

---

## Information Technology and Management Undergraduate Assessment Report Spring 2018

### Contents

ITM Undergraduate Assessment Report Spring 2018 .....	1
ITM Course Assessment Analysis Spring 2018 (Appendix A).....	7
ITM Undergraduate Student Artifact Assessment Spring 2018 (Appendix B).....	15
ITMD 362 Student Artifact Assessment Form and Sample Item .....	18
ITMD 421 Student Artifact Assessment Form and Sample Item .....	24
ITMT 430 Student Artifact Assessment Form and Sample Item .....	33
Information Technology and Management Assessment Plan Fall 2018.....	60
B.S in Applied Cybersecurity and I.T. Assessment Plan, 2018-2019, Revision 1.....	63

(Aggregate page numbers are in the upper right corner. Appendices are marked in the upper left corner. Individual document page numbers are in the lower right corner.)

**THIS PAGE INTENTIONALLY LEFT BLANK**

## Information Technology and Management Undergraduate Assessment Report Spring 2018

1. Identification of learning goal(s) assessed
  - a. Bachelor of Information Technology and Management Program Learning Objectives
    - i. 1. Problem solve and create innovative answers to provide technology solutions for the problems of business, industry, government, non-profit organizations, and individuals.
  - b. Bachelor of Information Technology and Management Student Outcomes (<https://appliedtech.iit.edu/information-technology-and-management/programs/undergraduate>)  
The Bachelor of Information Technology and Management degree produces graduates who are able to:
    - i. (a) Analyze a problem and identify and define the computing requirements appropriate to its solution [ABET CAC Criteria 3 Student Outcome 1]
    - ii. (b) Design, implement, and evaluate a computer-based solution to meet a given set of computing requirements [ABET CAC Criteria 3 Student Outcome 2]
    - iii. (d) Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles [ABET CAC Criteria 3 Student Outcome 4]
    - iv. (f) Identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems [ABET CAC Criteria 3 Student Outcome 6 [IT]]
    - v. **Note:** These correspond to the ABET Criteria 3 Student Outcomes in Information Technology from Version 2 of the 2018-2019 Criteria for Accrediting Computing Programs as noted, with our wording adjusted to comply with ITM Department standards for objectives and outcomes.
  - c. Graduate courses were included in assessment data collection but are reported separately.
2. Description of data collection methodology used
  - a. Data was collected via a survey with questions tailored for each course. Learning goals assessed in the survey were listed in paragraph 1 above. The population surveyed and the goals assessed were as follows:
    - ITMD 362 – Program Learning Objective 1  
Student outcomes (a), (b), and (f)
    - ITMD 421 – Program Learning Objective 1  
Student outcomes (a), (b), and (d)
    - ITMT 430 – Program Learning Objectives 1  
Student outcomes (b), (d), and (f)
  - i. 98 surveys were collected in April, 2018.

- b. Student artifacts in the form of homework assignments and projects were evaluated by faculty for the attainment of student outcomes. A representative sample of 10 artifacts were assessed unless there were fewer available, in which case all available artifacts were assessed. Outcomes assessed through evaluation of student artifacts were as follows:
    - ITMD 362 – Student outcomes (a) and (b)
    - ITMD 421 – Student outcomes (a) and (b)
    - ITMT 430 – Student outcome (d)
  - c. Assessments were conducted in May of 2018.
3. Presentation of Results
- a. Full results of the survey are presented in Appendix A to this report.
    - i. Total undergraduate enrollment in courses surveyed was 180. 98 students responded. The total undergraduate student participation rate was 54%.
  - b. Full results of the student artifact assessment are presented in Appendix B to this report.
    - i. Each evaluator reviewed between eight and ten student artifacts in the form of course assignments or projects. They ranked the attainment of two outcomes in each course evaluated on a scale of 1-5, designed to specifically equate to the 1-5 scale used in the survey questions as to outcome attainment.
4. Discussion of Survey Results
- a. The assessment was evaluated by members of the ITM Curriculum Committee in May 2018. Evaluators included:
    - Ray Trygstad, ITM Associate Chair and Industry Professor
    - James Papademas, Industry Professor
    - C. Robert Carlson, ITM Chair and Professor
  - b. Summary of Main Findings and Conclusions
    - i. In all courses surveyed, a majority of students agreed or strongly agreed that they had achieved the outcome or objective addressed in each question. Overall 87% of students agreed or strongly agreed that they had achieved the outcome or objective addressed in each question.
      - 1) Significant exceptions to majority agree/strongly agree
        - a) ITMD 362: None. There was an average of 95% agree or strongly agree with no outcomes with less than 88% agree or strongly agree.
        - b) ITMD 421: There was an average of 61% agree or strongly agree. One exception was outcome (a) as noted below.
        - c) ITMT 430: There was an average of 65% agree or strongly agree.
          - i. 36% were neutral, 20% disagreed or strongly disagreed, and only 44% agreed or strongly agreed that they developed an understanding of essential DBMS concepts, specifically database security, high availability, backup and recover and SQL database tuning. This is a course outcome only.

- ii. 34% were neutral, 19% disagreed or strongly disagreed, and only 47% agreed or strongly agreed that they could analyze a problem and identify and define the computing requirements appropriate to its solution. This is ITM Student Outcome (a).
- 2) There are only a scattered number of Disagree/Strongly Disagree responses in each course. Typically they represent two or three of the respondents in each course. We believe this is a reasonable number of students who just “don’t get it” in most courses. In an ideal world there would be no responses at this level, but we judge this to be an acceptable level.
- ii. Assessment of specific objectives and outcomes.
  - 1) ITMD 362 Program Learning Objective 1 question: *I am able to problem solve and create innovative answers to provide technology solutions for the problems of business, industry, government, non-profit organizations, and individuals.* – 50% strongly agree, 50% agree, 0% neutral, and 0% disagree. 100% represents complete success in students who agree that they have attained this objective.
  - 2) ITMD 362 Student Outcome (a) question: *I can analyze a problem, and identify and define the computing requirements appropriate to its solution* – 75% strongly agree, 13% agree, 0% neutral, and 13% disagree. 88% represents a significant percentage of students who agree that they have attained this outcome.
  - 3) ITMD 362 Student Outcome (b) question: *I have learned how to design, implement, and evaluate a computer-based solution to meet a given set of computing requirements* – 63% strongly agree, 25% agree, 13% are neutral, and 0% disagree. 88% represents a significant percentage of students who agree that they have attained this outcome.
  - 4) ITMD 362 Student Outcome (f) question: *I can identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems* – 75% strongly agree, 25% agree, 0% neutral, and 0% disagree. 100% represents complete success in students who agree that they have attained this outcome.
  - 5) ITMD 421 Program Learning Objective 1 question: *I can problem solve and create innovative answers to provide technology solutions for the problems of business, industry, government, non-profit organizations, and individuals* – 25% strongly agree, 31% agree, 27% neutral, 12% disagree, and 5% strongly disagree. 57% represents an acceptable percentage of students who agree that they have attained this outcome, but the high level of neutral responses is a concern.
  - 6) ITMD 421 Student outcome (a) question: *I can analyze a problem, and identify and define the computing requirements appropriate to its solution* – 22% strongly agree, 25% agree, 34% neutral, 14% disagree, and 5% strongly disagree. 47% represents an unacceptable percentage of students who agree that they have attained this outcome, and the high level of neutral responses is a concern as well.

- 7) ITMD 421 Student outcome (b) question: *I can design, implement, & evaluate a computer-based solution to meet a given set of computing requirements* – 27% strongly agree, 29% agree, 32% neutral, 8% disagree, and 5% strongly disagree. 56% represents an acceptable percentage of students who agree that they have attained this outcome, but the high level of neutral responses is a concern.
- 8) ITMD 421 Student outcome (d) questions: *I am able to make informed judgements in computing practice based on legal and ethical principals* – 24% strongly agree, 34% agree, 27% neutral and 15% disagree. 58% represents an acceptable percentage of students who agree that they have attained this outcome.
- 9) ITMT 430 Program Learning Objective 1 question: *I can problem solve and create innovative answers to provide technology solutions for the problems of business, industry, government, non-profit organizations, and individuals* – 23% strongly agree, 37% agree, 30% neutral, 7% disagree, and 3% strongly disagree. 60% represents an acceptable percentage of students who agree that they have attained this outcome, but the high level of neutral responses is a concern.
- 10) ITMT 430 Student outcome (b) question: *I can design, implement, & evaluate a computer-based solution to meet a given set of computing requirements* – 27% strongly agree, 33% agree, 40% neutral, and 0% disagree. 60% represents a significant percentage of students who agree that they have attained this outcome, but the high level of neutral responses is a concern.
- 11) ITMT 430 Student outcome (d) question: *I am able to make informed judgements in computing practice based on legal and ethical principals* – 23% strongly agree, 43% agree, 27% neutral, and 7% disagree. 67% represents a significant percentage of students who agree that they have attained this outcome.
- 12) ITMT 430 Student outcome (f) question: *I know how to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems* – 27% strongly agree, 47% agree, 27% neutral, and 0% disagree. 74% represents a significant percentage of students who agree that they have attained this outcome.

## 5. Discussion of Student Artifact Assessment results

- a. The Student Artifacts were evaluated by members of the ITM Faculty in May 2018. Evaluators included:
  - James Papademas, Industry Professor
  - Jeremy Hajek, Industry Associate Professor
  - Katherine Papademas, Adjunct Industry Professor
  - Luke Papademas, Adjunct Industry Professor
- b. Summary of main findings and conclusions
  - i. The average evaluation for all courses assessed fell at 4.55 on a scale of 5, which represents that students were reasonably able to fully able to demonstrate attainment of each outcome. This is a very positive outcome of representative assignments and projects from the courses assessed.

- ii. Student artifacts were selected by faculty members for each course assessed. Despite clear instructions as to the nature of artifacts required, some artifacts selected were not optimal for assessment of the assigned outcomes.
  - iii. No assignments in courses evaluated this semester were adequate to assess ITM Student Outcome (d), Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
6. Description of improvement plans
- a. There were no issues with the content or delivery of ITMD 362 and the course is properly meeting the appropriate role in the curriculum. Student artifacts bear out this conclusion.
  - b. Issues with the content or delivery of ITMD 421 are a concern, but the course is properly meeting the appropriate role in the curriculum. Possible solutions to identified issues developed by the committee are discussed below.
    - i. Although the number of students who felt they had not attained the outcomes was low and judged to be acceptable in all cases, an excessive number of students had a neutral response to both course outcome queries and ITM Student Outcome queries. The average number of neutral comments was 28%, with a range of 22% to 34%. In one case the level of neutral comments was sufficiently high to reduce the level of agreement that the outcome had been achieved been to less than 50%.
      - 1) The committee determined that this reflected a specific personnel issue in this course. Further discussion as a personnel matter is private and cannot be included in a report on assessment, but the committee recommended that the Chair and the Associate Chair resolve this issue before this course is offered again.
      - 2) This is a repeat issue but the previous instance involved different personnel. The department should look to a full-time faculty member to teach this course as it is critical knowledge, and clearly course staffing has become an ongoing issue.
  - c. Issues with the content or delivery of ITMT 430 are mostly minor and the course is properly meeting the appropriate role in the curriculum. Possible solutions to identified issues developed by the committee are discussed below.
    - i. 36% were neutral, 20% disagreed or strongly disagreed, and only 44% agreed or strongly agreed that they developed an understanding of essential DBMS concepts, specifically database security, high availability, backup and recover and SQL database tuning. This is a course outcome only. Database security, high availability and SQL tuning were not sufficiently emphasized given the breadth of material covered in the course.
      - 1) We recommend that the instructor rewrite this outcome to more closely align to actual course content.
    - ii. Several outcomes had a high level of neutral responses. One had sufficiently a high level of these responses to push the positive responses below 50%: 34% were neutral, 19% disagreed or strongly disagreed, and only 47% agreed or strongly agreed that they could analyze a problem and identify and define the computing requirements appropriate to its solution. (This is ITM Student

Outcome (a).) Some of the course outcomes drawn from program student outcomes with a high level of neutral responses were not emphasized in the course, and others may not have been on an individual student basis due to the team nature of the course projects.

- 1) The committee has previously recommended that a post-degree-completion assessment be conducted to ensure that students have an opportunity to reflect on their attainment of outcomes and objectives for the entire scope of the degree. This should ease some of the assessment burden imposed on ITMT 430. In addition, selected primary course outcomes currently assessed in ITMT 430 will move to a redesigned ITM 100, Introduction to the Information Technology Profession. ITM 100 has been expanded from 2 to 3 semester hours and made mandatory for transfer students and students changing majors to accommodate an expanded role in ensuring student outcomes.

#### 7. Assessment process recommendations

- a. Some courses had outcomes drawn from the previous version of the ITM Student Outcomes / ABET Information Technology criteria. The Curriculum Committee should provide all instructors of courses mapped to Student Outcomes with a copy of the outcomes specific to their course for possible inclusion in course objectives.
  - i. The Curriculum Committee and the assessment data collection staff should coordinate closely with faculty of courses to be assessed to select appropriate assignments or projects in advance for optimal assessability. There should be particular attention paid to ensuring selected student artifacts allow assessment of every objective and outcome being assessed in the term.
- b. In order to simplify Student Artifact Assessment, the Department should use Blackboard Outcomes for assessment of undergraduate assignments beginning in the Fall 2018 term. Blackboard Outcomes Assessment will allow the department to collect student artifacts from courses in Blackboard Learn, apply a rubric to the student work and generate both detailed and summary reports of the results.

#### 8. Assessment Plan for Fall 2018

- a. Included in the attached *Information Technology and Management Assessment Plan Fall 2018*
  - i. The Fall 2018 plan includes assessment for the Bachelor of Science in Applied Cybersecurity and Information Technology as laid out in the *Bachelor of Science in Applied Cybersecurity and Information Technology Assessment Plan, 2018-2019, Revision 1* which is also attached. This degree is designed to be accredited under both the ABET CAC Information Technology and Cybersecurity criterion, and will be assessed against both criteria.
- b. The *Information Technology and Management Assessment Plan for Undergraduate Degrees, 2019-2021* will be drafted and published in the fall of 2018 and will supersede the *Bachelor of Science in Applied Cybersecurity and Information Technology Assessment Plan, 2018-2019, Revision 1*.

# Spring 2018 ITM Course Assessment Analysis

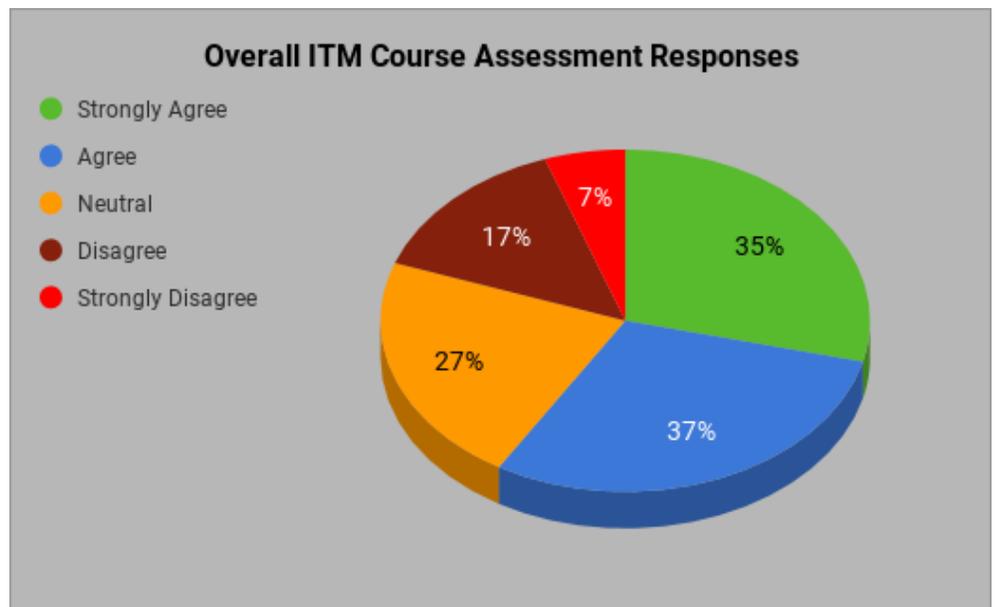
The Information Technology & Management (ITM) Assessment Plan for 2016 - 2018 assessed the following undergraduate and graduate courses:

- ITMD 362 Human Computer Interaction and Web Design**
- ITMD 421 Data Modeling & Applications**
- ITMT 430 System Integration**
- ITMT 593 Embedded Systems**
- ITMS 549 Cyber Security Technologies: Projects & Advanced Methods**

For undergraduate courses, assessment questions were created based on course outcomes on the syllabus, ITM Undergraduate Student outcomes and the BITM Program Educational Objectives (both outcomes and objectives found on a separate tab) as defined by the ITM Department for the HLC.

For graduate courses, assessment questions were created based on course outcomes on the syllabus and the MITM & MCYF Program Educational Objectives (found on a separate tab) as defined by the ITM Department for the HLC.

Total ITM Students Assessed	199
Total Assessment Respondents	107
Total Assessment Responses	1057
Assessment Participation Rate	54%



All assessment questions used the following scale:  
1 = Strongly Disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly Agree

**ITM Undergraduate Student Outcomes**

(a) Analyze a problem and identify and define the computing requirements appropriate to its solution

(b) Design, implement, and evaluate a computer-based solution to meet a given set of computing requirements

(c) Communicate effectively with a range of audiences about technical information

(d) Make informed judgments in computing practice based on legal and ethical principles

(e) Function effectively on teams to establish goals, plan tasks, meet deadlines, manage risk, and produce deliverables

(f) Identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems

(g) Assist in the creation of an effective project plan

*NOTE: ITM Undergraduate Student Outcomes (a)-(f) are common with ABET Information Technology Criteria 3 Student Outcomes 1.-6. These outcomes are new for Fall 2018 and follow CAC 2018 -2019 Criteria Version 2.0 which will be mandatory in our next accreditation cycle.*

**BITM Program Educational Objectives**

1. Problem solve and create innovative answers to provide technology solutions for the problems of business, industry, government, non-profit organizations, and individuals.

2. Perform requirements analysis, design and administration of computer and network-based systems conforming to policy and best practices, and monitor and support continuing development of relevant policy and best practices as appropriate.

3. Apply current technical and mathematical concepts and practices in the core information technologies and recognize the need to engage in continuing professional development.

**MITM Program Educational Objectives**

1. Deliver optimal technical & policy technology solutions for the problems of business, industry, government, non-profit organizations, and individuals in each student's particular area of focus.

2. Work with, lead, and manage teams in an enterprise environment to collaboratively arrive at optimal technology solutions.

3. Manage and deploy information resources applicable to each student's particular area of focus in an enterprise setting.

**MCYF Program Educational Objectives**

1. Design and implement a comprehensive enterprise security program using both policy and technology to implement technical, operational, and managerial controls.

2. Comprehensively investigate information security incidents and violation of law using computer resources in a manner such that all evidence is admissible in a court of law.

