



INSTITUTE OF ARCHAEOLOGY



**MSc**  
**ARCHAEOLOGICAL SCIENCE:**  
**TECHNOLOGY AND MATERIALS**

Degree Handbook 2018/2019

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## Introduction

This is the Handbook for the MSc degree programme in *Archaeological Science: Technology and Materials*. It outlines the aims and objectives, structure and content of the degree, and includes summaries of the most relevant options available this year. The information given here, and much more, is also available on the Institute's website.

This Handbook should be used alongside the MA/MSc Handbook (also available online), which contains information about all MA and MSc degrees, and options within them, being taught this year. Students should consult that Handbook if they need information about an option outside those normally offered within the present programme. The MA/MSc Handbook gives essential information on a range of topics, including enrollment, guidelines on referencing and plagiarism, and guidance on coursework and the dissertation, so students should ensure that they read it carefully. Distributed along with the MA/MSc Handbook are maps of the College precinct and surrounding area of London, the complete MA/MSc teaching timetable and the list of Personal Tutors to MA and MSc students.

All taught graduate programmes are designed for students who already have a relevant degree at undergraduate level, or suitable prior experience; however, given the interdisciplinary nature of this degree, we understand that you may feel weaker about some areas. If you need guidance for your own readings on any aspect of the degree where you feel less confident about your background, feel free to ask for help.

If students have queries about the organisation, objectives, structure, content or assessment of the degree, they should contact the Degree Co-ordinator, who will be pleased to discuss your concerns and answer any questions you may have.

## What is the degree about?

This degree is focused on artefacts and how scientific techniques can be used to understand their technologies and origins. This information may then be used to address questions about early societies, for example technological transfer, trade and exchange, innovation and identity.

Combining class-based introductions with extensive practical sessions in the laboratory, it aims to introduce students to the necessary research skills to design, implement and report instrumental analyses of archaeological materials. The degree has a focus on inorganic materials – ceramics, metals, glass and lithics –, which are those most commonly recovered from archaeological excavations, but organic materials will be introduced too. The instrumental and research skills may be transferable to other archaeological, environmental and conservation materials.

The degree includes practical training in sample preparation for petrography, metallography, chemical and isotopic analyses, as well as use of optical microscopy, SEM-EDS, XRF, FTIR and XRD, in addition to critical engagement with several other techniques.

While all students in this degree are expected to become competent in laboratory-based analyses, they are allowed to undergo further training on anthropological approaches to science-based archaeology and/or computing and data science, as well as choosing from a range of option courses on specific materials, methods, regions and periods.

## Who is the degree for?

The course is designed to allow students to cross over from either a humanities background or a scientific background into scientific archaeology, hence no specific background is preferred. We tailor our training to build on and expand your own strengths.

If you have an **archaeology degree** you will receive user-friendly training in scientific principles and methods directly related to the analysis of archaeological materials and artefacts. You will experience a wide range of laboratory work.

If you have a **science degree** you will be able to apply your scientific knowledge to the investigation of archaeological materials, with a context provided by material-specific courses which provide the appropriate archaeological background.

If you have a **conservation degree** you will learn the research skills and techniques needed to understand the technologies and materials of the objects that you conserve.

The degree provides an excellent background in the research skills needed to undertake a **PhD in archaeological science**.

## Aims, objectives and outcomes of the degree

The *MSc Archaeological Science: Technology and Materials* aims:

- To provide a wide-ranging and challenging introduction to the theoretical issues involved in materials analysis as a scientifically-informed sub-discipline of archaeology.
- To encourage critically aware perspectives on scientific practice and research processes in archaeological science, and their role in contributing to the development of knowledge and theory in archaeology.
- To provide an in-depth understanding of approaches to the scientific analysis and interpretation of materials in the context of archaeological research.
- To provide a sufficiently detailed understanding of scientific approaches to archaeological finds to serve as a basis for independent research.
- To foster the ability to develop original research questions and to explore them effectively through materials analysis.
- To provide training relevant to a professional and/or research career in the materials aspects of archaeological science.

These aims are pursued through a degree programme with a core course designed to provide a solid understanding of the foundations, approaches, potentials and challenges of artefact and materials analysis in archaeology, and a range of options relevant to artefact and materials analysis, archaeological theory and computation, from which students can define an individual pathway through the programme, tailored to their specific interests and personal educational objectives. All students undertake a supervised research project leading to a 15,000 word

dissertation, which enables them to develop specific practical, analytical and interpretive skills as well as broader research skills.

**Objectives:** Upon successful completion of the degree students will, among other things, have:

- Gained a detailed understanding of recent theoretical and practical perspectives in materials analysis in archaeological science.
- Developed their critical faculties in discussion, debate, and evaluation of alternative interpretations and perspectives on artefactual and materials data.
- Carried through a substantial programme of independent research embodied in a dissertation on a topic involving archaeological materials analysis that demonstrates theoretical understanding and practical competence in science-based archaeological analysis and interpretation.

