

## 5. PROFESSIONALISM

*This discussion is with respect to the paper titled “Contextualizing Professionalism in Capstone Projects Using the IDEALS Professional Responsibility Assessment”, International Journal of Engineering Education Vol. 28, No. 2, pp. 416–424, 2012*

### 5.1 AREAS OF RESPONSIBILITY

*Pick one of IEEE, ACM, or SE code of ethics. Add a column to Table 1 from the paper corresponding to the society-specific code of ethics selected above. State how it addresses each of the areas of seven professional responsibilities in the table. Briefly describe each entry added to the table in your own words. How does the IEEE, ACM, or SE code of ethics differ from the NSPE version for each area?*

Table 1 below is a reprinted image of the original table displayed and discussed in the International Journal of Engineering Education (NSPE) paper. Table 2 following Table 1 displays the IEEE Code of Ethics. Table 3 on the next page includes two added columns to the right comparing, contrasting, and analyzing the “area of responsibility” as described in the IJEE-NSPE and IEEE Codes of Ethics.

**Table 1 – “Table 1. The seven areas of professional responsibility” From IJEE-NSPE Paper**

Table 1. The seven areas of professional responsibility in the assessment instrument		
Area of responsibility	Definition	NSPE Canon
Work Competence	Perform work of high quality, integrity, timeliness, and professional competence.	Perform services only in areas of their competence; Avoid deceptive acts.
Financial Responsibility	Deliver products and services of realizable value and at reasonable costs.	Act for each employer or client as faithful agents or trustees.
Communication Honesty	Report work truthfully, without deception, and understandable to stakeholders.	Issue public statements only in an objective and truthful manner; Avoid deceptive acts.
Health, Safety, Well-Being	Minimize risks to safety, health, and well-being of stakeholders.	Hold paramount the safety, health, and welfare of the public.
Property Ownership	Respect property, ideas, and information of clients and others.	Act for each employer or client as faithful agents or trustees.
Sustainability	Protect environment and natural resources locally and globally.	
Social Responsibility	Produce products and services that benefit society and communities.	Conduct themselves honorably, responsibly, ethically, and lawfully so as to enhance the honor, reputation, and usefulness of the profession.

**Table 2 – IEEE Code of Ethics**

## 7.8 IEEE Code of Ethics

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We, the members of the IEEE, in recognition of the importance of our technologies in affecting the quality of life throughout the world, and in accepting a personal obligation to our profession, its members and the communities we serve, do hereby commit ourselves to the highest ethical and professional conduct and agree:

1. to accept responsibility in making decisions consistent with the safety, health, and welfare of the public, and to disclose promptly factors that might endanger the public or the environment;
2. to avoid real or perceived conflicts of interest whenever possible, and to disclose them to affected parties when they do exist;
3. to be honest and realistic in stating claims or estimates based on available data;
4. to reject bribery in all its forms;
5. to improve the understanding of technology; its appropriate application, and potential consequences;
6. to maintain and improve our technical competence and to undertake technological tasks for others only if qualified by training or experience, or after full disclosure of pertinent limitations;
7. to seek, accept, and offer honest criticism of technical work, to acknowledge and correct errors, and to credit properly the contributions of others;
8. to treat fairly all persons and to not engage in acts of discrimination based on race, religion, gender, disability, age, national origin, sexual orientation, gender identity, or gender expression;
9. to avoid injuring others, their property, reputation, or employment by false or malicious action;
10. to assist colleagues and co-workers in their professional development and to support them in following this code of ethics.

**Table 3 – NSPE Table 1 Plus IEEE Comparisons and Contrasts**

AREA OF RESPONSIBILITY	NSPE Definition	NSPE Canon	Respective IEEE Canon(s)	IEEE Comparisons and Contrasts
<i>Work Competence</i>	Perform work of high quality, integrity, timeliness, and professional competence.	Perform services only in areas of their competence. Avoid deceptive acts.	“6. to maintain and improve our technical competence and to undertake technological tasks for others only if qualified by training or experience, or after full disclosure of pertinent limitations;”  “9. to avoid injuring others, their property, reputation, or employment by false or malicious action;”  “10. to assist colleagues and co-workers in their professional development and to support them in following this code of ethics.”	The IEEE definition and canon are rather precise, whereas the IEEE code of ethics elaborates on falsification and malicious action. The IEEE code of ethics also lists a responsibility to mentoring coworkers to aid in their professional development, and this is not discussed in the IEEE table.
<i>Financial Responsibility</i>	Deliver products and services of realizable value and at reasonable costs.	Act for each employer or client as faithful agents or Trustees.	“2. to avoid real or perceived conflicts of interest whenever possible, and to disclose them to affected parties when they do exist;”  “4. to reject bribery in all its forms;”	The IEEE code of ethics specifically lists conflicts of interest—which are often financial in nature—whereas the NSPE definition and canon are a bit more vague.
<i>Communication Honesty</i>	Report work truthfully, without deception, and understandable to stakeholders.	Issue public statements only in an objective and truthful manner. Avoid deceptive acts.	“3. to be honest and realistic in stating claims or estimates based on available data;”	The IEEE and NSPE statements related to communication honesty are quite similar in meaning and content.
<i>Health, Safety, Well-Being</i>	Minimize risks to safety, health, and well-being of stakeholders.	Hold paramount the safety, health, and welfare of the public.	“1. to accept responsibility in making decisions consistent with the safety, health, and welfare of the public, and to disclose promptly factors that might endanger the public or the environment;”	Both the IEEE and NSPE codes of ethics use nearly identical language (“safety, health, and welfare”) in these delineated code sections. However, the IEEE code of ethics elaborates a bit more.
<i>Property Ownership</i>	Respect property, ideas, and information of clients and others.	Act for each employer or client as faithful agents or Trustees.	“7. to seek, accept, and offer honest criticism of technical work, to acknowledge and correct errors, and to credit properly the contributions of others;”	“Property ownership” did not have a clear analogue in the IEEE code; however, both of these code sections from both papers

