



Course Offerings

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GPAllied is the most diverse reliability and operations consulting and services company in the world. Combined, our unrivaled technical expertise, solutions portfolio and global reach help you achieve rapid bottom-line improvement and sustained cultural change.

GPAllied diversity and expertise result from joining together firms with experts in Maintenance and Reliability, Operational Excellence, and Workforce Development. This winning team allows us to offer you expertise in the fields of Lean, Reliability Engineering, Six Sigma, Condition Monitoring, Change Management, Maintenance Planning and Scheduling, Workforce Development and Maintenance Craft Skills training. However, only GPAllied can offer you solutions that fully integrate these specialties.

To ensure that GPAllied provides you with latest thinking and proven best practices, we have attracted recognized experts to our team, benchmarked best-in-class operations and connected with thought leaders throughout the industry. Furthermore, we ensure that our project team members have technical expertise, as well as expertise as trainers and mentors through a rigorous qualification process and the establishment of work execution standards.

GPAllied has modeled their deliverables based on the following core beliefs:

- The reason our clients are in business is to make money
- The first step to ensuring profitability is to have reliable “systems”
- The term “system” speaks to the combination of the people who operate the equipment, the processes they follow to operate the equipment and the equipment itself
- The definition of reliable is: the ability to perform a given task, at a stated rate, for a given period of time, under a given set of circumstances
- The organization must be motivated and prepared for any change to be sustainable
- Having successfully attained reliability, sustaining the improvements is paramount to on-going success
- Optimization is achieved through the use of a culture of continuous improvement
- Clients require a rapid return on investments

To that end, GPAllied offers you a complete suite of solutions in the following categories:

- Sustained Reliable Operations
- Reliable Capital Delivery
- Reliable Maintenance Execution

GPAllied prides itself on two (2) things: our passion for helping the client and the flexibility of delivery methods.

Our passion is driven by *the satisfaction of seeing our company help our customers build, utilize and realize the power of the Return on Asset Reliability (ROAR™).*

Our flexibility in delivery methods comes in any one of four (4) different ways. Each way specifically customized to meet the unique needs of the client. Those four (4) ways are:

Training

GPAllied offers all of our deliverables as classes for the client who prefers to implement using their own people.

Coaching

For the client who wants more than a training solution, but still prefers to implement using their own personnel, GPAllied offers a combination training/coaching package. The training class is augmented by a regimen of coaching and mentoring by our experienced consultants.

Services

Some clients prefer to contract out certain functions. GPAllied can deliver our services to the client in one of two forms:

- Project Based – GPAllied personnel are on-site for the duration of the project
- Full Time Equivalent (FTE) – GPAllied personnel are on-site, full time as contracted employees

Consulting

Whether you are starting a major change initiative or looking for the best way to improve performance, GPAllied's consultants guide you as you set your direction, design and deploy your approach, and realize results.

The GPAllied vision is to be the premier global provider of sustainable transformation driving improved customer operational and reliability excellence. To that end, we believe the best way to make our vision a reality is to optimize customer business performance through customized solutions utilizing our experienced people, innovative processes, and proven technologies.



Thus achieving operational and reliability excellence sustained through the use of cultural change management with the relentless pursuit to deliver the highest return on investment.

GP*Allied's* expert team provides unparalleled solutions. You can count on us to provide the following:

- A strong foundation to ensure that your organization's systems reliably meet customer needs with lower cost
- A roadmap to build upon that foundation to streamline your processes and help you achieve a culture of sustained continuous improvement
- Effective training to develop your people
- Consultants and trainers with technical expertise, interpersonal skills, and drive to work effectively with your team
- Solutions customized to fit your needs, drawing from a diverse range of methods and services
- A rapid return on your investment

Training Classes

At GP*Allied*, we understand that you are not interested in "training for training's sake". You need hard-hitting, impactful training that addresses the specific need of your employees, delivers value for your training dollars, and produces bottom-line results.

That's what we deliver.