**Outcomes:** More generally, they will also have:

- Acquired a range of skills, including practical skills, relevant to their further development.
- Developed a range of generic research-oriented and team-working skills.

## Programme structure

The programme of study for this degree is intended to help students meet the objectives outlined above, and also to provide an opportunity for them to achieve any additional personal objectives. To fulfill the requirements of the degree you study 180 credits.

### Core course

Students all follow one core course:

- Laboratory and Instrumental Skills in Archaeological Science (ARCLG347, 15 credits, 11 weeks)

### Option Courses

You are then able to choose further option courses to the value of 75 credits, depending on your background and interests. These options should be made up of:

**a) At least 15 credits of the following:**

- Technology within Society (ARCLG346, 15 credits, 11 weeks)
- Archaeological Data Science (ARCLG338, 15 credits, 11 weeks)

**b) At least 30 credits of the following:**

- Archaeometallurgy 1: Mining and Extractive Metallurgy (ARCLG108, 15 credits, 11 weeks)
- Archaeometallurgy 2: Metallic Artefacts (ARCLG109, 15 credits, 11 weeks)

- Archaeological Ceramics Analysis (ARCLG114, 15 credits, 11 weeks)
- Interpreting Pottery (ARCLG112, 15 credits, 11 weeks)
- Archaeological Glass and Glazes (ARCLG111, 15 credits, 11 weeks)
- Prehistoric Stone Artefact Analysis (ARCLG113, 15 credits, 11 weeks)
- Geoarchaeology: Methods and Concepts (ARCLG104, 15 credits, 11 weeks)
- Working with Artefacts and Assemblages (ARCLG348, 15 credits, 11 weeks)

**c) The remaining 30 credits** may also come from the above lists or can be chosen from the outstanding range of other Masters courses offered at the UCL Institute of Archaeology or elsewhere within UCL (subject to availability and resources).

## Dissertation

The dissertation is equivalent of **90 credits** and therefore contributes 50% towards your final degree grade.

The dissertation of 15,000 words is a report on research, the topic chosen being approved as being relevant within the general area covered by this degree. Before Christmas, students should discuss their area of research interest with their Degree Co-ordinator, who will help them to focus their ideas for their dissertation, or refer them to another member of staff who will be able to provide more specific advice, and will probably be appointed to be the student's Dissertation Supervisor. They will help the student define their dissertation topic, and provide guidance through the main stages of the work. The dissertation provides a further opportunity to define and achieve the student's own particular objectives, and may be related to a fieldwork period. It should be used to apply newly learned approaches to an archaeological problem and to gain greater experience with particular methods of data generation and analysis. If a student is studying part-time while working in the field, they might choose to analyse a data set derived from their own work, or to assess the potential of particular theoretical or methodological approaches for their work. They can treat the dissertation as a one-off research project, as a pilot study for a PhD project, or use it to showcase their skills to potential employers.

The dissertation should be submitted by **13<sup>th</sup> September 2019**. Guidelines for researching, writing and producing the dissertation are included in the MA/MSc Handbook.

The aim of the dissertation is to produce a written report (illustrated and referenced as necessary) based upon individual research on some area of material analysis and interpretation. This could include assemblages from excavated contexts, literary sources, or archived material, but there must be a specific range of materials being discussed. In some cases this will combine a professional finds report with an academic overview of the particular field using the results of the analysis undertaken in the Institute's Wolfson Archaeological Science Laboratory. It might be used to apply scientific approaches to an archaeological problem, or to gain greater experience with particular materials or a specific method of data analysis. You might choose to analyse a data set derived from your own work, or to assess the potential of particular theoretical or methodological approaches to your work. For this specific degree, you are normally expected to conduct original analytical research on archaeological materials.

When considering your dissertation topic, you should refer to the aims and objectives of the course. You will be encouraged to develop individual interests and acquire expertise in appropriate techniques through your choice of options. Initial discussions with the Degree Co-ordinator will be used to outline a general area of interest, which will be used to identify a suitable supervisor within the Institute of Archaeology. It is your responsibility to maintain contact with your supervisor and ensure that you have access to suitable material for study, but the Degree Co-ordinator and your supervisor are there to provide guidance and support in your choice of research question, access to suitable material and your analytical approach.

Work on your dissertation will be your principal activity from April to mid-September. You are advised to give some consideration to how you are going to structure your time and work in order to ensure that you can complete this project in the time available. If you expect to find the preparation of this document difficult, it is advisable to break the work down into smaller, more manageable, chunks.

In order to ensure that your dissertation is progressing adequately you are encouraged to consider the following schedule:

Term 1: Read the handbooks, consider topics for dissertation and discuss these with the Degree Co-ordinator, who will advise and help to arrange access to laboratory facilities and the appointment of a suitable Dissertation Supervisor. But don't be obsessed about finding a dissertation topic as soon as you arrive: allow yourself the first couple of months to explore what's available, with a view to identify a relevant research area by the end of Term 1.

