



PROJECT WORK DIARY *
B Tech/M Tech/PhD
(July - Dec / Jan - June 20 ____)

Name: Mr. /Ms.....
Registration No:
University:
Academic Institute/Dept:.....
Course / Branch:
Project Title:
.....

Project Guide's Details:

Guides/HoDs	Name	Desgn.	Email ID	Mobile No.
Industry Guides				
Industry HoD				
ARAI Guide				
ARAI HoD				
University Guide				
University HoD				

Name of Organization (with full Address) where Project Work is being carried out:

.....
.....
.....
.....
.....

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1. ABOUT THE DOCUMENT

This document is the Project Diary, to be maintained by the student at ARAI Academy, while conducting his/her research project. This diary will help the student maintain records, and monitor the project progress. The document will be used by each and every student at ARAI Academy; irrespective of his/her academic institute affiliation and degree program (Bachelors/Masters/Doctoral Degree Program). The students are supposed to maintain and regularly update the document. This document records information for the duration of one semester. In case, your project duration is more than one semester (six-months), then you have to issue a new copy for the subsequent semesters till the project work is complete. At the final evaluation towards your degree completion, you will present all the project diaries related to your project.

Before you fill the details in this diary:

1. Make sure you are aware of the academic requirements from your academic institution – more specifically on the project. These requirements will define the duration, start date of the project, end date of the project, whether you can do the project in a group or individually, in industry or within the academic setting, the number of project reviews and policies regarding the intermediate as well as final reviews. Also, be aware of the academic calendar for your current academic year.
2. In addition to the requirements at your academic institutions, you will have to comply with the requirements at the ARAI Academy. Hence, be aware of the policies at ARAI Academy and discuss your concerns with your course coordinator at ARAI Academy.
3. Read the complete document carefully and discuss with your guide from industry, ARAI, & Academy, understand their views and then proceed with use of the document.

This diary has to be shown to the course-coordinator from time to time and also at the end of project along with your final Report & presentation in soft-copy in the CD, also should be submitted, before a college leaving certificate can be issued to the student.

This document is an ever learning process at ARAI Academy. We have tried our best to put up a good document which can be a real utility to you. In case, you have any suggestions to improve the document. Please feel free to talk to your course coordinator.

2. INTRODUCTION

Project work is an important component of engineering and technology education. As per the curriculum, all students are required to carry out a project work individually (for post-graduation) or jointly in a group of three/four members (for under-graduation). Projects are carried out by the students under assigned faculty at your academic institute, ARAI guide and industry guide. The projects could be carried out within the ARAI campus or university / institute campus or in industry campus according to the nature of the project. Depending upon your academic institution and your degree program, the project can be for the duration of six months (VITU UG & PG) or twelve months (COEP PG programs) or 18 months (VITU PG Industry Professional) or longer (minimum three years, for PhD programs).

The primary objective of a project work is to expose the students to the application of the concepts and theories that they have learnt throughout the course. The projects can be categorized as:

- a) Testing and/or analysis of existing work practices; or
- b) The design and development of new processes, procedures, product, and equipment;
- c) Optimization of new processes, procedures, product, and equipment
- d) A system to solve automotive-relevant real-life problem.

The selection of project area depends on many factors including facilities available, requirements of the industry, problem solving with need and justification, time & interest of the students. An excellent project work can get not only good grades but also better jobs and awards/rewards. It can lead to publications / patents and thus improving one's academic standing.

3. OBJECTIVES

Some specific objectives of student projects are:

- To expose the students to industrial environment and work premises where design, manufacturing or service is being provided, so that they are mentally and physically prepared to serve in the organization after their degree;
- To enable the students to observe and learn the best practices adopted by the field experts of practicing engineers and professionals;
- To enhance the communication skills of the students by providing opportunities to discuss in groups and to present their observations, findings and report in formal reviews both in oral and written format;
- To identify the industrial practices compared to what are being taught in the institutional/laboratory setup; and
- To know the latest industrial trends and thus, improve the technical expertise of the students.
- To learn how to quantify, measure & meet targets.

Some specific problem oriented projects can also open the window of opportunities to the students by offering new and innovative solutions as a result of the suggestions or alternatives by industry/organization during the project implementation.

4. PROJECT SELECTION

At ARAI Academy, the introduction to project work covering need, importance, topics/areas available for study, prospective location for work and methodology are provided during the semester instructional hours. It includes presentation at the end of semester by the students who have already worked on their project work. The pre-final students thus have an opportunity to interact with senior students and staff and they can have an idea about the work they have to undertake for their project. During the pre-final semester the students identify their study area or the project that they would like to take. The faculty, ARAI guide and Industry guide are assigned based in the faculty's specialization and area of work/interest. University coordinators in consultation with head of the department finalize the student & guides and communicate the list via email/notice-board.

Different ways to get projects:

1. Project for placed students
 - Decide department, section, guide & location
 - Students who are placed should meet guide & decide project
 - Fill project proposal sheet & MS project plan
2. Project for unplaced students
 - Through Academy
 - By students (who are not interviewed & have least possibility of getting placed)
 - By sending project Request Letter to Industry through Academy Head.
3. Software – Simulation Projects
4. Projects at ARAI
5. Projects at Universities
6. Project through DST/CSIR/TIFAC/DRDO/ISRO
7. Contact Training Programmes speakers for projects
8. Contact SAE Authors for projects
9. Project abroad
 - Free
 - Chargeable
10. Project through websites
11. Project through AAAA
12. Project through relative's recommendation
13. Project through networking (exchange your visiting cards, wherever required)
14. Project discussion at Conference & expo.

ARAI ACADEMY

Sample of Project Request Letter:

ARAI-ACY/2013/VITUBT1/

Date:

To,
Name of Industry Contact Person (e-mail Id; Mobile No)
Designation,
Name of Industry
Full Address of Industry.

Sub: **B.Tech Mech. (specialization in Automotive Engg.) Projects for ARAI Academy Students**

Dear Sir,

As you are aware ARAI is running **B.Tech Mechanical (specialization in Automotive Engg.)** program in collaboration with VIT University. They undergo three years program consisting of theoretical subject at VIT University and they are with us at ARAI for the final year for specialized subjects as well as project work.

As a part of curriculum, they have to do project in automotive industries or vehicle related R & D organizations all over India. In this connection, we request you to allow Student's Name (10BMA00_, _____@_____.com, Mob no.:_____) who is studying in seventh semester of B.Tech at ARAI Academy to carry-out his project work at Name of Industry, Location in VIII Semester. The B.Tech project would be evaluated in 3 phases:

Phase-1	1 st week of Feb 2014 for 50 Marks (To be given by the Industry guide)
Phase-2	In March 2014 for 100 Marks (To be given by the Industry guide & Academy jointly)
Phase-3	In 2 nd week of June for 350 marks to be given by External Examiners in the form of viva-voce at ARAI Academy

He would be joining for the project work on 16th Dec 2013 and officially report to you at Name of Industry, Location. I request you to become his Project guide and give Project Proposal to him. So that he can submit M.S. Project Plan to Academy. You are requested to review the status of this project jointly with the student.

Please feel free to contact me or our Faculty, (Course Coordinator's name, e-mail Id, office phone No.) in case of any help required from our side.

I am looking forward for a fruitful cooperation and coordination.

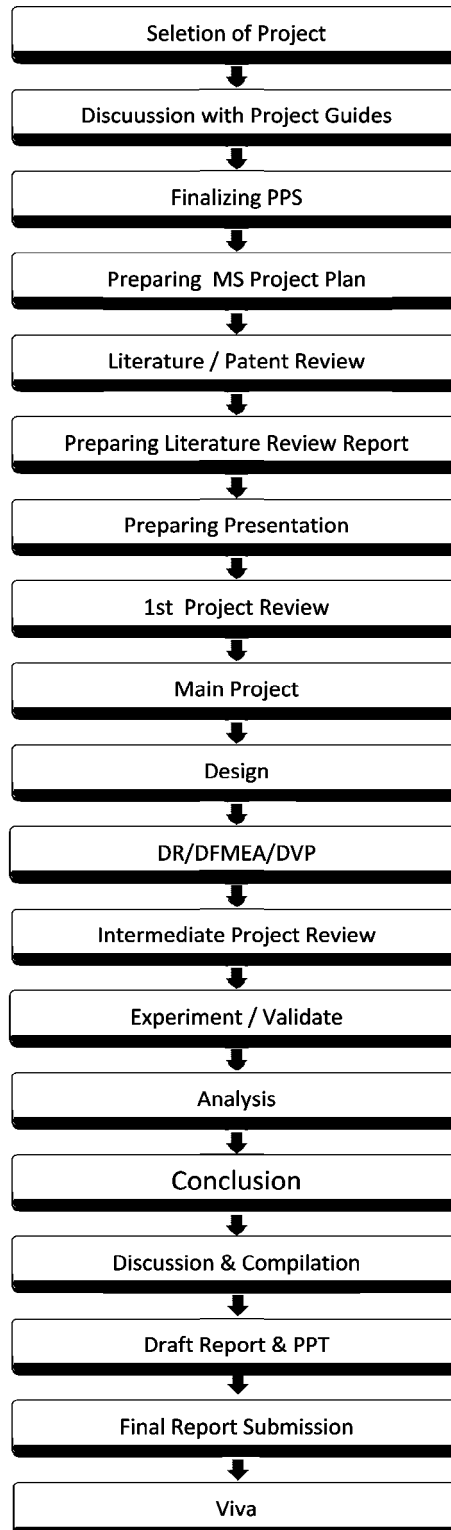
Thanking You,
Yours faithfully,

Dr. K.C. Vora
Dy. Director & Head-ARAI Academy
vora.pga@araiindia.com (020 30231240)

5. PROJECT SCHEDULE

The project comprises of various tasks (refer Flow Chart of next page). Each student is expected to prepare a Project Proposal Document (PPD) as per the given format. It shall be updated as and when each activity is carried out. Effort should be made to adhere to the planned schedule. If any major deviation is noticed, then suitable reschedule may be worked out in consultation with the guides. It is important to get all the revisions of the PPD approved by HoD, ARAI Academy.

