

History Rebooted: Alan Turing and Artificial Intelligence
FYS 188Q – Spring 2009

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Office Hours: Library Business Hours, By Appointment

Meeting Time: Tuesday/Thursday 8:30-10:00, Thursday 2:20-3:50

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Rationale: Since you are reading this document on a microcomputer, know it or not, Alan Turing has touched your life. Turing's 1936 paper "On Computable Numbers, with an Application to the Entscheidungsproblem" describes the core functions and components of the modern computer. Further, it would be fair to say that the Second World War touched the lives of everyone in the United States, and it is not an exaggeration to say that Turing had a personal hand in the Allies' victory. Turing was one of the British code breakers stationed at Bletchley Park during the war, and their importance to the war effort is illustrated by the order Winston Churchill gave when he received a request to allocate more resources to Bletchley Park: "Make sure they have all they want as extreme priority and report to me that this had been done."¹ Lastly, Turing's paper "Computing Machinery and Intelligence" proposes a test for artificial intelligence now known as the Turing Test, which, to this day, is the fundamental measure of whether a machine has replicated human intelligence. A fitting summary of Turing's importance to the twentieth and twenty first centuries can be found in words of Oxford Mathematics Professor Sir Roger Penrose:

...another revolution that is now beginning to make the most profound mark on almost every aspect of our lives. This is the general-purpose computer. The central seminal figure in this computer revolution was Alan Turing, whose outstanding originality and vision was what made it possible, in work originating in the mid 1930s. Although it is now hard to see what the limits of the computer revolution might eventually be, it was Turing himself who pointed out to us the very existence of such theoretical limitations.²

We will be studying the life and work of Alan Turing in order to gain an appreciation for his accomplishments, and a sense of how Turing's specific accomplishments have shaped our understanding of artificial intelligence. Of course, when one considers artificial intelligence what one is really doing is thinking about what it means to be human, and one thing I'd like to do in the name of thinking about what it means to be human is have us ask the extent to which we can get to know Turing (or anyone for that matter) through academic study. Along with the work we do researching Turing we are going to consider

¹ Gilbert, Martin. *Winston S. Churchill. Finest Hour 1939-1941*. Vol. 6. Boston: Houghton Mifflin, 1983. 1186.

² Hodges, Andrew. "Unveiling the Official Blue Plaque on Alan Turing's Birthplace." 23 June 1998. [The Alan Turing Home Page](http://www.turing.org.uk/bio/oration.html). <http://www.turing.org.uk/bio/oration.html> 17 Dec. 2007.

a couple of imaginative works about Turing and discuss how thoroughly can know someone by imaging them.

Required Reading

Leavitt, David. The Man Who Knew Too Much: Alan Turing and the Invention of the Computer. New York: W.W. Norton and Company, 2006.

Turing, Alan. The Essential Turing: Seminal Writings in Computing, Logic, Philosophy, Artificial Intelligence, and Artificial Life, Plus the Secrets of Enigma. Ed. Jack Copeland. Oxford: Clarendon Press, 2004. **Essays on E-Reserve**
“On Computable Numbers, with an Application to the Entscheidungsproblem.”
“Computing Machinery and Intelligence”
“Chess”

Levin, Jenna. A Madman Dreams of Turing Machines. New York: Knopf, 2006
Breaking the Code. Dir. Herbert Wise. Perf. Derek Jacobi. Drama House and WGBH
Boston for BBC North, 1997. **On Reserve, ODY (We will view this film together at the end of April.)**

2001: A Space Odyssey. Dir. Stanley Kubrick. MGM/UA Home Video, 1993.
On Reserve, ODY

Davis, James P. The Rowan and Littlefield Guide to Writing with Sources. 3rd Edition. Lanham MD: Rowman and Littlefield, 2007.

Ullman, Ellen. “Programming the Post-Human.” Harpers. Oct. 2002. 60-70.
On E-Reserve

How It’s Going to Play...

On a certain level our class is going to work in a very traditional discussion with occasional lecture format, and trust me it works best if there is lots more discussion than lecture, which means you need to be in class...you are allowed **three absences** over the course of the semester. More than that will have an adverse effect on your grade--these three, are, by the by, meant to accommodate things like the occasional head cold, they are not your freebies. Thus if you use all three and then get “the crud” (or have to travel home on family business) the next class you miss will count against you. In the event that you have a serious illness I will be notified by Joe Tolliver’s office.