Term 2: By the first or second week of the second term you are advised to prepare an outline of your dissertation proposal (in consultation with your supervisor) and submit this to both your supervisor and the Degree Co-ordinator for comment. (A single typed side of A4 should suffice; this should specify a title, aims, possible methodology, and sources of material and areas of literature to be examined.). By the end of this term you must complete the dissertation form A to be signed by your supervisor and returned to the Degree Co-ordinator.

Term 3: At the beginning of May you are advised to give an outline dissertation proposal countersigned by your supervisor, to the Degree Co-ordinator. This proposal should be no more than five sides of A4 providing a summary of your literature review and including chapter headings and listing the sources of material and access arrangements.

Early June: Agree your research timetable (analysis of material, reading, data processing, preparing illustrations, writing up, proof-reading, etc.) with your Dissertation Supervisor, and arrange to show her/him a substantial piece of work (e.g. a chapter of the dissertation) for comment.

**Note:** although a Masters degree lasts a full calendar year, up to mid-September, the course co-ordinator and supervisors are very likely to be out of London for large parts of the summer (usually undertaking fieldwork). Make sure that you have discussed your needs well in advance of this period and made arrangements for contact or communication as necessary.

**September 13<sup>th</sup> 2018** (or earlier!) Submit two copies of the dissertation in conformity with the guidelines, as well as a CD or memory stick including a digital copy of the dissertation itself and of all the analytical data produced (for archiving purposes).

### **Oral examination ('viva')**

All Master's students are required to attend an oral examination, normally as part of their Dissertation assessment. This will normally be held in June. Students must submit to their Dissertation Supervisor and Degree Programme Co-ordinator a single sheet of A4 summarising the proposed research design of their dissertation, and they will deliver a short presentation to some staff and peers. No marks are awarded for the oral examination; the assessment is satisfactory or unsatisfactory. In the event of a problem being identified by the examiners of the Dissertation, students may be invited to attend a formal viva voce examination with the External Examiner for the degree also in attendance. Part-time students will normally be required to give a Dissertation presentation (viva) in the year in which they are examined in the Dissertation.

### **Teaching schedule**

Taught courses are normally timetabled in the first two terms, though assessed work may be scheduled for submission in the third term, depending on which options have been selected. Full details of the timetable for each course are included in the course handbooks. Students are expected to use the remaining months to work on their dissertation.

A wide range of specialised lectures and lecture series are offered throughout the year at the Institute of Archaeology. These are open for all staff and students at the Institute, and are typically advertised in the entrance area and via email. There is no assessment on any of these, and students are encouraged to take up this unique opportunity for specialised teaching.

If they are pursuing the degree on a part-time basis, students will normally be expected to take two full elements (which will normally include the core course) in the first year and the remaining element in the second. They must agree their choice of courses with the Degree Co-ordinator. They may start work on the dissertation at the same time as full-time students, or they may wish to start later; either way they should consult the Degree Co-ordinator, and their Dissertation Supervisor, once the latter has been appointed.

### **Teaching methods**

Courses on Masters' programmes usually involve a combination of seminars and lectures. Most courses will also have associated practicals, laboratory sessions, or field trips. UCL staff, with the addition of occasional guest speakers, will conduct the lectures and seminars. Most classes will include a period of formal presentation by one or more lecturers and a period of class discussion that frequently use the essential readings as a basis from which to examine the topic and its relation to artefact analysis in archaeology. Please consider your own experiences and knowledge and use this to contribute examples of similarities and differences in relation to the description, theory and practice of artefact analysis and interpretation discussed in the course.

Seminars are run differently by different Course Co-ordinators, but all have weekly recommended readings, which students will be expected to have done, to be able fully to follow and actively to contribute to discussion. Some courses may require the student to make a seminar presentation; if so, this will be indicated in the course handout. Students will be required to undertake a considerable amount of self directed learning through reading and other information gathering methods.

## Practice essay: Is archaeology a science?

All Master's students are required to submit a practice essay. This is a formative exercise (i.e., it doesn't count towards your final marks!), only meant to prompt you to familiarise yourself with our marking criteria, allowing you to obtain early feedback on your approach to written assessments.

For this degree, you are required to write an essay addressing the following question: Is archaeology a science? In the references below (all available online through the core course Online Reading List, JSTOR, academia.edu, etc), you should have enough information to inform your essay: unlike other cases, you are not expected to carry out an exhaustive bibliographic search for this particular essay. Instead, the assessment will focus primarily on structure, coherence, conciseness, originality, critical ability, use of writing and referencing conventions... so that I can give you feedback that you can take into account when writing other essays for this and other courses.