Flow Chart for the different tasks during the Project Execution



6. PROJECT SUPERVISION

- (a) The Project Proposal Sheet (PPS) prepared by the students shall serve as a base for guidance and supervision of the project progress.
- (b) As per the schedule, project review meetings will be conducted periodically and recorded in the project work diary.
- (c) After project review, the student is expected to submit presentation and project review reports (PRR) to all project guides as per the schedule.
- (d) A draft version of final report (as per the specified format) shall be prepared and presented to the respective guides/Head of Department.
- (e) The observations and suggestions made shall be considered and met. The final version of the report must be submitted to ARAI Academy at least a week before exam.
- (f) The guide can explore the possibilities of getting any financial assistance to support the project from various funding.
- (g) The guide shall plan and get necessary permission and approval from HOD/management for any special equipment/facilities needed for the completion of the project.
- (h) It shall be the moral responsibility of the guide to see that the project is worthy in terms of its usefulness to the industry, innovation carried out, design & development of a new system, new model, scope for further research, publication of the work, and at the same time they should see that the project is completed well within the available time frame.
- (i) If a project work is carried out by the group of students, the tasks assigned and carried out by individual members must be recorded. Contribution of individual members to the project progress should be clear and it should be the duty of the guide to allocate equal work and responsibility to the team members.
- (j) At the end of the project, student(s) and guides are expected to give individual feedback about the project as per the format.

7. OUTCOME OF THE PROJECT

One or more of the following are generally expected as outcome of the project:

- Innovative solution to the selected problem,
- Development of new design/product/process/procedure/equipment/model,
- Analysis of existing practices and offering suggestions for improvements,
- New software development.
- Conference / journal Publication.
- Patents.

8. GUIDELINES FOR STUDENTS

GENERAL: Dos and Don'ts

1. You should be punctual and sign the muster in the morning while entering and in the evening while going out. You should fill-up leave form with proper justification if you are planning to be absent.
2. Use of USB, compact disc, etc. is strictly prohibited.
3. Student should work on the specific PCs for a specific time allotted to them. Access to other Academy PCs is strictly prohibited.
4. Students cannot access Academy students' old project reports, Software Manuals, Academy databank, project agreements, etc. with written approval.
5. Printing, photocopying of books, project reports, confidential data etc is strictly prohibited.
6. Student should not access internet facility unless authorized.
7. Students are not allowed to work after office hours without prior approval.
8. You would not submit any abstract, papers, patent or presentation without written permission of HOD.
9. Student should give a copy of letter issued to him at the time of joining to project guide / concerned engineer.
10. Photography and videography in the premises of ARAI is strictly prohibited.

Guideline for PC/e-mail/Internet use: Dos and Don'ts of Information Security Awareness

Sr. No	Description
A	Internet
1	Don't Browse Porn sites.
2	Don't chat on Gtalk/yahoo/ orkut/face book.
3	Don't leave the Internet browser open for long time.
4	Don't browse the unknown sites and social security sites.
5	Don't download & install any of freeware software like screensavers, freeware software & its Sr. No crack, songs, Online Games, movies, live radio & TV.
B	Mail
1	Don't send e-mails with Heavy attachments Recommended is 2 to 5 MB Max.
2	Avoid marking of same mail to multiple recipients
3	Don't open mail from unknown recipients and do not open the link provided in the mail.
4	Update your local address book continuously.
C	Desktop
1	Don't install Pirated software on any PC in Computer lab or any other PC.
2	Don't put multiple copies of unwanted data on PC like presentations, Songs, Video clips etc.
3	Scan the outside data before downloading. Most of the data is transferred through USB pen drive. Scan it before downloading.
4	Shut down the PC in lunch break if possible
5	Lock the PC and switch off the monitor in small break time or when your are not at your seat.
6	Keep the PC always in energy saver Mode.

Strict compliance to above procedural norms is essential.

9. PROJECT EVALUATION & ASSESSMENT

To monitor the progress and assist the timely completion of the project, three reviews are planned during the phase of project. These are usually equi-spaced during the semester. The first review is done at the site by the guide but the second and the final review committee has external reviewers.

For M.Tech Programmes in collaboration with CoEP:

The project would be evaluated in two stages:

Dissertation Stage I: At the end of Third semester Oct/ Nov

Dissertation StageII: At the end of Fourth semester June/ July

During the fourth semester there will an intermediate review in the month of Feb/March to monitor the progress of the project.

Evaluation scheme for reviews are mentioned below for ready reference and also the actual evaluation sheet is available on subsequent pages.

Dissertation Stage I: Project Review Sheet:

Sr. No.	Project Evaluation Criterias
1	Microsoft Project Tracking / Adherence
2	Literature / Patent Review
3	Quality/Quantity of work till date
4	Presentation (Slides & Style)
5	Knowledge & Understanding (Q&A)
6	Results & Scope for further work

Dissertation Stage II: Final Project Review Sheet:

Sr. No.	Project Evaluation Criterias
1	Microsoft Project Tracking / Adherence
2	Quality of Work
3	Results / Analysis / Conclusions
4	Quality of Project Report
5	Quality of Presentation (slides & Style)
6	Knowledge and Understanding (Viva, Q & A)
7	Experimental Validation
8	Paper Publication & Intellectual Property
9	Implementation of Project
10	Feedback / Submission of Report before 1st June

ARAI ACADEMY

CoEP-ARAI M.Tech. Automotive Technology Evaluation Sheet for Dissertation Phase-I

Academic Year				
Name of the Examination	Dissertation Phase-I Examination			
Name of the Candidate				
M. Tech. Program	M. Tech. (Automotive Technology)			
Year of his / her studies	SY			
Title of the Dissertation				
Presentation on	Date:	Time:		
Number of students present for attending this seminar				
Signature of the candidate				
Progress made after the Mid-Sem evaluation. <i>(Check mid-sem review report)</i>	Excellent / Good / Enough / Just Enough / Not Satisfactory			
Suggestions given for improving the dissertation, if any				
Marks Given				
	91-100	86-90	76-85	66-75
Grade allotted	AA	AB	BB	BC
	Extraordinary	Very Good	Good	Satisfactory
Signature of examiners and Names	<i>Write marks and grades here, if grade is below CC or lower</i>			
	COEP Guide	ARAI Guide	Industry Guide	
	Internal Examiner	External Examiner		

Faculty Advisor

HoD

ARAI ACADEMY

CoEP-ARAI M.Tech. Automotive Technology Evaluation Sheet for Dissertation Phase-II - Final Viva-Voce

Academic Year				
Name of the Examination	Dissertation Phase-II Final Examination			
Name of the Candidate				
M. Tech. Program	M. Tech. (Automotive Technology)			
Year of his / her studies	SY			
Title of the Dissertation				
Presentation on	Date:	Time:		
Number of students present for attending this seminar				
Signature of the candidate				
Progress made after the Mid-Sem evaluation. <i>(Check mid-sem review report)</i>	Excellent / Good / Enough / Just Enough / Not Satisfactory			
Suggestions given for improving the dissertation, if any				
Marks Given	91-100	86-90	76-85	66-75
	AA	AB	BB	BC
Grade allotted	Extraordinary	Very Good	Good	Satisfactory
	<i>Write marks and grades here, if grade is below CC or lower</i>			
Signature of examiners and Names	COEP Guide	ARAI Guide	Industry Guide	
	Internal Examiner		External Examiner	

Faculty Advisor

HoD

For B.Tech as well as M.Tech Programmes in collaboration with VIT University & Vel-Tech University:

The project would be evaluated in three phases:

Phase 1: In 1st week of Feb/ Aug. (for 50 Marks)

Phase 2: In 2nd week March / Sept (for 100 Marks)

Phase 3: In 2nd week of June / Dec (for 350 Marks) in the form of viva-voce.

Evaluation scheme for all three reviews are mentioned below for ready reference and also the actual evaluation sheet is available on subsequent pages.

Phase 1: First Project Review Sheet:

Sr. No.	Topic	Marks
1	Microsoft Project Plan	10
2	Presentation	10
3	Attendance/Punctuality	10
4	Daily Targets	10
5	Project Progress	10
Total Marks		50

Phase 2: Intermediate Project Review Sheet:

Sr. No.	Topic	Marks
1	Microsoft Project Tracking / Adherence	10
2	Literature / Patent Review	15
3	Quality/Quantity of work till date	15
4	Presentation (Slides & Style)	20
5	Knowledge & Understanding (Q&A)	20
6	Results & Scope for further work	20
Total Marks		100

Phase 3: Final Project Review Sheet:

Sr. No.	Topic	Marks
1	Microsoft Project Tracking / Adherence	20
2	Quality of Work	50
3	Results / Analysis / Conclusions	50
4	Quality of Project Report	50
5	Quality of Presentation (slides & Style)	50
6	Knowledge and Understanding (Viva, Q & A)	50
7	Experimental Validation	20
8	Paper Publication & Intellectual Property	20
9	Implementation of Project	20
10	Feedback / Submission of Report before 1st June	20
Total Marks		350

Student Project Review Examination

PROJECT REVIEW SCHEDULE (1 st Review)		Date :	Time :	Weightage 50 Marks					
		Industry/Institute:							
Sr. No.	Project Title	Registration No / Student Name	First Review (Marks - 50)						
			1	2	3	4	5	Total	

- 1. M.S. Project Plan (10 Marks)
- 2. Presentation (10 Marks)
- 3. Attendance/Punctuality (10 Marks)
- 4. Daily Targets (10 Marks)
- 5. Project Progress (10 Marks)

Comments / Suggestions:

Reviewer's Signature with Date
 Reviewer's Name:
 Affiliation:
 Designation:

Student Project Review Examination

PROJECT REVIEW SCHEDULE		Date :	Time :	Weightage 150 Marks						
ARAI Department:										
Sr. No.	Project Title	Univ Reg. / Student Name	First Review (Marks out of 50)	Intermediate Review						Total (1-6)
				1	2	3	4	5	6	100

1. M.S. Project Tracking / Adherence (10 Marks)
2. Literature / Patent Review (15 Marks)
3. Quality/Quantity of work till date (15 Marks)
4. Presentation (Slides & Style) (20 Marks)
5. Knowledge & Understanding (Q&A) (20 Marks)
6. Results & Scope for further work (20 Marks)

Comments / Suggestions:

ARAI Guide

Coordinator or Head, ARAI Academy

Industry Guide

Industry HOD

Student Project Viva Voce Examination

FINAL PROJECT REVIEW SCHEDULE													
		Date :			Time :			Weightage 350 Marks					
Sr. No.	Project Title	Univ Reg. / Student Name	1 (20)	2 (50)	3 (50)	4 (50)	5 (50)	6 (50)	7 (20)	8 (20)	9 (20)	10 (20)	Marks out of 350

- 1 M.S. Project Tracking / Adherence
- 2 Quality of Work
- 3 Results / Analysis / Conclusions
- 4 Quality of Project Report
- 5 Quality of Presentation (slides & Style)
- 6 Knowledge and Understanding (Viva, Q & A)
- 7 Experimental Validation
- 8 Paper Publication & Intellectual Property
- 9 Implementation of Project
- 10 Feedback / Submission of Report before prescribed date

Comments/Suggestions:

Reviewer's Signature with Date
 Reviewer's Name:
 Affiliation:
 Designation:

Student Project Viva Voce Examination
M.Tech. for Industry Professionals with specialization in Engine Technology (ARAI-VIT- Cummins)

Project Review Marksheets : Semester II		Date :	Time :	Weightage 100 Marks									
Sr No	Roll No.	Student Name	Project Title	Semester II- Project Review Marks - Maximum 100									
				1	2	3	4	5	6	Total			

- | | | | |
|------------------------------|----------|--|----------|
| 1. Project plan | 15 Marks | 4. Knowledge & Understanding | 15 Marks |
| 2. Presentation | 15 Marks | 5. Quality of Project Report | 15 Marks |
| 3. Literature/ Patent Review | 15 Marks | 6. Evaluation by Cummins Project Guide | 25 Marks |

Industry Guide Industry HOD VIT Guide ARAI Guide Coordinator or Head, ARAI Academy

Student Project Viva Voce Examination
M.Tech. for Industry Professionals with specialization in Engine Technology (ARAI-VIT- Cummins)

Project Review Marksheets : Semester III		Date :	Time :	Weightage 100 Marks								
Sr No	Roll No.	Student Name	Project Title	Semester III- Project Review Marks - Maximum 100								
				1	2	3	4	5	6	Total		

- | | | | | |
|----|--|----------|-------------------------------------|----------|
| 1. | M.S. Project Tracking / Adherence & Literature / Patent Review | 15 Marks | 4. Knowledge & Understanding (Q&A) | 15 Marks |
| 2. | Quality/Quantity of work till date | 15 Marks | 5. Results & Scope for further work | 15 Marks |
| 3. | Quality of Project Report & Presentation | 15 Marks | 6. Evaluation by Guide | 25 Marks |

Industry Guide

VIT Guide

ARAI Guide

Student Project Viva Voce Examination
M.Tech. for Industry Professionals with specialization in Engine Technology (ARAI-VIT- Cummins)

Intermediate Project Review Marksheet:Semester IV		Date :	Time :	Weightage 100 Marks												
Sr No	Roll No.	Student Name	Project Title	Semester IV- Intermediate Project Review - Maximum 100												
				<table border="1"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>Total</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td>100</td> </tr> </table>	1	2	3	4	5	Total						100
1	2	3	4	5	Total											
					100											

1. Project Tracking / Adherence & Literature / Patent Review / 20 Marks 4. Knowledge & Understanding (Q&A) 20 Marks
2. Quality/Quantity of work till date 20 Marks 5. Results & Scope for further work 20 Marks
3. Presentation(Slides & Style) 20 Marks

ARAI Guide

Head, ARAI Academy

Industry Guide

Industry HOD

10. PROJECT PROPOSAL DOCUMENT

The Project starts with the initial discussions between the student(s) and the guides, during which they both decide the project expanse and decide on the apt title. The Project Proposal Document (PPD) contains the gist of the discussions and serves as the guiding document to indicate the milestones during the project execution. Although the student can revise the document after discussions with guides, it is always beneficial to the student to grill down the details before the start of the project.

The Project Proposal Document is a three-part document:

- (a) Project Proposal Sheet (PPS)
- (b) Project Schedule (Later on Microsoft Project document will be required)
- (c) Objective. Brief Description, Methodology and Target of the Intended Project.

Instructions to fill-up the Project Proposal Sheet:

- (a) Project Title should be short & appropriate to your degree and should indicate the major task to be achieved at the project completion. It should not be title case.
- (b) The industry/Institute with their address.
- (c) Depending upon academic requirements, the project duration will vary. As mentioned earlier, the duration can be either six months, a year or much longer.
- (d) Under the Project Category (# 4.1 section) you can choose the option which the closest to your project and additionally specify other deliverable from the subsequent options, if any applicable to your project work.
- (e) For Standards, please cite the most relevant document here and also attach an annexure to accommodate additional references, if required.
- (f) For Objectives/Targets, please specify the most relevant and final deliverable with subsequent details under the third document.
- (g) For the section under department competency, please refer to the specific equipments necessary for your project execution.
- (h) Confirm the details for your guide, Department head, ARAI Academy guide and Academy head.
- (i) The PPS should be preferable of one page.

Instructions to help fill-up the Project Schedule (Plan) sheet:

- (a) Discuss with your course coordinator and immediate supervisor and confirm the details on the timeline for the project. The dates are generally reflected in the academic calendar for the semester.
- (b) Please note that all the signatures are done before you submit the document copy to your course coordinator.

Instructions to help fill the third part of the PPS:

- (a) Note that this part is a four-part document, including objective, brief description, methodology and target for the intended project.
- (b) The target must be quantifiable and measurable.

ARAI ACADEMY

1.		Project Title			
2.		Industry / Institute			
3.		Project Duration			
4.		Project Category			
	4.1	Design Elements to be Included (Inclusive of Mandatory Min 3) *Mandatory	<input checked="" type="checkbox"/>	Engineering Standard*	Prototype and Fabrication
			<input checked="" type="checkbox"/>	Design Analysis*	Experimentation
				Modeling and Simulation	Software Development
	4.2	Realistic Constraint to be Addressed (Minimum 3)		Economic	Ethical
				Environmental	Health and Safety
				Social	Manufacturability
				Political	Sustainability
5.		Related Standards, Regulations, Reference Literature, if any			
6.		Objectives & Target of the Project			
7.		Need and Justification			
8.		How your Department is capable of taking up this Project?			
	a)	Existing facilities / infrastructure/Software			
	b)	Competences/ experience			
	c)	Studies conducted / publications, if any			
9.		Monthly Stipend			
10.		Remarks			

Signature:			
	Student 1	Student 2	Student 3
Name			
Designation			
Department			
Mobile No.			
Email ID			

Signature:					
	Industry Guide	Industry HOD	University Guide	ARAI Guide	ARAI Academy Head
Name					Dr. K C Vora
Designation					Sr. Dy. Director & Head
Department					ARAI Academy
Mobile No.					9975581049
Email ID					vora.pga@araiindia.com

ARAI ACADEMY

1.		Project Title				
2.		Industry / Institute				
3.		Project Duration				
4.		Project Category				
	4.1	Design Elements to be Included (Inclusive of Mandatory Min 3) *Mandatory	<input checked="" type="checkbox"/>	Engineering Standard*		Prototype and Fabrication
			<input checked="" type="checkbox"/>	Design Analysis*		Experimentation
				Modeling and Simulation		Software Development
	4.2	Realistic Constraint to be Addressed (Minimum 3)		Economic		Ethical
				Environmental		Health and Safety
				Social		Manufacturability
				Political		Sustainability
5.		Related Standards, Regulations, Reference Literature, if any				
6.		Objectives & Target of the Project				
7.		Need and Justification				
8.		How your Department is capable of taking up this Project?				
	a)	Existing facilities / infrastructure/Software				
	b)	Competences/ experience				
	c)	Studies conducted / publications, if any				
9.		Monthly Stipend				
10.		Remarks				

Signature:						
	Student	Industry Guide	Industry HOD	University Guide	ARAI Guide	ARAI Academy Head
Name						Dr. K C Vora
Designation						Sr. Dy. Director & Head
Department						ARAI Academy
Mobile No.						9975581049
Email ID						vora.pga@araiindia.com

ARAI ACADEMY

PROJECT SCHEDULE [PLAN]

Name of the Students :

Registration No(s) :

University :

Course & Branch of Study :

Name of External Guide(s) :

Name of Internal Guide(s) :

Project Title :

.....

[Identify main activities in your project work and write down here in chronological order with target date. *Change the timeline based on the academic calendar.]

Major Activities	Target Date
Student physically report to Guide	
Literature Survey	
Finalization of Objectives & Methodology	
Project Proposal, Project Schedule and Brief Description of Project	
M.S. Project Plan to be submitted by student	
First Project Review of VIT/VTU students by Guide/s (Review I)	
Marks out of 50 from Reporting Guide by e-mail to Academy	
Report, PPT & Intermediate Review at Project Site (Review II) with Head / Faculty, ARAI Academy	
Marks out of 150 jointly given by Reporting Guide, Academy Faculty & University Faculty to be declared	
Submission of Draft Report to Guide	
Submission of Modified Report to Guide	
Submission of Modified Report to Head, ARAI Academy	
Submission of Final Bound Report to Head, ARAI Academy	
Final Presentation & Viva -Voce with Internal / External Examiner at ARAI, Pune (Review III)	
Marks out of 350 jointly given by External & Internal examiners to ARAI Academy for Viva- Voce	
Total Marks out of 500 given by Academy and e-mail to University	

Date: Signature of the Student(s)

Signature of the Guide(s)

Signature of Head, ARAI Academy

ARAI ACADEMY

PROJECT WORK UNDERTAKEN BY A GROUP OF STUDENTS

If a project work was carried out by a group of students, list out the tasks assigned and carried out by each member here. This information is required to know the specific contribution made by each member of the group on carrying out the project work.

