BMI 512/612: Clinical Information Systems
OFFERED ONLINE

Version information: This version of the syllabus updated August 21, 2018

Key information about this course:

<table>
<thead>
<tr>
<th>Course Number</th>
<th>BMI 512/612</th>
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<tbody>
<tr>
<td>Course Title</td>
<td>Clinical Information Systems</td>
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<tr>
<td>Number of Credits</td>
<td>3</td>
</tr>
<tr>
<td>Quarter</td>
<td>Fall Term 2018</td>
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</tbody>
</table>
| Instructors (with e-mail addresses) | Vishnu Mohan MD MBI FACP  
mohany@ohsu.edu  
503-494-4469
| Required Textbook   | None                       |

Do I need to complete any prerequisites before I enroll in this course?

Yes, you need to successfully complete BMI 510 (Introduction to Biomedical Informatics) or OHSU’s 10x10 program before enrolling in BMI 512/612.

What is this course about?

This course will introduce you to basic concepts associated with clinical information systems, and help you practically apply these concepts, with an emphasis on the electronic health record. The breadth of material covered is large, and hence this course is intended to provide knowledge at a high level, with an emphasis on the operational informatics environment.

Is this a required course?

If you are a student in the graduate certificate program, then BMI 512 is a required course that you must take.
What are the primary learning objectives of this course?

This course will enable you to:

1. Learn about clinical information systems (CIS), with emphasis on electronic health records (EHRs)
2. Appreciate CIS-related concepts of clinical workflows and user interface design
3. Address important applications of CIS, including computerized physician order entry, clinical decision support, and clinical reporting
4. Understand how organizations approach implementation, maintenance and optimization of EHRs in both outpatient and inpatient settings
5. Gain knowledge of topics associated with CIS privacy and security, EHR certification, interoperability, and Meaningful Use guidelines
6. Utilize practical approaches to real-world challenges associated with clinical information systems

Is there a required textbook?

There is no prescribed textbook for the course. Core readings will be made available to students as the course progresses.

How is this course coordinated?

This class is available to online students.

You will learn through the Sakai learning management software at http://sakai.ohsu.edu. The online component includes reading material, lectures (including streaming presentations and handouts), project material, learning assignments, and online discussions. If you have any technical questions or if you need help logging in, please contact the Sakai Help Desk, which is open Mon – Fri, 8 am – 9 pm and weekends 12 pm – 5 pm, Pacific Time.

Contact Information:
(Toll-free) 877-972-5249
(Web) http://atech.ohsu.edu/help
(Email) sakai@ohsu.edu

Who teaches this course?
Vishnu Mohan MD MBI FACP

About me: I am an internist, clinical educator, and clinical informatician, and an Associate Professor in Medical Informatics, Medicine, and Management here at OHSU. I am board certified in internal medicine and in the subspecialty of clinical informatics. I serve as Program Director for the ACGME-accredited Clinical Informatics subspecialty fellowship at OHSU.

Teaching: I teach three core clinical informatics courses at DMICE - BMI 560/660 (Design and Evaluation in Health Informatics), BMI 512/612 (Clinical Information Systems), and BMI 513 (Electronic Health Record Lab). I also teach ISQA 551 (Healthcare Information Technology for Managers) for the PHSU/PSU MBA in Healthcare Management program. As an internist and clinician-educator, I also teach residents, medical students, and clinical informatics fellows.

Research interests: My primary research interest is in ensuring patient safety in the delivery of healthcare, and in promoting clinical diagnostic reasoning in today’s technology-rich clinical environment. I study how clinicians interact with technology, and how technology affects their decision-making. I am also interested in using high-fidelity simulations to examine how clinicians interact with technology. I have been involved with developing protocols that promote EHR safe use.

Other interests: I am also interested in clinical and biomedical informatics education, as well as curriculum development that helps to train the clinical and health IT workforce.

Homepage: My OHSU web page is at: http://goo.gl/OXAVY

Address: BICC 409
Department of Medical Informatics and Clinical Epidemiology
Oregon Health & Science University
3181 Sam Jackson Park Rd
Portland, OR 97239
Email: mohanv@ohsu.edu
Telephone: 503 494 4469

How to reach me: Email is always the best way to communicate with me.
My office hours are by appointment – email me for a time when we can meet virtually or face-to-face.

