2017 Florida Manufacturing Technician Competencies Survey

Obtaining feedback from industries is vital to reviewing curriculum content of schools preparing a competent workforce to meet industries' needs. The survey was developed by FloridaMakes in partnership with Polk State College (PSC), the Florida Forum for Engineering Technology (ET Forum) and FLATE (Florida Advanced Technological Education Center of Excellence). It was designed to define curriculum content of schools preparing competent workforce to meet manufacturers technician workforce needs.

The 15 minute survey was distribute to manufacturers in Florida via (a) FloridaMakes; (b) Florida Regional Manufactures Associations (RMA's); and (3) State and Community college offering A.S. ET Degrees. The survey was open for 2 weeks in November 2017. Eighty-eight respondents from across Florida completed the survey during that time period.

Section 1 of the survey focused on Technical Skills and requested two responses for each item: one for the importance of the item and the second for the frequency performed. For each importance item, respondents were asked to rank the importance responses using a scale from 1 to 5, with 5 being "Most Valuable" and 1 being "Least Important." Respondents could also select "N/A" (Not Applicable) as an option if appropriate. For frequency performed, respondents were asked to select one of three choices: "Never", "Sometimes" or "Always". If N/A was selected for the importance response, respondents were asked to select "Never" for the frequency response.

Section 2 was for personal and teamwork skills. Section 2 requested responses for only the level of importance and used the same 1-5 scale as that used for the technical skills in section 1.

This material is based upon work supported by the National Science Foundation under Grant No. 1204751. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

Competencies/Learning Objectives Descriptions Competency Descriptions (1-20)	**Frequency of Use**			**Knowledge Levels**	**Specialized Skills Levels**
Technical Skills: A highly skilled employee at this plant is expected to have in-depth technical knowledge, critical thinking and judgement abilities, and systems thinking abilities in order to:	Never	Sometimes	Always	1-8 Level of credentials Ranked highest at 1-5 of importance	1-8 Level of credentials Ranked highest at 1-5 of importance
1. Implement all related safety codes and regulations in industrial working environments	2%	24%	74%	L 3 Rank 5 @ 70%	L 3
2. Perform tasks in a specialized technical area.	1%	41%	58%	L 4 Rank 5 @ 46%	L 3
3. Work with computer aided drafting and create geometric part files.	21%	52%	27%	L 3 Rank 3 @ 25%	L 3
4. Work at the entry level with traditional materials removal machines (milling, lathe, drill press, cut-off-saws).	22%	55%	24%	L 1 Rank 4 @ 26%	L 1
5. Understand mechanical and process characteristics of common materials.	6%	58%	37%	L 4 Rank 4 @ 58%	L 2
6. Operate materials testing tools and equipment.	8%	67%	25%	L 4	L 5 Rank 4 @ 31%
7. Operate, maintain, and repair mechanical, hydraulic and pneumatic systems.	18%	58%	24%	L 3	L 3 Rank 4 @ 27%
8. Operate AC electric-powered tools, and equipment	8%	47%	45%	L 2	L 2 Rank 5 @ 31%
9. Operate DC electric-powered tools and equipment.	18%	52%	30%	L 2	L 2 Rank 3 @ 30%
10. Operate electronic sensors, switches, and controls.	9%	50%	41%	L 2	L 2 Rank 4 @ 29%
11. Operate programmable logic controllers and use systems schematics.	14%	59%	27%	L 3	L 3 Rank 4 @ 33%
12. Diagnose causes and troubleshoot systems operations, using schematics and ladder logic diagrams.	17%	61%	21%	L 7	L 5 Rank 3 @ 25%
13. Report total quality improvements of a unit and the entire systems operation.	19%	63%	18%	L 8	L 7 Rank 3 @ 34%
14. Evaluate the results of tasks performed in accordance with standard operating procedures (SOPs).	8%	43%	49%	L 4	L 3 Rank 4 @ 34%
15. Perform root cause analysis and recommend corrective actions.	7%	58%	35%	L 7	L 7 Rank 4 @ 35%
16. Participate in planning and evaluating processes.	5%	70%	25%	L 7	L 7 Rank 3 @ 37%
17. Compare and contrast process alternatives.	14%	66%	20%	L 7	L 7 Rank 3 @ 34%
18. Recommend new solutions and consider effects on various processes even in circumstances where requirements are subject to frequent changes.	7%	62%	31%	L 8	L 8 Rank 5 @ 31%
19. Demonstrate a high level of independent judgment in a range of technical functions and articulate significant challenges involved.	3%	43%	54%	L 7	L 7 Rank 5 @ 42%
20. Participate in the development of an existing and/or new product and/or operation.	11%	56%	33%	L 8	L 8 Rank 5 @ 34%