Name of the Members	Task Assigned / Major Work Carried out
Your Name:	
Member 1 Name:	
Member 2 Name:	
Member 3 Name:	

Date:

Signature of the Student

Guide's Remarks:

Signature of Guide with date

ARAI ACADEMY

11. A RECORD OF INTERACTIONS/DISCUSSIONS BETWEEN STUDENT(S) AND GUIDE(S)

DATE	POINTS DISCUSSED

Signature of student

Date:

Signature of faculty/Industry Guide(s):

Name of the Guide(s):

ARAI ACADEMY

12. RECORD OF ACTIVITIES CARRIED OUT BY THE STUDENTS

Month (for Regular B.Tech & M.Tech)/Quarter (for M.Tech Industry Professionals)/Semester (for Ph.D.)

[You may also record here the points discussed/to be discussed with your guide]

Week / Month	ACTIVITIES CARRIED OUT
1 st Week / Month	
2 nd Week / Month	
3 rd Week / Month	
4 th Week / Month	

Signature of student

Date:

Signature of faculty/Industry Guide(s):

Name of the Guide(s):

ARAI ACADEMY

12. RECORD OF ACTIVITIES CARRIED OUT BY THE STUDENTS

Month (for Regular B.Tech & M.Tech)/Quarter (for M.Tech Industry Professionals)/Semester (for Ph.D.)

[You may also record here the points discussed/to be discussed with your guide]

Week / Month	ACTIVITIES CARRIED OUT
1 st Week / Month	
2 nd Week / Month	
3 rd Week / Month	
4 th Week / Month	

Signature of student

Date:

Signature of faculty/Industry Guide(s):

Name of the Guide(s):

ARAI ACADEMY

12. RECORD OF ACTIVITIES CARRIED OUT BY THE STUDENTS

Month (for Regular B.Tech & M.Tech)/Quarter (for M.Tech Industry Professionals)/Semester (for Ph.D.)

[You may also record here the points discussed/to be discussed with your guide]

Week / Month	ACTIVITIES CARRIED OUT
1 st Week / Month	
2 nd Week / Month	
3 rd Week / Month	
4 th Week / Month	

Signature of student

Date:

Signature of faculty/Industry Guide(s):

Name of the Guide(s):

ARAI ACADEMY

12. RECORD OF ACTIVITIES CARRIED OUT BY THE STUDENTS

Month (for Regular B.Tech & M.Tech)/Quarter (for M.Tech Industry Professionals)/Semester (for Ph.D.)

[You may also record here the points discussed/to be discussed with your guide]

Week / Month	ACTIVITIES CARRIED OUT
1 st Week / Month	
2 nd Week / Month	
3 rd Week / Month	
4 th Week / Month	

Signature of student

Date:

Signature of faculty/Industry Guide(s):

Name of the Guide(s):

ARAI ACADEMY

12. RECORD OF ACTIVITIES CARRIED OUT BY THE STUDENTS

Month (for Regular B.Tech & M.Tech)/Quarter (for M.Tech Industry Professionals)/Semester (for Ph.D.)

[You may also record here the points discussed/to be discussed with your guide]

Week / Month	ACTIVITIES CARRIED OUT
1 st Week / Month	
2 nd Week / Month	
3 rd Week / Month	
4 th Week / Month	

Signature of student

Date:

Signature of faculty/Industry Guide(s):

Name of the Guide(s):

ARAI ACADEMY

12. RECORD OF ACTIVITIES CARRIED OUT BY THE STUDENTS

Month (for Regular B.Tech & M.Tech)/Quarter (for M.Tech Industry Professionals)/Semester (for Ph.D.)

[You may also record here the points discussed/to be discussed with your guide]

Week / Month	ACTIVITIES CARRIED OUT
1 st Week / Month	
2 nd Week / Month	
3 rd Week / Month	
4 th Week / Month	

Signature of student

Date:

Signature of faculty/Industry Guide(s):

Name of the Guide(s):

13. RECORD OF CHALLENGES FACED BY STUDENTS DURING THE PROJECT WORK

[Record here major hurdles/ problems faced by you/ your team in completing the project work.
Briefly discuss what steps have been taken to over-come or solve the problems, if any]

S. No	Major Problems / Challenges/ failures	How it was solved?

Signature of student

Date:

Signature of faculty/Industry Guide(s):

Name of the Guide(s):

14. FEEDBACK (STUDENT)

Name of the Student :

Academic Institute/University :

Register No :

Course & Branch of Study :

Faculty Guide's Name :

Designation :

Project Title :

Name of the Organization :

Rating : from 1 to10, 10 being excellent & 1 being poor.

1. What is your personal rating of your project work? (i.e. How well you have carried out the project work)

1	2	3	4	5	6	7	8	9	10

2. How far the Project work has contributed to your personal growth, learning and knowledge enrichment?

1	2	3	4	5	6	7	8	9	10

3. How far the organization has benefitted out of your project work?

1	2	3	4	5	6	7	8	9	10

4. How was your ARAI guide helpful in carrying out your project work?

1	2	3	4	5	6	7	8	9	10

5. How was your University guide helpful in carrying out your project work?

1	2	3	4	5	6	7	8	9	10

6. How was your course coordinator helpful in carrying out your project work?

1	2	3	4	5	6	7	8	9	10

7. Rate How far have you meet the quantified target?

1	2	3	4	5	6	7	8	9	10

8. What is the chance of getting a placement in the company, where you did the project?

To a very large extend

Large extent

To a certain Extent

Not at all

9. What is the scope for improvement of the present project by juniors or in your higher studies?

.....
.....
.....
.....

10. Give details of HR head, R&D Head and other contacts established during the course of project work?

Sr. No.	Name	Designation	Phone/Mobile No.	E-mail ID
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Date:

Signature

14. FEEDBACK FORM (INDUSTRY GUIDE)

Industry Guide's Name :

Designation :

Department :

Project Title :

1. Name of the Student(s) supervised for the project work:

.....

.....

2. How far the project guided contributed to your personal growth, learning and knowledge enrichment?

To a very large extend

Large extent

To a certain Extent

Not at all

3. How far your organization has benefitted out of the project work(s)?

To a very large extend

Large extent

To a certain Extent

Not at all

4. On an average, what is your personal rating of our students?

Excellent

Good

Fair

Could have been better

5. On what aspects students have to be further developed to face challenges in the project work?

.....

.....

6. What is the scope for continuation and improvement of any of the present projects by next batch of students?

.....

.....

7. What is the chance of getting a placement for the students in the companies you have visited for the project work?

To a very large extend

Large extent

To a certain Extent

Not at all

Date: / /20

Signature

14. FEEDBACK FORM (ARAI GUIDE)

ARAI Guide's Name :

Designation :

Department :

Project Title :

1. Name of the Student/ students who has/ have done project work in your organization under your supervision:

.....

.....

2. How far the project works guided contributed to your personal growth, learning and knowledge enrichment?

To a very large extend

Large extent

To a certain Extent

Not at all

3. How far your organization has benefitted out of the project work(s)?

To a very large extend

Large extent

To a certain Extent

Not at all

4. On an average, what is your personal rating of our students?

Excellent

Good

Fair

Could have been better

5. On what aspects students have to be further developed to face challenges in the project work?

.....

.....

6. What is the scope for continuation and improvement of any of the present projects by next batch of students?

.....

.....

7. What is the chance of getting a placement for the students in the companies you have visited for the project work?

To a very large extend

Large extent

To a certain Extent

Not at all

Date: / /20

Signature

ARAI ACADEMY

14. FEEDBACK FORM (FACULTY GUIDE)

Faculty Guide's name :

Designation :

Department :

1. Name of the Student/ students who has/ have done project work under your supervision:
.....
.....

2. How far the project works guided contributed to your personal growth, learning and knowledge enrichment?

<input type="checkbox"/>	To a very large extend	<input type="checkbox"/>	Large extent
<input type="checkbox"/>	To a certain Extent	<input type="checkbox"/>	Not at all

3. How far organization has benefitted out of your project work guidance?

<input type="checkbox"/>	To a very large extend	<input type="checkbox"/>	Large extent
<input type="checkbox"/>	To a certain Extent	<input type="checkbox"/>	Not at all

4. On an average, what is your personal rating of your student's project work?

<input type="checkbox"/>	Excellent	<input type="checkbox"/>	Good
<input type="checkbox"/>	Fair	<input type="checkbox"/>	Could have been better

5. On what aspects students have to be further developed to face challenges in the project work?
.....
.....

6. Was there any scope for consultancy out of any of the project works?
.....
.....

7. What is the scope for continuation and improvement of any of the present projects by next batch of students?
.....
.....

8. What is the chance of getting a placement for the students in the companies you have visited for the project work

<input type="checkbox"/>	To a very large extend	<input type="checkbox"/>	Large extent
<input type="checkbox"/>	To a certain Extent	<input type="checkbox"/>	Not at all

Date: / /20 Signature _____

15. PROJECT REPORT FORMAT

Preamble

While it is essential to pay attention to the content of the thesis/dissertation/report (hereinafter called the 'thesis'), which is being submitted in partial fulfillment of the requirements of the respective degree, it is also imperative that a standard format be prescribed. The same format shall be followed in preparation of the final copies of the thesis to be submitted to the Department/Library in future.