Speaking of “being there”—our Thursday afternoon sessions are going to be devoted to working on “the tools of the trade”: research resources, writing and presentation software, html and graphic software. **These meetings are not optional**, and any Thursday afternoon you miss is one of your three strikes. I think you’ll find these meetings useful and even fun—oboes to ocarinas fun—see you Thursday afternoon!

Speaking of “being there”—class participation figures into the grade. If you steadfastly refuse to participate in class I will subtract a half a letter grade, since it is understood that participation is “part of the job.” What do I mean by “participation?” Not simply talking everyday...“participation” is being prepared and looking for opportunities in the

conversation where your preparation can energize or alter the flow of shared ideas (can turn algebra into calculus). You don't have to be continually at the fore, but you need to be engaged with the course dialogue to the extent that your personality is part of the course composite. You can trust that if I am not happy with your participation you will hear from me long before the end of the semester.

Speaking of “being there”—you'll note that Leah Summerville Farrar is the course mentor. Leah is responsible for being available to help you with the projects you'll encounter this semester. What do I mean by “help?” It is not Leah's responsibility to clean up typos, revise your work, or make sure you get a certain grade—it is our responsibility to facilitate space and means for you to do your best work. Leah is an active participant in the St. Lawrence University community, she is a good writer, and she has taken one of my courses (so she can certainly empathize with any student of mine). I have a lot of confidence in her. Leah will be teaching the Refworks component of the course (and I will be assisting her).

In addition to the help you can receive from me and Matt, the Munn Center for Rhetoric and Communication maintains The WORD Studio in ODY Library—a place to get feedback from peers on assignments in Writing, Oral communication, Research, and Design of visual projects. You can come for a consultation to plan a paper or presentation (you don't need anything but a blank piece of paper!); to find ways to improve the ideas, organization, and style of a draft; to videotape and review a presentation rehearsal; to practice a PowerPoint presentation, and more. Peer tutors are not proofreaders or editors who silently “fix” your work for you; instead, they are trained to have a conversation with you about ways you can fix problem areas yourself and become better overall communicators. You may use The WORD Studio for consultations on assignments for any of your courses, although for FYP assignments you should first seek out Leah during his office hours.

The WORD Studio is open Monday through Thursday, 8:30 a.m. to 11:00 p.m.; Friday, 8:30 a.m. to 4:00 p.m.; and Sunday, 1:00 p.m. to 11:00 p.m. You may also IM the Studio during regular hours with quick questions about grammar, citation, and style: *SLUword*.

Writing Assignments

Course Weblog

We're going to blog! A major component of the course is keeping a journal, which will have both an individual and collective effort. The idea is to give you a chance to reflect on both Turing and the reading and writing that we are doing. So, by the banks of the old St. Lawrence,³ at blogs.stlawu.edu/turing, you will be posting to our course blog, and you will submit some of your journal directly to me (through SLU e-mail). What I'm trying to do is create a space where you're writing for an audience that isn't simply me, and also have an avenue where, in fact, you can write with me in mind, and perhaps write about

³ Interestingly, “I Blog By the Banks of the Old St. Lawrence” was a hit tune in 1950 for Myron Matheison and the Pocket Full O'Marbles.

where you have been within the context of where the course has gone. The blog is going to be interactive, as you will both be posting and commenting on your classmate's posts. So, you might read something Simon wrote (pretend for a second there is a student in the class named Simon) and this might inspire you to see one of the issues we discussed in a new way, or even open up a whole new avenue of investigation. Each blog post needs to be at least 500 words (it can most certainly be more), and the due dates are on the schedule. You'll be writing about:

- **Blog** An introduction of yourself as a student of artificial intelligence...what interests you in the topic, how have you thought about it, is there a book or movie or experience that particularly inspired you to study this topic. If you took the course because you heard the instructor likes Jethro Tull and German cooking think fast...
- **Blog** On reading "On Computable Numbers." It ain't easy, I realize. So in this entry describe the process of reading the paper, and what you thought as we worked on this piece in class. You can certainly describe your emotions as you read the paper, but no profanity please (although assessments of your instructor's sanity or lack thereof are fair game).
- **To Paul** On reading the Leavitt biography, who is the Alan Turing that Leavitt attempts to bring to life, and how, as a biographer does he do it. What does it mean for the reader to be working through a biography. This post will be revised into a short essay.
- **Blog** On reading "Computer Machinery and Intelligence." Much like the assignment "On Computable Numbers" but also think about what it means to be reading a primary source—what it means to be reading something written by the man who we are trying to understand.
- **Blog** The Kubrick film. A reaction to the film and to Hal, and don't worry, you won't scare me Dave...
- **To Paul** A reaction to the Levin text. As you did with the Leavitt text who is the Turing Levin presents and how does the fictionalization facilitate this. You will have to think about what it means to read a novel. This post will be revised into a short essay.
- **Blog** Who is Alan Turing? Having read all this stuff and thought about the man, what do you think?
- **Blog** You need to **find three posts** to add commentary to. **I'm not going to set a minimum**, you may have a great comment in the form of a terse paragraph—you may find you wish to respond to one of your classmates with what amounts to a complete blog post. The idea is to address the post that interests you by asking a question, or suggesting an alternative reading, or thinking online about where the ideas you address may go next. Now, you'll note that there are no due dates for these three blog entries. These responses should be to three different classmates, not just to Simon (not that Simon isn't an interesting guy...) It's up to you to do them. If you choose to wait until the last week of the class I can pretty well guaren-darn-tee you that they are going to be weak. Weak blog comments make me eat way too much pork and sauerkraut supper, and when I've gorged on pork and sauerkraut supper I flunk everybody. Send me an e-mail when you post your comment and post your comment when the posts are made (ergo don't go back to

the first posts on the last week of class). Speaking of the first posts, it strikes me that the first blog post would be an excellent one to comment on by way of getting to know your classmates...

A note on journal writing, the journal grade

The writing you do on your journal is not, necessarily, in a linear design. It's a chance to think on paper...or on blog. You can follow an idea wherever it takes you, juxtapose what we've discussed in class with your own experience, you can take a stand outside the context of the discussions we've had. You do not need to stay on one topic, you can move back and forth between the concepts we are working on...what I don't want are plot summaries or summaries of the discussions we've had in class. I've read the books and was in the class. Give me an idea of where you are by reflecting on what you're thinking. All of the journal posts will receive a grade, and they will be averaged into one journal grade. Your comment posts will not be graded, **however failure to come up with three comments or a series of unacceptable comments will reduce your journal grade by a full point.** There are two kinds of unacceptable comments. Firstly, this is meant to be a civil academic exchange and comments that show a lack of consideration and respect for a classmate are unacceptable. Secondly, comments like "I agree with everything Simon wrote," in other words comments that show no thought on the part of the commenter, are likewise last week's corn beef and cabbage. I will immediately be in touch with anyone who I think has not done their job.

Book Papers, Portfolio Essay

You will be turning your journal posts on the Leavitt and Levin texts into two to three page essays that will address, along with the books, where you are as a reader. As a university student you need to assess yourself, understand yourself as a reader. You have a "persona" as a reader in the same way you have a "persona" as a son or daughter, even if you've never thought about it. We will work forward from the ideas you present in your journal posts to me to develop a more formal personal essay that gets you thinking about yourself as a reader. The books will be the springboard for this. Thinking about who you are and where you're at is never a bad thing and as a university student, cell-phones-Facebook-texting and the like be damned, you are making your living as a reader.

You will also be writing a three page paper to accompany your portfolio. Your portfolio is all the work you did over the course of the semester, and you need to gather everything together and submit as a requirement of the FYS. Your essay should speak to what you considered your progress in the course, and I would like it to detail the process you undertook to research your final project. What you did, what do you wish you'd done, what did you take away from the approach you took to the AI project. The portfolio is due on the last day of finals (can most certainly be submitted before then), and failure to submit a portfolio will lower your final grade by a point.