### Reading material

- Binford, L. 1962. Archaeology as anthropology. *American Antiquity*, 28: 217-225.
- Hawkes, J. 1968. The proper study of mankind. *Antiquity*, 42: 255-261
- Isaac, G. L. 1971. Whither archaeology? *Antiquity*, 45: 123-129.
- Jones, A. 2004. Archaeometry and materiality: materials-based analysis in theory and practice. *Archaeometry* 46(3): 327-338
- Killick, D. 2015. The awkward adolescence of archaeological science. *Journal of Archaeological Science* 56: 242-247.
- Martín-Torres, M. and Killick, D.C. 2015. Archaeological theories and archaeological sciences, in A. Gardner, M. Lake and U. Sommer (eds.), *Oxford Handbook of Archaeological Theory*. Oxford: Oxford University Press. Online

Wordcount: 760-840. Deadline: 20 October. Turnitin Class ID: 3886076. Password: loA1819

## Staff and contact

In addition to the individual option course co-ordinators, the core staff members for the degree comprise:

- **Mike Charlton**, room 210, [m.charlton@ucl.ac.uk](mailto:m.charlton@ucl.ac.uk), tel. 02076797498
- **Ian Freestone**, room 210, [i.freestone@ucl.ac.uk](mailto:i.freestone@ucl.ac.uk), tel. 02076794963
- **Bill Sillar**, room B16, [b.sillar@ucl.ac.uk](mailto:b.sillar@ucl.ac.uk), tel. 02076791538

- **Ulrike Sommer**, room 409a, [u.sommer@ucl.ac.uk](mailto:u.sommer@ucl.ac.uk), tel. 02076791493
- **Miljana Radivojevic**, room 603, [m.radivojevic@ucl.ac.uk](mailto:m.radivojevic@ucl.ac.uk), tel. 02076794924
- **Patrick Quinn**, room B17, [patrick.quinn@ucl.ac.uk](mailto:patrick.quinn@ucl.ac.uk), tel. 02076795595
- **Tom Gregory**, room B4, [t.gregory@ucl.ac.uk](mailto:t.gregory@ucl.ac.uk), tel. 02076794921
- **Agnese Benzonelli**, room B51, [agnese.benzonelli.12@ucl.ac.uk](mailto:agnese.benzonelli.12@ucl.ac.uk), tel. 02076797481

**Mike Charlton is the programme co-ordinator and you should contact him with general queries in the first instance.**

I have set office times to meet students without previous appointment. These are normally shown on my office door. It would be helpful if you could come in these slots, but we can arrange to meet at other times if these are not convenient. During the first few weeks I will try to be available as much as possible to solve any queries you may have. Feel free to just pop by anytime. For less urgent matters, and if you require longer meetings, it is much better if we can arrange an appointment beforehand. You can also contact me by email, either to arrange appointments or for brief questions.

## Prerequisites

Courses for Masters programmes do not have prerequisites; students will have been accepted to the programme on the understanding that they already have sufficient background in archaeology or a relevant field, either through their previous degree, or through relevant experience, to be able to follow the programme and courses for which they have been accepted. If, however, students wish to change their programme, or the courses in which they indicated an interest in enrolling in, in their application, they should discuss this with the relevant Degree and Course Co-ordinators.

If you would like guidance on reading for a particular area of the degree you feel less confident about, feel free to ask.

## Libraries and other resources

In addition to the Library of the Institute of Archaeology, the Science Library and the Main Library of UCL have holdings of particular relevance to this degree.

Libraries outside of UCL with holdings which may also be relevant to this degree are the Senate House Library, the British Library, the Imperial College Library and the Library of the Department of Scientific Research at The British Museum. When searching for rare publications, you are encouraged to explore the M25 Consortium of Academic Libraries (<http://www.m25lib.ac.uk>).

## Online resources: reading lists and Moodle

Jointly with the Library team, we are making an effort to exploit the advantages of the internet, and this MSc aims to make all of the teaching resources available online.

Both for the core course and for the main option courses (see list above), you can find their relevant reading lists online, where all of the articles noted as “essential reading” and most of the

“further reading” items are available for download in PDF format. If the PDF is not available due to copyright restrictions, you will find a link to the relevant library shelfmark where you can find a hard copy of the publication.

The Online Reading Lists are available via the Institute’s Administration Intranet (link available from the Institute’s website, UCL ID and password required)

In addition, all courses available via Moodle, an online teaching resource where you will find access to the reading lists but also to relevant websites, PowerPoint presentations, class handouts, activities and discussion groups that are relevant to this degree. The Moodle portal is: <https://moodle.ucl.ac.uk> (UCL ID and password required)

## **The photographic laboratory**

The photographic department is a teaching and service facility with extensive experience of getting the best results from difficult-to-photograph finds and samples. Students are welcome to use the photographic laboratory for their own research needs, even if not attending this course. If you have any questions relating to the use of these facilities, contact Stuart Laidlaw.