How is the course structured?

The course is structured in a modular fashion as a series of weekly components. Each weekly module includes a lecture, additional reading material, and assignments. Tests may also be held online, at the discretion of the instructor. Lectures may be delivered by guest lecturers with experience in the operational informatics universe.
Example of the course schedule and topics covered (note that the actual schedule for this course may vary from the example):

<table>
<thead>
<tr>
<th>Week</th>
<th>Material</th>
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<tbody>
<tr>
<td>Week 1</td>
<td>Introduction - What Is A Clinical information System?</td>
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<td>Week 2</td>
<td>Clinical Workflows</td>
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<td>Week 3</td>
<td>User Interface Design and EHR Usability</td>
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<td>Week 4</td>
<td>Computerized Provider Order Entry</td>
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<td>Week 5</td>
<td>Clinical Decision Support</td>
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<td>Week 6</td>
<td>Clinical quality informatics</td>
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<td>Week 7</td>
<td>Implementation and Go-Live</td>
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<td>Week 8</td>
<td>Configuring clinical information systems</td>
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<td>Week 9</td>
<td>Training</td>
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<tr>
<td>Week 10</td>
<td>Privacy and Security</td>
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<td>Week 11</td>
<td>Interoperability</td>
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How is the course graded?

By design, this course has a diverse evaluative framework that includes evaluation of both individual and group activities in order to provide a comprehensive and accurate reflection of the student’s course activities. The grading is divided into 4 components:

- Online participation = 30%
- Clinfowiki post = 10%
- Group project = 30%
- Final paper = 30%

Grades are assigned on a curve, but are generally based on the following cutoffs:

- A 93-100
- B+ 87-89.99
- B 83-86.99
- B- 80-82.99
- C+ 77-79.99
How will I be graded for participation online?

Each week, students will be required to participate in discussions, held in the Forums section on Sakai. Discussions will typically center on a topic that I will put up at the beginning of each week. We will also discuss group projects, individual student final projects, and other CIS-related topics that you may want to talk about during the term.

Forums participation is graded using the following rubric:

0 = no participation  
1 = minimal participation  
2 = adequate participation in discussion (students posts satisfy the requirements)  
3 = student post demonstrates that they have met learning objectives  
4 and 5 = superior participation in a meaningful manner that promotes the learning of others

You will see that there is a significant weightage towards participation that allows others to learn from your perspectives.

What are the assignments I will have to complete during this course?

**Group project**

During week 5 of this course, you will be assigned to a group of about 3-4 students (the group size varies depending on class size and the number of scenarios offered for this activity), and tasked with completing a group project that is designed around case scenarios. You will have 3 weeks to complete your project. Clinical informatics is a collaborative field, and these projects are intended to offer insight into the types of collaboration that you may be engaging in as a clinical informatician. Students are expected to collaborate on all deliverables, and each group will be assigned a single grade that will apply to all students within that group.

**Individual student term project**

The student project represents a significant individual effort that should be similar to one you might be assigned as the Director of Clinical Information Systems. You will be required to deliver a 5-10 page (not including references or executive summary) report, complete
with a 1-page executive summary. Please take the time to proofread your submission for grammar and language before submission. To allow all students to operate under the same requirements, the paper should be typed, double spaced, with the font selected to 12 pt Times New Roman.

Please submit original work for your student project. Do not reuse material from other courses.

**Examples of prior student final project topics:**

- Request for Proposal for a CIS
- Analysis of a CPOE implementation plan
- Clinical Decision Support proposal
- Post-implementation CIS evaluation plan
- CIS business case including return on investment estimates
- Case study describing a current or past CIS, EMR, etc. implementation, along with current status
- Overview of local health information system infrastructure from an interoperability perspective
- Proposal to implement a speech recognition system for adult primary care providers
- Benefits and challenges associated with implementing an open source EHR
- Review of EHR downtime contingency planning
- Efficiency of anesthesia information management systems in the perioperative setting
- Text messaging in healthcare
- Utilizing EHRs to improve TQM/CQI
- Optimizing patient portals with respect to patient adoption and use
- Utilizing the EHR for chronic disease management
- Moving the EHR to the Cloud
- Enforcing HIPAA compliance in small rural hospitals