3. Technically secure enterprise information assets and resources to deter, detect, and prevent the success of attacks and intrusions.

Green shading denotes outcomes and educational program objectives being assessed this term

# Spring 2018 ITM Student Outcomes Assessment Analysis

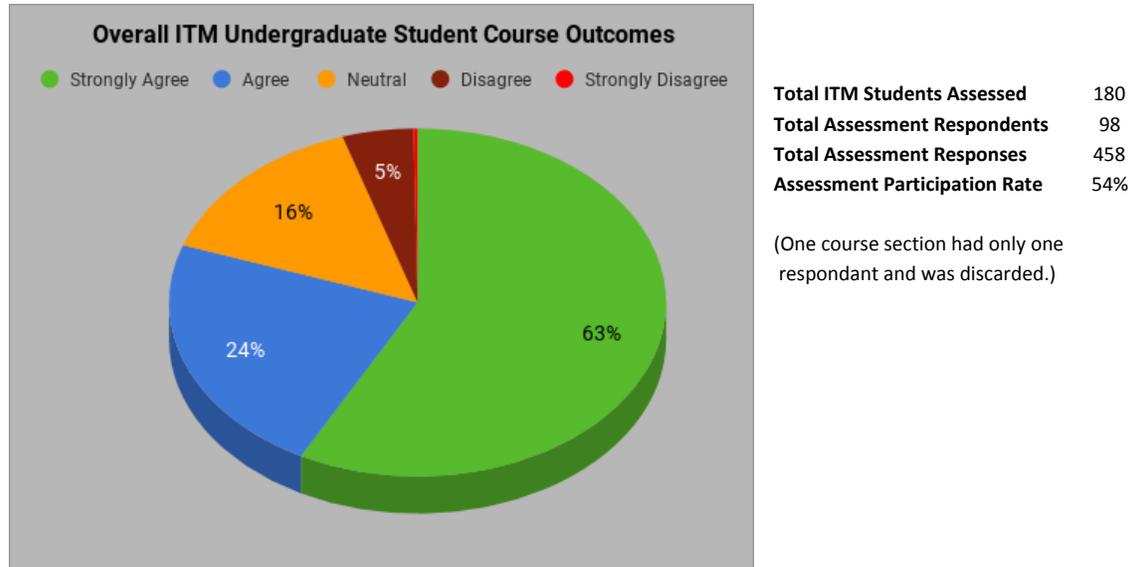
The Information Technology & Management (ITM) Assessment Plan for 2016 - 2018 assessed the following undergraduate courses:

- ITMD 362 Human Computer Interaction and Web Design**
- ITMD 421 Data Modeling & Applications**
- ITMT 430 System Integration**

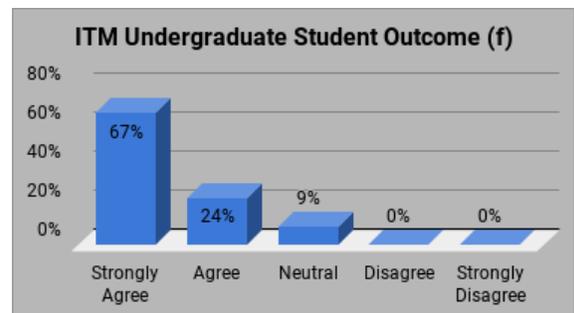
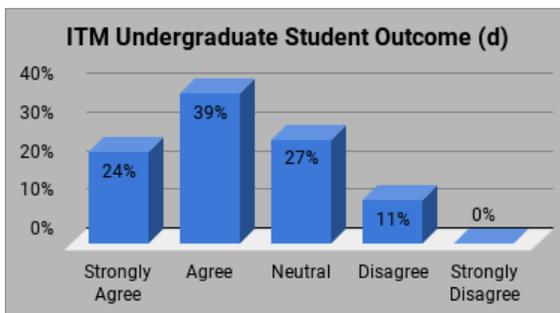
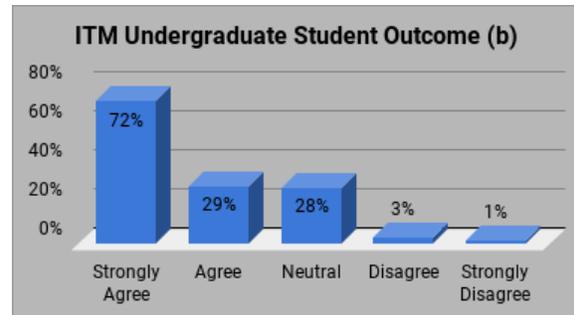
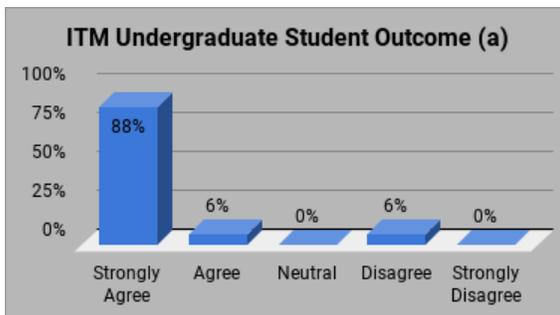
For undergraduate courses, assessment questions were created based on the following ITM Undergraduate Student outcomes: (a), (b), (d), (f); these equate to ABET Criteria 3 Student Outcomes 1, 2, 4, 6 from CAC 2018 -2019 Criteria Version 2.0

All assessment questions used the following scale:

1 = Strongly Disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly Agree



ALL Student Outcomes Averaged	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	63%	24%	16%	5%	0%



\*A list of ITM Undergraduate Student Outcomes and BITM & MITM Program Educational Objectives can be found on a separate tab

**STUDENT COURSE ASSESSMENTS: SPRING 2018**  
**ITMD 362 Human Computer Interaction and Web Design**

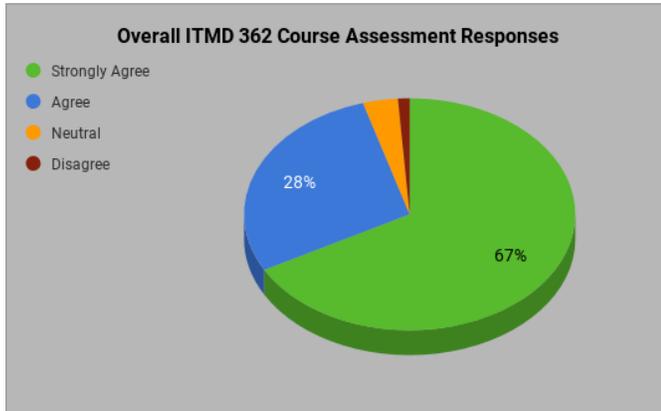
Instructor: Karl Stolley

Spring Enrollment: 32

Assessments collected: 8

**TALLIES: COURSE LEARNING OBJECTIVES**

Scale: 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree



Overall Class Ranking  
**4.61**

**\*ITM Undergraduate student outcome #Program Educational Objective**

**Q1 I can describe the diversity of information system users and tasks, and their impact on design.**

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Left blank	AVG
50%	38%	13%	0%	0%	0%	4.38

88% of students strongly agreed or agreed that they achieved this outcome.

**Q2 I can explain the need to evaluate system usability.**

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Left blank	AVG
63%	38%	0%	0%	0%	0%	4.63

100% of students strongly agreed or agreed that they achieved this outcome.

**Q3\* I learned how to design, implement and evaluate a computer-based solution to meet a given set of computing requirements.**

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Left blank	AVG
63%	25%	13%	0%	0%	0%	4.50

88% of students strongly agreed or agreed that they achieved this outcome.

**Q4 I learned how to demonstrate the core concepts, applicability, and cost benefits of user-centered design.**

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Left blank	AVG
88%	13%	0%	0%	0%	0%	4.88

100% of students strongly agreed or agreed that they achieved this outcome.

**Q5 I can demonstrate how user-centered concerns can be incorporated into system development life cycles.**

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Left blank	AVG
63%	25%	13%	0%	0%	0%	4.50

88% of students strongly agreed or agreed that they achieved this outcome.

**Q6 I learned how to explain the need to evaluate system usability and describe and apply general principles of design.**

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Left blank	AVG
63%	0%	0%	0%	0%	0%	4.63

63% of students strongly agreed or agreed that they achieved this outcome.

**Q7\* I can identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.**

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Left blank	AVG
75%	25%	0%	0%	0%	0%	4.75

100% of students strongly agreed or agreed that they achieved this outcome.

**Q8 I can describe and execute touch-friendly, mobile-first responsive web design.**

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Left blank	AVG
88%	13%	0%	0%	0%	0%	4.88

100% of students strongly agreed or agreed that they achieved this outcome.

**Q9 This course taught me to understand and apply core theories from human-computer interaction to web design and development.**

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Left blank	AVG
63%	38%	0%	0%	0%	0%	4.63

100% of students strongly agreed or agreed that they achieved this outcome.

**Q10# I am able to problem solve and create innovative answers to provide technology solutions for the problems of business, industry, government, non-profit organizations, and individuals.**

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Left blank	AVG
50%	50%	0%	0%	0%	0%	4.50

100% of students strongly agreed or agreed that they achieved this outcome.

**Q11\* I can analyze a problem and identify and define the computing requirements appropriate to its solution.**

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Left blank	AVG
75%	13%	0%	13%	0%	0%	4.50

88% of students strongly agreed or agreed that they achieved this outcome.

**STUDENT COURSE ASSESSMENTS: SPRING 2018**

**ITMD 421 Data Modeling and Applications**

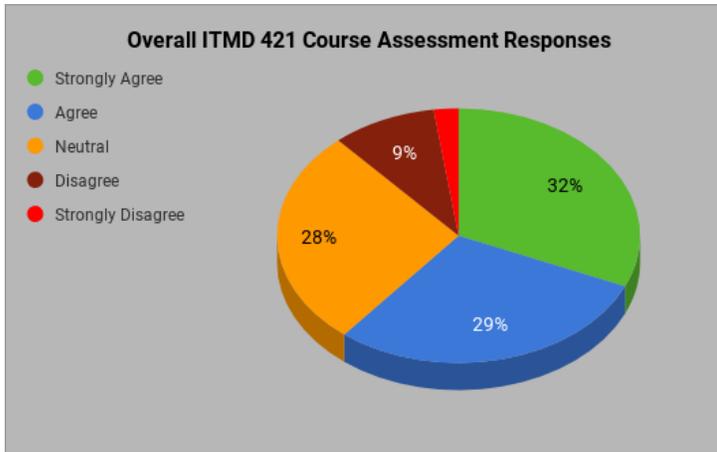
Instructor: Aastha Gupta

Spring Enrollment: 82

Assessments collected: 59

**TALLIES: COURSE LEARNING OBJECTIVES**

Scale: 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree



**Overall Class Ranking**  
**3.79**

*ITM Undergraduate student outcome	#Program Educational Objective	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Left blank	AVG
<b>Q1 I can describe the theoretical and physical concepts of a relational database.</b>		34%	36%	24%	5%	2%	0%	3.95
<b>69% of students strongly agreed or agreed that they achieved this outcome.</b>								
<b>Q2 I understand the design methodology for databases and can verify their structural correctness.</b>		34%	31%	29%	7%	0%	0%	3.92
<b>64% of students strongly agreed or agreed that they achieved this outcome.</b>								
<b>Q3 I learned querying language, primarily SQL, and their database related supported software.</b>		51%	27%	20%	2%	0%	0%	4.27
<b>78% of students strongly agreed or agreed that they achieved this outcome.</b>								
<b>Q4 I can implement the theory behind the various database models and query languages.</b>		29%	34%	25%	10%	2%	0%	3.78
<b>63% of students strongly agreed or agreed that they achieved this outcome.</b>								
<b>Q5 I am able to design and build a simple database management system and demonstrate competence with the fundamental tasks involved with modeling, design, and implementing a DBMS.</b>		49%	24%	22%	5%	0%	0%	4.17
<b>73% of students strongly agreed or agreed that they achieved this outcome.</b>								
<b>Q6 I have developed an understanding of essential DBMS concepts, specifically database security, high availability, backup and recover and SQL database tuning.</b>		20%	24%	36%	15%	5%	0%	3.39
<b>44% of students strongly agreed or agreed that they achieved this outcome.</b>								
<b>Q7* I can analyze a problem and identify and define the computing requirements appropriate to its solution.</b>		22%	25%	34%	14%	5%	0%	3.46
<b>47% of students strongly agreed or agreed that they achieved this outcome.</b>								
<b>Q8* I can design, implement and evaluate a computer-based solution to meet a given set of computing requirements.</b>		27%	29%	32%	8%	3%	0%	3.68
<b>56% of students strongly agreed or agreed that they achieved this outcome.</b>								
<b>Q9* I am able to make informed judgements in computing practice based on legal and ethical principles.</b>		24%	34%	27%	15%	0%	0%	3.66
<b>58% of students strongly agreed or agreed that they achieved this outcome.</b>								
<b>Q10# I can problem solve and create innovative answers to provide technology solutions for the problems of business, industry, government, non-profit organizations, and individuals.</b>		25%	31%	27%	12%	5%	0%	3.59
<b>56% of students strongly agreed or agreed that they achieved this outcome.</b>								

**STUDENT COURSE ASSESSMENTS: SPRING 2018**

**ITMT 430 System Integration**

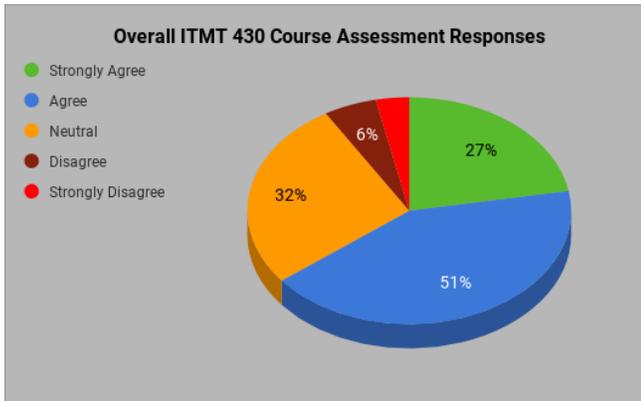
Instructor: Jeremy Hajek

Spring Enrollment: 42

Assessments collected: 30

**TALLIES: COURSE LEARNING OBJECTIVES**

Scale: 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree



Overall Class Ranking  
3.75

\*ITM Undergraduate student outcome #Program Educational Objective

**Q1 I can identify, gather, analyze, and write information system requirements based on user needs.**

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Left blank	AVG
10%	60%	20%	10%	0%	0%	3.70

70% of students strongly agreed or agreed that they achieved this outcome.

**Q2 I learned to document integration requirements using business process models.**

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Left blank	AVG
23%	33%	23%	13%	7%	0%	3.53

57% of students strongly agreed or agreed that they achieved this outcome.

**Q3 I am able to design, construct, integrate, and implement an information system as a solution to a business problem.**

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Left blank	AVG
20%	40%	33%	3%	3%	0%	3.70

60% of students strongly agreed or agreed that they achieved this outcome.

**Q4 I learned how to apply key systems integration architecture, methodologies, and technologies in the construction of an information system using industry best practices.**

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Left blank	AVG
20%	37%	37%	3%	3%	0%	3.67

57% of students strongly agreed or agreed that they achieved this outcome.

**Q5 Based on identified user needs, I can demonstrate the use of user centered design in the selection, creation, evaluation, and administration of an information system.**

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Left blank	AVG
17%	57%	23%	0%	3%	0%	3.83

73% of students strongly agreed or agreed that they achieved this outcome.

**Q6 I am able to recall and explain professional, ethical, legal, security, and social issues and responsibilities in information systems.**

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Left blank	AVG
37%	20%	20%	13%	10%	0%	3.60

57% of students strongly agreed or agreed that they achieved this outcome.

**Q7 I can describe the local and global impact of computing on individuals, organizations, and society.**

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Left blank	AVG
17%	43%	30%	3%	7%	0%	3.60

60% of students strongly agreed or agreed that they achieved this outcome.

**Q8 I am able to describe the need to engage in continuing professional development and explain how this may be achieved.**

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Left blank	AVG
23%	57%	13%	3%	3%	0%	3.93

80% of students strongly agreed or agreed that they achieved this outcome.

**Q9\* I can design, implement, and evaluate a computer-based solution to meet a given set of computing requirements.**

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Left blank	AVG
27%	33%	40%	0%	0%	0%	3.87

60% of students strongly agreed or agreed that they achieved this outcome.

**Q10\* I learned how to make informed judgments in computing practice based on legal and ethical principles.**

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Left blank	AVG
23%	43%	27%	7%	0%	0%	3.83

67% of students strongly agreed or agreed that they achieved this outcome.

**Q11\* I know how to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.**

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Left blank	AVG
27%	47%	27%	0%	0%	0%	4.00

73% of students strongly agreed or agreed that they achieved this outcome.

**Q12# I can problem solve and create innovative answers to provide technology solutions for the problems of business, industry, government, non-profit organizations, and individuals.**

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Left blank	AVG
23%	37%	30%	7%	3%	0%	3.70

60% of students strongly agreed or agreed that they achieved this outcome.