## **Scientific laboratory facilities**

The UCL Wolfson Archaeological Science Laboratories in the basement provide excellent facilities for the examination and analysis of a wide variety of archaeological materials, facilities for wet and dry sieving and the sorting and storage of artefacts and sediment cores, small furnaces for controlled experimentation with melting and firing conditions and facilities for preparing polished and thin-sections, as well as pressed powder pellets, and the digestion of samples for stable isotope analysis. More ‘high-tech’ facilities include an electron-probe X-ray microanalyser which allows analysis of the elements present within minute areas of an object, two portable X-ray fluorescence spectrometers, which provide an accurate method of analysing major and trace elements in bulk samples, particularly in metals, slags, ceramics and glasses, an X-ray diffractometer for mineralogical analyses, and a Fourier-transform infrared spectrometer, which enables the user to analyse both organic and inorganic compounds. A wide range of microscopes are available for use, including several scanning electron microscopes with energy and wavelength- dispersive spectrometers, a Philips environmental SEM, a Hitachi variable pressure SEM and a JEOL field emission SEM for versatile analyses of entire objects or samples, stereoscopic light microscopes for small and detailed examination of artefacts, and petrological and metallurgical microscopes with digitising equipment for image analysis. There are also extensive laboratories for archaeological conservation on the sixth floor which are equipped for the examination and treatment of archaeological and ethnographical materials, as well as state-of-the art computing facilities on the third floor. If you have any questions relating to the use of these facilities please contact Marcos Martín-Torres.

## **Lectures, seminars and events**

The Institute hosts a wide range of lectures and seminars that are advertised primarily by email and via the Institute’s website. You are welcome to attend almost all of these, and I would

particularly encourage you to participate in the weekly research seminars on Monday at 4pm, which give you a flavour of research carried out by Institute's staff.

## Health and safety

The Institute has a Health and Safety policy and code of practice which provides guidance on laboratory work, etc. This is revised annually. All work undertaken in the Institute is governed by these guidelines and students have a duty to be aware of them and to adhere to them at all times. This is particularly important in the context of the laboratory work which will be undertaken as part of this degree. Amongst other safety inductions, you will also need to complete a few online training courses. The courses aim to inform participants about good laboratory practices and instil safe behaviours which apply to all laboratory environments.

You have to watch the presentations, pass the final tests, and send the certificates to Agnese.

1. **UCL safety Induction**, available at this link: <https://moodle.ucl.ac.uk/enrol/index.php?id=38969>
2. **Principles of Laboratory Safety**, available at this link: <https://moodle.ucl.ac.uk/enrol/index.php?id=39173>
3. **Basic fire safety**, available at this link: <https://moodle.ucl.ac.uk/enrol/index.php?id=39149>

You will also need to meet one day to sign a few forms and have a member of the laboratory staff guide you through the fire route.

## Feedback

In trying to make this degree as effective as possible, we welcome feedback during the course of the year. Students will be asked to fill-in Progress Forms at the end of each term, which the Degree Co-ordinator will discuss with them, which include space for comment on each of their courses.

At the end of each course all students are asked to give their views on the course in an anonymous questionnaire, which will be circulated at one of the last sessions of the course. These questionnaires are taken seriously and help the Course Co-ordinator to develop the course. The summarised responses are considered by the Degree Co-ordinator, the Institute's Staff-Student Consultative Committee, Teaching Committee, and by the Faculty Teaching Committee.

If students are concerned about any aspect of a specific course, we hope they will feel able to talk to the relevant Course Co-ordinator, but if they feel this is not appropriate or have more general concerns, they should consult their Degree Co-ordinator or the Graduate Tutors. They may also consult the Academic Administrator, the Chair of Teaching Committee, or the Director.

*Appended to this introduction is a series of separate one-page summaries of some of the option courses associated with this degree which are available this year. For more detailed information, please refer to the Institute's website, where individual course handbooks are accessible for registered students. You may also wish to contact the relevant course coordinators.*

## G346 Technology within Society

COURSE CO-ORDINATOR: Bill Sillar, [b.sillar@ucl.ac.uk](mailto:b.sillar@ucl.ac.uk)

This course introduces concepts and theories used to study the social significance of technology and material culture. Students will debate how these are being applied in the analysis of archaeological artefacts. Seminars will use case studies to explore anthropological, archaeological and material science approaches to the study of technology and material culture. This interdisciplinary approach highlights the significance of material culture studies in relation to ethnographic, historical and archaeological examples. Sessions follow the life-history of artefacts, exploring the sequence of raw-material acquisition, craft production, use, and disposal, as well as site formation and archaeological excavation. Handling sessions will be used to open discussion about research questions and analytical methods that can be applied more widely. Debating technology from an anthropologically-informed perspective should help students to think creatively about how the analysis of artefacts can be used to address research questions. A group project will require students to work on individual themes and then draw these together to develop a research proposal. This wide-ranging introduction to theories and approaches used in the study of archaeological artefacts should equip students to consider these ideas in relation to their other course options and dissertation projects.