**OHSU Clinfowiki**

You will be expected to contribute an article to OHSU Clinfowiki, a clinical informatics wiki project that is a resource for clinicians, clinical informaticians, and information system professionals working in healthcare. I serve as the Editor for Clinfowiki, which can be found at: [http://www.clinfowiki.org](http://www.clinfowiki.org)

**What are students expected to do in order to successfully complete this course?**

To succeed in this course, you are expected to:
1. Review reading assignments; including lectures, chapters from the required textbook, articles or handouts, and independent reading for projects and questions. You are responsible for learning all content in the assigned readings, whether discussed in the lectures or not.

2. Participate in class discussions; this class actively encourages engagement and participation by all students. Your participation grade is based on your level of contribution to the learning of others.

3. Complete assignments and projects in a timely fashion. It is anticipated that you will substantiate your assertions with appropriate attribution, and demonstrate that you possess the ability to critically retrieve and analyze information that is available in the informatics literature. **Many assignments and projects involve teamwork for preparation, presentation, and grading.** As is common in real life, there are penalties for late submissions and bonuses for those who turn their work in early.

4. Complete quizzes and other evaluative tools during the course in a timely fashion.

**What is your philosophy on learning and the role of the instructor?**

At this level of education, I anticipate that students will be adult learners and already have significant insight into the way they learn best.

My classes emphasize a culture where participation and sharing information results in the dissemination of knowledge and wisdom. Expect to spend a significant proportion of your time engaged in online conversation with other students and with me.

When I teach a course at the graduate level, I often find that I learn as much from you as you do from your instructors. I see my role as primarily that of a facilitator, helping you reach your learning goals for the course.

**What is the best way to participate in Forums?**

Participation scores are graded weekly, so read and post on the Forum regularly! The weekly score is based on your level of contribution to the learning of others. I’m looking for quality, not quantity! It’s not how much you post, but **what** you say and **how** you say it.

Remember that a Forum format is just that – a place for meaningful discussion. Responses to posts often are as useful to enhance learning as the original post itself. The Forum is a great format to help us learn from each other.
Please read all prior responses before replying to a specific post. This will help grow the conversation and avoid repletion.

Please respect the opinions of others when posting on the Forum.

Please do take the time to frame your posts clearly and concisely, with attention to grammar and punctuation.

**When do I get my grades?**

OHSU is committed to providing grades to you in a timely manner. Course instructors will provide you with information in writing at the beginning of each course that describes the grading policies and procedures including but not limited to evaluation criteria, expected time needed to grade individual student examinations and type of feedback they will provide.

Class grades are due to the Registrar by the Friday following the week of finals. However, on those occasions when a grade has not been submitted by the deadline, the following procedure shall be followed:

1) The Department\(^1\) /Program Coordinator\(^2\) will immediately contact the Instructor requesting the missing grade, with a copy to the Program Director and Registrar.

2) If the grade is still overdue by the end of next week, the Department\(^1\) /Program Coordinator\(^2\) will email the Department Chair directly, with a copy to the Instructor and Program Director requesting resolution of the missing grade.

3) If, after an additional week the grade is still outstanding, the student or Department\(^1\) /Program Coordinator\(^2\) may petition the Office of Graduate students for final resolution.

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1 For courses that are run by a specific department.
2 For the conjoined courses (course number is preceded by CON, that are run by Graduate Studies.

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**What is DMICEs position on academic honesty?**

You are expected to maintain academic honesty in your course work. You should refrain from seeking published solutions to any assignments. Literature and resources (including Internet resources) employed in fulfilling assignments must be cited. **Please note that Turnitin software may be used at the discretion of the course instructor.**

See [http://ozone.ohsu.edu/som/faculty/docs/graduatecouncil/profconductpolicy.pdf](http://ozone.ohsu.edu/som/faculty/docs/graduatecouncil/profconductpolicy.pdf) and [http://www.ohsu.edu/xd/education/library/research-assistance/plagiarism.cfm?WT_rank=1#](http://www.ohsu.edu/xd/education/library/research-assistance/plagiarism.cfm?WT_rank=1#) for information on code of conduct for OHSU and
In an effort to uphold the principles and practice of academic honesty, faculty members at OHSU may use originality checking systems such as Turnitin to compare a student's submitted work against multiple sources.