Enigma Poster Project

We need to think about Turing's service in the Second World War. Along with the consideration we give Bletchley Park by reading the Leavitt text, I want you to participate in a poster presentation on a topic related to the code breaking. You'll have free reign to create the poster you want (and we'll talk about options for doing that), and we are thinking here about a four minute presentation. What's important is that you bring to light something we didn't discuss in class. You'll be doing your presentation as part of a group—now I believe in the “share and share alike” approach to group presentations: you all should be doing like amounts of work on the presentation and I'll trust “you all” to make sure that happens. If there is a problem within a group, contacting me about it is an option, and I can help you try to resolve it. Be a team—it's more fun. Here's the list of poster topics:

- **Fundamentals of cryptography**
- **Fundamentals of “Bombe”**
- **Turing's colleagues (2)**
- **Historians assessment of Bletchley Park**

Research Project: Machine Intelligence

While the class is coming to grips as a group with who Alan Turing was as a person you are going to be researching a topic within the framework of artificial intelligence that is of interest to you. We'll move forward from “Computing Machinery and Intelligence” to other areas of artificial intelligence. Your final project can “stay close to home” and focus on the Turing Test, or you can look at recent developments in AI. The ethical/legal implications of artificial intelligence are most certainly “fair game.” You can also do a history of artificial intelligence research that went on after Turing...it's up to you. You will want to come up with a specific focus, artificial intelligence raises big questions and if you end up with a topic that is effectively “what is life” you'll never hone that down to a manageable size. Your essay will be published as an html document, ergo a web site. It needs to be the equivalent of a ten page paper, but putting it up on the web offers the potential for including graphics, media, and links that do in fact come with the web. You need not have experience putting something up on the web; we will discuss creating a web site, how to publish it, all that stuff (don't worry, the basics of creating web sites aren't nearly as hard as breaking German military code...). The Final Project itself is made up of four separate, but equally important, parts:

Proposal and Bibliography

Your proposal will be a paragraph that sketches out what you want to do, and gives a first stab at a thesis. It must demonstrate some real thought about what you want to do, but there will be a lot of leeway given for the probably inevitable thesis revision. Your bibliography is a fifteen minimum item annotated bibliography of articles, books, or web sites about Turing and/or artificial intelligence. We will certainly discuss finding these materials, and what to look for in the material you select. The annotations do not need to be a paragraph, but

need to tell me what the item is and, **specifically**, why it is useful for your project. Two of the citations must reference material on the Turing Test. I will need copies of the articles and the first page of web sites. You'll be creating this bibliography in Refworks, which is something we will devote class time to.

Functional Outline/Rough Draft

This is the first go at the paper. A functional outline is a way to plan the paper that works forward from a thesis to a paragraph by paragraph plan to integrate your sources into the paper. It is "at one" with the rough draft—like any preparation the more you put into your functional outline the better the wiener schnitzel you serve will be. From this you'll submit a first go at the paper, which **will be submitted in hard copy**. You will also need to submit a cover letter which gives me an assessment of where you think the project is, what you think you'll need to work on in the revision, and anything else you'd like me to know.

Presentation on Artificial Intelligence

What I'd like you to do is, working with a partner, present what you and your partner have found about AI. This presentation need not directly deal with Turing (although it certainly can), but you need to present that argument you two are developing about AI, and find some common ground. What are the two of you working on, and how does it together suggest the nature of AI. After we know what people are working on we'll figure out partner match-ups that make sense. This is a major five to seven minute presentation and we will devote class time to formal rehearsals. You have complete creative control on how you choose to do the presentation.

Final Project

The finished essay, up in html! One thing, by virtue of the fact that you're doing a final draft you are not guaranteed a like or better grade than your rough draft. Say your rough draft is solid; if you make no tangible effort to improve what you've done or do a rewrite that in fact makes it worse than the first go, you will receive a lower grade on the final draft. Now, if you think about your final draft and allow yourself an opportunity to work through the issues that arise on your first draft, you are likely to see positive results. Be confident, but the point is that this is not an assignment in simply retyping.

Week by Week

Readings are to be completed by the day they appear on the schedule, written work is submitted no later than **5:00 e.s.t., late work will not be accepted, don't even ask**. If there are extraordinary circumstances I will know from Joe Tolliver's office.

January 20nd, 22th Meet the course! Meet the blog! Meet the instructor! Meet the mentor! Meet mathematical logic! Meet your friends for German food! Thinking about someone you'd like to meet, thinking about journaling...

Due January 22th Syllabus read

Due January 23rd First blog post

January 27th, 29th "On Computable Numbers," Concise writing.