**STUDENT COURSE ASSESSMENTS: SPRING 2018**

**ITMT 593 Embedded Systems**

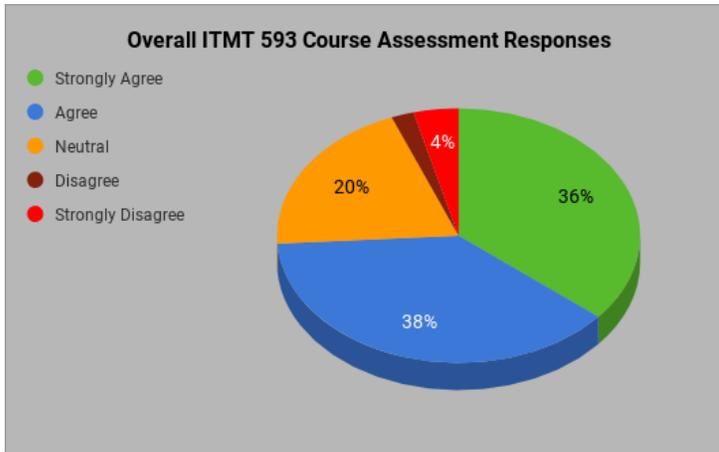
Instructor: Jeremy Hajek

Spring Enrollment: 7

Assessments collected: 5

**TALLIES: COURSE LEARNING OBJECTIVES**

Scale: 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree



Overall Class Ranking

4.00

**#Program Educational Objective**

Program Educational Objective	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Left blank	AVG
<b>Q1 I have an understanding of and can apply the principles of electricity and electronics that support smart tech.</b>	60%	20%	20%	0%	0%	0%	4.40
<b>80% of students strongly agreed or agreed that they achieved this outcome.</b>							
<b>Q2 I can understand schematics, diagrams, and electronic symbols.</b>	0%	80%	20%	0%	0%	0%	3.80
<b>80% of students strongly agreed or agreed that they achieved this outcome.</b>							
<b>Q3 I now have an understanding of the concepts of Data Collection, Data Transmission, and Data presentation using small computers and sensor networks.</b>	60%	20%	20%	0%	0%	0%	4.40
<b>80% of students strongly agreed or agreed that they achieved this outcome.</b>							
<b>Q4 I understand the fundamentals and can demonstrate basic use of wireless communication standards:Bluetooth, NFC, xBee (802.15), Wi-Fi.</b>	40%	40%	20%	0%	0%	0%	4.20
<b>80% of students strongly agreed or agreed that they achieved this outcome.</b>							
<b>Q5 I understand the concepts of solar panels and LiPo batteries and how to deploy them.</b>	40%	60%	0%	0%	0%	0%	4.40
<b>100% of students strongly agreed or agreed that they achieved this outcome.</b>							
<b>Q6 I have an understanding of the basics of cloud data storage for smart technology.</b>	20%	20%	40%	20%	0%	0%	3.40
<b>40% of students strongly agreed or agreed that they achieved this outcome.</b>							
<b>Q7 I understand the basics of Augmented Reality devices.</b>	60%	20%	0%	0%	20%	0%	4.00
<b>80% of students strongly agreed or agreed that they achieved this outcome.</b>							
<b>Q8 I learned how to use and have a basic working understanding of Voice Assistants.</b>	20%	40%	20%	0%	20%	0%	3.40
<b>60% of students strongly agreed or agreed that they achieved this outcome.</b>							
<b>Q9 I can manage and deploy information resources applicable to each student's particular area of focus in an enterprise setting.</b>	20%	20%	60%	0%	0%	0%	3.60
<b>40% of students strongly agreed or agreed that they achieved this outcome.</b>							
<b>Q10# I am able to work with, lead, and manage teams in an enterprise environment to collaboratively arrive at optimal technology solutions.</b>	40%	60%	0%	0%	0%	0%	4.40
<b>100% of students strongly agreed or agreed that they achieved this outcome.</b>							

**STUDENT COURSE ASSESSMENTS: SPRING 2018**

**ITMS 549 Cyber Security Technologies: Projects & Advanced Methods**

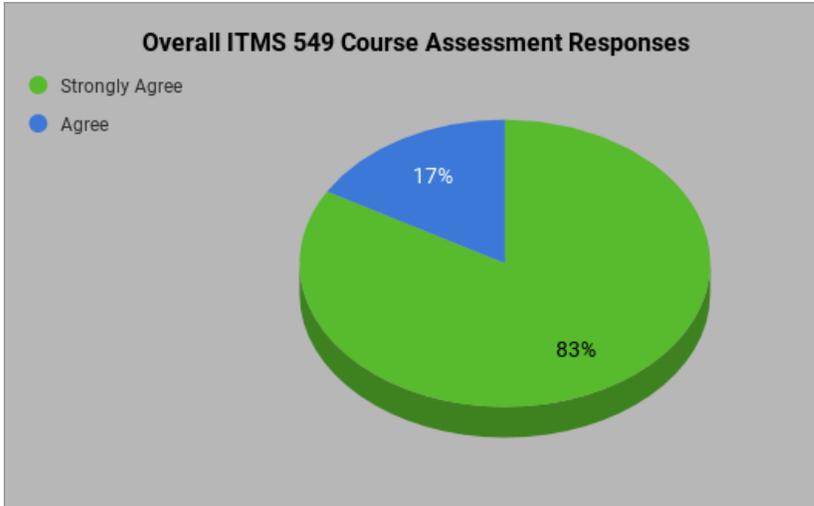
Instructor: Bill Lidinsky

Spring Enrollment: 12

Assessments collected: 4

**TALLIES: COURSE LEARNING OBJECTIVES**

Scale: 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree



**Overall Class Ranking**  
**4.83**

<b>Q1 I am able to create a paper clearly describing their project, it's background and its results.</b>	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Left blank	<b>AVG</b>
	75%	25%	0%	0%	0%	0%	4.75
<b>100% of students strongly agreed or agreed that they achieved this outcome.</b>							
<b>Q2 I can demonstrate their project in an understandable manner.</b>	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Left blank	<b>AVG</b>
	75%	25%	0%	0%	0%	0%	4.75
<b>100% of students strongly agreed or agreed that they achieved this outcome.</b>							
<b>Q3 If appropriate, I learned how to create a user manual so that others can demonstrate.</b>	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Left blank	<b>AVG</b>
	100%	0%	0%	0%	0%	0%	5.00
<b>100% of students strongly agreed or agreed that they achieved this outcome.</b>							
<b>Q4 I learned to create a user manual and technical paper that is sufficient to allow a knowledgeable person to reproduce the team's work.</b>	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Left blank	<b>AVG</b>
	75%	25%	0%	0%	0%	0%	4.75
<b>100% of students strongly agreed or agreed that they achieved this outcome.</b>							
<b>Q5 I am able to create a clear presentation of their work for presentation at a professional conference.</b>	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Left blank	<b>AVG</b>
	75%	25%	0%	0%	0%	0%	4.75
<b>100% of students strongly agreed or agreed that they achieved this outcome.</b>							
<b>Q6 I presented and and demonstrated the team's project at the ForenSecure '18 conference in April 2018.</b>	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Left blank	<b>AVG</b>
	100%	0%	0%	0%	0%	0%	5.00
<b>100% of students strongly agreed or agreed that they achieved this outcome.</b>							

## ITM Undergraduate Student Artifact Assessment Spring 2018

Three courses were evaluated by three to five faculty members. Results of the assessment are presented in the *Spring 2018 Student Artifact Assessment (Responses)* which follows. Each evaluator reviewed between eight and ten student artifacts in the form of course assignments or projects. They ranked the attainment of two outcomes on a scale of 1-5, indicating the level at which a student or project team was able to demonstrate attainment of each outcome. This scale was **1 Unable**, **2 Marginally able**, **3 Somewhat able**, **4 Reasonably able**, and **5 Fully able**. This was designed to specifically equate to the 1-5 scale used in the survey questions as to outcome attainment. The questionnaire measuring the outcomes for each course also follows. Only one questionnaire item is shown, but on the actual questionnaire completed by the evaluators, the number of items equated to the number of student items presented for evaluation.

Specific amplifying information regarding the evaluation of each course follows:

### ITMD 362

The assignment assessed a project in which each student created a single-page design that features a sign-up process to get new users to join some type of project, such as an email list, a software beta test, or an open-source community. The goal of the project was to experiment with patterns of interaction that persuade someone to sign up for whatever is being offered. The following ITM student outcomes evaluated in the assessment:

Bachelor of Information Technology and Management graduates should be able to:

- (a) Analyze a problem and identify and define the computing requirements appropriate to its solution
- (b) Design, implement, and evaluate a computer-based solution to meet a given set of computing requirements

Submission for this assignment was in the form of a Git repository on GitHub, with a link to the repository and a link to a live version of the page design. The assignment, followed by one example of the submission document with the front page of the Git repository and the live web page, appropriately anonymized, is included. Evaluators had the opportunity to view the entire Git repository.

### ITMD 471

The assignment assessed was a typical homework assignment for the course which allowed students to demonstrate their understanding of key database concepts by application of normalization. The two outcomes evaluated in this assessment include:

Bachelor of Information Technology and Management graduates should be able to:

- (a) Analyze a problem and identify and define the computing requirements appropriate to its solution
- (b) Design, implement, and evaluate a computer-based solution to meet a given set of computing requirements

One example of the homework assignment evaluated, appropriately anonymized, is included.

**ITMT 430**

The assignment assessed was a team project to construct an information system. Project outputs were demonstrated through application code and infrastructure code on Github, project progress was tracked on Trello (Project Management tool) and Slack was used to show code commits and team discussion. Bugs were tracked and resolved on Github Issues. In addition, regular reports were submitted during the course of the entire project. The ITM student outcomes to be evaluated in this assessment include:

Bachelor of Information Technology and Management graduates should be able to:

- (b) Design, implement, and evaluate a computer-based solution to meet a given set of computing requirements
- (f) Identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems

Due to a clerical error in the Assessment Form, only outcome (f) was assessed. Since outcome (b) was evaluated in the other courses this term, this was judged to be sufficient.

The submissibles for this project are complex and do not lend themselves well to print output as some projects included as many as 27,000 files, but the assignment followed by a final report from one project is included. Evaluators had the opportunity to view the entire project contents including contents of the entire Git repository.

## Spring 2018 Student Artifact Assessment (Responses)

ITMD 362 Spring 2018		Outcome and Item Number Assessed																				
Timestamp	Email Address	(a) 1	(b) 1	(a) 2	(b) 2	(a) 3	(b) 3	(a) 4	(b) 4	(a) 5	(b) 5	(a) 6	(b) 6	(a) 7	(b) 7	(a) 8	(b) 8	(a) 9	(b) 9	(a) 10	(b) 10	
5/27/2018 11:20:35	kpapadem@iit.edu	5	5	5	5	5	5	5	4	5	5	5	5	5	5	5	5	5	5	4	5	5
5/27/2018 18:01:14	lpapadem@iit.edu	4	4	5	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
5/27/2018 19:37:49	jpapadem@iit.edu	4	4	4	4	5	5	4	5	4	5	4	4	4	4	4	5	4	4	5	5	5
5/28/2018 22:07:23	hajek@iit.edu	5	5	5	5	5	5	4	4	5	5	4	4	4	4	4	4	4	4	4	4	4
Average for this outcome for this student		4.5	4.5	4.75	4.5	5	5	4.5	4.5	4.75	5	4.5	4.5	4.5	4.5	4.5	4.75	4.5	4.25	4.75	4.75	

	Av.	Med	Min	Max
<b>Total</b>	4.63	4.50	4.25	5.00
<b>Outcome (a)</b>	4.63	4.50	4.50	5.00
<b>Outcome (b)</b>	4.63	4.50	4.25	5.00

Faculty Comments: Excellent work in ITMD 362, I think the self-analysis at the end really brought each assignment together and easy to evaluate if he goals were met.

Outcome (a) This student appears to be \_\_\_\_\_ analyze a problem and identify and define the computing requirements appropriate to its solution  
 Outcome (b) This student appears to be \_\_\_\_\_ to design, implement, and evaluate a computer-based solution to meet a given set of computing requirements

ITMD 421 Spring 2018		Outcome and Item Number Assessed																				
Timestamp	Email Address	(a) 1	(b) 1	(a) 2	(b) 2	(a) 3	(b) 3	(a) 4	(b) 4	(a) 5	(b) 5	(a) 6	(b) 6	(a) 7	(b) 7	(a) 8	(b) 8	(a) 9	(b) 9	(a) 10	(b) 10	
5/27/2018 11:50:41	kpapadem@iit.edu	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3	3	4	4
5/27/2018 17:40:51	lpapadem@iit.edu	5	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
5/27/2018 17:50:34	jpapadem@iit.edu	4	4	5	4	5	5	4	3	4	4	5	5	4	4	4	4	5	5	4	4	
5/28/2018 22:19:43	hajek@iit.edu	3	3	5	5	5	5	4	4	5	5	4	3	5	5	4	4	4	3	4	3	
Average for this outcome for this student		4.25	4	5	4.75	5	5	4.5	4.25	4.75	4.75	4.75	4.5	4.75	4.75	4.5	4.5	4.25	4	4.25	4	

	Av.	Med	Min	Max
<b>Total</b>	4.53	4.50	4.00	5.00
<b>Outcome (a)</b>	4.60	4.63	4.25	5.00
<b>Outcome (b)</b>	4.45	4.50	4.00	5.00

Faculty Comments: Some students didn't complete the assignments, therefore the reason for the lower evals. Also the evaluation criteria were very vague and hard to apply to these assessable items.

Outcome (a) This student appears to be \_\_\_\_\_ analyze a problem and identify and define the computing requirements appropriate to its solution  
 Outcome (b) This student appears to be \_\_\_\_\_ to design, implement, and evaluate a computer-based solution to meet a given set of computing requirements

ITMT 430 Spring 2018		Outcome and Item Number Assessed															
Timestamp	Email Address	(a) 1	(b) 1	(a) 2	(b) 2	(a) 3	(b) 3	(a) 4	(b) 4	(a) 5	(b) 5	(a) 6	(b) 6	(a) 7	(b) 7	(a) 8	(b) 8
5/27/2018 12:29:15	kpapadem@iit.edu	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
5/27/2018 20:36:30	lpapadem@iit.edu	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
5/28/2018 21:22:24	hajek@iit.edu	4	4	4	4	3	3	5	5	4	4	3	3	4	4	2	2
5/28/2018 23:29:36	jpapadem@iit.edu	4	4	5	5	5	5	5	5	5	5	4	4	4	4	3	3
Average for this outcome for this team		4.5	4.5	4.75	4.75	4.5	4.5	5	5	4.75	4.75	4.25	4.25	4.5	4.5	3.75	3.75

	Av.	Med	Min	Max
<b>Total</b>	4.5	4.5	3.75	5
<b>Outcome (b)</b>	4.5	4.5	3.75	5

Faculty Comments: Next Spring (2019) I will adjust the syllabus and deliverables to denote/match the new ABET guidelines so as to make the evaluation part cleaner (from course instructor)

Outcome (b) This student team appears to be \_\_\_\_\_ to design, implement, and evaluate a computer-based solution to meet a given set of computing requirements

**Average rank of all outcomes assessed: 4.55**

# ITMD 362 Student Artifact Assessment

Please examine all student artifact items in the Google Team Drive ITM Courses > ITMD > ITMD 362 > Assessment directory and complete the assessment section for each item. We suggest opening the Assessment directory in a separate browser window and placing the two windows side-by-side.

Your email address ([trygstad@iit.edu](mailto:trygstad@iit.edu)) will be recorded when you submit this form. Not **trygstad**?

[Sign out](#)

\* Required

## Item 1

Based on your examination of this item, please rank the student's attainment of the outcome on a scale of one to five.

1 Unable    2 Marginally able    3 Somewhat able    4 Reasonably able    5 Fully able

1. This student appears to be \_\_\_\_\_ analyze a problem and identify and define the computing requirements appropriate to its solution \*

*Mark only one oval.*

	1	2	3	4	5	
Unable	<input type="radio"/>	Fully able				

2. This student appears to be \_\_\_\_\_ to design, implement, and evaluate a computer-based solution to meet a given set of computing requirements \*

*Mark only one oval.*

	1	2	3	4	5	
Unable	<input type="radio"/>	Fully able				

## Submit

Thank you for your effort on behalf of our continuous improvement process!

3. We would welcome any comments or observations:

---

---

---

---

---

## PROJECT ONE: ONBOARDING

### Project Description

You will create a single-page design that features a sign-up process to get new users to join some type of project, such as an email list, a software beta test, or an open-source community. Focus on designing for an effortless, engaging entry of personal information; and friendly, frictionless client-side tests and alerts for malformed, missing, or incomplete information. The goal of this project is to experiment with patterns of interaction that persuade someone to sign up for whatever it is you're offering, which is not at all an easy task.

### Project Goals

- Create a touch-friendly, mobile-first responsive web design
- Experiment with design and interaction patterns for pleasing user experience
- Design progressively enhanced page using at least two media queries
- Apply design principles including typography, color, and material design
- Engage in agile, iterative development; documented with plenty of commit comments

### Deliverables & Milestones

1. **First Deliverable:** Create a Basecamp post describing your work in progress. Title the post with your name and project number (example Daniel Krieglstein: Project 1). Your post should include:
  - The URL to your GitHub repository, and the URL to your Github Pages live link
  - Two questions eliciting feedback on from fellow students
2. **Second Deliverable:** Give constructive comments to help at least three other students.
3. **Third Deliverable:** Edit your original Basecamp post under Project 1 by fixing your code based on feedback from the professor and fellow students. Additionally, add the following:
  - Add a 3-4 sentence self-critique memo of your project and your progress in class to this point

### Requirements

- Project must be built with only one valid well-formed HTML file, one valid CSS file, and one JavaScript file.
- All source files in UTF-8/Unicode character encoding.
- No code-generators like WYSIWYGs, Bootstrap, or other off-the-shelf frameworks
- HTML, CSS, and JavaScript files should both be indented with 2 spaces per level of indent; indent all CSS style rules inside the declaring block, and further indent all rules and blocks inside your media queries
- Must pass HTML and CSS validators!
- HTML requirements:
  1. Only structural, semantic uses of HTML elements and attributes. **Absolutely no** table markup, break tags, or any other use of HTML to achieve a particular page layout.
  2. At least three HTML form elements, written in conjunction with <label> tags and the for attribute
  3. Semantically structured text-based HTML content to accompany any media elements (image, audio, video)
- CSS requirements:
  1. CSS file should open with a set of reset styles. Meyers, and the Form section of Normalize.

2. Use at least two min-width media queries to enhance your mobile-first styles for larger screens
- JavaScript requirements:
    1. JavaScript that throws no uncaught errors and is loaded unobtrusively (no JavaScript event attributes in your HTML, in other words; attach events to any elements requiring interaction)
    2. JavaScript that uses only asynchronous methods and callbacks
  - Git requirements:
    1. A Git repository with frequent commits and meaningful commit messages that accurately reflect each set of changes that you make
    2. GitHub repository must contain **only** the files and commits from this project

# Project 1, Final Turn-in: <name removed>

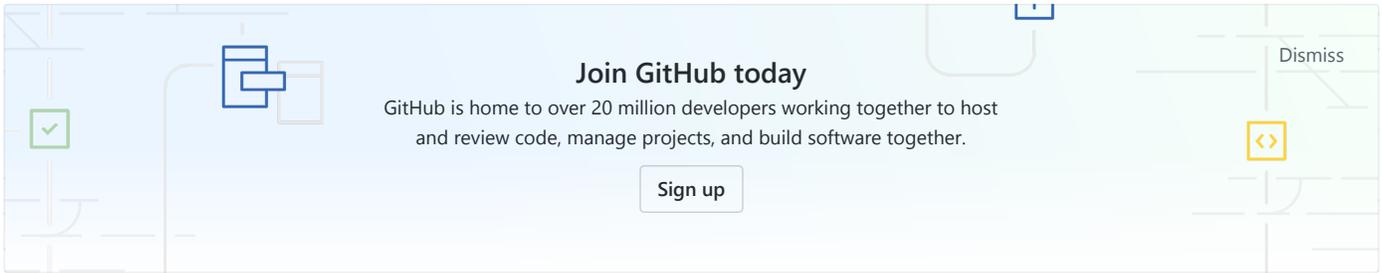
Repository link: [https://github.com/nameremoved/ITMD362\\_Project1](https://github.com/nameremoved/ITMD362_Project1)

Live Link: [https://nameremoved.github.io/ITMD362\\_Project1/](https://nameremoved.github.io/ITMD362_Project1/)

Questions:

- 1) Is it OK to leave my "oninvalid" functions as attributes of my html <input> tags, or should these be put into the javascript file? What is considered "best practice"?
- 2) What are some ways I can really distinguish between the tablet display and the desktop/laptop display? As it is, I changed some font sizing, body width, and some margins, but is there more I should be doing for the tablet layout?
- 3) I had to change my form method from "post" to "get" in order to avoid 405 errors after the form is submitted. Is this happening because we're not using any php? Is there a way to leave the method as "post" while also avoiding the 405 errors without php?

nameremoved / ITMD362\_Project1



design a mobile-first, one-page form

80 commits      1 branch      0 releases      1 contributor

Branch: master ▾    New pull request    Find file    Clone or download ▾

nameremoved changed HTML background color ...    Latest commit cf7ca0f on Mar 13

CSS	changed HTML background color	3 months ago
js	removed forced-format on phone number	3 months ago
.gitattributes	Initial commit	3 months ago
README.md	Update README.md	3 months ago
index.html	3 changes for final turn-in	3 months ago

README.md

# ITMD362\_Project1

The goal of this project is to design a mobile-first, one-page web form that encourages a user to sign up for something. It uses two media queries so that the form displays differently on tablets and full-screen displays (i.e., laptops and desktops).

