon R. <i>Characterisation and Location of Original Surface of Corroded Metallic Archaeological Objects</i> Source: Surface Engineering, March 2001, vol. 17, no. 3, pp. 241-245(5) Maney Publishing</p> <p>Jones D. A. 2nd ed. 1996. <i>Principles and Prevention of Corrosion</i>, Prentice Hall, Upper Saddle River, NJ.</p>

Kratschmer, A et al, The evolution of outdoor copper patina, *Corrosion Science*, 44, 2002, pp. 425-450.

Lawrence J. Korb et al. 1987. *American Society of Metals: ASM Handbook Vol. 13. Corrosion*. Prepared under the direction of the ASM International Handbook Committee, 9th ed. Metals Park, Ohio. ASM International.

Leygraf C. 2000. *Atmospheric corrosion*. Christofer Leygraf, Thomas Graedel. Wiley-Interscience, xii, 354 p.

Code	MAS 5304
Title	Deterioration of Masonry Fabric
Type	Lectures
ECTS credits	4
Year in which it is being offered & Semester	1 st year, 2 nd semester
Pre-requisite study –unit	None
Method of assessment	Assignment
Result	Percentage mark & grade
Attendance	
Lecturer	Prof. A. Torpiano
Description	<p>This study-unit will deal with the problems associated with the degradation of the masonry fabric. It will include lectures on the diagnosis and monitoring of cracks, especially in the case of historic buildings. Structural degradation will also be discussed, with appropriate examples. This study-unit will also include information on the nature and diagnosis of geotechnical problems which can affect a historic building.</p>
Reading List	<p>Essential reading</p> <p>Beckmann P. 1995. <i>Structural Aspects of Building Conservation</i>. London, New York, McGraw-Hill.</p> <p>Croci G. 1998. <i>The Conservation and Structural Restoration of Architectural Heritage</i>. Computational Mechanics Publications, Southampton and Boston.</p> <p>Feilden B.M. 2003. <i>Conservation of Historic Buildings</i>. Architectural Press.</p> <p>Rocchi G. <i>Istituzioni di Restauro dei Beni Architettonici e Ambientali</i>. Hoepli. 1994.</p>

Code	MAS 5401
Title	Structural Masonry Interventions
Type	Lectures and visits
ECTS credits	4
Year in which it is being offered & Semester	1 st year, 2 nd semester
Pre-requisite study –unit	None
Method of assessment	Assignment
Result	Percentage mark & grade
Attendance	
Lecturer	Prof. A. Torpiano
Description	<p>This set of lectures will discuss the many types of interventions which can take place on a historic building with structural problems. It will discuss the issues of stone replacement as well as patch repairs, especially in the local context. The various methods for strengthening a structure will be explained, with relevant examples. Geotechnical interventions will also be discussed.</p>
Reading List	<p>Essential reading</p> <p>CIRIA. 1986. <i>Structural Renovation of Traditional Buildings</i>. (R111). Crocì G. 1998. <i>The Conservation and Structural Restoration of Architectural Heritage</i>. Computational Mechanics Publications, Southampton and Boston. Poul B. 1995. <i>Structural Aspects of Building Conservation</i>. McGraw Hill. Rocchi G. 1994. <i>Istituzioni di Restauro dei Beni Architettonici e Ambientali</i>. Hoepli. Sowden A.M. (ed.) 1990. <i>The Maintenance of Brick and Stone Masonry Structures</i>. E. & F.N. Spon.</p>