1 Organization of the Thesis/Dissertation/report

This thesis shall be presented in a number of chapters, starting with Introduction and ending with Summary and Conclusions. Each of the other chapters will have a precise title reflecting the contents of the chapter. A chapter can be subdivided into *sections, subsections and sub subsection* so as to present the content discretely and with due emphasis. When the work comprises two or more mutually independent investigations, the thesis may be divided into two or more parts, each with an appropriate title. However, the numbering of chapters will be continuous right through, for example Part 1 may comprise Chapters 2-5, Part Two, Chapters 6-9.

1.1 Introduction

The title of **Chapter 1** shall be Introduction. It shall justify and highlight the problem posed, define the topic and explain the aim and scope of the work presented in the thesis. It may also highlight the significant contributions from the investigation.

1.2 Review of Literature

This shall normally form Chapter 2 and shall present a critical appraisal of the previous work published in the literature pertaining to the topic of the investigation. The extent and emphasis of the chapter shall depend on the nature of the investigation.

1.3 Report on the present investigation

The reporting on the investigation shall be presented in one or more chapters with appropriate chapter titles.

- Due importance shall be given to experimental setups, procedures adopted, techniques developed, methodologies developed and adopted.
- While important derivations/formulae should normally be presented in the text of these chapters, extensive and long treatments, copious details and tedious information, detailed results in tabular and graphical forms may be presented in Appendices. Representative data in table and figures may, however, be included in appropriate chapters.

- Figures and tables should be presented immediately following their first mention in the text. Short tables and figures (say, less than half the writing area of the page) should be presented within the text, while large table and figures may be presented on separate pages.
- Equations should form separate lines with appropriate paragraph separation above and below the equation line, with equation numbers flushed to the right.

1.4 Results and Discussions

This shall form the penultimate chapter of the thesis and shall include a thorough evaluation of the investigation carried out and bring out the contributions from the study. The discussion shall logically lead to inferences and conclusions as well as scope for possible further future work.

1.5 Summary and Conclusions

This will be the final chapter of the thesis. A brief report of the work carried out shall form the first part of the Chapter. Conclusions derived from the logical analysis presented in the Results and Discussions Chapter shall be presented and clearly enumerated, each point stated separately. Scope for future work should be stated lucidly in the last part of the chapter.

1.6 Appendix

Detailed information, lengthy derivations, raw experimental observations etc. are to be presented in the separate appendices, which shall be numbered in Roman Capitals (e.g. "Appendix IV"). Since reference can be drawn to published/unpublished literature in the appendices these should precede the "Literature Cited" section.

1.7 Literature Cited

This should follow the Appendices, if any, otherwise the Summary and Conclusions chapter. The candidates shall follow the style of citation and style of listing in one of the standard journals in the subject area consistently throughout his/her thesis, for example, IEEE in the Department of Electrical Engineering, Materials Transactions in Department of Metallurgical Engineering and Materials Science. However, the names of all the authors along with their initials and the full title of the article/monogram/book etc. have to be given in addition to the journals/publishers, volume, number, pages(s) and year of publication. Citation from websites should include the names(s) of author(s) (including the initials), full title of the article, website reference and when last accessed. Reference to personal communications, similarly, shall include the author, title of the communication (if any) and date of receipt.

1.7.1 Publications by the candidate

Articles, technical notes etc. on the topic of the thesis published by the candidate may be separately listed after the literature cited. This may also be included in the contents. The candidates may also include reprints of his/her publications after the literature citation.

1.8 Acknowledgements

The acknowledgments by the candidate shall follow the citation of literature, signed by him/her, with date.

2 THESIS FORMAT

2.1 Paper

2.1.1 Quality

The thesis shall be printed/xeroxed on white bond paper, whiteness 95% or above, weight 70 gram or more per square meter.

2.1.2 Size

The size of the paper shall be standard A 4; height 297 mm, width 210 mm.

2.1.3 Type Setting, Text Processing and Printing

The text shall be printed employing laser jet or Inkjet printer, the text having been processed using a standard text processor. The standard font shall be Times New Roman of 12 pts with 1.5 line spacing.

2.1.4 Page Format

The Printed Sheets shall have the following written area and margins:

Top Margin	15 mm
Head Height	3 mm
Head Separation	12 mm
Bottom Margin	22 mm
Footer	3 mm
Foot Separation	10 mm
Text Height	245 mm
Text Width	160 mm

When header is not used the top margin shall be 30 mm.

Left and Right Margins

The candidates shall have the options of single or double sided printing

- Single sided/odd number page (in double sided printing)

Left Margin 30mm
Right Margin 20 mm

- Double sided even numbered page

Left Margin 20mm
Right Margin 30mm

2.1.5 Pagination

Page numbering in the text of the thesis shall be Hindu Arabic numerals at the center of the footer. But when the candidate opts for header style the page number shall appear at the right and left top corner for the odd and even number pages, respectively.

Page number “1” for the first page of the Introduction chapter shall not appear in print, only the second page will bear the number “2”.

The subsequent chapters shall begin on a fresh page (fresh odd number page in case of double sided printing). When header style is chosen the first page of each chapter will not have the header and the page number shall be printed at the center of the footer.

Pagination for pages before the Introduction chapter shall be in lower case Roman numerals, e.g., “iv”.

2.1.6 Header

When the header style is chosen, the header can have the Chapter number and Section number (e.g., Chapter 2, Section 3) on even numbered page headers and Chapter title or Section title on the odd numbered page header.

2.1.7 Paragraph format

Vertical space between paragraphs shall be about 2.5 line spacing.

The first line of each paragraph should normally be indented by five characters or 12mm. A candidate may, however, choose not to indent if (s) he has provided sufficient paragraph separation.

A paragraph should normally comprise more than one line. A single line of a paragraph shall not be left at the top or bottom of a page (that is, no windows or orphans should be left)

The word at the right end of the first line of a page or paragraph should, as far as possible, not be hyphenated.

2.2 Chapter and Section Format

2.2.1 Chapter

Each chapter shall begin on a fresh page (odd number page in case of double sided printing) with an additional top margin of about 75mm. Chapter number (in Hindu-Arabic) and title shall be printed at the center of the line in 6mm font size (18pt) in bold face using both upper and lower case (all capitals or small capitals shall not be used). A vertical gap of about 25mm shall be left between the Chapter number and Chapter title lines and between chapter title line and the first paragraph.

2.2.2 Sections and Subsections

A chapter can be divided into Sections, Sub-sections and Sub-sub-Sections so as to present different concepts separately. Sections and subsections can be numbered using decimal points, e.g. 2.2 for the second section in Chapter 2 and 2.3.4 for the fourth Subsection in third Section of Chapter 2. Chapters, Sections and Subsections shall be included in the contents with page numbers flushed to the right. Further subsections need not be numbered or included in the contents.

The Section and Sub-Section titles along with their numbers in 5 and 4mm (16 and 14 pt) fonts, respectively, in bold face shall be flushed to the left (not centered) with 15 mm space above and below these lines.

In further subdivisions character size of 3 and 3.5 with bold face, small caps, all caps and italics may be used for the titles flushed left or centered. These shall not feature in the contents.

2.2.3 Table / Figure Format

As far as possible, tables and figures should be presented in portrait style. Small size table and figures (less than half of writing area of a page) should be incorporated within the text, while larger ones may be presented on separate pages. Table and figures shall be numbered chapter wise. For example, the fourth figure in chapter 5 will bear the number Figure 5.4 or Fig 5.4.

Table number and title will be placed above the table while the figure number and caption will be located below the figure. Reference for Table and Figures reproduced from elsewhere shall be cited in the last and separate line in the table and figure caption, e.g. (after McGregor [12]).

3 Auxiliary Format

3.1 Binding

The final hard bound copies to be submitted in Black colour only

3.2 Front Covers

The front covers shall contain the following details:

- Full title of thesis in 6 mm 22 point's size font properly centered and positioned at the top.
- Full name of the candidate in 4.5 mm 15 point's size font properly centered at the middle of the page.
- A 40 mm dia replica of the Institute emblem followed by the name of department, name of the Institute and the year of submission, each in a separate line and properly centered and located at the bottom of page.

3.2.1 Lettering

All lettering shall be embossed in gold.

3.2.2 Bound back

The degree, the name of the candidate and the year of submission shall also be embossed on the bound (side) in gold.

3.3 Blank Sheets

In addition to the white sheets (binding requirement) two white sheets shall be put at the beginning and the end of the thesis.

3.4 Title Sheet

This shall be the first printed page of the thesis and shall contain the submission statement: the Thesis/Dissertation/project Report submitted in partial fulfillment of the requirements of the Degree, Ph.D. /M.Tech. /B.Tech., the name and Roll No. of the candidate, name(s) of the Guide and Co-guide (s) (if any), Department, Institute and year of submission.

3.5 Abstract

The 500 word abstract shall highlight the important features of the thesis/dissertation/report and shall correspond to the electronic version to be submitted to the Library for inclusion in the website. The Abstract in the thesis, however, shall have two more parts, namely, the layout of the thesis giving a brief chapter wise description of the work and the key words.

3.6 Contents

The contents shall follow the Abstract and shall enlist the titles of the chapters, section and subsection using decimal notation, as in the text, with corresponding page number against them, flushed to the right.

3.6.1 List of Figures and Tables

Two separate lists of Figure captions and Table titles along with their numbers and corresponding page numbers against them shall follow the Contents.

3.8 Abbreviation Notation and Nomenclature

A complete and comprehensive list of all abbreviations, notations and nomenclature including Greek alphabets with subscripts and superscripts shall be provided after the list of tables and figures.(As far as possible, generally accepted symbols and notation should be used).

3.9 A Declaration of Academic Honesty and Integrity

A declaration of Academic honesty and integrity is required to be included along with every thesis/dissertation/report .