# Register to Volunteer!

Please enter your information to find volunteer opportunities near you.

First Name

Last Name

Email

Phone Number

Zip Code



I am 18 years of age or older

**Volunteer Today**

# ITMD 421 Student Artifact Assessment

Please examine all student artifact items in the Google Team Drive ITM Courses > ITMD > ITMD 421 > Assessment directory and complete the assessment section for each item. We suggest opening the Assessment directory in a separate browser window and placing the two windows side-by-side.

Your email address ([trygstad@iit.edu](mailto:trygstad@iit.edu)) will be recorded when you submit this form. Not [trygstad](#)? [Sign out](#)  
*\* Required*

## Item 1

Based on your examination of this item, please rank the student's attainment of the outcome on a scale of one to five. We recognize that these items are not optimal for evaluating these outcomes but exercise your best judgement.

1 Unable    2 Marginally able    3 Somewhat able    4 Reasonably able    5 Fully able

1. This student appears to be \_\_\_\_\_ analyze a problem and identify and define the computing requirements appropriate to its solution \*

*Mark only one oval.*

	1	2	3	4	5	
Unable	<input type="radio"/>	Fully able				

2. This student appears to be \_\_\_\_\_ to design, implement, and evaluate a computer-based solution to meet a given set of computing requirements \*

*Mark only one oval.*

	1	2	3	4	5	
Unable	<input type="radio"/>	Fully able				

## Submit

Thank you for your effort on behalf of our continuous improvement process!

3. We would welcome any comments or observations:

---

---

---

---

---

## ITMD 421: Database Modeling and Applications Assignment 2

**Due Monday, February 5<sup>th</sup>**

**Total points: 100**

**1.**

**This table is un-normalized form. Convert this table from 1NF to 3NF.**

**Show your work.**

Project Code	Project Title	Project Manager	Project Budget	Employee No.	Employee Name	Department No.	Department Name	Hourly Rate
PC010	Pensions System	M Phillips	24500	S10001	A Smith	L004	IT	22.00
PC010	Pensions System	M Phillips	24500	S10030	L Jones	L023	Pensions	18.50
PC010	Pensions System	M Phillips	24500	S21010	P Lewis	L004	IT	21.00
PC045	Salaries System	H Martin	17400	S10010	B Jones	L004	IT	21.75
PC045	Salaries System	H Martin	17400	S10001	A Smith	L004	IT	18.00
PC045	Salaries System	H Martin	17400	S31002	T Gilbert	L028	Database	25.50
PC045	Salaries System	H Martin	17400	S13210	W Richards	L008	Salary	17.00
PC064	HR System	K Lewis	12250	S31002	T Gilbert	L028	Database	23.25
PC064	HR System	K Lewis	12250	S21010	P Lewis	L004	IT	17.50
PC064	HR System	K Lewis	12250	S10034	B James	L009	HR	16.50

Project Code	Employee No.	Hourly Rate
PC010	S10001	22.00
PC010	S10030	18.50
PC010	S21010	21.00
PC045	S10010	21.75
PC045	S10001	18.00
PC045	S31002	25.50
PC045	S13210	17.00
PC064	S31002	23.25
PC064	S21010	17.50
PC064	S10034	16.50

Project Code	Project Type	Project Manager	Project Budget
PC010	Pensions System	M. Philips	24500
PC045	Salaries System	H Martin	17400
PC064	HR System	K Lewis	12250

<u>Employee No.</u>	Employee Name	Department No.
S10001	A Smith	L004
S10030	L Jones	L024
S21010	P Lewis	L004
S10010	B Jones	L004
S31002	T Gilbert	L028
S13210	W Richards	L008
S10034	B James	L009

(IT and Database was repeated)

<u>Department No.</u>	Department Name
L004	IT
L024	Pensions
L028	Database
L008	Salary
L009	HR

## 2. What are the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> NF?

Pet_id	Pet_Name	PET_Type	Pet_Age	Owner	Visit Date	Procedure
1	Brown	DOG	12	Sam	JAN 13/2002	01 - RABIES VACCINATION
					MAR 27/2002	10 - EXAMINE and TREAT WOUND
					APR 02/2002	05 - HEART WORM TEST
2	Tucker	DOG	2	John	JAN 21/2002	08 - TETANUS VACCINATION
					MAR 10/2002	05 - HEART WORM TEST
3	Maggie	CAT	4	Sam	JAN 23/2001	01 - RABIES VACCINATION
					JAN 13/2002	01 - RABIES VACCINATION
4	Tweety	BIRD	2	John	APR 30/2002	20 - ANNUAL CHECK UP
					APR 30/2002	12 - EYE WASH

### 1<sup>st</sup> NF

<u>Pet_id</u>	Pet_Name	PET_Type	Pet_Age	Owner	Visit Date	Procedure
1	Brown	DOG	12	Sam	JAN 13/2002	01 - RABIES VACCINATION
1	Brown	DOG	12	Sam	MAR 27/2002	10 - EXAMINE and TREAT WOUND
1	Brown	DOG	12	Sam	APR 02/2002	05 - HEART WORM TEST
2	Tucker	DOG	2	John	JAN 21/2002	08 - TETANUS VACCINATION
2	Tucker	DOG	2	John	MAR 10/2002	05 - HEART WORM TEST
3	Maggie	CAT	4	Sam	JAN 23/2001	01 - RABIES VACCINATION
3	Maggie	CAT	4	Sam	JAN 13/2002	01 - RABIES VACCINATION
4	Tweety	BIRD	2	John	APR 30/2002	20 - ANNUAL CHECK UP
4	Tweety	BIRD	2	John	APR 30/2002	12 - EYE WASH

2<sup>nd</sup> NF

<u>Pet_id</u>	Pet_Name	PET_Type	Pet_Age	Owner
1	Brown	DOG	12	Sam
2	Tucker	DOG	2	John
3	Maggie	CAT	4	Sam
4	Tweety	BIRD	2	John

<u>Pet ID</u>	Visit Date	Procedure
1	JAN 13/2002	01 - RABIES VACCINATION
1	MAR 27/2002	10 - EXAMINE and TREAT WOUND
1	APR 02/2002	05 - HEART WORM TEST
2	JAN 21/2002	08 - TETANUS VACCINATION
2	MAR 10/2002	05 - HEART WORM TEST
3	JAN 23/2001	01 - RABIES VACCINATION
3	JAN 13/2002	01 - RABIES VACCINATION
4	APR 30/2002	20 - ANNUAL CHECK UP
4	APR 30/2002	12 - EYE WASH

3<sup>rd</sup> NF

Pet_id	Pet_Name	PET_Type	Pet_Age	Owner
1	Brown	DOG	12	Sam
2	Tucker	DOG	2	John
3	Maggie	CAT	4	Sam
4	Tweety	BIRD	2	John

<u>Pet ID</u>	Visit Date	Procedure ID
1	JAN 13/2002	01
1	MAR 27/2002	10
1	APR 02/2002	05
2	JAN 21/2002	08
2	MAR 10/2002	05
3	JAN 23/2001	01
3	JAN 13/2002	01
4	APR 30/2002	20
4	APR 30/2002	12

(broken down the procedure id and name)

<u>Procedure ID</u>	Procedure Name
01	Rabies Vaccination
10	Examine and Treat Wound
05	Heart Worm Test
08	Tetanus Vaccination
20	Annual Check Up
12	Eye Wash

3. The following schema is used to register information on repayment of loans.

Repayment(borrower\_id, name, address, loanamount, requestdate, repayment\_date, repayment\_amount)

1nf

Borrower ID	Name	Address	Loanamount	Requestdate	Repayment_date	Repayment_amount
-------------	------	---------	------------	-------------	----------------	------------------

3nf

Borrower ID	Name	Address	Loanamount
-------------	------	---------	------------

Borrower ID	Requestdate	Repayment_date	Repayment_amount
-------------	-------------	----------------	------------------

4. Consider the below table structure that a company uses to keep track of office equipment's.

ITEM_ID	ITEM_LABEL	ROOM_NUM	BLD_NUM	BLD_NAME	BLD_MGR
125457	Dell Desktop	224	CDM	College of Digital Media	I.M. Jackson
145287	Dell Laptop	224	CDM	College of Digital Media	I.M. Jackson
175486	Brother Printer	145	LDM	Collge of Law	R.F John

Given the above information

- Write the relational schema and identify partial and transitive dependencies if any.
- Normalize the schema. Show all your work.

Items(ITEM\_ID, ITEM\_LABEL, ROOM\_NUM, BLD\_NUM, BLD\_NAME, BLD\_MGR)

Transitive Dependencies : BLD\_MGR, BLD\_NAME

Make the normalization to 3<sup>rd</sup> Normal Form. Show your work.

ITEM_ID	ITEM_LABEL	ROOM_NUM
125457	Dell Desktop	224
145287	Dell Laptop	224
175486	Brother Printer	145

(Room 224 was repeated)

ROOM_NUM	BLD_NUM
224	CDM
145	LDM

BLD_NUM	BLD_NAME	BLD_MGR
CDM	College of Digital Media	I.M. Jackson
LDM	Collge of Law	R.F John

5. Normalize the below data

EMP_NUM	PROF_RANK	EMP_NAME	DEPT_ID	DEPT_NAME	PROF_OFFICE	ADVISEE	COMMITTEE_CODE	JOURNAL_CODE
147587	Professor	John	CDM	College of Digital Media	CDM 642	4578, 1452, 5987, 2360	PROMO, MEDIA, DEV, PROG	ITIM, ITSC, QTS
412547	Adjunct	Mark	CIS	College of Information SyS	CDM 641	1457,4789,3652,2541,8596,7853,9654	DEV	ITIM
234654	Asst. Prof	Mary	CDM	College of Digital Media	CDM 785	2578,7896,5896,5874,5214,5236,3258,3257	TEST,MEDIA	ITSC, QRT
789654	Asst. Prof	Joe	LAW	College of Law	CDM 478	5678.9087,2014,5630,2140	Promo, PROG	QRT

Given the below information –

- Identify the multivalued, partial and transitive dependencies, if there are any.
- Eliminate the dependencies and normalize the data.

Show your work.

Dependencies: DEPT\_NAME

<b>EMP_NUM</b>	<b>ADVISEE</b>	<b>COMMITTEE_CODE</b>	<b>JOURNAL_CODE</b>
147587	4578, 1452, 5987, 2360	PROMO, MEDIA, DEV, PROG	ITIM, ITSC, QTS
412547	1457,4789,3652,2541,8596,7853,9654	DEV	ITIM
234654	2578,7896,5896,5874,5214,5236,3258,3257	TEST,MEDIA	ITSC, QRT
789654	5678.9087,2014,5630,2140	Promo, PROG	QRT

<b>EMP_NUM</b>	<b>PROF_RANK</b>	<b>EMP_NAME</b>	<b>DEPT_ID</b>	<b>PROF_OFFICE</b>
147587	Professor	John	CDM	CDM 642
412547	Adjunct	Mark	CIS	CDM 641
234654	Asst. Prof	Mary	CDM	CDM 785
789654	Asst. Prof	Joe	LAW	CDM 478

(CDM was repeated)

<b>DEPT_ID</b>	<b>DEPT_NAME</b>
CDM	College of Digital Media
CIS	College of Information Sys
LAW	College of Law

# ITMT 430 Student Artifact Assessment

Please examine all student artifact items in the Google Team Drive ITM Courses > ITMT > ITMT 430 > Assessment directory and complete the assessment section for each item. We suggest opening the Assessment directory in a separate browser window and placing the two windows side-by-side. Please read the notes for this assessment in the Assessment directory before viewing the items.

Your email address ([trygstad@iit.edu](mailto:trygstad@iit.edu)) will be recorded when you submit this form. Not trygstad? [Sign out](#)  
\* Required

## Item 1

Based on your examination of this item, please rank the student team's attainment of the outcome on a scale of one to five.

1 Unable    2 Marginally able    3 Somewhat able    4 Reasonably able    5 Fully able

1. **These students appear to be \_\_\_\_\_ identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems \***

*Mark only one oval.*

	1	2	3	4	5	
Unable	<input type="radio"/>	Fully able				

2. **These students appear to be \_\_\_\_\_ to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems \***

*Mark only one oval.*

	1	2	3	4	5	
Unable	<input type="radio"/>	Fully able				

## Submit

Thank you for your effort on behalf of our continuous improvement process!

3. **We would welcome any comments or observations:**

---

---

---

---

---

### 3 Week Project Sprint & Final Team Project Deliverable Outline

You will form a team of 5 or 4 (minimum) based on the Lab section maximum people. There are 5 positions that you will rotate through in three week sprints. Each person will take a primary role—but that role is not exclusive. Each team, starting week 1, will outline a 3 week project plan of goals they aspire to accomplish – listed by the project manager. At the end of those 3 weeks (in the Lab time) the team will present their project to the entire class. See below for **written paper requirements**:

The outputs will be demonstrated through your application code and infrastructure code on Github, your project progress will be tracked on Trello (Project Management tool) and Slack will be used to show code commits and team discussion. Bugs will be tracked and resolved on Github Issues. Operations will be tested to show how your Visio diagrams match your output and how automated your build infrastructure is.

1. **Project Manager** responsibilities include but are not exclusive to:
  - a. Responsible for managing resources, team, goal setting, and achieving set goals for that 3 week sprint
  - b. Responsible for determining resource blockers
  - c. Responsible for preparing reports and demonstrating application build
  - d. Responsible for assuring working product and documenting necessary build instructions
  - e. Responsible for allocating issues and issues tracking on Github
2. **Developer** responsibilities include but are not exclusive to:
  - a. Responsible for coding and programming
  - b. Responsible for showing consistent code commitment and deployment based on the language the team selected
3. **Jr. Developer** (if a team has 4 people, this job is absorbed by UI/UX)
  - a. Responsible for working with the Developer in coding tasks
  - b. Responsible for SecOps (Security Operations) in testing/searching code for security vulnerabilities
  - c. Responsible for working with UI/UX developer to resolve user bugs
4. **IT Operations** responsibilities include but are not exclusive to:
  - a. Responsible for ensuring and deploying infrastructure and code
  - b. Responsible for ensuring all team members can deploy all code locally and to production
  - c. Responsible for documenting and drawing all infrastructure
5. **UI/UX Developer**
  - a. Responsible for designing and documenting the UI/UX of the project
  - b. Responsible for justifying the UI/UX decision
  - c. Responsible for testing responsive design
  - d. Responsible for user testing the cite and filing of bugs on Github Issues

### Project Base Requirements

Each Project will have additional specific details per job to be delivered once project subject is determined:

1. Language and framework of your choice (ITM 311, ITM 312, ITMD 361, ITMD 411) **Suggestions:**
  - a. Android/iOS/XBOX UWP (yes I will get us an Xbox if you choose this route)
  - b. PHP – Cake/Symphony
  - c. Java – Spring/JSP/Hibernate
  - d. Javascript – NodeJS/Angular/React/Vue.js
  - e. Ruby – Ruby on Rails
2. Operating System Platform of Choice (ITM 301, ITMO 456)
3. Use of Data Store (ITMD 421, ITMD 411, ITMO 456)
  - a. Database or similar storage technology
4. Data encrypted at rest (ITMS 448)
5. Database makes use of master/slave replication (~ITMD 421, ITMD 411)
  - a. Master for database writes
  - b. Slave for database reads
6. Use of Responsive design (where applicable) (ITMD 361, ITMD 362)
7. Use of https (ITMS 448, ITMO 456)
  - a. Self-signed certs
  - b. Google authentication for login
  - c. SQRL - <https://www.grc.com/sqrl/sqrl.htm>
8. Use of user authentication (ITMD 361)

- a. Must use HTTP Session
- b. Different UI for Unauthenticated users
  - i. Must have read/only features for unauthenticated users
- c. Different UI for Authenticated users
  - i. Must have a user account management page (EDIT Page)
- d. Different UI for Administrative users
  - i. Must have an administrative database dump and restore feature
- e. UI is modified per authenticated user via CSS
9. Creation of Dev Environment (local laptop), (ITMO 456)
  - a. Production must always be working
  - b. Environment must be configurable via script pre-deploy
    - i. No manual editing or installing
  - c. Initial Sprint will implement development via laptop using Packer, Vagrant, and VirtualBox
  - d. Test and Production environments will be built in the next 2 Sprints
10. Layout design (ITMD 361, 362, ITMM 471)
  - a. Diagrams of site functionality
  - b. Diagrams of colors, fonts, and other usability features
11. Management of Visio (or comparable) diagram tool of work flow (ITM 301, ITMO 456)
12. Management of project progress (ITMM 471)
  - a. Trello
  - b. Slack
  - c. Github
  - d. Github Issues to resolve bug posts from UI/UX tester
13. Team must generate at least 15 real “test” users and proper data to test functionality of a system
  - a. No system is ever used “blank” always fill it up with real data.