				appear to describe ideas as property (i.e., intellectual property).
<b>Sustainability</b>	Protect environment and natural resources locally and globally.	(None provided)	“1. to accept responsibility in making decisions consistent with the safety, health, and welfare of the public, and to disclose promptly factors that might endanger the public or the environment;”	Both codes of ethics (IEEE and NSPE) clearly state that engineers have a responsibility to preserving the welfare of the environment. The IEEE code does not explicitly list the necessity to preserve natural resources.
<b>Social Responsibility</b>	Produce products and services that benefit society and communities.	Conduct themselves honorably, responsibly, ethically, and lawfully so as to enhance the honor, reputation, and usefulness of the profession.	“5. to improve the understanding of technology; its appropriate application, and potential consequences;”  “8. to treat fairly all persons and to not engage in acts of discrimination based on race, religion, gender, disability, age, national origin, sexual orientation, gender identity, or gender expression;”	Interestingly, the NSPE code does not touch on the need to avoid discrimination based on various societal categorizations, like in #8 of the IEEE code. This is a stark and surprising contrast (via omission on the part of the NSPE) that lends credibility to the IEEE code over the NSPE code.

## 5.2 PROJECT SPECIFIC PROFESSIONAL RESPONSIBILITY AREAS

*For each of the professional responsibility areas in Table 1, discuss whether it applies in your project's professional context. Why yes or why not? How well is your team performing (High, Medium, Low, N/A) in each of the seven areas of professional responsibility, again in the context of your project. Justify.*

- **Work Competence** – Work competence is likely one of the highest-priority areas of professional responsibility for our project. Due to the independent nature of the various sub-systems in our project, each of our group members must complete their responsibilities to the best of their ability. Failure to do so creates risk of jeopardizing the functionality of our overall system with little recourse for remedial measures by other group members. In short, we are counting on all our group members to complete their unique tasks competently and in a timely manner.
- **Financial Responsibility** – Financial responsibility does not have a paramount role in our project, because our budget is relatively small (~\$300-500). Nevertheless, it is important to the extent that the proper parts are identified and purchased. Moreover, a failure to secure funding pushed back our design and construction phases by a matter of weeks, so we witnessed the repercussions of lax financial responsibility firsthand.
- **Communication Honesty** – Communication honesty is important in our project for two primary reasons: (1) we need to present our progress and ideas in our written reports in a way that accurately conveys our status to our instructors and (2) we need to communicate our progress accurately to each other (the other members of our group) so each group member knows when to begin the various stages of sub-system design. Misrepresenting one's progress through inaccurate communication could harm our group significantly by stifling progress on all fronts.
- **Health, Safety, Well-Being** – One of the main applications of our project is biomedical imaging in the healthcare industry, so ensuring a functioning product is—in essence—pertinent to delivering quality healthcare solutions. Our second application is in the construction industry, and a functioning product that was designed with professional principles in mind will help prevent workplace hazards, wasted expenses, and design delays.
- **Property Ownership** – This professional responsibility area is not particularly relevant to our project, because we are not responsible for confidential information of a client or property that does not belong to us as a group. That said, we have a responsibility to one another to deliver the highest quality finished product we can with the physical resources at our disposal.
- **Sustainability** – Again, sustainability is not a particularly pressing area of professional responsibility in our project, in part, because we do not perceive mass production or environmental waste as a necessary consequence of our system design. Yet, there are certain conversancy implications in our project, including the potential waste at

construction sites if our product does not accurately identify hidden structures as it is intended to.

- **Social Responsibility** – Social responsibility is important in our project for many of the reasons stated above: construction and healthcare industry members will rely on our solution to enhance the efficiency and security of their respective jobs, so we must keep their needs in mind while designing our system and implementing quality control measures.

### **5.3 MOST APPLICABLE PROFESSIONAL RESPONSIBILITY AREA**

*Identify one area of professional responsibility that is both important to your project, and for which your team has demonstrated a moderate or high level of proficiency in the context of your project. Briefly describe what this responsibility means to your project, the ways in which your team has demonstrated the responsibility in the project, and specific impacts to the project that you have observed.*

#### **Work Competence**

As stated in the section above, work competence is likely our highest-priority area of professional responsibility for our project. To ensure that we “perform work of high quality, integrity, timeliness, and professional competence,” we have chosen a project that in a broad sense meets not only the interests of all the team members but also the skill level and areas of specialization of all the team members. More importantly, while considering the importance of specialization in effective teamwork, we divvied up the subsystems of the project and the respective tasks that come along with those subsystems among the team members based on their areas of competence. By doing this we save lots of time and effort as we ensure that a team member is not assigned to a subsystem that requires knowledge that they have no exposure to.

#### ***What the Professional Responsibility of “Work Competence” Means to Our Project***

Due to the independent nature of the various sub-systems in our project, each of our group members must complete their assigned responsibilities to the best of their ability. In short, we are counting on all our group members to complete their unique tasks competently and in a timely manner. This ensures that all time and effort is used effectively and as a result as a team we produce high quality work.

#### ***Specific Impacts of Work Competence on our Project that we have Observed***

Failure to maintain a competent level of work jeopardizes the functionality of our overall system with little recourse for remedial measures by other group members. Since we were careful and deliberate with how we assigned tasks, we have yet to face any major difficulty with the progress of the overall project. As with any project, obstacles are to be expected but by divvying up the tasks based on the team members’ areas of competence, we ensure that we can minimize the overall risk to project because of such obstacles.