Rank 3

Rank 4

Rank 5

Competencies/Learning Objectives Descriptions Competency Descriptions (1-20)	**Frequency of Use**			**Personal Skills Level**	**Social Skills**
Personal & Team Skills: Index factors for personal and team skills are based on self-sufficiency, responsibility, and self-awareness, and reflectiveness. In addition team skills are measured based on communication, involvement, work ethic, character, adaptability, problem solving, critical observation, teamwork, and leadership. Employees should be able to demonstrate the ability to:	% Ranked @ the most important. WEIGHTED AVERAGE xx/5.0			1-8 Level of credentials Ranked highest at 1-5 of importance	1-8 Level of credentials Ranked highest at 1-5 of importance
1. Use required learning guides and request learning guidance when needed.	53.4%	WA	4.4	L 2	
2. Use initiative to set their own enhanced learning objectives related to daily tasks and performance.	38.7%	WA	4.1	L 3	
3. Evaluate personal strengths and weaknesses of knowledge and performance related activities.	27.3%	WA	3.9	L 4	
4. Define objectives for new simple applications and establish tasks to accomplish the objectives.	25.0%	WA	3.8	L 4	
5. Share with team members alternative ideas and strategies to define the objectives of complex applications.	46.6%	WA	4.2		L 3
6. Express the mission, goals, and objectives of the workplace.	39.8%	WA	4.1	L 3	
7. Take responsibility for work environment.	81.8%	WA	4.8	L 5	
8. Demonstrate interpersonal communication.	60.2%	WA	4.5		L 1
9. Follow rules and regulations in the workplace.	87.5%	WA	4.8	L 2	
10. Execute team assignments competently.	70.5%	WA	4.6		L 3
11. Listen effectively.	80.7%	WA	4.7		L 2
12. Effectively participate in a diverse work environment	63.6%	WA	4.5		L 3
13. Communicate clearly, timely, and relevant information on processes and results at all levels.	62.5%	WA	4.5		L 4
14. Conduct, analyze, interpret, and present complex facts and provide solutions.	27.3%	WA	3.9	L 8	L 6
15. Take appropriate corrective actions based upon provided feedback.	59.1%	WA	4.5	L 5	
16. Build consensus from group discussions.	27.3%	WA	3.9		L 3
17. Demonstrate the ability to transfer information and specialized skills to others.	36.4%	WA	4.1		L 6
18. Set short-term and long-term goals.	33.0%	WA	4.0	L 4	
19. Represent the organization in a professional manner.	71.6%	WA	4.6		L 8
20. Demonstrate appropriate social skills.	59.1%	WA	4.5		L 6

Rank 3
Rank 4
Rank 5

The level indicators were taken from work of the Lumina Foundation and assigned to the program competencies by the educators in partnership with industry. Over 150 competencies were defined for the Advanced Manufacturing in the Engineering Technology A.S. degree program. These were grouped to the 40 items in the industry survey and the indicators carried forward to the combined competencies. The cognitive indicators were not included/visible in the industry survey.

Knowledge Levels

1. Demonstrates General Knowledge.
2. Demonstrates and uses basic knowledge.
3. Demonstrates and applies extended knowledge for predictable problems.
4. Demonstrates comprehensive theoretical & technical knowledge.
5. Demonstrates integrated & special professional knowledge.
6. Demonstrates broad integrated knowledge regarding scientific principles & practical application of scientific subject.
7. Demonstrates specialized knowledge in subject, & can involve in professional activities.
8. Demonstrates specialized knowledge in adjoining disciplines including knowledge in a new discipline or profession.

Specialized Skills Levels

1. Demonstrates basic cognitive & practical skills to perform tasks within stipulated rules.
2. Demonstrates skills needed to establish correlations among functions and tasks.
3. Demonstrates cognitive & practical skills for perform tasks & problem solve.
4. Demonstrates ability to select alternative actions based on reciprocal effects on other functional areas.
5. Plans and evaluates processes while considering alternatives and impacts.
6. Develops & evaluates new solutions & considers effect on various criteria.
7. Demonstrates technical & conceptual skills to analyze, consolidate, and synthesize knowledge toward strategic activities.
8. Demonstrates comprehensive skills in R&D or innovations in profession

Personal Skill Levels

1. Takes responsibility for learnings.
2. Uses stipulated learning guides and seeks guidance if needed
3. Sets one's own learning & work objectives
4. Initiates planning & designing technical learning objectives.
5. Takes responsibility for overall actions and outcomes.
6. Exercises autonomy & responsibility for planning and development of processes that support substantial changes.
7. Defines objectives for new applications reflecting on societal, economic, & cultural implications.
8. Selects appropriate means & develops new ideas & processes.

Social Skills Levels (Associates)

1. Respects others' actions & accepts critique and feedback.
2. Listens effectively & uses comprehension skills to receive direction & information
3. Helps shape the work within a heterogeneous, working /learning group.
4. Communicate solutions to moderately complex, controversial, sensitive matters.
5. Demonstrates advanced interpersonal abilities to convey complex facts to cross-disciplinary audiences.
6. Demonstrates ability to work with and lead expert groups.
7. Demonstrates ability to lead expert debates, build consensus, & promote professional development of others.
8. Leads groups in complex or interdisciplinary tasks, promotes organizational goals.