### Project List:

Here is an initial list of projects to choose from (Groups can duplicate their choice or originate their own)

1. Bugoverlflow
  - a. Create a near feature complete copy of Stackoverflow Q&A site – this time for identifying insect photographs
  - b. Create a feature that allows for mapping based on Geotags of photos
  - c. Create storage solution for photos
2. Project Factor (user front end)
  - a. Create a system allowing users to create accounts and upload video, using a speech to text library (cloud based or opensource) to create text transcripts of these videos
  - b. Include solution for storage of videos and cost justification
3. Project Factor (back end search index)
  - a. Using a Hadoop/Solr/Lucene based application create an search engine to allow for searching of phrases and correlation with timestamp index in the corresponding video
4. Flickr like/Instagram hybrid internal photo search site
  - a. Create a flicker like tagged photo system allowing employees to search and modify stock photos (I will provide the photos to you)
  - b. Analyze realtime image rendering vs storing pre-rendered images
  - c. Create storage solution for images
5. Rideshare service for ITM Department (mobile/Xbox)
  - a. A service for connecting people wishing to share location and schedule for coordinating a rideshare
  - b. [Make it a progressive web app](#)
6. FixMe mobile app (mobile)
  - a. A service for allowing people to highlight problems and create a voting system for rank priorities
  - b. Create image storage back end
  - c. Create voting and reputation system including difficulty/time to completion/ and cost factors
  - d. [Make it a progressive web app](#)
7. Create AI assistant (Google Home, Microsoft Cortana, Amazon Echo) based assistant for ITM course syllabi inquires
  - a. Coordinate department syllabi to be injected into application (will be provided)

- b. Create voice syntax for querying via voice and receiving spoken responses
  - c. Focus on VI/VX (voice interface, voice experience) to make the service as friendly as possible
  - d. Focus on deployment (App store account will be provided to you)
8. Other user defined project

**Written Report Content:** At the end of a three week sprint, the project manager will be responsible to collecting the team's input and preparing a report. You will receive feedback from me on this report, to be incorporated in the final project report. The report should state the following:

1. Describe the team members and their functions
2. Describe the groups stated (atomic) goals for the sprint
  - a. Describe how many of these initial goals you accomplished
  - b. Describe what you would change or adapt to complete more of these goals.
3. Describe what was accomplished and why/how
  - a. List feature deployment
  - b. List next Sprints goals
4. Explain and show how bugs were found, tracked, and delegated
5. Explain any security assumptions made and explain how these were discovered and mitigated
6. Each team member should comment on their each accomplishments and describe what they did and explain any decisions referencing any lectures or material from the text book or web.
7. Reference decisions from any of the videos, guest lectures, and class presentations, or text book.

**Deliverables:** Each team will have different requirements but there are core requirements for all.

- Visio or other diagramming tool for the outline of your application
  - Create a folder named: **diagrams** in your team Github account.
- Create UI/UX layout designs of every page – including content layout, colors, fonts, etc etc
  - Place these in your diagrams folder
- ReadMd.md must have teach team members name and contact email
  - Must include build instructions to automatically build the application from the command line including all necessary dependencies, instructions, and assumptions

### Final project Report

1. Create and summarize into a final report detailing the accomplishments of the 5 three week sprint reports.
2. Explain the overall accomplishments of the team based on the content of the 5 reports
3. Analyze the completeness of the project in fulfilling the stated goals (self-assessment, how close did you get?)
  - a. Explain in detail from the textbook and resources – some features that were not implemented are ok if you can explain accurately why that happened.
4. Explain your technology and stack choices
5. Include your teams backgrounds

## ITMT 430

### Team 5 Octocat - InterpretAir Project

#### Team Members

1. <removed>

## 13 Project Base Requirements

### 1. MEAN Stack

We used the MEAN stack.

MEAN is an acronym short for Mongo DB (database system), Express (back-end web framework), Angular.js (front-end framework) and Node.js (back-end runtime environment). Our team is the most comfortable with Javascript and it is a modern approach to web development. JavaScript is a dynamic programming language for client-side and server-side web application development.

MEAN stack uses JSON as the format for data-interchange on all the layers. So, there is no need to use libraries for converting data during client-side and server-side interaction. JSON also allows working with external APIs (application programming interfaces) easily which is ideal for our project.

**MongoDB** will be discussed further in Data Store section.

**Express.js** is used in creating server side web applications faster and smarter, simplicity, minimalism, flexibility, scalability, easy to configure and customize, allows you to create rest API server, easy to connect with databases.

**Angular.js** is a front-end JavaScript development framework for developing single-page applications. It allows a clean way of adding interactive functions and AJAX-driven rich components on the client-side. Since, you have Node.js providing a server-side solution; there is JavaScript implementation on both client and server-side. This makes programming applications with MEAN stack very effective.

**Node.js** (8.10.0) also runs on LINUX, Windows and OS X. Node.js operates on a single thread for processing incoming HTTP requests. It uses non-blocking I/O (input-output) calls to handle multiple new incoming requests efficiently. Unlike other web servers like Apache, Node.js is extremely fast and scalable, supporting thousands of concurrent connections. Node.js uses web sockets to enable sending data to client without having the client to request it. Hence, it is an ideal choice for developing real-time web applications like chatting applications. Node.js is also supported by a large module library.

### Node modules:

We have started using a number of new modules post-midterm: dotenv, faker, gulp, gulp-ng-config, passport-google-oauth, passport-google-oauth20, passport-local, webcam.

So our list of Node Modules we're using is

1. angular2-flash-messages
2. bcrypt
3. bcryptjs
4. body-parser
5. cookie-parser
6. cors
7. debug
8. dotenv
9. express
10. faker
11. gulp
12. gulp-ng-config
13. jsonwebtoken
14. mongoose
15. morgan
16. nodemon
17. passport
18. passport-google-oauth
19. passport-google-oauth20
20. passport-jwt
21. passport-local
22. pug
23. serve-favicon
24. webcam

## 2. Operating System: Ubuntu Linux 17.10 Distribution

Our team chose Ubuntu for following reasons: 1. All our team members are familiar with linux based operating system. 2. It's free and doesn't cost to download or setup. 3. It's secure as it has built-in firewalls and virus protection method that makes sure you're protected. In comparison to Windows, the malware risks associated with Ubuntu Linux are negligible. 4. It's highly customizable so we can configure it to the way we want so it will run smoothly with our web appplication, 5. It is estimated today that close to 38% of websites across the world are hosted on Linux machines, of which Ubuntu servers took up 35%. As such, Ubuntu offers a strong community support and it's one of the biggest advantages of Ubuntu over other distrubutions. 6. Low system requirements so it can run across all our laptops. The recommended hardware requirements are 700 MHz processor, 512MB RAM, and 5GB hard disk. 7. It's open source.

## 3. MongoDB used to store data.

We chose Mongo DB because it's great for database system when managing huge tables with tons of data. MongoDB's flexibility allowed us to build our application faster and manage all kinds of data types. Adding a field, for example, does not require us to update an entire table.

It is worth mentioning that in Mongo DB, documents resemble to objects in an object-oriented programming language. A document can be queried on any field and data access is simplified by reducing the use for joins.

## 4. Data encrypted at rest

Passwords are hashed to protect personal information. We use node module called **bcrypt** to hash all the passwords of all user accounts. The salt is a string of characters unique to each user. The hash is created by combining the password provided by the user and the salt, and then applying one-way encryption. As the hash can't be decrypted, the only way to authenticate a user is to take the password, combine it with the salt and decrypt it again. If the output of this matches the hash, the password must have been correct.

When we deploy the web application with vagrant, we set up our own credentials in the variables.json file. These credentials are then used to limit access to the database to only one user; the deploying user. Individuals then have more control of their own copy of the database since they regulate with credentials.

## 5. Database Master/Slave Replication

We have successfully set up two separate boxes for the slave and master databases running on two separate IP addresses. On deployment with Vagrant, the slave database will serve as a copy of the master database. Hence any changes on the master database will be reflected on the slave database. Should the master database go down, data would remain available on the slave database. Also, should the master database become obsolete, we could turn the slave database into the master database. It should be mentionned that one normally has read-only access to the slave database.

## 6. Use of Responsive Design

1. Our team will be using bootstrap because we are quite familiar with it and it's fairly easy to use. We chose bootstrap because:
  - Highly responsive due to its fluid grid layout that dynamically adjusts to proper screen resolution.
  - It saves a lot of time in terms of development. There are ready made classes which are available for us to use.
  - Highly customizable. We only need to the required functionalities for our project just by selecting on Bootstrap customize page.
  - Consistency across different webpages, as we are rotating Sprints every 3 weeks. Design must be consistent throughout the project.
1. We also wrote media queries to include more responsive design in our code. [These](#) were written for the webpage of the unauthenticated user.

## 7. Use of https

### a. Self-signed certs

Self signed certificates encrypt communications, but provide no validation of server identity. Although they prevent eavesdropping, they leave you vulnerable to man-in-the-middle attacks. Only certificates signed by a trusted certificate authority will allow MongoDB drivers to verify the server's identity.

When our application is [deployed](#) with vagrant, self-signed certificates are generated and then [placed](#) in our app's config folder. When the app is fired up with `npm start`, the self-signed are then put it into use when serving up our application.

### b. Google Authentication for login

We chose Google authentication because gmail is second most used email client and many working professionals have a google account. This allows the user to sign in without going through the long signup process. This normally speeds up the registering process and enhance user experience. Sometimes users refuse to use a service if a tedious sign up process is a requirement.

What we have done so far: we were able to authenticate successfully with google authentication. However, because we're all using different IP addresses to serve up our application, it becomes tricky to set up the Google console correctly in order to redirect to dashboard after authentication.

### c. Explanation of security assumptions relating to:

1. Firewall: We do set up the firewall for our webserver in our `post_install_itmt430-github-ws` script. We allow a number of protocols and services: `ssh`, `webserver`, `https`, `mongoDB`. We also allow/open a number of ports for service: 27017, 8080, 3000, 4200.
2. Seeding of usernames and passwords: In our `app.js` file, we are able to use module `faker` to generate usernames and passwords for 15 users.
3. Pre-seeding databases/datastores with schema and records: In our `user` model (`user.js`), we are able to create a schema for what we want to store in our MongoDB database (`username`, `password`, `first` and `last` name, `email`). On deployment, this schema is created automatically.

## 8. Use of user authentication

User Authentication and authorization is important because we have to ensure each user is only allowed to see their account and their information and not other information of other users. We have to prevent unauthorized access to the information in our database.

Our MEAN Stack Authentication Flow: 1. User data is stored in MongoDB, with the passwords hashed 1. CRUD functions are built in an Express API — Create (register), Read (login, get profile), Update, Delete 1. An Angular application calls the API and deals with the responses 1. The Express API generates a JSON Web Token (JWT) upon registration or login, and passes this to the Angular application 1. The Angular application stores the JWT in order to maintain the user's session 1. The Angular application checks the validity of the JWT when displaying protected views 1. The Angular application passes the JWT back to Express when calling protected API routes. 1. JWTs are preferred over cookies for maintaining the session state in the browser. Cookies are better for maintaining state when using a server-side application.

We used `Passport` to handle the Express Authentication. Passport is a Node module that simplifies the process of handling authentication in Express. It provides a common gateway to work with many different authentication “strategies”, such as logging in with Facebook, Twitter or Oauth. The strategy we'll use is called “local”, as it uses a username and password stored locally.

Unauthenticated users can use the platform without logging in, by just creating a room and inviting other users in. Transcripts are not stored in their account but end of each call, there will be a summary page with the option to download or email the transcript to themselves.

Authenticated users have their own account where they can store their transcripts and have a list of contacts. The list of contacts allows the user to chat or call them when they are online.

For Administrative users, we haven't created a page for them as of now. Should we continue working on this project, we will incorporate this feature in the next iterations for management and restore feature in case of a problem after new code deployment, we can revert to the previous commit. User Interface will be useful in managing and help to transfer

the management process easily to a new team member. In this way, we don't need to depend on just one system administrator to restore the problem.

## 9. Creation of Dev Environment (local laptop)

This is our Automation flow:

Thanks to Vagrant and Packer, We make use of 'automation' to create a local environment. Our [README.md](#) file walks you through the steps to generate this environment.

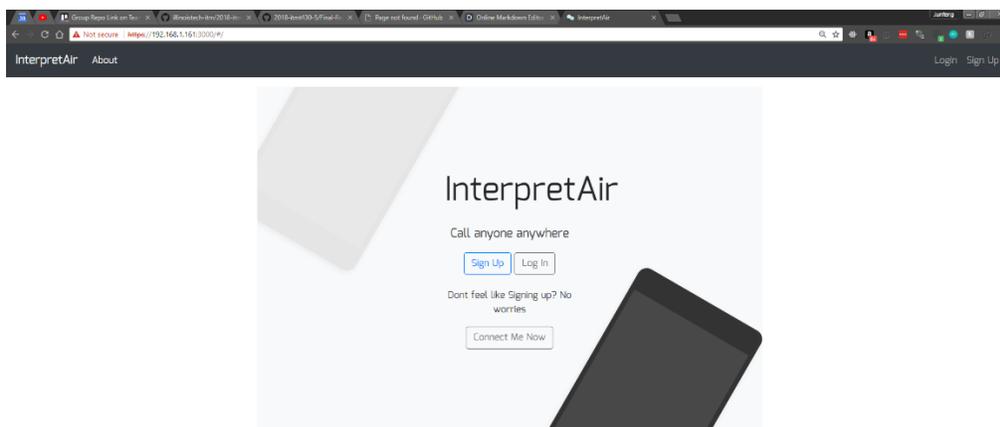
At first, with packer, we build boxes which are containers, upon which we are able to build our databases (Slave and Master) and our webserver. However, prior to running Packer, we need to customize our [variables.json](#) file to use our database credentials and our own IP addresses. After building our boxes with Packer, we then move on to adding those newly generated containers to Vagrant. Vagrant will set up our local environment by running bash scripts until the only thing we need to do is type in: `https://{webserverip}:3000` in our browser.

We also focus on making infrastructure easier to rebuild than to repair as we can "Vagrant Destroy" and Vagrant up again in case there were issues with code deployment. This repeatable environment creation systems ensure no manual environment production changes are allowed.

## 10. Layout Design

Layout design is simple and user friendly. Not cluttered, it incorporates minimalistic design so it's clear for the user what each function does, but still with all the required functionalities to run our web application. We are using Bootstrap to ensure the consistency and simplicity of the design. We will customize the colors, fonts and other usability features more in the next sprint.

### Welcome Page



---

*alt text*

## Login Page

InterpretAir About Login Sign Up

### Login

Username

Password

[New around here? Sign up](#)  
[Forgot password?](#)

*alt text*

## Unauthenticated User Dashboard Page

[Log Out](#)

### This is you

Choose your language ▼

Translation:

Example of translated transcription of the user...

### The guy on the other side...

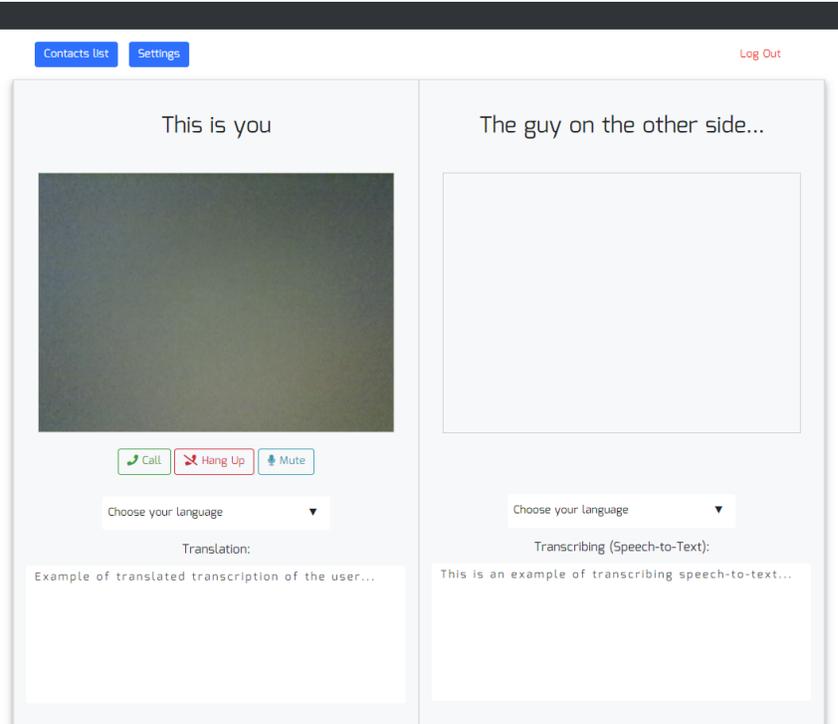
Choose your language ▼

Transcribing (Speech-to-Text):

This is an example of transcribing speech-to-text...