Due January 30th Second blog post
February 3rd, 5th Leavitt text, Bletchley Park and Enigma, Research
Due February 8th: Leavitt blog
February 10th, 12th Poster preparation, Research
Due Friday Feb 13th, Leavitt paper
Feb 17th, 19th, Posters and Enigma presentations, “Computer Machinery and Intelligence,” “Chess,” Refworks
Due February 19th Computer Machinery blog
Due February 20th Final Project Proposal
Feb 24th, 26th Artificial Intelligence, Kubrick Film,
Due February 27th, Kubrick blog
March 3rd, 5th Ullman article, Google/Firefox
Due March Friday March 6th Bibliography
March 10th, 12th, Functional Outline, Conferences
Due March 13th, Functional Outline
Spring Break (Read Levin!)
March 24th, 26th, Rough drafts, Levin text, artificial intelligence in science fiction literature
Due March 24th Levin blog
March 31st, April 2nd, Concise writing, Conferences
Due April 3rd Rough drafts
Due April 7th Levin paper
April 7th, 9th, Machine Intelligence Presentations preparation
April 14th, 16th (Due), Machine Intelligence preparation/presentations
April 21th, 24th, HTML, research revisited
April 28th, 30th, Whitmore film, loose ends
Due April 28th Machine Intelligence Final Project
Due April 30th Who is Turing Blog
Due May 8th, Portfolio

Course Assessment

Occasional Assignments—50%
Blog Posts—50%
Leavitt/Levin/Portfolio Essays—40%
Poster Presentation—10%
Machine Intelligence—50%
Proposal/Bibliography –25%
FO/Rough Draft –25%
Final Draft—25%
Presentation on Artificial Intelligence—25%

With the exception of the rough draft of the Machine Intelligence project, all work needs to be submitted electronically. I will respond with grades and comments through e-mail. You need to save these e-mails for your portfolio: that is, any e-mail with a grade needs to go into your portfolio since it is the same as me marking up a hard copy.

The Academic Honor Code

All students at St. Lawrence University are bound by honor to maintain the highest level of academic integrity. By virtue of membership in the St. Lawrence community, every student accepts the responsibility to know the rules of academic honesty, to abide by them at all times, and to encourage all others to do the same.

Responsibility for avoiding behavior or situations from which academic dishonesty may be inferred rests entirely with the students. Students should be sure to learn from faculty what is expected as their own work and how the work of other people should be acknowledged.

Academic Dishonesty, according to the *Student Handbook*: includes any dishonest conduct in connection with any academic (including research) course, program, or work.

1. It is assumed that all work submitted for credit is done by the student unless the instructor gives specific permission for collaboration.
2. Cheating on examinations and tests consists of knowingly giving or using, or attempting to use unauthorized assistance during examinations or tests.
3. Dishonesty in work outside of examinations and tests consists of handing in for credit as original work that which is **not** original, where originality is required.
4. Falsifying research methods, data, and/or results constitutes academic dishonesty.

The following constitute examples of academic dishonesty:

a) *Plagiarism*: Presenting as one's own work the work of another person—words, ideas, data, evidence, thoughts, information, organizing principles, or style of presentation — without proper attribution. Plagiarism includes paraphrasing or summarizing without acknowledgment by quotation marks, footnotes, endnotes, or other indices of reference (cf. Joseph F. Trimmer, *A Guide to MLA Documentation*).

b) Handing in false data, reports or results in connection with any research project or experiment.

c) Handing in a book report on a book one has not read.

d) Falsification of attendance records of a laboratory or other class meeting.

e) Supplying information to another student knowing that such information will be used in a dishonest way.

f) Submission of work (papers, journal abstracts, etc.) which has received credit in a previous course to satisfy the requirement(s) of a second course without the knowledge and permission of the instructor of the second course.

g) The above list is not exhaustive. In the event there is a question as to whether alleged conduct falls within the scope of the Academic Honor Code, the vice president and dean of academic affairs' determination shall be final.

Claims of ignorance and academic or personal pressure are unacceptable as excuses for academic dishonesty. Students must learn what constitutes one's own work and how the work of others must be acknowledged." (*St. Lawrence University 2007–2008 Student*

Handbook, pp. 149–154.)

All intentional and unintentional acts of academic dishonesty may result in disciplinary action. Recommendations of disciplinary action may include a failing grade on the work in question, a failing grade in the course, disciplinary probation, suspension from the University, or expulsion from the University.

More information on academic integrity, including the Academic Honor Council's Constitution, can be found at: www.stlawu.edu/acadaffairs/academicintegrity.htm. For information about academic integrity or the Academic Honor Council issues, contact the Dean's Office at x5993.