Code	MAS 5402
Title	Conservation of Masonry Materials
Type	Lectures, seminars and visits
ECTS credits	4
Year in which it is being offered & Semester	1 st year, 2 nd semester
Pre-requisite study –unit	None
Method of assessment	Assignment
Result	Percentage mark & grade
Attendance	
Lecturer	Arch. H. Bonnici Prof. J. Cassar Arch. I. Farrugia Dr. S. Golfomitsou Ing. Arch. G. Tampone Visiting lecturers
Description	This study-unit will tackle the problem of the treatment of various materials traditionally used in buildings. It will deal with inorganic building materials such as stone, mortars and plasters, ceramics and glass and metals. The conservation and restoration of wooden structures will also be tackled. This will include lectures on the methods of conservation of stone, including cleaning, consolidation and protection. The use of lime based mortars and plasters for restoration purposes will also be discussed. Other lectures will include the conservation of ceramics, glass and metals in buildings, including discussion on when a conservator should be called in, what conservators can do. Wooden Historic Structures in general will also be discussed, as well as Criteria and Techniques of Repair of degraded wooden load bearing structures. Preventive maintenance will also be discussed.
Reading List	<p>Essential reading</p> <p>Ashurst J. and Dimes F. G. 1990. <i>Conservation of Building and Decorative Stone</i>. Butterworth-Heinemann.</p> <p>Ashurst J. and N. 1988. <i>Practical Building Conservation. Volume 3: Plasters, Mortars and Renders</i>. Gower Technical Press.</p> <p>Ashurst J. and N. 1988. <i>Practical Building Conservation. Volume 4: Metals</i>. Gower Technical Press.</p> <p>Ashurst J. and N. 1988. <i>Practical Building Conservation. Volume 5: Wood, Glass and Resins</i>. Gower Technical Press.</p> <p>Buyss S. and Oakley V. 2002. <i>Conservation and Restoration of Ceramics</i>. Butterworth-Heinemann.</p> <p>Cassar J., Tonna G., Torpiano A. and Zammit G. 2000. "Performance testing of transparent protective coatings on Globigerina Limestone." In: <i>Deterioration and Conservation of Stone</i>, Proceedings of the 9th International Congress, Venice, Italy. Elsevier, The Netherlands, Vol. 2, pp. 251-261.</p> <p>Cassar J., Marrocchi A., Santarelli M.L. and Muscat M. 2008. "Controlling crystallization damage by the use of salt inhibitors on Malta's limestone." In: <i>Materiales de Construcción</i>, Vol., 58, No. 289 – 290, January June 2008, pp. 281-293.</p> <p>Davison S. 2003. <i>Conservation and Restoration of Glass</i>. Butterworth-Heinemann.</p>

- Feilden B.M. and Jokilehto J. 1993. *Management Guidelines for World Heritage Sites*. ICCROM.
- Fidler J. 1995. *Lime Treatments: Lime Watering and Shelter Coating of Friable Historic Masonry*. In: APT Bulletin, Special Issue: Preservation of Historic Masonry. Vol. XXVI, No.4, pp. 50-57.
- Massari G. 1977. *Humidity in Monuments*. University of Rome, Faculty of Architecture.
- Mifsud T., and Cassar J. 2006. "The treatment of weathered Globigerina Limestone: the surface conversion of calcium carbonate to calcium oxalate". In: *Heritage, Weathering and Conservation*. Proceedings of the International Conference HWC-2006, Madrid, Spain, pp. 727-734. Shreir L.L. (ed.) 1994. Corrosion. Vol. 2. *Corrosion control*. Newnes-Butterworth, London, 1134p.
- Scott D. A. 2002. *Copper and Bronze in Art: Corrosion, Colorants, Conservation*. Getty Conservation Institute, xvi, 515 p.
- Tampone G. 1996. *Il restauro delle strutture di legno*. Hoepli. Milano.
- Tampone G. (Ed.) 1990. *Il restauro del legno*. 2 Vols. Nardini, Fiesole (FI). Atti del 2° Congresso Nazionale Restauro del Legno, 1989.
- Weaver M.A. 1993. *Conserving Buildings. A Guide to Techniques and Materials*. Chap. 4. Restoring and Repairing Old Wooden Structures, pp. 13-48.
- Weaver M.A. 1993. *Conserving Buildings. A Guide to Techniques and Materials*. Chap. 6. Architectural Ceramics, pp. 99-132.
- Weaver M.A. 1993. *Conserving Buildings. A Guide to Techniques and Materials*. Chap. 9. Architectural Metalwork, pp. 175-199.
- Weaver M.A. 1993. *Conserving Buildings. A Guide to Techniques and Materials*. Chap. 11. Architectural Glass, pp. 232-237.
- Weiss N. R. 1982. *Preventive Maintenance in Historic Structures*. National Academy Press.