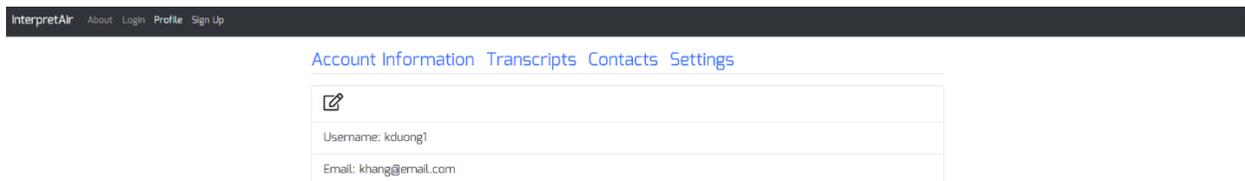
*alt text*

## Authenticated User Dashboard Page



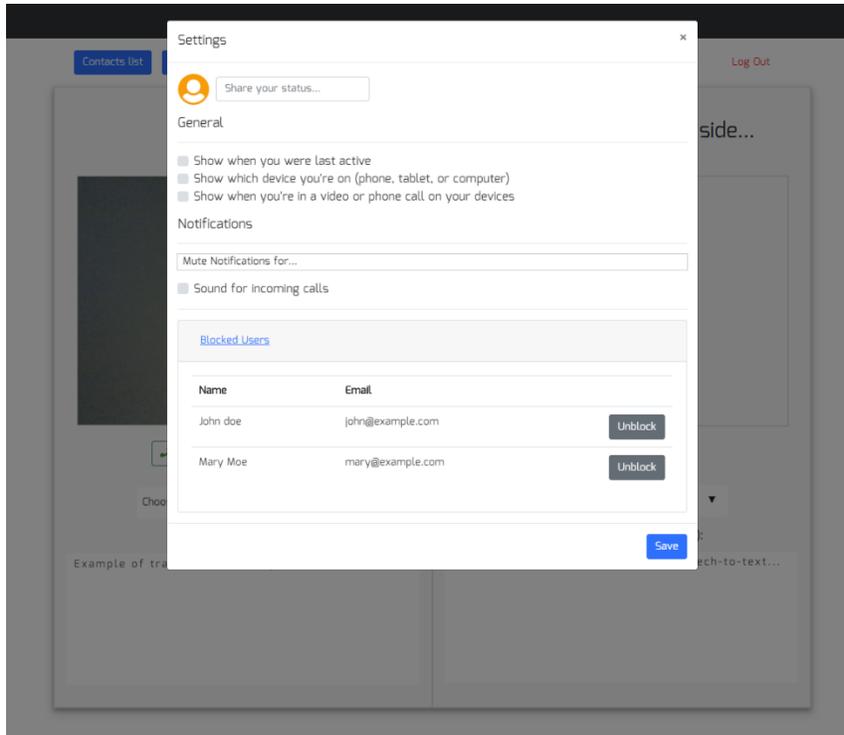
*alt text*

## Account Information Page



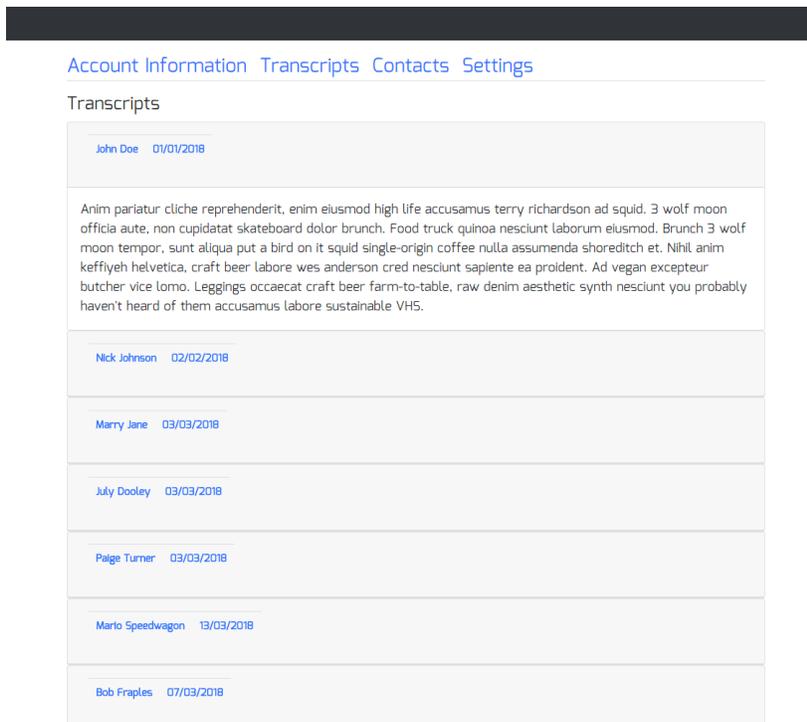
*alt text*

## Settings Page



*alt text*

## Transcripts Page



*alt text*

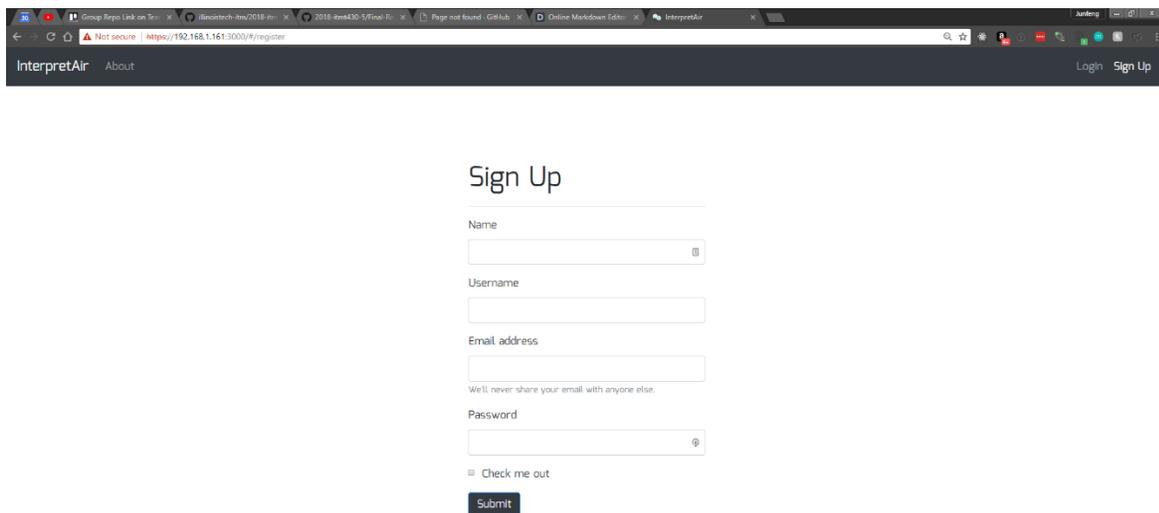
## Contacts Page

[Account Information](#)
[Transcripts](#)
[Contacts](#)
[Settings](#)

	Name	Email	Call
 	John doe	john@example.com	
 	Mary Moe	mary@example.com	
 	July Dooley	july@example.com	
 	Mario Speedwagon	mario@example.com	
 	Paul Molive	paul@example.com	
 	Paige Turner	paige@example.com	
 	Jeremy Hajek	jeremy@example.com	
 	Bob Frapples	bob@example.com	
 	Anna Sthesia	anna@example.com	
 	July Dooley	july@example.com	
 	Petey Cruiser	petey@example.com	

*alt text*

## Registration Page



InterpretAir About Login Sign Up

### Sign Up

Name

Username

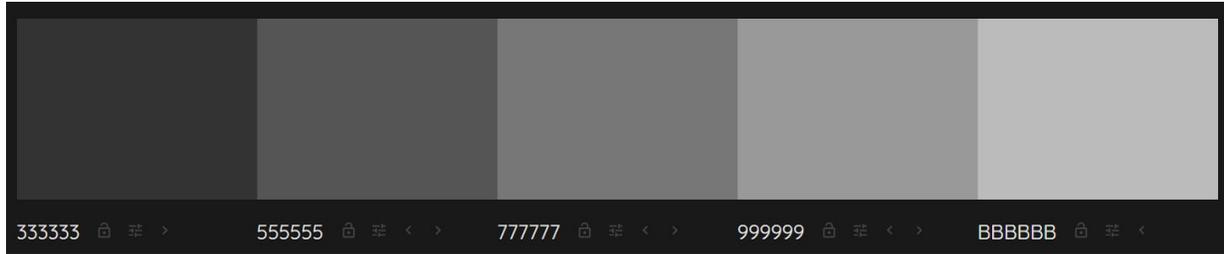
Email address   
We'll never share your email with anyone else.

Password

Check me out

*alt text*

## Color Palette



*alt text*

## Bootstrap Outline Buttons for Video Call



*alt text*

## Font Awesome Icons



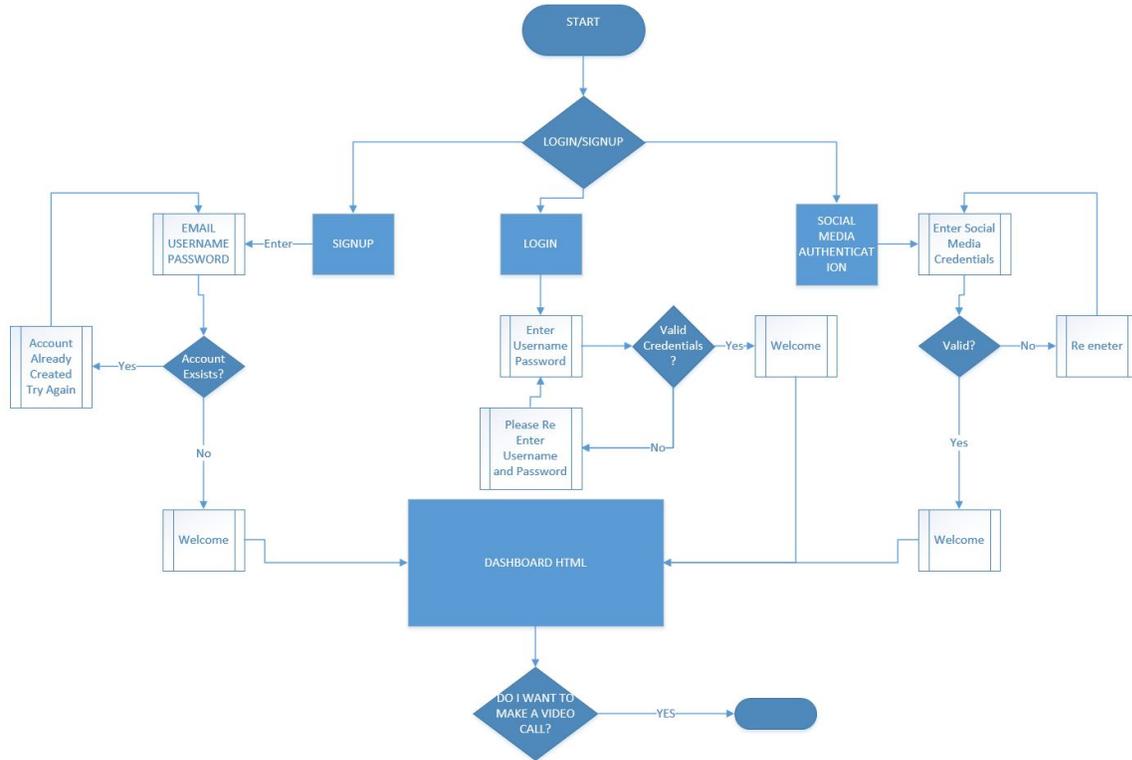
*alt text*

Fonts: Mina, sans-serif

## 11. Management of Visio

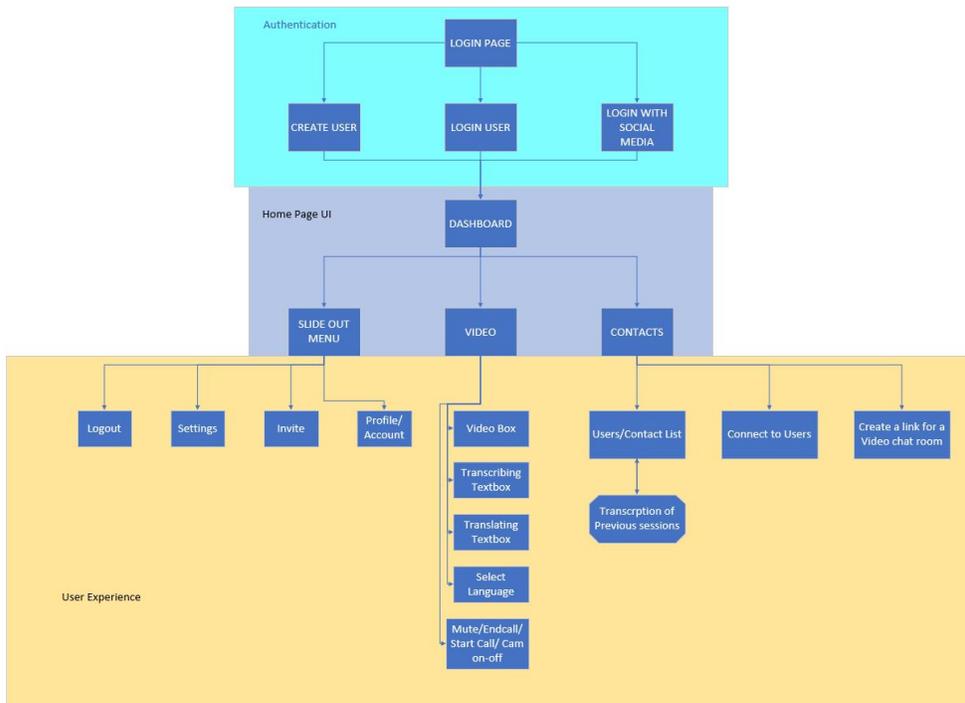
We created diagrams of User workflow and Application architecture for MEAN stack in Visio to help the team understand the processes of our web application both from the high level point of view and the technology point of view.

### User Workflow 1



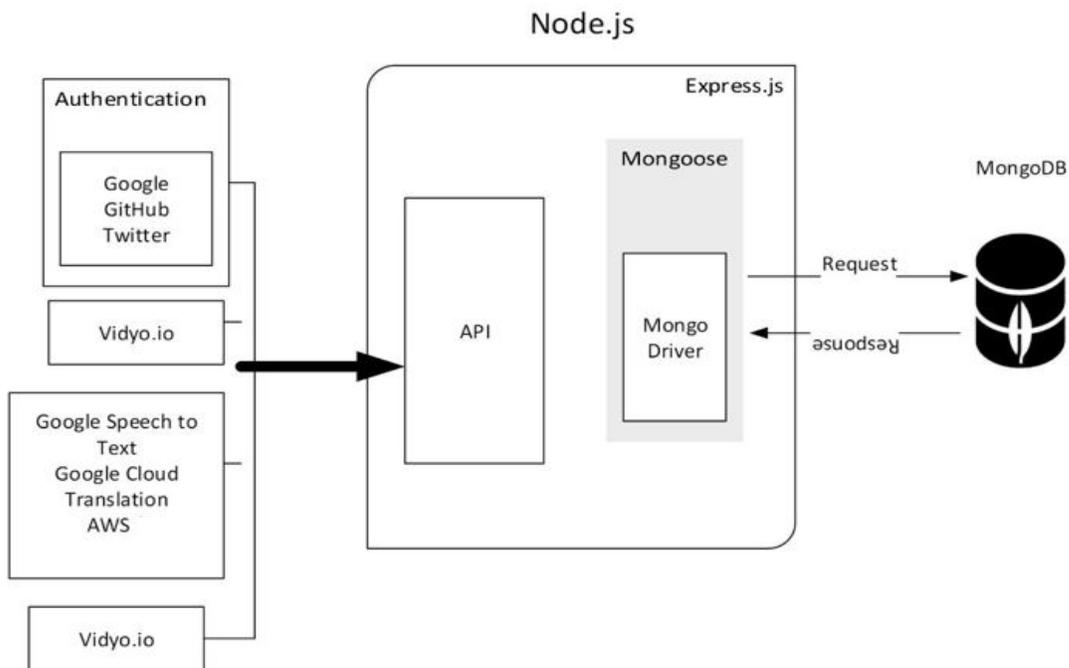
*alt text*

### User Workflow 2



*alt text*

## Application Architecture

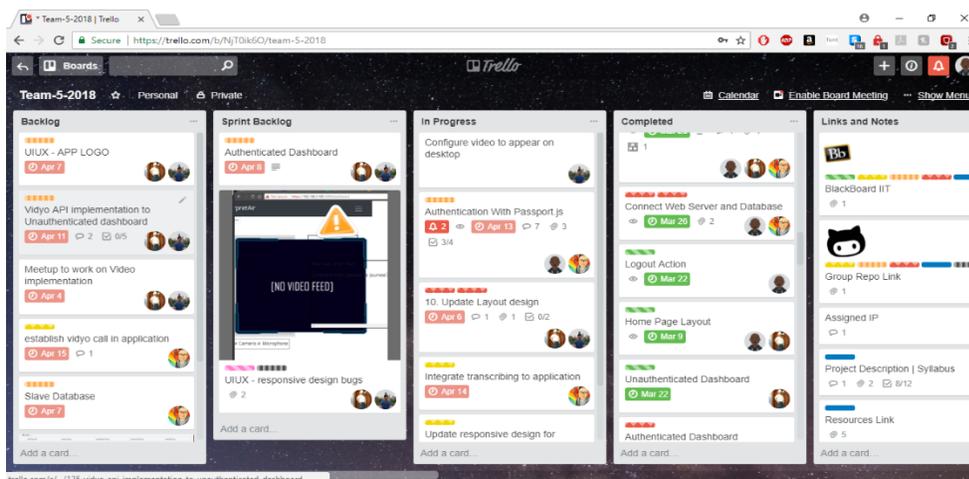


*alt text*

## 12. Management of Project progress

### 1. Trello

We chose to use Trello because it's a very efficient project management tool. Trello allowed us to make our work visible to prevent work piling up or being stalled in the technology value stream.



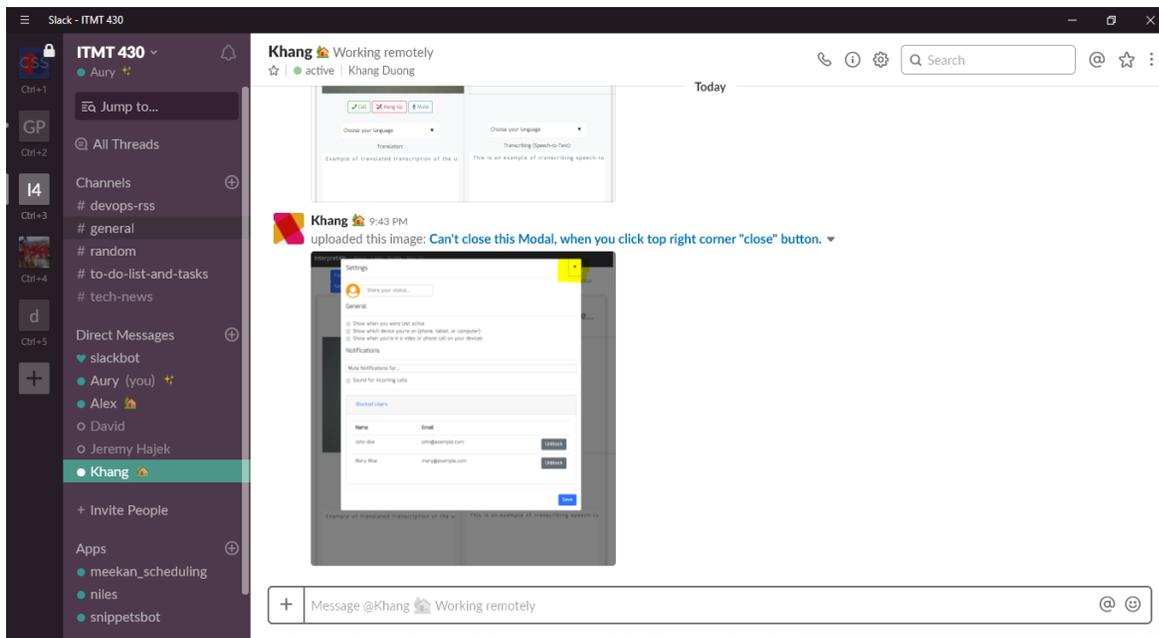
*alt text*

These cards helped us stay on top of our tasks and see what everyone was doing. The cards held us accountable and responsible for different tasks. If someone ran into a problem, they could ask for help or assistance on slack or in weekly meetings. This promoted transparency and responsibility of each member.

## 2. Slack

Slack was used extensively to communicate and chat about our progress and problems, share technologies that could be implemented in our project and see what was feasible. We replied on Slack much faster than by using email so problems were solved faster. Whenever one member found a problem with something, we used slack to posted the problem to transform local discoveries into global improvement. With the integration of GitHub to Slack, we were able to keep tabs on each other's work and monitor progress that way.

We chose Slack because it allows us to take communication to another level with functionalities like: 1. Different Channels help us organize different conversations either with entire team or private conversations. There are channels for different topics of the project as well. 2. File sharing/images/code snippets sharing are very easy to use, if we need to send each other screenshots. 3. We have integrated our Slack with GitHub and Snippetbot. ... This allow us to see all the GitHub commits by each member. It will let us see know who is working on what and what changes have been made in real time. ... Snippetbot is used for personal tracking of your tasks. You can input your tasks under "Done", "Next" and "Blocking". Our snippetbot allow us to break down work in small batch sizes. As we found out in Sprint 1, large batch sized led to long lead times and poor quality results.