Title Sheet

(Title)

Submitted in partial fulfillment of the requirements

of the degree of

(Doctor of Philosophy/Master of Technology/ Bachelor of Technology)

by

(Name of the Student)

(Roll No. _____)

Guide (s):



OR



OR



(Name of the Department/School/Interdisciplinary Programme)

NAME OF INSTITUTE / UNIVERSITY

(Year)

CERTIFICATE

This is to certify that the dissertation work titled “<Name of Project>” is submitted by <Name of Student> bearing registration Number <I. D. Number> to the School of Mechanical and Building Sciences of the VIT University, Vellore and ARAI Academy, The Automotive Research Association of India, Pune, in partial fulfilment of the requirements for the degree of **Masters of Technology in Automotive Engineering**. This is a bonafide work carried out at <Name of company where project work done> by him under our supervision. The contents of this dissertation, in full or in parts have not been submitted to any other institute or university for the award of any degree.

<Name of Company Guide>
<Designation>
<Department>

<Name of ARAI Guide> (if any)
<Designation>
<Department>
The Automotive Research Association of
India

<Name of VIT Guide>
<Designation>
School of Mechanical and Building
Science
VIT University

NAME, DESIGNATION AND AFFILIATION
OF ADDITIONAL GUIDE
IF ANY

Dr. K. C. Vora
Sr. Dy. Director & Head,
ARAI Academy,
The Automotive Research Association of
India

Internal Examiner

External Examiner

1. _____

2. _____

Date of Submission: dd/mm/yyyy

DECLARATION

I declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

(Signature)

(Name of the student)

(Roll No.)

Date: _____

ACKNOWLEDGEMENT

<Start you message here>

ABSTRACT

< Project Abstract, limited to **ONE PAGE**>

PROJECT EXECUTIVE SUMMARY

< Put an extended description of entire project work with all finding and conclusions, limited to TWO **pages**. It may also contain main figures/graphs supporting your claims and discussion >

LIST OF FIGURES

< List of all the figures in the report and corresponding page numbers >

Fig. No.	Name of the figure	Page. No.

LIST OF TABLES

<List of all the Tables in the report and corresponding page numbers>

Table No.	Name of the table	Page. No.

ABBREVIATIONS

16. SAE Technical Paper Format & Guidelines

2015-01-XXXX

Type the Title of your Paper Here

Author, co-author (Do NOT enter this information. It will be pulled from participant tab in MyTechZone)

Affiliation (Do NOT enter this information. It will be pulled from participant tab in MyTechZone)

Copyright © 2015 SAE International

Abstract

Abstract MUST be no more than 250 words. The paper is the authoritative source for the abstract. Footnotes, figures and tables should not be included in the title or abstract.

This template is merely a guide to aid the author in submitting the text of their paper. The final published paper will NOT look exactly as the author submitted.

The manuscript elements have been formatted to the SAE Technical Paper Style Guide which can be used as an additional resource and can be found on the SAE website where this template is located.

Remember to use the Technical Paper Checklist also found at on the SAE website where this template is located before submitting your paper. This will ensure that all steps have been completed and are correct.

This template should be printed as a reference and all text beginning after the abstract heading deleted before beginning use.

Introduction

The [Head1] style is a Level 1 heading. It has been applied to the "Abstract" and "Introduction" headings. A [Head1] is Arial, 12 point, initial caps, bold. [Normal] style text and other levels of headings [Head2], [Head3], and [Head4] should be used to structure the content within any given section.

First Heading of Body

The body of the paper should include detailed and structured description of the work performed, including (as appropriate) methodology, assumptions, hardware, observations, analysis, and a comparison of results with prior work. The information presented must be self-contained (in the sense that thereader is not assumed to have read prior papers) and provide an appropriate level of detail for the intended audience. Define all terms at first usage and apply them consistently.

The body section is not entitled "Body". Rather it comprises multiple sections and subsections titled using topical headings in a four-level structure. Template styles [Head1] through [Head4] are used to tag and format titles of the different levels. No specific heading titles are mandated, but common examples include Methods, Results, and

Discussion. The [Normal] style tag is used for paragraph text. Figures, tables, and equations fall under the body section. Found in this template are examples of a figure, a table, and equations (which must be kept to 3.5" wide).

Head 2 Example

A [Head 2] style tag applied to the heading above is Arial, 11 point, initial caps, bold, italic. The [Normal] style tag should be used for paragraph text which is Arial, 9 point, regular.

Head 3 Example

A [Head3] style tag applied to the heading above is Arial, 10 point, initial caps, bold. The [Normal] style tag should be used for paragraph text which is Arial, 9 point, regular.

Head 4 Example

A [Head4] style tag applied to the heading above is Arial, 9 point, initial caps, bold, italic. The [Normal] style tag should be used for paragraph text which is Arial, 9 point, regular.

Table 1. This is an example of a table and table title. For tables, the recommended size is 3.5 inches. Table titles are Arial, 8 point, SAE Blue and are placed above the table. The Normal Table Text style tag should be applied to the table text.

Displaced volume	1966 cc
Stroke	154 mm
Bore	127.5 mm
Connecting Rod	255 mm
Compression ratio	14.3:1
Number of Valves	4
Exhaust Valve Open	34° BBDC @ 0.15 mm lift
Exhaust Valve Close	6° BTDC @ 0.15 mm lift
Inlet Valve Open	2° BTDC @ 0.15 mm lift



Figure 1. Example of a figure and figure caption. The sample figure has been sized to 3.5 inches wide, which is the recommended size. Captions for figures are Arial, 8 point, SAE Blue and are placed below the figure.

1. This is an example of an ordered list. When creating this type of list do not enclose number or letter in parenthesis i.e. (1) or (a). Instead number as shown in this example.

Shown are examples of equations. All equations wider than 3.5 inches must be wrapped to the next line as shown in these equations.

$$\frac{d\lambda}{dt} = \left[\frac{\sqrt{1 + 161 \left(\frac{x}{x^+}\right)^2} - 12}{2(A/F)_{st}} - \frac{\sqrt{1 + 161 \left(\frac{x_{prev}}{x^+}\right)^2} - 1}{2(A/F)_{st}} \right] (1 - BG F_{st}) \cdot \frac{12}{(t - t_{prev})} \quad (1)$$

$$\Delta K_{aero_f}(0) = -\frac{1}{2} \frac{\partial K_f}{\partial W_f} L_{aero_f} + \frac{1}{2l} \left(l_r \frac{\partial F_{aero_y}}{\partial \beta} + \frac{\partial M_{aero_z}}{\partial \beta} \right) \left(\frac{l_f}{l_r K_r} - \frac{l}{mV^2} \right) K_f$$

$$\Delta K_{aero_r}(0) = -\frac{1}{2} \frac{\partial K_r}{\partial W_r} L_{aero_r} + \frac{1}{2l} \left(l_f \frac{\partial F_{aero_y}}{\partial \beta} - \frac{\partial M_{aero_z}}{\partial \beta} \right) \left(\frac{1}{K_r} - \frac{l}{mV^2} \frac{l_f}{l_r} \right) K_r$$

(2)

Summary/Conclusions

If the Summary/Conclusions section is not wanted, delete this heading and text.

References

1. SAE uses the Chicago Manual of Style in formatting references. In the text of the paper the citations are numerically identified using square brackets [1]. Up to four authors should be listed; more than four, et al. should be used after the fourth author is listed. Refer to the SAE Technical Paper Style Guide for

formatting of different types of references. Apply the List-Ordered-Numeric style tag to format references. Below are some examples.

2. Guo, Q. and Liu, B., "Simulation and Physical Measurement of Seamless Passenger Airbag Door Deployment," SAE Technical Paper 2012-01-0082, 2012, doi:[10.4271/2012-01-0082](https://doi.org/10.4271/2012-01-0082).
3. Kunkel, S., Zimmer, T., and Wachtmeister, G., "Friction Analysis of Oil Control Rings during Running-In," SAE Technical Paper 2011-01-2428, 2012, doi:[10.4271/2011-01-2428](https://doi.org/10.4271/2011-01-2428).
4. Morgan, R., Scullion, P., Nix, L., Kan, C. et al., "Injury Risk Investigation of the Small, Rear-seat Occupant in Side Impact," SAE Technical Paper 2012-01-0092, 2012, doi:[10.4271/2012-01-0092](https://doi.org/10.4271/2012-01-0092).
5. Kimura, Y. and Murakami, M., "Analysis of Piston Friction - Effects of Cylinder Bore Temperature Distribution and Oil Temperature," *SAE Int. J. Fuels Lubr.* 5(1):1-6, 2012, doi:[10.4271/2011-01-1746](https://doi.org/10.4271/2011-01-1746).
6. SAE International Surface Vehicle Recommended Practice, "Laboratory Measurement of the Composite Vibration Damping Properties of Material on a Supporting Steel Bar," SAE Standard J1637, Rev. Aug. 2007.

Contact Information

If a Contact Information section is not wanted, delete this heading and text.

Acknowledgments

If the Acknowledgments section is not wanted, delete this heading and text.

Definitions/Abbreviations

SA	sample abbreviations
UBT	Use borderless table ≤ 3.5 inches wide.
test vector	Don't capitalize term unless an acronym or proper noun.

Appendix

The Appendix is one-column. If you have an appendix in your document, you will need to insert a continuous page break and set the columns to one. If you do not have an appendix in your document, this paragraph can be ignored and the heading and section break deleted.



SAE International Technical Paper Style Guide

Version: 3.3-September, 2014

Introduction

The purpose of this Style Guide is to facilitate the writing of high quality SAE technical papers. In general, the guidelines presented here follow the advice of the Chicago Manual of Style, and in the case of missing or unclear guidelines, defer to that manual.

A companion document, the SAE Technical Paper Template¹ provides a starting point for writing SAE papers. The SAE Technical Paper Template is to be used for submission of your draft and final manuscripts. The purpose of the template is to guide authors in applying styles to identify or tag each of the document's elements (an element is defined as anything that needs a style tag applied such as a heading, figure, equation, table title, etc.) as required for electronic publishing. In addition, correctly applying the style tags creates a document suitably formatted for the paper review process.