In today's increasingly competitive business environment, your training investment only makes sense if it yields a tangible improvement in KPI's like:

- Production efficiency
- Employee retention
- Labor costs
- Asset downtime
- Safety
- Quality control

With over 200 courses that can be easily customized to your equipment and processes, we are the one-stop shop for all of your technical and change management training needs. We offer these classes on-site at your facilities, for your employees; or periodically around the world on an open-enrollment basis.

When you select us for your training, you receive:

- Training from practitioners and implementers who are also skilled trainers.
- Courses designed with your learning objectives in mind using professional instructional system design combined with our subject-matter expertise.

You can obtain most of the courses in a format that works best for you:

- **Off the Shelf**— you can select our standard training if a generic course suits your needs.
- **Customized** — you can ask us to make minor modifications to better fit your organization's existing terminology and culture (which we can do quickly and cost-effectively), or you can ask us to develop a truly custom curriculum.

- **Public Courses** — you may decide to attend one of our expanding list of publicly offered courses, including those offered through Macomb Community College Workforce Development Institute in Warren, MI.
- **e-Learning** — for certain courses; you can select e-Learning, or a blended solution of e-Learning, instructor-led training, and coaching.

Combustion Principles

DESCRIPTION

This course provides information on the concepts associated with combustion, heat and temperature, combustion air blowers, burners, combustion air systems, gas systems, combustion heat transfer, combustion safety, and combustion equipment. The lessons cover a wide range of topics such as fuels, flame structure, air/fuel ratio, primary air flow control, premix burner, nozzle-mix burner, delay mix burner, butterfly valves, gas line shut off valves, gas line safety valves, thermocouples, pyrometers, combustion schematics, and combustion troubleshooting. Upon completion of this course, the participants will be able to explain the function, design and construction of a burner; install, remove and maintain burners; and identify causes of burner failure.

RECOMMENDED AUDIENCE

This course is recommended for mechanical and electrical maintenance technicians.

YOU WILL LEARN:

- Discuss the basic concepts behind combustion.
- Discuss some of the basic terms used to describe and understand combustion.
- Discuss the different types of fuels, and their relation to combustion.
- Discuss the basic concepts behind flame structure.
- Describe and explain the primary mixing zone, flame core, flame envelope, and flame profile.
- Discuss the chemical constituents of fuels to include Carbon Monoxide, Sulfur Dioxide, Nitrous Oxide, heating value, flame temperature, and air/fuel ratio.
- Explain the difference between heat and temperature.
- Discuss the relationship between air/fuel mixing and flame temperature.
- Discuss the reaction process and hazards of a natural gas - Oxygen combustion scenario.
- Discuss the reaction process and hazards of a perfect air – gas combustion scenario.
- Discuss the reaction process and hazards of an excess air combustion scenario.
- Discuss the reaction process and hazards of an excess fuel combustion scenario.
- Discuss the basic concepts behind a combustion air blower.
- Describe the main components of a combustion air blower.
- Discuss the basic concepts behind a burner.
- Describe the main components of a burner.
- Describe the burner characteristics of capacity, turndown, velocity, and flame shape.
- Discuss the basic concepts behind a combustion air system.
- Discuss some of the basic terms used to describe and understand combustion air system design.

- Describe and explain the air pressure switch, motorized butterfly valve, manually operated butterfly valve, and limiting orifice butterfly valve.
- Discuss the basic functions and design of the main gas system.
- Describe the following main gas system components; main gas line shut off valve, main gas meter, and main gas line pressure switch.
- Describe the main components of the main gas line shut off valve.
- Discuss the basic functions and design of the pilot gas system.
- Describe the main components of the pilot gas system.
- Discuss the purpose and operation of thermocouples.
- Discuss some of the basic terms used to describe and understand thermocouple design.
- Discuss the purpose and operation of a mercury flame sensor.
- Discuss the purpose and operation of pyrometers.
- Discuss the basic concept behind combustion heat transfer.
- Discuss some of the basic terms used to describe and understand combustion heat transfer.
- Discuss the basic concept behind combustion safety.
- Discuss some of the basic terms used to describe and understand combustion safety.
- Given a combustion schematic, identify the main components of the combustion operation.
- Given a combustion schematic, troubleshoot basic faults in the combustion operation.

CLASS DURATION

8 to 16 hours (depending upon audience, and audience experience).