### *alt text*

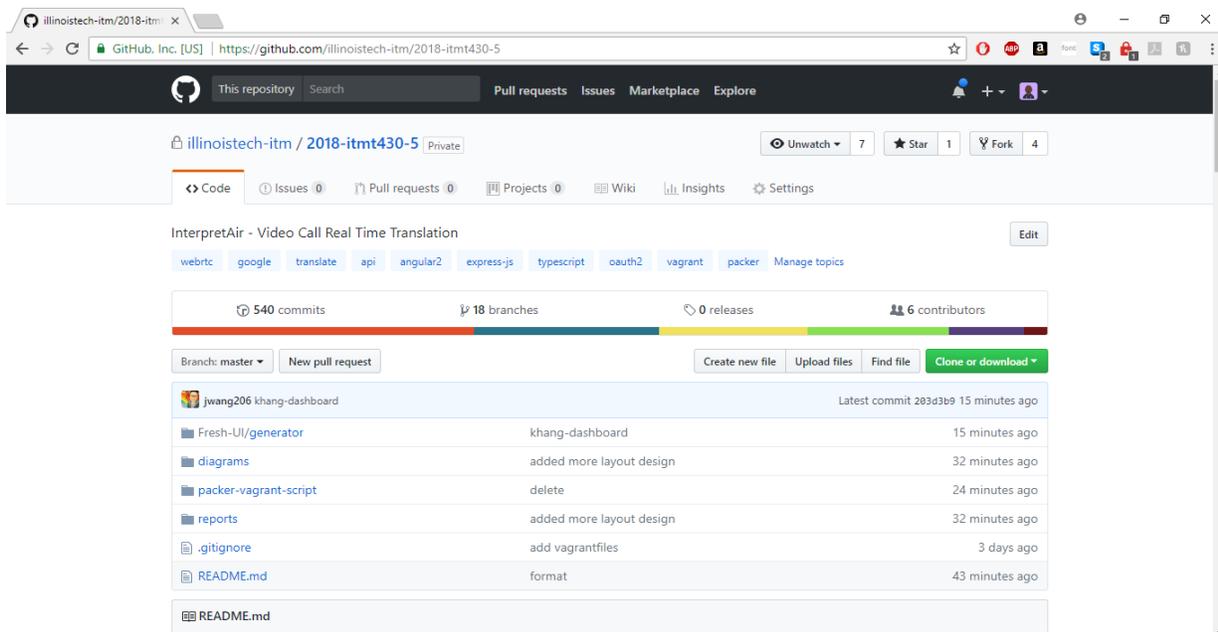
1. Search boxes allow us find different part of conversations very quickly.
2. We can use it on the phone or on our laptops.

### 3. GitHub

GitHub is version control system that helped us manage and store revisions of our project. GitHub is becoming very popular and almost a requirement at most work places. We chose this because it is a useful tool to know and help us contribute our code in a very efficient way from remote locations. It takes care of this problem by keeping track of all the changes that have been pushed to the repository by all members. It allowed us to have a version history of our code so that previous versions were not lost with every iteration.

It can also be integrated with Amazon and Google Cloud if we decide to host our project on Amazon cloud later on. The Markdown is a simple text editor that allow us describe our projects and also great for documentation.

To make sure a team member can reproduce this repository, our team needs to ensure there are all components such as: 1. All application code and dependencies (Libraries) 2. All the environment creation tools and artifacts (Puppet or Chef recipes) 3. Any file used to create containers (Docker definition or composition files) 4. All Project Artifacts (Requirement documentation, deployment procedures, release notes,etc.) 5. All cloud configuration files (AWS, Azure etc.) 6. Any other script or configuration information to create infrastructure that supports multiple services (Database management systems, configuration rules for firewalls)

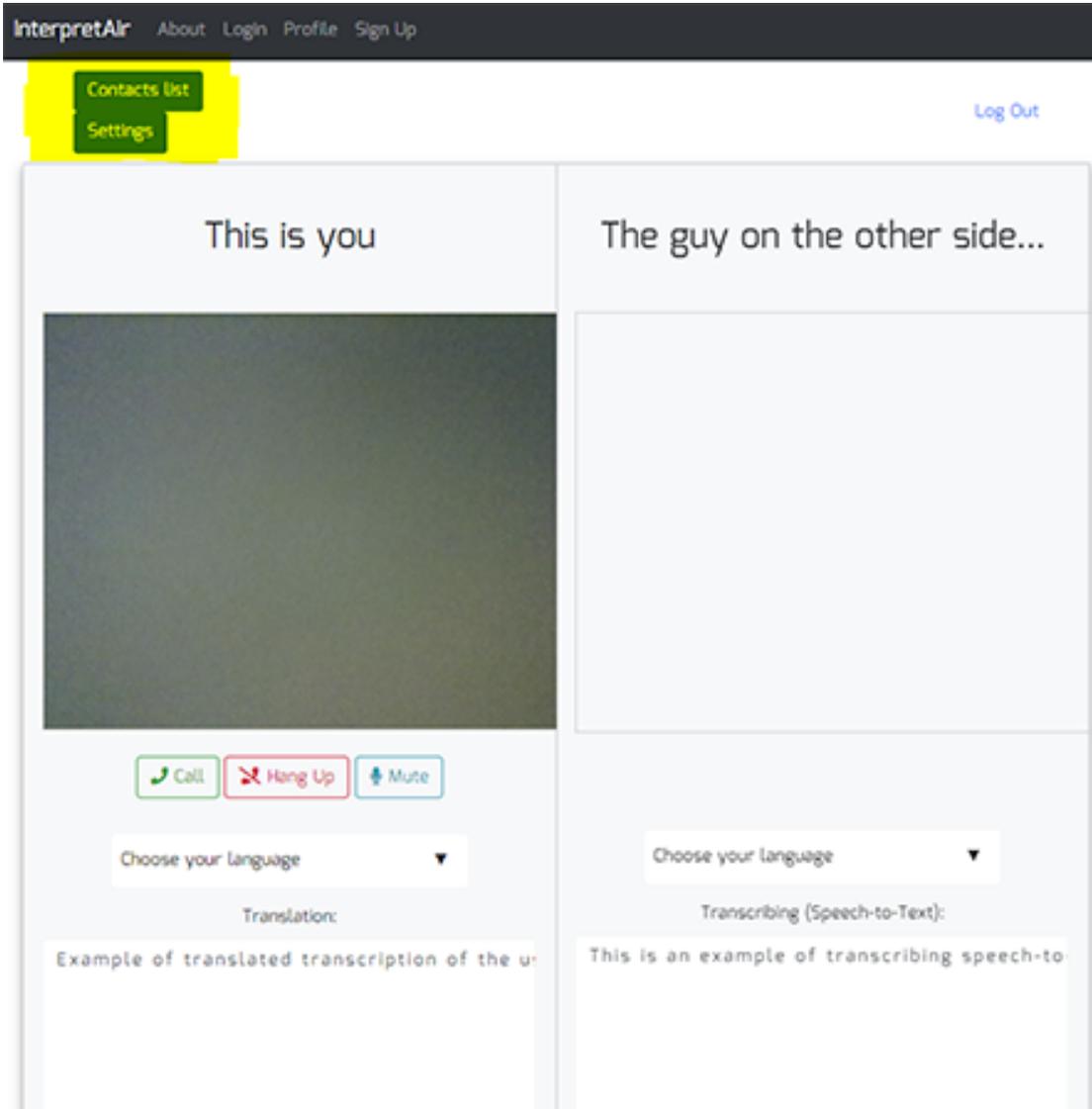


*alt text*

### 4. GitHub Issues to resolve bug posts from UI/UX tester

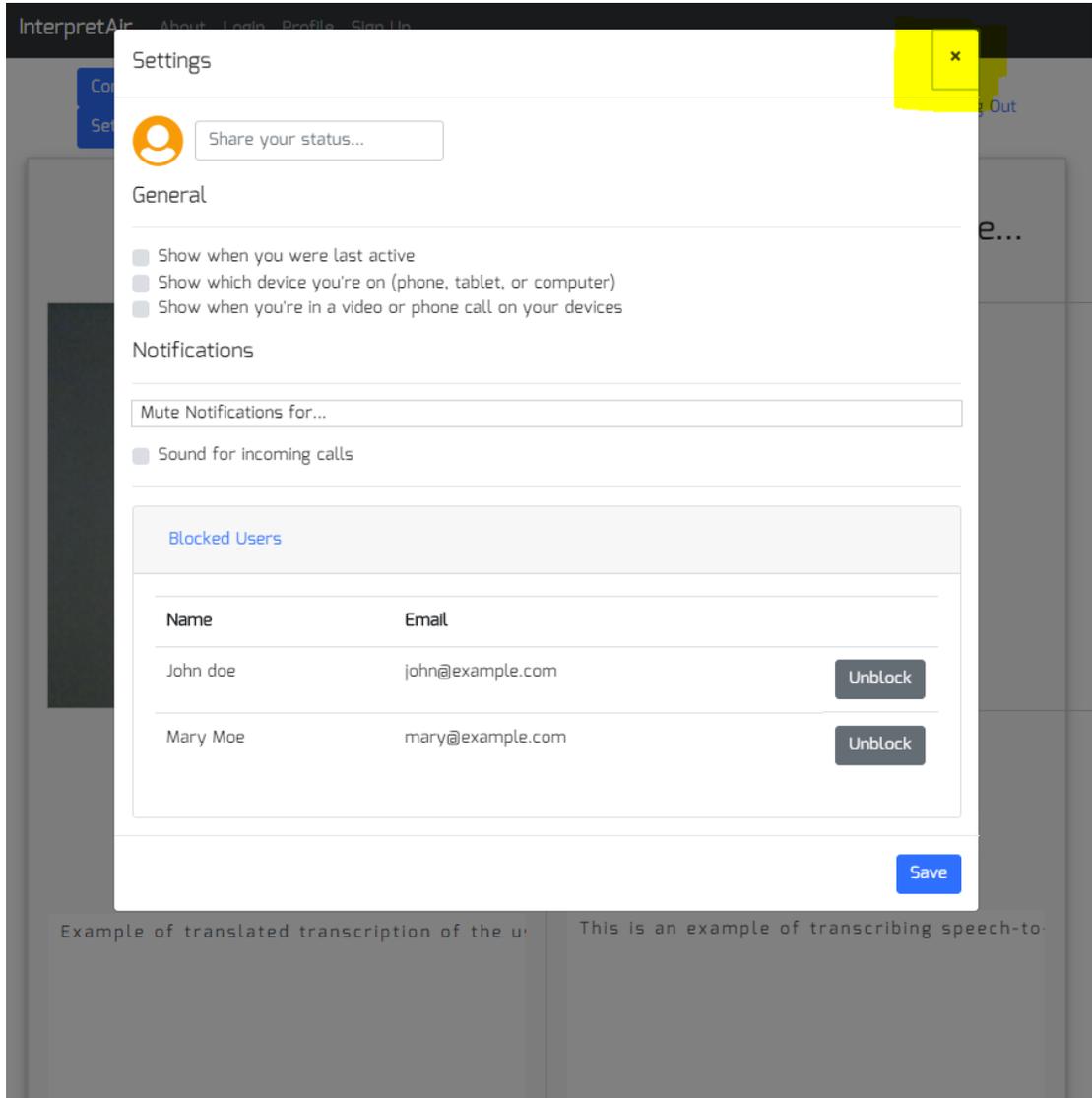
We ran into a mix of both security and layout issues as can be seen below

Issue 1: on small screens, buttons stack on top of each other



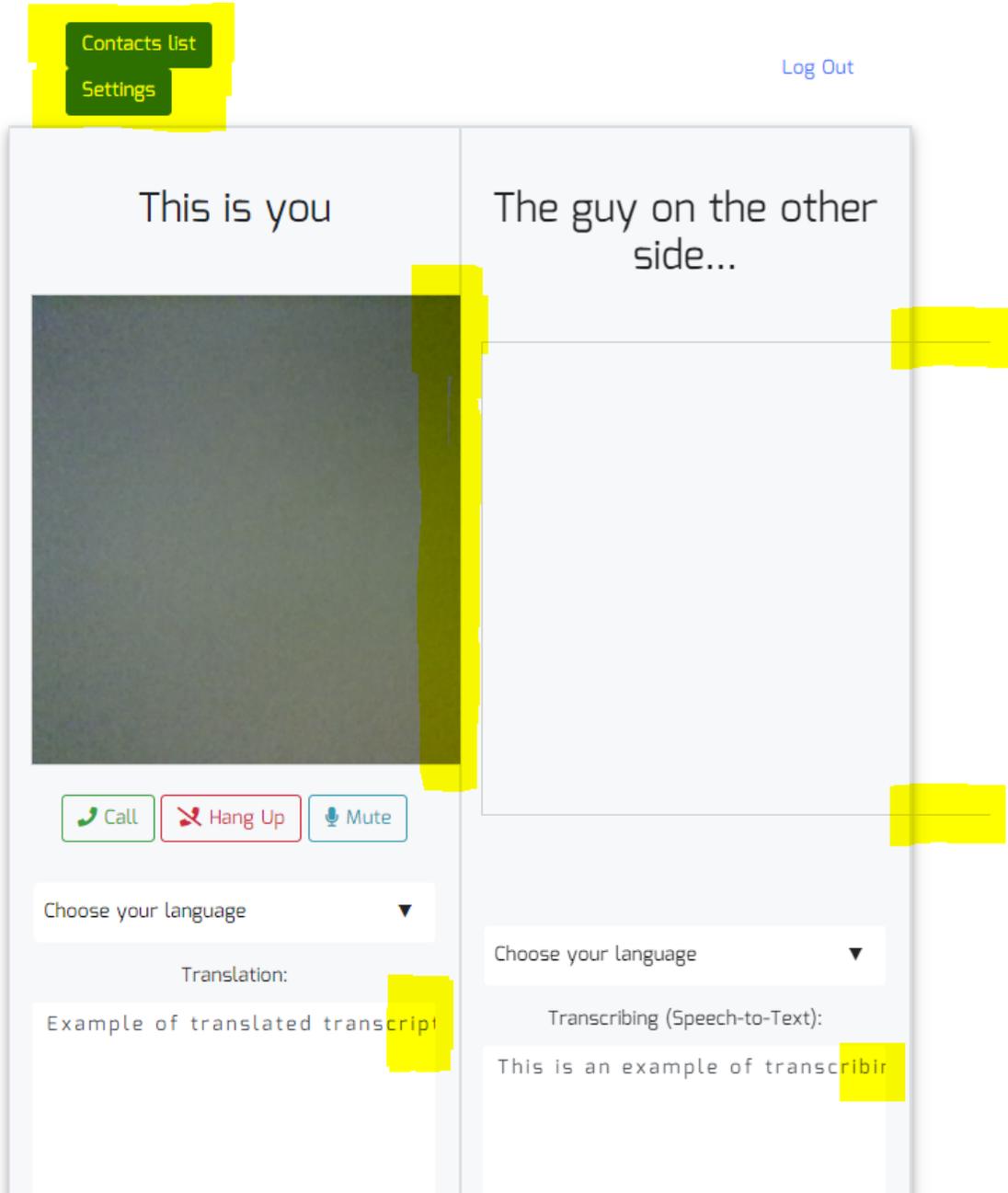
*alt text*

## Issue 2: modal window doesn't close



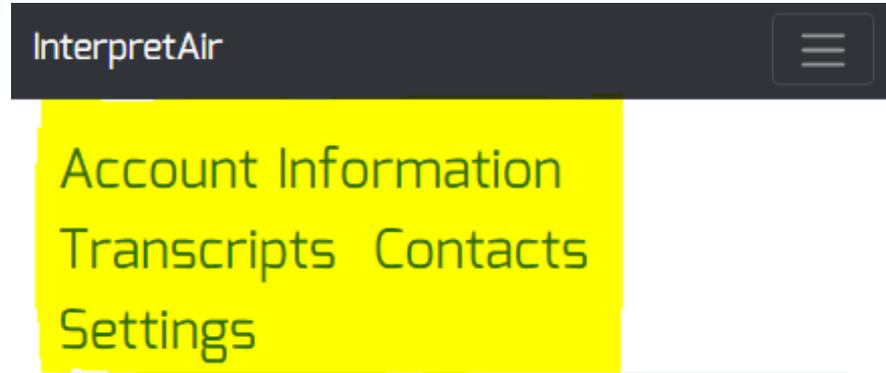
*alt text*

Issue 3: dashboard does not resize on smaller screens



*alt text*

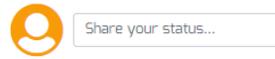
Issue 4: navigation bar items are bundled up on small screens on profile page



*alt text*

### Issue 5: The Accordion (or the Tab) of blocked users doesn't toggle

[Account Information](#) [Transcripts](#) [Contacts](#) [Settings](#)



#### General

- Show when you were last active
- Show which device you're on (phone, tablet, or computer)
- Show when you're in a video or phone call on your devices

#### Notifications

Mute Notifications for... ▾

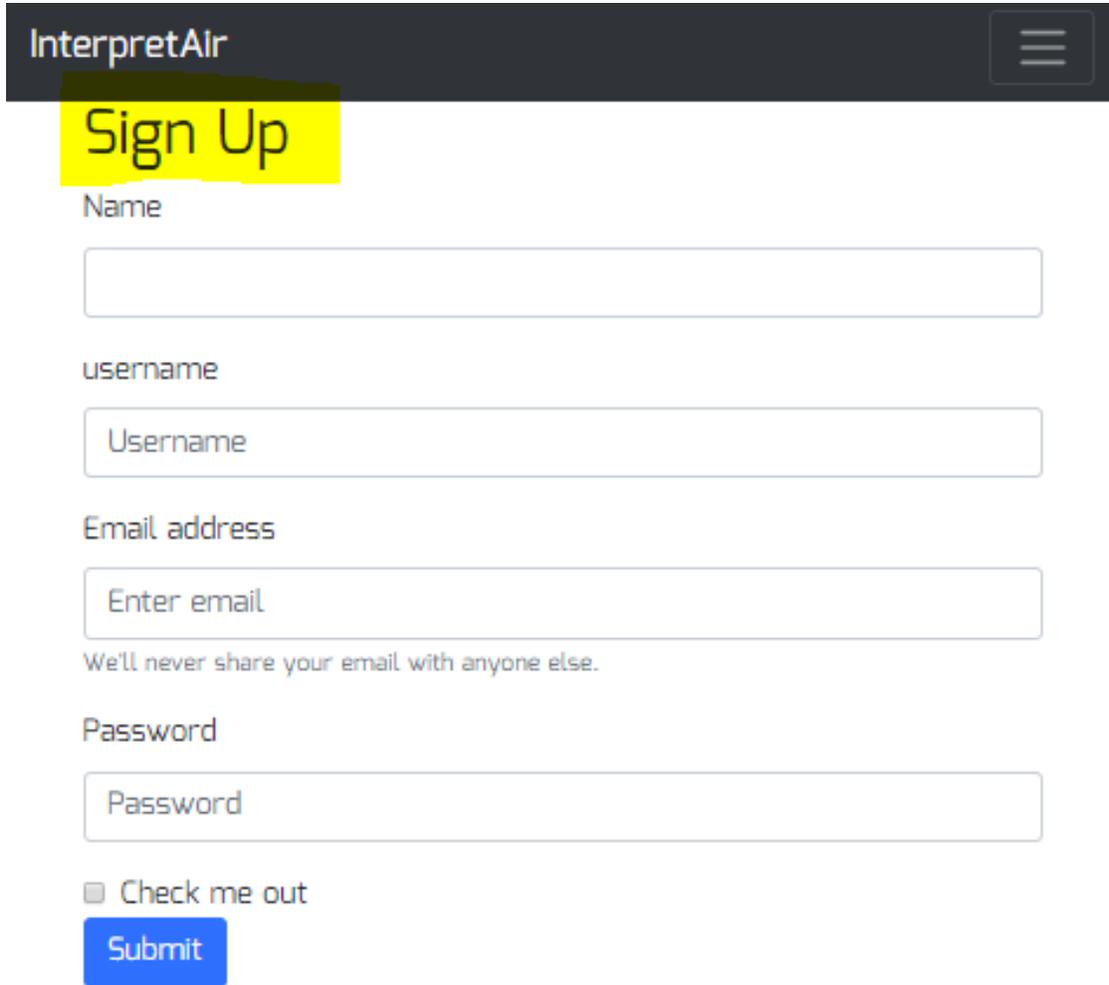
- Sound for incoming calls



Save

*alt text*

## Issue 6: margins missing on registration page



InterpretAir 

**Sign Up**

Name

username

Email address

We'll never share your email with anyone else.