### AIMS OF THE COURSE

- This course introduces a wide range of concepts and ideas used in artefact studies, with a strong critical consideration of the academic and theoretical significance of such research. More specifically the course aims:
- To provide a wide-ranging and challenging introduction to the role of artefact studies in modern archaeology.
- To encourage students to think about technology from an anthropologically informed perspective that focuses on how and why people make and use artefacts.
- To encourage an interdisciplinary approach to artefact studies and the scientific analysis of materials.

### TEACHING METHODS

Each weekly session will start with a short lecture followed by seminar discussion of relevant literature where students should actively engage in debate. Seminars have two or three essential readings each week, which students are expected to have read and critiqued prior to class and contributed to a pre-class discussion on the course Moodle. Some classes will include artefact handling where this is relevant to support discussion and debate. There will also be both individual and group work required in developing the group project.

Formal assessment is based on two pieces of coursework. A 1000 word component within a group project will contribute 25% to the final grade, and a 3000 word essay will contribute the other 75%.

## G338 Archaeological Data Science

COURSE CO-ORDINATOR: Mark Altaweel, [m.altaweel@ucl.ac.uk](mailto:m.altaweel@ucl.ac.uk)

This course introduces principles of information science and its application to archaeology. The areas covered include database management and design, basic principles of computer languages and scripts, use of computational modelling methodologies in archaeological problems, network analysis, crowd sourcing, and basic design of broader computer applications and apps for smart phones and other devices. The course is intended to provide a basic understanding in core principles and practical application on how emerging technologies and methods can be applied to archaeological problems. Lectures will cover how these techniques have been used in archaeology and other fields, including benefits and limitations. The course will also utilize hands on training and practicals to reinforce methods and techniques taught.

### AIMS

The aim is to introduce students to key concepts in data/information science as it applies to archaeology. With increased use of technologies and increasing availability of data and data repositories, archaeologists need techniques and methods to understand how to promote their work in a modern format to other researchers and the public, while also utilizing information to make new and deeper understanding into archaeological problems. This includes being aware of current technical tools that are available as well as enabling students to begin to produce their own tools to solve problems of interest.

### LEARNING OUTCOMES

By the end of the course, students will have:

- a basic understanding of fundamentals in data management, network analysis, computer modeling, and scripts and software creation
- be able to create a basic design and practical implementation of software and technical approaches to archaeological problems
- know how the variety of tools and methods apply to archaeology and other related fields

### TEACHING METHODS

The course will be delivered via lectures and seminars, while practicals will also be used as a means to give examples of the key contents taught. The practical time will be used to create scripts, programs, and use software to address issues raised in lectures and seminars. Students will be asked to create a final research project assignment that will emphasize a more elaborate version of concepts taught in the course. All software will be open source, allowing students to use methods and technologies long after they leave UCL.

## G108 Archaeometallurgy: Mining and extractive technology

COURSE CO-ORDINATOR: Mike Charlton, m.charlton@ucl.ac.uk, room 210, ext. 27498.

### COURSE AIMS

The aim of the course is to provide students with a fundamental understanding of the development and spread of mining and metallurgy within their geological and archaeological contexts from the Neolithic up to the early modern period, as well as with the basic skills to identify and study archaeometallurgical remains. This includes a brief introduction to the concept of metals as a specific class of material, with a considerable diversity in properties among different metals. Based on this, it strives to convey some of the basic chemical and metallurgical processes relevant to the primary production of metals, including the principles of ore reduction, slag formation, alloying and refining. While copper/bronze and iron/steel take centre stage as the most important metals, individual sessions will address the less common metals and alloys such as lead, silver, zinc, brass and gold. Examples are drawn from Europe, Asia, Africa and America, and include current research projects carried out at the Institute. More specialised topics, such as less common metals or specific geographic regions, can be included in the lecture schedule according to students' interests.

TEACHING STRUCTURE: The course is taught in the first term. It will include lectures, seminars, videos, handling sessions and other practicals

### TOPICS COVERED

Introduction to the course. Ores, minerals and metals. Beneficiation. Principles of metal smelting. Crucibles, furnaces, metals, moulds. Explaining technological choices. The inception and transmission of copper metallurgy. Lead and silver. Iron and steel. Bloomery smelting. Iron smelting and smithing. Industrial production. Iron and copper in Africa. Zinc and brass. Gold metallurgy: Precious metal refining. Open topic.

### ASSESSMENT

The course is assessed by one standard essay and a materials identification test. Specific topics and submission deadlines are given in the full course handbook.

### PRACTICALS

A number of practicals are planned to accompany the lectures/seminars, including handling of relevant materials and experimentation; details are to be found in the course handbook.