With SAE's electronic publishing process, final formatting of technical papers is the exclusive responsibility of the publisher (SAE). SAE will publish all papers in the classic two column format. SAE's electronic publishing strategy reflects the dominant popularity of Microsoft Word software.

This Style Guide is divided into the following sections:

- [Section 1](#), General Guidelines, presents instructions that apply to the entire technical paper.
- [Section 2](#), Sections of an SAE Technical Paper, identifies the mandatory and optional sections that make up an SAE technical paper and provides instructions for each.
- [Section 3](#), Other Elements of an SAE Technical Paper, covers figures, equations, and more.
- [Section 4](#), Styles of the SAE Technical Paper Template, lists the Template styles that are used to tag and format each of the technical paper sections.
- [Appendix A](#), Sample References, contains a table of sample references for a range of source types.
- [Appendix B](#), Color Guidelines.

This Style Guide primarily covers the writing process. Details concerning the next step—the submission and approval process—can be found at <http://volunteers.sae.org/#authors>. The site includes an author checklist and tutorial, a list of Frequently Asked Questions, the Technical Paper Template, and this Style Guide. Frequent updates are likely, so please always check for new versions of these files when beginning a new technical paper. Questions and comments can be emailed to techpaper@sae.org.

¹ Two versions of the Template are provided: one is a Word 2003 file and the other is a Word 2007 file. Both versions are Word for Windows files, but they also can be opened on Macintosh machines for those using Word 2004 or Word 2008. Find the Templates at <http://volunteers.sae.org/#authors>.

1 General Guidelines

1.1 Quality Standards	<p>All SAE papers should be in review-ready form at the time of submission. The formal review process will determine paper publishability based on the following six Judgment Bases (further details at http://volunteers.sae.org/volunteers/judgmentbases.htm):</p> <ul style="list-style-type: none">• Quality of data and validity of analytical techniques;• Long-term reference value;• Technically new, innovative, or a constructive review;• Professional integrity;• Clear presentation;• Soundness of conclusions. <p>Papers should be written in an objective, formal, and impersonal style. The body of the text should be organized to reflect natural groupings of information into categories which flow from one to the other. Good headings will naturally evolve from a good technical paper outline.</p> <p>SAE does not restrict the number of pages for a technical paper, although the average technical paper has fewer than 12 pages in two-column format. The length of any technical paper should be sufficient to explain the methodology used to obtain the supporting evidence, and sufficient to prove all stated conclusions. The organizer has the authority to instruct the author on the content and quantity of information needed.</p>
1.2 Language Considerations	<p>Standard rules for written English should be followed in the text of the paper. U.S. or UK rules are acceptable, but either must be applied consistently, not mixed. Standard grammar will ensure that the paper is easily understood by a wide audience including those who do not use English as a primary language. Spell-check and grammar-check software can be used to inspect the written text but is not a substitute for a thorough review. Reviews by non-authors fluent in English is one way to check the grammar in the paper, but must be completed prior to the SAE peer-review process. (Official reviewers and organizers cannot be expected to provide this service.) The complexity of the technical subject is never an excuse to avoid following these guidelines. Also, an author's difficulty with technical writing should not be a reason to relax these standards. A good question to ask is, "Would a person unfamiliar with this subject be able to read the paper and understand the general theme?"</p>

1.3 Examples of Unacceptable Text	<p>Editorial comments, such as: “The jet aircraft costs \$5,500,000. This is a substantial sum of money despite the casualness with which million-dollar sums are bandied about these days.”</p> <p>Personal history: “The first military pre-stressing problem that came to my desk was in 1938 in connection with a request from the Army that we increase the displacement of its truck engines.”</p> <p>Unsubstantiated sweeping statements: “I believe I can safely say that practically every failure of a new or retreaded jet tire, where the cause could be ascertained, has proved to be the result of a manufacturing error.”</p> <p>Commercialism or advertising: “Tests on XYZ Corporation’s SuperProduct 1000 have demonstrated the superior quality of our product.”</p>
1.4 Units of Measure	<p>The long-term goal for SAE is international communication with minimal effort and confusion. Therefore, the use of S.I. units in all technical publications and presentations is preferred. SAE International will strive toward universal usage of S.I. units and will encourage their use whenever appropriate.</p> <p>However, SAE International also recognizes that sectors of the mobility market do not yet use S.I. units because of tradition, regulatory language, or other reasons. Mandating the use of S.I. units in these cases will impede rather than facilitate technical communication. Therefore, it is the policy to allow non-S.I. units and dual dimensioning where communication will be enhanced. This shall not be viewed as an avenue to circumvent the long-term goal of 100 percent S.I. usage.</p>

<p>1.5 Tagging/Formatting</p>	<p>As mentioned in the Introduction, the SAE Technical Paper Template provides styles to be applied to each element of the technical paper. Applying a style both tags (electronically identifies) and formats the element. Although authors may wish to adjust font and layout characteristics to their liking, this will have no effect on the appearance of the final published paper since final formatting is controlled by SAE's electronic publishing process. SAE will publish all papers in the classic two-column format.</p> <p>Details of which SAE Technical Paper Template style to apply to which paper element are presented in the Style Guide, Section 3. Throughout this Guide, square brackets are used to identify Template styles, e.g., [Head1] and [Normal]. For more information about using Microsoft Word styles, please refer to instructions available within the application or at Microsoft internet sites: http://www.microsoft.com/mac/videos.msp for Macintosh Word 2008 and http://office.microsoft.com/en-us/word/HA102308821033.aspx for Windows Word 2007. Instructions for older Word versions are available as well at Microsoft sites. The use of style tags is useful for two primary reasons. First, a manuscript with style tags applied is easier for a reviewer to follow the flow of the paper during the review process. Second, style tags also assist during the publishing process.</p>
<p>1.6 Review Process</p>	<p>The review process is a critical part of the SAE technical paper approval process. Reviewers provide constructive feedback to the author so that the paper will have greater acceptance when published. Authors are required to respond to reviewer comments and/or modify the paper as necessary to address reviewer concerns. The final acceptance of the paper is at the discretion of the session organizers, who take into account reviewer recommendations both before and after revisions. Further details of the review process are available in the Author Orientation Module at http://volunteers.sae.org/#authors.</p>
<p>1.7 Copyright Permission</p>	<p>If an author uses material that is directly taken from another source (figures, tables, images, text, facts, equations, etc.), even if the source is another SAE International publication, the author is required to obtain permission to use the material. A reference to the original source of the information must be indicated at the end of the line of text in which the reference is made by sequentially numbering each instance. This (reference) number correlates to complete information about the original source which will be included in the References section at the end of the paper. In addition, images used with permission must</p>

	<p>include the copyright statement as provided by the copyright owner as part of the caption and must also include a reference number. A Copyright Permission Form for this purpose is located at http://volunteers.sae.org/authors/copyrightpermission.pdf.</p>
<p>1.8 Submitted Files</p>	<p>Another point to remember before you even begin your paper is to always go to the SAE website at http://volunteers.sae.org/#authors to download the most recent updated Word template. Please do NOT make changes to the existing style tags or create new tags. Although you may wish to adjust font and layout characteristics to your liking this, however, will have no effect on the appearance of the final published paper since final formatting is controlled by SAE’s electronic publishing process.</p> <p>You will be required to upload both your source file (i.e. Word, LaTeX) and the created PDF in MyTechZone. It is critical that your PDF is well proofed because this file is sent to the conversion vendor to create the XML. Also, be sure that your source file and PDF are identical.</p>

2 Sections of an SAE Technical Paper

SAE Technical Papers contain the mandatory and optional sections listed in Table 1. The order in the table is the same as the order of sections in the paper. For each section, the table indicates whether it is mandatory, and what Template style should be applied to text in that section. Also included are additional instructions for each section. Further information about the use of Template styles is presented in the Style Guide, Section 5.

Note that all sections except the first 3 include both a *heading* plus text. For example, the 5th section begins with the heading *Introduction* followed by the introductory text. To tag (and format) the section *headings*, apply the [Head1] style. Certain sections (Introduction, Body, Summary/Conclusions, and Appendices) may be structured with subsections—for those, apply [Head2] through [Head4] styles as appropriate. Note also that the Body section does not use the term *Body* as a top-level heading, but rather uses appropriate topical titles for all levels of headings. Finally, it is important to note that the styles to be applied to section *text* vary from section to section—Table 1 specifies the proper text styles to use. For a visual example of the proper layout of paper sections, examine the SAE Template document.

Please note this important detail concerning the paper submission process: Do not add author and affiliation areas when submitting your final manuscripts as this information will be pulled from MyTechZone during the publishing process. Therefore it is important that the information on the participant tab in MyTechZone be correct when submitting the final manuscript. For purposes of final publication, MyTechZone is considered the authoritative source for the author/co-authors, affiliations, and author order. In contrast, the submitted paper is the authoritative source for the title and abstract.