Password

Check me out

*alt text*

## Issue 7: submit button too close to registration form

### Sign Up

Name

username

Email address

We'll never share your email with anyone else.

Password

Check me out

*alt text*

## Issue 8-10: security issues

The screenshot shows a web browser window displaying a GitHub Issues page. The URL is <https://github.com/illinoistech-itm/2018-itmt430-5/issues?q=is%3Aissue+is%3Aclosed>. The page features a navigation bar with a search filter set to "is:issue is:closed", buttons for "Labels" and "Milestones", and a "New issue" button. Below the navigation, there is a section for "Clear current search query, filters, and sorts". The main content area displays a list of issues with the following details:

Issue Title	Author	Projects	Milestones	Assignee	Sort
Security Issue	#59 by jhajak				
ReadMe.md step 3 - critical vagrant networking error	#46 by jhajak				1
Security vulnerability	#14 by jhajak				

At the bottom of the page, there is a footer with copyright information: © 2018 GitHub, Inc. and links to Terms, Privacy, Security, Status, Help, Contact GitHub, API, Training, Shop, Blog, and About.

*alt text*

## 13. 15 real "test" users and proper data to test functionality of a system

In our `app.js` file, we are able to use module `faker` to generate usernames and passwords for 15 users.

## Sources

1. Kim, G., Humble, J., Debois, P., & Willis, J. (2016). DevOps Handbook. IT Revolution Press.
2. [REDACTED] (2018). Chapter 2, The First Way: The Principles of Flow. Presentation presented in ITMT 430 class at Illinois Institute of Technology, Chicago, IL
3. [REDACTED] (2018). Chapter 4, The First Way: The Principles of Flow. Presentation presented in ITMT 430 class at Illinois Institute of Technology, Chicago, IL
4. [REDACTED] (2018). Chapter 5-6, The First Way: The Principles of Flow. Presentation presented in ITMT 430 class at Illinois Institute of Technology, Chicago, IL
5. [REDACTED] (2018). Chapter 9, The First Way: The Principles of Flow. Presentation presented in ITMT 430 class at Illinois Institute of Technology, Chicago, IL
6. [REDACTED] (2018). Chapter 11, The First Way: The Principles of Flow. Presentation presented in ITMT 430 class at Illinois Institute of Technology, Chicago, IL
7. [REDACTED] (2018). Chapter 12, The First Way: The Principles of Flow. Presentation presented in ITMT 430 class at Illinois Institute of Technology, Chicago, IL

## Images & Screenshots

1. Skype Translator image: <https://www.matinee.co.uk/blog/skype-translator-is-now-available-to-everyone-on-windows/>
2. ppear.in screenshot <https://appear.in/khangd>
3. Hangouts screenshot: <https://hangouts.google.com/>
4. Trello screenshot: <https://trello.com/b/NjT0ik60/team-5-2018>
5. Color palette: <http://colormind.io/bootstrap/>
6. GitHub screenshot: <https://github.com/illinoistech-itm/2018-itmt430-5>

## Information Technology and Management Assessment Plan Fall 2018

### Undergraduate Assessment, Fall 2018:

Based on *Information Technology and Management Assessment Plan for Undergraduate Degrees, 2016-2018 (Revision 4)* [http://itm.iit.edu/faculty/2016-2018ITMUndergraduateAssessmentPlan\(Rev4\).pdf](http://itm.iit.edu/faculty/2016-2018ITMUndergraduateAssessmentPlan(Rev4).pdf) and *Bachelor of Science in Applied Cybersecurity and Information Technology Assessment Plan, 2018-2019 (Revision 1)* <http://itm.iit.edu/faculty/2018-2019BSACITAssessmentPlanRev1.pdf>

Program Educational Objectives Assessed: BITM/BSACIT 2 and BSACIT 3

New Student Outcomes Assessed: BITM/BSACIT (b), (c), (f), and BSACIT (h)

Student Artifacts: Survey / December 2018 / Evaluation by ITM Curriculum Committee

Assignments / December 2018 / Evaluators: Trygstad/Arora/Dawson

Courses assessed:

<i>Curricular Area</i>	<i>Course</i>
Software Development	ITMD 411 Intermediate Software Development
Networking and Communications	ITMO 440 Introduction to Data Networks and the Internet
System/Data Security	ITMS 448 Cyber Security Technologies
Human/Organizational/Societal Security	ITMS 478 Cyber Security Management

The following BITM/BSACIT program education objective will be evaluated:

2. Perform requirements analysis, design and administration of computer and network-based systems conforming to policy and best practices, and monitor and support continuing development of relevant policy and best practices as appropriate.

The following BSACIT program education elective will be evaluated in ITMS courses:

3. Design and implement an enterprise security program using both policy and technology to implement technical, operational, and managerial controls, which will technically secure enterprise information assets and resources to deter, detect, and prevent the success of attacks and intrusions.

The following BITM/BSACIT Student Outcomes will be evaluated in ITMD 411:

BITM/BSACIT graduates should be able to:

- (b) Design, implement, and evaluate a computer-based solution to meet a given set of computing requirements [ABET Computing 2]
- (f) Identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems [ABET IT 6]

The following BITM/BSACIT Student Outcomes will be evaluated in ITMO 440:

BITM/BSACIT graduates should be able to:

- (c) Communicate effectively with a range of audiences about technical information [ABET Computing 3]
- (f) Identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems [ABET IT 6]

The following BITM/BSACIT Student Outcomes will be evaluated in ITMS448 and ITMS 478:

BITM/BSACIT graduates should be able to:

- (c) Communicate effectively with a range of audiences about technical information [ABET Computing 3]

BSACIT graduates should be able to:

- (h) Apply security principles and practices to the environmental, hardware, software, and human components of a system. [ABET Cybersecurity 6]

In addition to the above, course objectives for each course will be assessed.

**Student Artifact Assessment:** The Department will use Blackboard Outcomes for assessment of undergraduate assignments beginning in the Fall 2018 term. Blackboard Outcomes Assessment will allow us to collect student artifacts from courses in Blackboard Learn, apply a rubric to the student work and generate both detailed and summary reports of the results. This will require that the following steps be taken in each course to be assessed:

1. Identify the course in which we will collect student artifacts. (Done.)
  - a. We will send the necessary information so the IIT Office of Student Learning Assessment can enter the learning goals into Blackboard.
2. Identify the assignment in each course that will provide the student artifacts.
  - a. Faculty members need to select an assignment that *best* allows evaluation of the outcomes being assessed. This selection needs to be made at the time of drafting of the course syllabus.
3. Create the assignment in Blackboard Learn.
4. Align the assignment to the appropriate learning goal (student outcomes).
  - a. This has always been there when we create assignments but we have never been able use it. We will provide all of our student outcomes so that faculty members may elect to make use of this even for courses not being assessed.

### **Graduate Assessment, Fall 2018:**

Based on *Information Technology and Management Assessment Plan for Graduate Degrees, 2016-2018 (Revision 2)* [http://itm.iit.edu/faculty/2016-2018ITMGraduateProgramAssessmentPlan\(Rev.2\).pdf](http://itm.iit.edu/faculty/2016-2018ITMGraduateProgramAssessmentPlan(Rev.2).pdf)

Master of Information Technology and Management (MITM) Program Educational

Objectives Assessed: 3

Master of Cyber Forensics and Security (MCYF) Program Educational Objectives Assessed: 1

Master of Science in Applied Cybersecurity and Digital Forensics (MSASDF) Program Educational

Objectives Assessed: 1

Student Artifacts: Survey / December 2018 / Evaluation by ITM Curriculum Committee

Assignments / December 2018 / Evaluators Trygstad/Arora/Dawson

Courses assessed:

<i>Curricular Area</i>	<i>Course</i>
System Technologies (MITM)	ITMO 556 Introduction Open Source Software
Security Management (MCYF/ MSACDF)	ITMS 578 Cyber Security Management

The following program education objective will be evaluated in ITMO 556:

At the conclusion of their studies, graduates of the Master of Information Technology and Management should be able to:

2. Manage and deploy information resources applicable to each student's particular area of focus in an enterprise setting..

The following program education objective will be evaluated in ITMS 578:

At the conclusion of their studies, graduates of the Master of Cyber Forensics and Security and the Master of Science in Applied Cybersecurity and Digital Forensics degrees should be able to:

1. Design and implement a comprehensive enterprise security program using both policy and technology to implement technical, operational, and managerial controls.

In addition to the above, course objectives for each course will be assessed.

**Survey drafting and data collection staff:**

Amber Chatellier, ITM Department Manager  
 Angela Jarka, ITM Assistant Department Coordinator

**Assessment Evaluators:***ITM Curriculum Committee*

The Curriculum Committee evaluates Survey Artifacts and makes recommendations based on evaluations of all assessment artifacts. All full-time faculty members are voting members of the committee should they elect to participate.

Chair: Ray Trygstad, ITM Associate Chair and Industry Professor  
 Members: Jeremy Hajek, Industry Associate Professor  
 Louis F. McHugh IV, SAT Computer Systems Manager and Adjunct Industry Professor  
 Thomas “T.J.” Johnson, Adjunct Industry Professor  
 Sheik “Sam” Shamsuddin, Adjunct Industry Professor; College of DuPage  
 Professor and Computer Information System Program Coordinator  
 Faculty: C. Robert Carlson, ITM Chair and Professor  
 Karl Stolley, Associate Professor (joint appointment)  
 Maurice Dawson, Director, Center for Cyber Security and Forensics Education  
 and Assistant Professor  
 Yong Zheng, Assistant Professor  
 Adarsh Arora, Coleman Entrepreneur-in-Residence and Industry Professor  
 William Lidinsky, Industry Professor  
 James Pappademas, Industry Professor

All faculty members may be appointed as assessment evaluators for Assignment Artifacts.

## Bachelor of Science in Applied Cybersecurity and Information Technology Assessment Plan, 2018-2019, Revision 1

Assessment plans for 2018-2019 will adhere to the rubric as defined by the IIT Assessment Report Evaluation Rubric. One or two program educational objectives and four to five student outcomes will be assessed each term, and all objectives and outcomes will be assessed at least once in each three-year cycle. The full list of objectives and outcomes follows beginning on page 2 below. In addition to the objectives and outcomes listed below, course objectives for each course will be assessed.

This plan will be superseded by the Information Technology and Management Undergraduate Assessment Plan 2019-2011.

### Fall 2018:

Program Educational Objectives Assessed: 1, 3

Student Outcomes Assessed: (b), (c), (f), (h)

Student Artifacts: Survey / November 2018 / Evaluation by ITM Curriculum Committee  
Assignments / December 2018 / Evaluators: Trygstad/Arora/Dawson

Courses assessed:

<i>Curricular Area</i>	<i>Course</i>
Software Development	ITMD 411 Intermediate Software Development
Networking and Communications	ITMO 440 Introduction to Data Networks and the Internet
System Security	ITMS 448 Cyber Security Technologies
Management	ITMS 478 Cyber Security Management

### Spring 2019:

Program Educational Objectives Assessed: 2, 4

Student Outcomes Assessed: (a), (d), (e), (f), (i)

Student Artifacts: Survey / April 2019 / Evaluation by ITM Curriculum Committee  
Assignments / May 2019 / Evaluators: TBD

Courses assessed:

<i>Curricular Area</i>	<i>Course</i>
Software Development	ITM 313 Introduction to Open Source Software Development
Web Design and HCI Systems	ITMD 362 Human Computer Interaction & Web Design
System Security	ITMT 430 System Integration
	ITMS 458 Operating System Security

The following program education objectives will be evaluated for HLC and ABET accreditation purposes.

The Bachelor of Science in Applied Cybersecurity and Information Technology degree produces graduates who are able to:

Program Educational Objective	Required Courses Supporting the Objective
1. Problem solve and create innovative answers to provide technology solutions for the problems of business, industry, government, non-profit organizations, and individuals.	ITMD 411 Intermediate Software Development ITMD 421 Data Modeling & Applications ITMT 430 Systems Integration IPRO 3/497 Interprofessional Project (Not assessed by the department)
2. Perform requirements analysis, design and administration of computer and network-based systems conforming to policy and best practices, and monitor and support continuing development of relevant policy and best practices as appropriate.	ITM 311 Introduction to Software Development ITMD 362 Human-Computer Interaction and Web Design ITMO 440 Introduction to Data Networking & the Internet ITMO 456 Introduction to Open Source Operating Systems (Not included in assessment cycle as role is very narrow) ITMS 448 Cyber Security Technologies ITMT 430 Systems Integration
3. Design and implement an enterprise security program using both policy and technology to implement technical, operational, and managerial controls, which will technically secure enterprise information assets and resources to deter, detect, and prevent the success of attacks and intrusions.	ITMS 443 Vulnerability Analysis and Control ITMS 448 Cyber Security Technologies ITMS 478 Cyber Security Management
4. Investigate information security incidents and violation of law using computer resources in a manner such that all evidence is admissible in a court of law.	ITMS 438 Digital Forensics ITMS 483 Digital Evidence
5. Apply current technical and mathematical concepts and practices in the core information technologies and recognize the need to engage in continuing professional development.	ITM 100 Introduction to Information Technology as a Profession ITMD 411 Intermediate Software Development ITMD 421 Data Modeling & Applications ITMM 471 Project Management for ITM ITMO 440 Introduction to Data Networking & the Internet ITMT 430 Systems Integration

The following student outcomes will be evaluated for ABET accreditation purposes:

Students completing the Bachelor of Science in Applied Cybersecurity and Information Technology will be able to:

Student Outcomes	Required Courses Supporting the Outcome
(a) Analyze a problem, and identify and define the computing requirements appropriate to its solution [ABET Computing 1]	ITM 311 Introduction to Software Development ITM 312 Introduction to Systems Software Programming\ ITMD 361 Fundamentals of Web Development ITMD 362 Human-Computer Interaction and Web Design ITMD 411 Intermediate Software Development ITMD 421 Data Modeling & Applications ITMO 440 Introduction to Data Networking & the Internet\ ITMS 448 Cyber Security Technologies ITMT 430 Systems Integration

(b) Design, implement, and evaluate a computer-based solution to meet a given set of computing requirements [ABET Computing 2]	ITM 301 Intro to Contemp Operating Systems & Hardware I ITM 311 Introduction to Software Development ITM 312 Introduction to Systems Software Programming ITMD 361 Fundamentals of Web Development ITMD 362 Human-Computer Interaction and Web Design ITMD 411 Intermediate Software Development ITMD 421 Data Modeling & Applications ITMO 440 Introduction to Data Networking & the Internet ITMO 456 Introduction to Open Source Operating Systems ITMS 448 Cyber Security Technologies ITMT 430 Systems Integration
(c) Communicate effectively with a range of audiences about technical information [ABET Computing 3]	ITMD 361 Fundamentals of Web Development ITMD 362 Human-Computer Interaction and Web Design ITMM 471 Project Management for ITM ITMS 448 Cyber Security Technologies IPRO 397/497 Interprofessional Project
(d) Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles [ABET Computing 4]	ITM 100 Introduction to Information Technology as a Profession ITM 311 Intro to Contemp Operating Systems & Hardware I ITMM 471 Project Management for ITM ITMM 485 Legal and Ethical Issues in Information Technology ITMS 438 Digital Evidence ITMT 430 Systems Integration
(e) Function effectively on teams to establish goals, plan tasks, meet deadlines, manage risk, and produce deliverables [ABET Computing 5]	ITM 100 Introduction to Information Technology as a Profession ITMM 471 Project Management for ITM ITMS 448 Cyber Security Technologies ITMT 430 Systems Integration
(f) Identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems [ABET IT 6]	ITM 311 Introduction to Software Development ITMD 362 Human-Computer Interaction and Web Design ITMD 411 Intermediate Software Development ITMD 421 Data Modeling & Applications ITMM 471 Project Management for ITM ITMO 440 Introduction to Data Networking & the Internet ITMO 456 Introduction to Open Source Operating Systems ITMT 430 Systems Integration
(g) Assist in the creation of an effective project plan. [IIT BITM/BSACIT]	ITMM 471 Project Management for ITM ITMS 448 Cyber Security Technologies ITMT 430 Systems Integration IPRO 397/497 Interprofessional Project
(h) Apply security principles and practices to the environmental, hardware, software, and human components of a system. [ABET Cybersecurity 6]	ITMS 443 Vulnerability Analysis and Control ITMS 448 Cyber Security Technologies ITMS 478 Cyber Security Management ITMT 430 Systems Integration
(i) Analyze and evaluate systems with respect to maintaining operations in the presence of risks and threats. [ABET Cybersecurity 7]	ITMO 456 Introduction to Open Source Operating Systems ITMS 418 Coding Security ITMS 448 Cyber Security Technologies ITMS 458 Operating System Security ITMT 430 Systems Integration

**Survey drafting and data collection staff:**

Amber Chattalier, ITM Department Manager  
 Angela Jarka, ITM Assistant Department Coordinator

**Assessment Evaluators:***ITM Curriculum Committee*

The Curriculum Committee evaluates Survey Artifacts and makes recommendations based on evaluations of all assessment artifacts. All full-time faculty members are voting members of the committee should they elect to participate.

Chair: Ray Trygstad, ITM Associate Chair and Industry Professor  
 Members: Jeremy Hajek, Industry Associate Professor  
 Louis F. McHugh IV, SAT Computer Systems Manager and Adjunct Industry Professor  
 Thomas “T.J.” Johnson, Adjunct Industry Professor  
 Sheik “Sam” Shamsuddin, Adjunct Industry Professor; College of DuPage  
 Professor and Computer Information System Program Coordinator  
 Faculty: C. Robert Carlson, ITM Chair and Professor  
 Karl Stolley, Associate Professor (joint appointment)  
 Maurice Dawson, Director, Center for Cyber Security and Forensics Education  
 and Assistant Professor  
 Yong Zheng, Assistant Professor  
 Adarsh Arora, Coleman Entrepreneur-in-Residence and Industry Professor  
 William Lidinsky, Industry Professor  
 James Pappademas, Industry Professor

All full-time faculty members may be appointed as assessment evaluators for Assignment Artifacts. Appointments will be made at the beginning of each term in which assignments will be assessed, and the Assessment Plan will be updated to reflect these appointments.