### BASIC TEXTS

Bayley, J., Crossley, D. and Ponting, M. 2008. *Metals and metalworking. A research framework for archaeometallurgy*. London: HMS. INST ARCH KEA Qto BAY, ISSUE DESK IOA BAY 2

Craddock, P., 1995, *Early Metal Mining and Production*. Edinburgh University Press. INST ARCH KEA CRA

## G111 Archaeological glass and glazes

COURSE CO-ORDINATOR: Ian Freestone; Room 210, Ext: 27498; [i.freestone@ucl.ac.uk](mailto:i.freestone@ucl.ac.uk)

### COURSE AIMS

This series of lectures gives an introduction to the wide range of artificial siliceous materials, most importantly Egyptian, Roman and Medieval glasses, faience and glazes on a variety of bodies, natural and artificial pigments, and beads. Given the width of the topic, only a selected number of topics can be covered, and independent reading will form an integral part of the programme.

### TEACHING STRUCTURE

The course will be taught in Term 1. It will comprise lectures, videos and a gallery tour in the British Museum.

### TOPICS COVERED

Overview, siliceous materials and the vitreous state. Faience, glazed stone and Egyptian Blue. Late Bronze Age and early Iron Age glass. The Roman glass tradition. Continuity and change in Late Antiquity and the early medieval period. Medieval glass in the East. Medieval glass in the West; Renaissance glass. Beads and precious stones; Chinese, African and Indian glass. Glazes and Enamels. Metals and Glass; open session, discussion, final summary

### ASSESSMENT

The course is assessed entirely by coursework, consisting of 2 essays, each of ca. 2,500 words. Essay topics and submission deadlines are given in the full course handout.

### BASIC TEXTS AND RESOURCES

The following introductory texts and background reading are relevant to this course:

Bowman, S., 1991, *Science and the Past*. British Museum Press, London. INST ARCH AJ BOW

Henderson, J., 1989, *Scientific Analysis in Archaeology*. Oxford University Committee for Archaeology, Monograph 19. INST ARCH AJ HEN

Kaczmarczyk, A & Hedges, R., 1983, *Ancient Egyptian Faience*. Warminster, Aris & Phillips. EGYPTOLOGY M 20 KAC

Lilyquist, Chr. & Brill, R., 1993, *Studies in Early Egyptian Glass*. New York: The Metropolitan Museum of Art.

Pollard, M. & Heron, C., 1996, *Archaeological Chemistry*. Royal Society of Chemistry Paperbacks. INST ARCH JD POL

## G112 Interpreting pottery

COURSE CO-ORDINATOR: Bill Sillar; Room B16; Ext: 21538; [b.sillar@ucl.ac.uk](mailto:b.sillar@ucl.ac.uk)

### COURSE OUTLINE

This module provides a broad introduction to ancient pottery and the ways in which it is studied in archaeology. Using examples from around the world spanning several millennia, it covers the depth and breadth of ancient pottery and other ceramic artefacts. The module is structured around the life-cycle of pottery from raw materials to archaeological finds. It places particular emphasis on production as a means of understanding past pottery-making cultures. The topics of distribution, consumption and discard are also covered.

The module consists of lectures, museum visits, demonstrations, artefact handling and experimental archaeology. By completing the module, participants should have gained a good general appreciation of the role of pottery within archaeology and obtained practical experience in retrieving and interpreting data from pottery assemblages in order to answer a range of basic archaeological questions. The module is an essential pre-requisite for ARCLG114 on Archaeological Ceramic Analysis in Term II.

Timetable: Term I, 2 hours of lectures plus 2 hours of practicals/demonstrations/fieldwork per week

### ASSESSMENT

The module will be assessed by means of a practical research project that will be written up as a 3500 word report. Project topics will be chosen in Week 3 and the report will need to be handed in by Friday 15 January 2016. Some topics may involve working in pairs. Students will also be expected to give a short presentation on their project in Week 10 but this is not assessed.

### SCHEDULE

Week 1 - The World of Pottery - Definitions, History and Study within Archaeology

Week 2 - The Life Cycle of Pots. Potters Raw Materials

Week 3 - Raw Material Processing and Paste Preparation

Week 4 - Pottery Forming Methods: Tools, Techniques and Recognition

Week 5 - Decoration and Surface Treatment

Week 6 - Pottery Firing: Principles, Processes and Structures

Week 7 - Organisation of Pottery Production

Week 8 - Distribution, Trade and Exchange of Pottery

Week 9 - Consumption, Use, Breakage and Formation of Pottery Assemblages

Week 10 - Presentation of Individual Projects

## **G113 Prehistoric stone artefact analysis**

COURSE CO-ORDINATOR: Ignacio de la Torre, [i.torre@ucl.ac.uk](mailto:i.torre@ucl.ac.uk)

This course will examine the different ways in which human behaviour is reflected in the production and use of knapped and ground stone artefacts.

We will explore a variety of analytical approaches and the ways these can be used for the interpretation of technological, cognitive, economic, and social issues.

The Institute has extensive tool reference material, and we will concentrate on material from Europe, the Near East, and Africa. The possibility to undertake experimental flint knapping will also be given.