To protect student privacy in this process, it will be necessary to remove all personal information, i.e. student name, email address, student u-number, or any other personal information, from documents BEFORE submission.

What is OHSU's policy regarding Student Access/Disability Services?

OHSU is committed to providing equal access to qualified students who experience a disability in compliance with Section 504 of the Rehabilitation Act of 1973, the Americans with Disabilities Act (ADA) of 1990, and the ADA Amendments Act (ADA-AA) of 2008. If you have a disability or think you may have a disability (physical, sensory, chronic health, psychological or learning) please contact the Office for Student Access at (503) 494-0082 or studentaccess@ohsu.edu to discuss eligibility for academic accommodations. Information is also available at www.ohsu.edu/student-access. Because accommodations may take time to implement and cannot be applied retroactively, it is important to have this discussion as soon as possible. All information regarding a student's disability is kept in accordance with relevant state and federal laws.

What restrictions does DMICE have with respect to course access, and why?

Every reasonable effort has been made to protect the copyright requirements of materials used in this course. You are warned not to copy, audio, or videotape in violation of copyright laws. Journal articles will be kept on reserve at the library or online for student access. Copyright law does allow for making one personal copy of each article from the original article. This limit also applies to electronic sources.

To comply with the fair use doctrine of the US copyright law, Sakai course sites close three weeks after grades are posted with the Registrar. Please be sure to download all course material you wish to keep before this time as you will have no further access to your courses.

DOWNLOADING COURSE CONTENT:

Students are encouraged to download and save course content (excluding videos) from each class in Sakai while you are taking the class if you think you will want to refer to it later. This is especially important for PhD students who will need to review content prior to taking the qualifying exam. Save the course content to a local drive, not in Sakai.
What is the DMICE policy regarding communication?

1. If the syllabus directs the student to contact the TA before contacting the instructor, the student should do so. Otherwise, the student should contact the instructor and allow 2 business days (not including weekends) for a response.

2. If the student does not receive a response from the instructor within 2 business days, s/he should contact the TA (if there is one). When contacting the TA s/he should cc the instructor and Diane Doctor at doctord@ohsu.edu.

3. If a student does not receive a response from the TA within 1 business day (not including weekends), s/he should contact Diane Doctor at doctord@ohsu.edu and cc the instructor and the TA.

4. If Diane does not reply within 1 business day (not including weekends), the student should contact Andrea Ilg at ilgan@ohsu.edu.

5. Students having difficulties with Sakai should contact the Sakai Help Desk at sakai@ohsu.edu or at (877) 972-5249. Sakai help is available M-F from 8am to 10pm and weekends from Noon to 5pm. Do not contact the instructor.

6. Please use professional etiquette when communicating with peers and the instructor. This means avoiding aggressive or offensive language, showing respect for others’ opinions and positions, and conducting yourself as if you were face to face with them. Please pay special attention to etiquette in class forums and when using email. If you notice someone violating this policy, please make the instructor and TA aware of the problem.

What is the DMICE policy regarding discrimination?

Oregon Health & Science University is committed to creating and fostering a learning and working environment based on open communication and mutual respect. If you encounter sexual harassment, sexual misconduct, sexual assault, or discrimination based on race, color, religion, age, national origin or ancestry, veteran or military status, sex, marital status, pregnancy or parenting status, sexual orientation, gender identity, disability or any other protected status please contact the Affirmative Action and Equal Opportunity Department at 503-494-5148 or aaeo@ohsu.edu. Inquiries about Title IX compliance or sex/gender discrimination and harassment may be directed to the OHSU Title IX Coordinator at 503-494-0258 or titleix@ohsu.edu

COMMITMENT TO EQUITY AND INCLUSION

Oregon Health & Science University is committed to creating and fostering a learning and working environment based on open communication and mutual respect. If you encounter sexual harassment, sexual misconduct, sexual assault, or discrimination based on race, color, religion, age, national origin or ancestry, veteran or military status, sex, marital status, pregnancy or parenting status, sexual orientation, gender identity, disability or any other protected status please contact the Affirmative Action and Equal Opportunity
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