Further reading

- Anon. *Adhesives and Coatings*. Science for Conservators Book 3. Crafts Council Conservation Science Teaching Series, 1983.
- Cassar, J. 2007. "Malta's prehistoric temples: conservation issues." In: *STONE Newsletter on stone decay*, No 1. Jun 2007, 3-7.
http://www.qub.ac.uk/geomaterials/weathering/newsletter/issue_1.pdf Viewed March 2009.
- Charola A.E. *Laboratory Tests and Evaluation of Proposed Masonry Treatments*. In: APT Bulletin, Special Issue: Preservation of Historic Masonry. Vol. XXVI, No.4, 1995, pp. 35-40.
- Imbrighi G. 1982. *I materiali dell'Architettura*. Edizioni Kappa.
- Cook G.K. and Hinks A.J. 1992. *Appraising Building Defects*. Longman Scientific and Technical.
- Fiorentino P. 1994. "Restoration of the Monument of Marcus Aurelius: Facts and Comments". In: Scott D., Podany J. and Considine B. (eds) *Ancient and Historic Metals: Conservation and Scientific Research*. Getty Conservation Institute, pp. 21-31.
- Marabelli M. 1994. "The Monument of Marcus Aurelius: Research and Conservation". In: Scott D., Podany J. and Considine B. (eds) *Ancient and Historic Metals: Conservation and Scientific Research*. Getty Conservation Institute, pp. 1-19.
- Metal 95: *International Conference on Metals Conservation*. 1997. Proceedings of the International Conference on Metals Conservation. MacLeod I.D., Pennec S. L., Robbiola L. (eds). Semur en Auxois, 25-28 Sept. 1995. London, James & James
- Metal 98: *International Conference on Metals Conservation*. 1998. Proceedings of the

International Conference on Metals Conservation. Mourey W. and Robbiola L. (eds). Draguignan-Figanières, France, 27-29 May 1998. London, James & James, 1998.

Metal 2001: *International Conference on Metals Conservation*. 2004. Proceedings of the International Conference on Metals Conservation, Chile.

Metal 2004: *International Conference on Metals Conservation*. 2004. Proceedings of the International Conference on Metals Conservation. Canberra, 2004

Oliver A.B. *The Variable Performance of Ethyl Silicate: Consolidated Stone at Three National Parks*. APT Bulletin, Vol. XXXIII, No. 2-3, 2002, pp. 39-46.

Price C.A. 1996. *Stone Conservation An Overview of Current Research*. Getty Conservation Institute.

http://www.getty.edu/conservation/publications/pdf_publications/stoneconservation.pdf Viewed March 2009.

Searls C. L. and Wessel D.P. 1995. *Guidelines for Consolidants*. In: APT Bulletin, Special Issue: Preservation of Historic Masonry. Vol. XXVI, No.4, pp. 41-45.

Selwitz C. 1992. *Epoxy Resins in Stone Conservation*. Getty Conservation Institute.

<http://www.getty.edu/conservation/resources/epoxyresins.pdf> Viewed March 2009.

Selwitz C. *The use of Epoxy Resins for the Stabilization of Deteriorated Masonry*. In: APT Bulletin, Special Issue: Preservation of Historic Masonry. Vol. XXVI, No.4, 1995, pp. 27-34.

Shreir L. L. 2009. Corrosion, vol.2. *Corrosion control*. Elsevier.

Vannucci S., Cassar J. and Tampone G. *The Treatment of a Typical Soft Limestone with Different Consolidants: a Comparative Study*. Reprinted from *Bollettino Ingegneri*, N. 11, 1985, pp. 3-11.

Young M.E., Murray M., and Cordiner P. *Stone consolidants and chemical treatments in Scotland. Report to Historic Scotland* (298 pages).

<http://www2.rgu.ac.uk/schools/mcrg/miconsol.htm> Viewed March 2009.

