

BMIF 370 Evaluation Methods in Biomedical Informatics

Instructors: Gadd, Peterson, Aronsky

Fall

Students are introduced to evaluation and experimentation, with exposure to study design, including sampling, appropriate use of controls; data collection, including human subjects considerations; analysis, including testing for statistical significance, definitions of sensitivity and specificity, ROC plots; and reporting of results. Quantitative and qualitative methods will be covered, as well as methods and issues specific to healthcare settings.

Notes:

1. One 3-hour class per week
2. Prerequisites: BMIF 300 and Biostatistics
3. Other Readings for Class Discussion drawn from publications and examples from current research of students, faculty, others
4. Course will be taught using a team approach. CG, JP, DA and guest lecturers, including Laurie Novak (LN) and Josh Denny (JD).
5. Text: Friedman and Wyatt, *Evaluation Methods in Biomedical Informatics 2ed.*

Week	Topic	Subtopics	Concepts or Methods	F&W Chapter	Other Readings for Class Discussion	Lead Instructor	Homework Assignments
1	Overview of Evaluation Methods in Biomedical Informatics and this Course	1. Evaluation in Biomedical Informatics 2. Evaluation as a field 3. Course objectives and mechanics	2a. Introduce objectivist & subjectivist approaches	1 & 2		CG	
2	Approaches to Evaluation	1. Deciding what to study	1a. Study types 1b. Information resource types	3	Stead et al. Friedman Dexter et al. Forsythe	CG	Self-tests
3	Objectivist Approaches	1. Measurement 2. Demonstration	2a. Study designs	4	Friedman & Abbas	CG	Self-tests
4	Measurement Study Methods	1. Reliability and validity in measurement	Reference standards, consensus procedures	5 & 6	Cork et al. Hripscak et al.	CG	Self-tests

5	Demonstration Study Methods - Design	1. Study design and sources of bias		7	Bates et al., Weingart et al., Han et al., Brown et al., Weingart et al.,	JP/DA	Self-tests
6	Demonstration Studies – Analysis	1. Overview of quantitative methods concepts 2. Systematic literature review	Contingency table analysis, Bayes' Theorem, and ROC	8		JP/DA	Self-tests
7	Demonstration Study Methods – Analysis cont.	1. Meta-analysis		8		JP	
8	Surveys – Development and Use			-	Bourque & Fielder; Anderson & Aydin book chapters	CG	Survey assignment
9	1. Proposals, IRB, and Ethical Issues 2. Project Abstract Presentations			12	PHS 398; Vanderbilt IRB Policies & Procedures	JP	Student Project Abstracts are Due Today
Tues.	11am-1pm Attend IRB Meeting (IRB Conf Room – 5th FI Oxford House)					JP	
10	1. Economic Aspects of Evaluation 2. Project Abstract Presentations	1. Costs 2. Outcomes	Cost effectiveness, ROI, others	11	Examples	CG	Self-tests
11	Subjectivist Approaches			9	Kaplan & Duchon, Forsyth	LN	
*	<i>Thanksgiving</i>						
12	Performing Subjectivist Studies			10	Jordan, Nemeth, and Patterson	LN	

13	Special Topics in Evaluation Methods	1. IR 2. NLP 3. Terminologies		-		JD	
14	Project Presentations						Project is Due Today

* No class

Graded Assignments (tentative plans):

1. Term Project: Students will develop individual evaluation study proposals for a real project (e.g., MS thesis) – break it down into components/milestones w/ due dates for feedback (from instructors, peers) over the term and final proposal due at end of term – more information will be provided.
2. Homework Assignments: a) Self-tests (in text) and problem sets will be used to exercise mastery of concepts and methods throughout the course; b) Critiquing one or more published evaluation studies will demonstrate understanding of study design, methods, analysis of results, and reporting.
3. Class Participation: a) Each class will have 1-2 featured publications, from which one student will be responsible for presenting the key points to the class – students will not know in advance who will be presenting each class so all will be prepared to discuss; b) Understanding of topics and willingness to explore/challenge concepts, as demonstrated by class participation throughout the course.