Your responsibilities: Be in class, be prepared, participate, ask questions, offer constructive criticism, be respectful of others, stay healthy!

My responsibilities: carry through on the vision of what the course is and where it should go; be able to speak specifically to student questions and concerns; evaluate work promptly; not get bogged down in details and lose sight of what learning is; and to stay healthy!

First-Year Program Philosophy and Goals 2006-07

The First-Year Program (FYP) and First-Year Seminar (FYS) are the first steps in a four-year process of helping you meet the University's Aims and Objectives and the broader goals of a liberal education. The faculty of the FYP and FYS see themselves as partners and mentors in the process of working with you to acquire the intellectual habits of mind, the writing, speaking, and research skills, and the ethical self-reflexiveness that are at the core of a liberal education. The FYP and FYS will ask you to consider new perspectives on the world and your place in it and will challenge you to confront many of the hidden assumptions you bring to college with you. We hope to open you to new ideas, help you to see the complexity of the way in which knowledge gets produced and used in society, and encourage you to see yourself as an active contributor in making the world a better place. The course topics, the texts you will read, listen to, and watch, the in-class and out-of-class activities you will engage in, and the writing, speaking, and research assignments you will work on are all designed to introduce you to the depth of critical thinking and the quality and complexity of the communication skills that will be expected of you at SLU and as a citizen of an increasingly diverse society.

First and foremost among our goals are those related to your abilities as a communicator. The work of the FYP and FYS asks you to design and deliver written, spoken, performed and/or visual texts that demonstrate basic skills in the relevant modes of communication and with an increasing degree of rhetorical sensitivity. Our focus on "rhetorical sensitivity" means that we expect you to cultivate the awareness that all of your communication, whether formal or informal, involves having to make choices about your messages, whether written, spoken, aural or visual. To become a good communicator, you need to recognize that the creation of meaningful and powerful written, spoken,

performed, or visual texts involves both a creator and an audience, and that therefore the voice you adopt in your communication, the audience you imagine yourself communicating to, and the social and ethical context of the content, matter a great deal in creating such texts. One important way to become a better communicator is to become a better critical reader, viewer, and listener, which is why we will ask you to engage challenging materials in a variety of forms and work with you to learn how to interpret them.

Learning to read, listen, write, speak, do research and/or perform well also requires feedback. As faculty, we submit our work for feedback from colleagues all the time, and giving and receiving constructive feedback from both friends and strangers is central to collaborative work in any field and is itself a form of critical thinking and learning. We further recognize that this feedback process is not linear and that good communication requires that you continually rethink, restructure, and revise your work in order for it to be your best. This is why we require that your writing, speaking, and performance assignments be “projects” that include preparatory exercises and multiple drafts or rehearsals, all of which ask you to continue to reflect critically on the choices you have made in the texts that you produce. Furthermore, we see all of these forms of communication as complementary and intertwined, which is why many of your assignments will ask you to integrate elements of the written, spoken, performed, and visual. Finally, developing good habits of critical inquiry and communication also means reflecting on the ethical dimensions of how your work represents that of others, thus one of our goals is to help you to understand both the nature of academic integrity and the social processes by which knowledge is produced and represented.

To ensure that the program is meeting its stated goals, all FYP and FYS syllabi are read by other faculty in the program to determine if they include a variety of assignments that foster the writing, speaking, research, and critical thinking goals of the program. All FYP and FYS courses have to be approved by faculty in the program before they are offered.

First-Year Seminars Research Project Learning Goals 2007-08

With respect to research skills specifically, our learning goals for the spring are that students should:

- Be introduced to ways of conducting productive and imaginative inquiry and research in order to become a part of the various conversations surrounding issues.
- Learn to differentiate among the various ways that information is produced and presented, between popular and scholarly journals and books, between mainstream and alternative publications, between primary and secondary sources.
- Learn how to evaluate and synthesize information, whether gathered from traditional sources, e.g., books and journals, or from websites or electronic media.

- Begin to develop the skills of critical analysis in the interpretation and use of information gathered from any source.
- Be introduced to the ethical obligations that scholars have to both responsibly represent their sources and inform their readers of the sources of their information, as well as learning, and being held responsible for the proper use of, the conventions of scholarly citation and attribution.
- Present the results of your research in written, spoken, visual and/or other forms that demonstrate the ability to communicate effectively using the conventions of the mode of communication adopted.

1/5/09