### **AIMS**

The aims of the course are:

- To promote a comprehensive understanding of the type of information that lithic artefacts can provide about past human behaviour.
- To explore the range of analytical techniques, methods and theoretical perspectives lithic specialists employ to study stone tool assemblages

### **OBJECTIVES**

On successful completion of this course a student should:

- Be familiar with the analytical and theoretical approaches used in lithic analysis.
- Understand the ways in which lithics as a form of material culture inform us about the human past.
- Be able to critically evaluate reports on, and interpretations of lithic assemblages.
- Be familiar with a range of case studies related to specific aspects of lithic analysis.

### **TEACHING METHODS**

The course is taught through a series of lectures, seminars and discussion, and practical work.

## G114 Archaeological ceramic analysis

COURSE CO-ORDINATOR: Patrick Quinn; email: [Patrick.quinn@ucl.ac.uk](mailto:Patrick.quinn@ucl.ac.uk)

### COURSE OUTLINE

This module introduces participants by means of lectures and demonstration to a range of scientific techniques that can be used to analyse and interpret cultural information from archaeological ceramic assemblages, including thin section petrography, geochemistry, scanning electron microscopy and organic residue analysis.

The module is designed to complement and build upon the 1<sup>st</sup> term course 'Interpreting Pottery' (G112) which focused on the visual analysis of larger assemblages of pottery and a consideration of their archaeological context.

Focusing in particular on ceramic petrography, the module provides in depth practical training, on the principles of this versatile geoarchaeological approach and its role in the interpretation of pottery provenance and manufacturing technology. Assessment is by means of two microscope-based practical exercises. The module is pre-requisite for those wishing to undertake MA or MSc dissertations that involve ceramic analysis.

### ASSESSMENT

The module will be assessed by means of a short critique of the application of scientific ceramic analysis as well as an unseen microscope practical in which participants were expected to characterise and interpret archaeological ceramic thin sections. The critique will need to be handed in by Thursday 24 March 2016. Students will also be expected to give a short presentation on their project in Week 10 but this is not assessed.

### SCHEDULE

Week 1 - Archaeological Ceramics and their Analysis. Introduction to Optical Mineralogy

Week 2 - Igneous Rocks: Their Classification and Identification in Thin Section

Week 3 - Sedimentary Rocks: Their Classification and Identification in Thin Section

Week 4 - Metamorphic Rocks: Their Classification and Identification in Thin Section

Week 5 - Clay, Soil and Weathering. Introduction to Thin Section Ceramic Petrography

Week 6 - Classification and Characterisation of Ceramics in Thin Section

Week 7 - Interpreting Ceramic Provenance in Thin Section

Week 8 - Reconstructing Ceramic Technology in Thin Section

Week 9 - Instrumental Geochemical Analysis of Archaeological Ceramics

Week 10 - Scanning Electron Microscopy and X-Ray Diffraction Analysis of Archaeological Ceramics. Practical Assessment

## **G104 Geoarchaeology: Methods and Concepts**

Course coordinator: Manuel Arroyo-Kalin ([m.arroyo-kalin@ucl.ac.uk](mailto:m.arroyo-kalin@ucl.ac.uk))

### **COURSE DESCRIPTION AND AIMS**

Soils and sediments are archives that record evidence about the evolution and transformations of landscapes over time. ARCLG104 is an introduction to the study of soils and sediments focused on interrogating their properties to understand past landscape change and archaeological formation processes. The course aims to provide students with the knowledge base and practical tools necessary to: critically evaluate geoarchaeological research, formulate geoarchaeological research questions, and undertake entry-level geoarchaeological investigations. Through lectures, seminars, laboratory demonstrations and laboratory practical, the course structures a geoarchaeological perspective on past human-landscape interactions that is pertinent to engage with broader discussions in archaeological theory and method, human niche construction, and the effects of anthropic factors in earth system science.

### **OBJECTIVES**

On successful completion of this course, students will

- Understand the main concepts, themes, and approaches that make up the discipline of geoarchaeology.
- Understand how geoarchaeology relates to broader archaeological concerns as well as to research conducted by earth system science disciplines.
- Understand how a geoarchaeological perspective can be employed to formulate and tackle archaeological research questions in different chronological and landscape settings.
- Achieve a comprehensive overview of the practical approaches that can be employed to study sediments and soils in the course of geoarchaeological research.
- Acquire practical laboratory skills to implement some of these approaches, specifically with a view to undertaking geoarchaeological research during and after their postgraduate course.

### **TEACHING METHODS AND SCHEDULE**

The course consists of lectures, seminars, laboratory demonstrations, and laboratory practicals with compulsory and recommended readings. Lectures provide general overviews of key geoarchaeological themes. Finer details of these themes are expanded and discussed during seminars, where students are expected to provide a critical appraisal of specific case studies for the rest of the class (which in turn must actively contribute to discussion). Laboratory demonstrations provide hands on training on the use of specific geoarchaeological techniques. Laboratory practicals are devoted to conducting supervised laboratory-based geoarchaeological research (on materials provided by the Institute's ongoing research projects), specifically aiming to produce datasets that can be adequately contextualised, reported, and interpreted.