Code	MAS 5403
Title	Conservation Projects
Type	Lectures, seminars and visits
ECTS credits	4
Year in which it is being offered & Semester	1 st year, 2 nd semester
Pre-requisite study –unit	None
Method of assessment	Assignment
Result	Percentage mark & grade
Attendance	
Lecturer	Prof. A. Torpiano Ms K Stroud Visiting lecturers
Description	<p>This multi-faceted study-unit will delve into particular problems associated with the conservation of historic buildings. It will discuss the problems of humidity in buildings, and how to treat this problem. The specific problems associated with the conservation and restoration of archaeological sites will also be discussed. Project organization and management, and particularly interesting case studies will also be tackled.</p>
Reading List	<p>Essential reading Charters: Athens, Venice, Burra. http://www.international.icomos.org/charters.htm Viewed March 2009. Council of Europe Conventions: Granada, Valletta, Florence. Lowenthal D. 1985. <i>The Past is a Foreign Country</i>. Cambridge University Press. Lowenthal D. 1996, 1997, 1998. <i>The Heritage Crusade</i>. Cambridge University Press.</p> <p>Further reading Cordaro M. 1994, 1999. <i>Il Restauro. Teoria e Pratica</i>. Ed. Riuniti. De la Torre M. 1995. <i>The Conservation of Archaeological Sites in the Mediterranean Region</i>. Los Angeles, Getty Conservation Institute. Renfrew C. and Bahn P (eds) 2000. <i>Archaeology. Theories Methods and Practice</i>. Thames and Hudson.</p> <p>Proceedings of STREMA International Symposia on <i>Structural Repair and Maintenance of Historical Buildings</i>.</p>

Code	MAS 5501
Title	Dissertation
Type	Research
ECTS credits	30
Year in which it is being offered & Semester	3 rd semester
Pre-requisite study –unit	
Method of assessment	Written document and viva voce
Result	Percentage mark & grade
Attendance	
Lecturer	Various
Description	Students will carry out a research project on an original topic pertinent to one or more of the study units taken during the taught part of the course. This will include a critical review of the relevant literature, laboratory or site research work and a critical discussion of the results. The written thesis will be not less than 20,000 words long, and not exceeding 25,000 words, and will contain the results of the research project.
Reading List	According to research topic.

LEARNING OUTCOMES:

<ul style="list-style-type: none"> • Highly specialised knowledge in aspects of the conservation of masonry buildings, some of which is at the forefront of knowledge in a field of conservation work or study, as the basis for original thinking.
<ul style="list-style-type: none"> • Critical awareness of knowledge issues in the field of the humanities and/or sciences and at the interface between the different fields related to the conservation of masonry buildings.
<ul style="list-style-type: none"> • Ability to apply specialised problem-solving skills in research and/or innovation in the conservation of masonry buildings to develop new knowledge and procedures and to integrate knowledge from different fields to perform conservation and restoration work on masonry buildings.
<ul style="list-style-type: none"> • Ability to consider and integrate both ethical and aesthetic issues, as independent professionals, and/or in cooperation with specialists (i.e. art historians, archaeologists, conservators etc.) who contribute to conservation-restoration study/work.
<ul style="list-style-type: none"> • Ability to apply expertise in management and administration to generate solutions to specific problems in the field of conservation of masonry buildings.
<ul style="list-style-type: none"> • Competence in managing and transforming conservation study that is complex, unpredictable and requires new strategic approaches through effective planning and coordination.
<ul style="list-style-type: none"> • Competence to take responsibility for contributing to professional knowledge and practice in conservation of buildings.
<ul style="list-style-type: none"> • Competence to disseminate information gained from research.

Master of Science (M.Sc.) in Conservation Technology for Masonry Buildings (due to open on October 2017). The M.Sc. in Conservation Technology for Masonry Buildings is aimed at persons already practicing as architects, conservators, or in a related field, or holding a first degree in these areas, and wishing to specialize in the conservation of historic masonry buildings. The programme of studies extends over a period of eighteen months of full-time studies spread over 3 semesters.Â The course structure requires participants to follow 60 ECTS of compulsory taught study-units, delivered over two semesters during the first academic year. Seminars and group work form an important component of the programme.