ARAI ACADEMY

Table 1 – Technical Paper Sections, Text Style and Instructions

Order	Section Name	Mandatory	Text Style	Instructions
1	Paper Number	Yes	[Paper Number]	Papers reviewed and accepted are assigned a paper number, e.g. 2013-01-0661. This final paper number can be retrieved from MyTechZone once the paper has been officially approved for publication by the session organizer. The website will also send an automated email that includes the final paper number. Affix this number to the top of the first page of the paper and apply the [Paper Number] style.
2	Title	Yes	[Title]	The paper title should accurately but briefly describe the focus of the work presented. All words should be capitalized except: <ul style="list-style-type: none"> • articles (a, an, the) • prepositions (under, below, among, between, etc.) (with exceptions such as Look <u>U</u>p, Turn <u>D</u>own, <u>O</u>n Button) • conjunctions (and, but, for, or, nor) • the word “to” not only as a preposition, but as part of an infinitive (to Manufacture, to Build, etc.) The title cannot contain footnotes.
3	Author List (including order) Affiliation	Yes	[Author] [Affiliation]	Do NOT enter information into these sections. This information will be pulled from the Participant Tab in MyTechZone. Please ensure MyTechZone contains the current author information including affiliation(s) and author order.
4	Abstract	Yes	[Normal]	The purpose of the abstract is to enable potential readers to determine whether or not the paper contains material of interest to them. It should include what new data, conclusions, or perspective the reader will find, followed by a brief statement of the significance of this new material. The abstract should be self-contained and

Table 1 – Technical Paper Sections, Text Style and Instructions

Order	Section Name	Mandatory	Text Style	Instructions
				coherently independent of the rest of the document. The abstract MUST be no more than 250 words and cannot contain footnotes.
5	Introduction	Yes	[Normal]	<p>A good introduction:</p> <ul style="list-style-type: none"> • describes the overall issue being addressed and why it is important; • states the scope and goals of the work; • provides background material (including a survey of relevant prior work) to bring the intended audience up to speed; • orients the reader by outlining the organizational structure of the paper.
6	Body (This is the main body of the paper covering measurements, analysis, findings but there is no section specifically titled “Body”.)	Yes	[Normal]	<p>The body of the paper should include a detailed and structured description of the work performed, including (as appropriate) methodology, assumptions, hardware, observations, analysis, and a comparison of results with prior work. The information presented must be self-contained (in the sense that the reader is not assumed to have read prior papers) and provide an appropriate level of detail for the intended audience. Define all terms at first usage and apply them consistently.</p> <p>The body section is not entitled <i>Body</i>. Rather it comprises multiple sections and subsections titled using topical headings in a four-level structure. Template styles [Head1] through [Head4] are used to tag and format titles of the different levels. No specific heading titles are mandated, but common examples include Methods, Results, and Discussion.</p>
7	Summary/ Conclusions	Yes	[Normal]	<p>The summary and/or conclusions are counterparts to the introductory statements: there was a specific problem, an investigation was conducted, these results were obtained, and this is what it means. The section may also suggest future follow-up work. Every technical paper should have a summary, but the nature of the paper may make conclusions inappropriate</p>
8	References	Yes	[List-	Literature references corresponding to

Table 1 – Technical Paper Sections, Text Style and Instructions				
Order	Section Name	Mandatory	Text Style	Instructions
			ordered]	citations in the body of the paper are assembled in the References section in numerical order and tagged/formatted with the [List-Ordered] style. Rules for referencing different types of sources are presented in the Style Guide, Appendix A. Instructions for inserting citations into the body of the paper are provided in the Style Guide, Section 3.
9	Contact Information	No	[Normal]	Contact details for the <i>corresponding author</i> may include mailing address, email address, and/or telephone number (whichever is deemed appropriate).
10	Acknowledgements	No	[Normal]	Credit can be given here to non-authors who contributed to the work.
11	Definitions/ Abbreviations	No	[Definition Term] and [Definition]	If it will assist the reader, include a list of terms and abbreviations with definitions. The term or abbreviation is tagged with the [Definition Term] style, and the definition text is tagged with the [Definition] style. Do not capitalize the term unless it is an acronym or proper noun.
12	Appendices	No	[Normal]	<p>Any bulk of information that interrupts the flow of thought in the paper would best be placed in an appendix. Examples include large tables, large images, or long mathematical derivations. The reactions of reviewers can be a guide to what interferes with the reader's easy grasp of the paper. Multiple appendices can be included and are titled sequentially as follows: <i>Appendix A: Title, Appendix B: Title, etc.</i></p> <p>Appendices can be structured using the same subsection headings and formatting used in other sections of the paper. When labeling figures, tables and equations within an appendix, restart the numbering in each appendix and prefix the number with the letter of the appendix, e.g., Figure A7 or Eq. (A1). The appendix is one-column.</p>

3 Other Elements of an SAE Technical Paper

3.1 Figures

Controlling the flow of text around figures is now the responsibility of SAE (see Style Guide Section 1). Authors should insert figures and captions inline at the end of the paragraph where the figure(s) is referenced, in a way that enhances readability for the reviewers. The author may also choose to position images at the end of the paper with appropriate captions. Figures are tagged/formatted by applying the [Figure] style of the Template.



Figure 1. This is an example of a figure and figure caption. The sample figure has been sized to 3.5-inches wide which is the recommended size. The caption is 8 point SAE Blue font. The figure and caption is left justified.

SAE technical papers follow the publishing standard for a two-column format. Authors are urged to size their figures for a two-column width (3 ½ -inches). Resolution of the images should be at least 300 dots-per-inch at the intended publication size. Any text included in figures should be 8 point.

Each figure should consist of only a single component. If a figure with multiple images is desired, use a graphics/image editor to combine the images, plus all overlays, labels, or notes, into a single image or file before inserting into the paper. This will ensure that components of a figure do not wander when published in different formats. Word's Insert Picture command can be used to insert figures, but make sure to set the Text Wrapping style to *Inline with Text*. Further instructions are available by searching in Microsoft Word Help for *inline picture*.

Each figure must be properly labeled with a caption placed on the line following the figure and tagged/formatted with the [Figure Caption] style. **Do not use Word's Insert TextBox tool. Do not include the caption within the figure/image.** Consecutive figure numbers precede the captions.

SAE can accept many electronic figure formats. Vector-based images (EPS, SVG, WMF) and pixel-based images (TIF, JPG, PNG, BMP, GIF) at a minimum resolution of 300 DPI (dots per inch) are acceptable. SAE recommends that authors provide high quality images whenever available (original image resolution and dimensions). SAE will convert these as necessary for online presentation.

The use of color in figures is encouraged since readers with access to SAE's online publications will be able to view color content and download color PDFs. SAE has refreshed our visual identity to reinforce our position as a global leader. To visually express our brand correctly and

consistently we ask that when creating your color graphics that you adhere to our color palette which is described in Appendix B.

Keep in mind that in SAE printed publications, papers will appear in grayscale. For this reason, please be sure that selected colors are distinguishable when converted to grayscale during printing. Alternatively, employ distinct symbols or labels to differentiate data.

3.2 Tables

Tables have a title rather than a caption, positioned above the table. The title is prefaced by a table number (e.g., Table 1) and is tagged/formatted using the [Table Title] style. The table itself is formatted by applying one of Word's Table Styles. Preferred styles include the following: [Borderless Table], [Borderless Table Center], [Table Grid], and [Table Grid Center]. Borderless styles are useful for situations requiring text alignment. Text within a table should be 7 point.

Table 1. This is an example of a table and table title. For tables, the recommended size is 3.5 inches. The title is 8 point SAE Blue font. The table and table title are left justified.

Displaced volume	1966 cc
Stroke	154 mm
Bore	127.5 mm
Connecting Rod	255 mm
Compression ratio	14.3:1
Number of Valves	4
Exhaust Valve Open	34° BBDC @ 0.15 mm lift
Exhaust Valve Close	6° BTDC @ 0.15 mm lift
Inlet Valve Open	2° BTDC @ 0.15 mm lift

SAE will publish in the classic two-column format. Authors are encouraged to size tables to match the two-column width (3 ½ -inches). A table wider than 7 inches can be attached as an Appendix.

Do not use *tabs* in a table because they will not be retained when the content is converted to XML. Use borderless tables to properly align text when necessary. **Do not wrap text around tables or images.** If call outs, text boxes, and/or image overlays are necessary in the table, use an image/graphics editor to combine all elements with the table and save everything as a single image before inserting into the paper.

3.3 Equations

The preferred method of creating equations is MicroSoft Word Equation Editor. Cutting an equation from an alternative equation editor and then pasting as a graphic is also permissible, but has the disadvantage of disabling future electronic publishing capabilities. A final option is to create and paste MathML equations (using MathType for example), an approach that retains all the benefits of XML objects.

Shown below are examples of equations. **All equations wider than 3.5 inches must be wrapped to the next line as shown in equation (2).**

$$\frac{d\lambda}{dt} = \left[\frac{\sqrt{1+161\left(\frac{x}{x^+}\right)^2} - 12}{2(A/F)_{st}} - \frac{\sqrt{1+161\left(\frac{x_{prev}}{x^+}\right)^2} - 1}{2(A/F)_{st}} \right] (1 - BGF_{st}) \cdot \frac{12}{(t-t_{prev})} \quad (1)$$

$$\begin{aligned}\Delta K_{aero_f}(0) &= -\frac{1}{2} \frac{\partial K_f}{\partial W_f} L_{aero_f} + \dots \\ &\quad + \frac{1}{2l} \left(l_r \frac{\partial F_{aero_y}}{\partial \beta} + \frac{\partial M_{aero_z}}{\partial \beta} \right) \left(\frac{l_f}{l_r K_r} - \frac{l}{mV^2} \right) K_f \\ \Delta K_{aero_r}(0) &= -\frac{1}{2} \frac{\partial K_r}{\partial W_r} L_{aero_r} + \dots \\ &\quad + \frac{1}{2l} \left(l_f \frac{\partial F_{aero_y}}{\partial \beta} - \frac{\partial M_{aero_z}}{\partial \beta} \right) \left(\frac{1}{K_r} - \frac{l}{mV^2} \frac{l_r}{l_f} \right) K_r\end{aligned}\tag{2}$$

If necessary, break long equations before an operational sign or a major bracket. If it is necessary to break an equation do so at an operational sign or major bracket followed by three dots (ellipsis). On the second line of the equation begin by repeating the same operator that you broke after and then align the first and second lines by aligning the first character of the second line. Enter equations on separate lines and apply the [Equation] style which will center the equations.

Number equations consecutively with the number enclosed in parentheses and following the equation on the same line (right justifying the numbers is not required). Equation numbering continues across the main body sections without restarting, except in appendices (see Style Guide, Section 3). Note that simple equations may be incorporated into the text without numbering.

References to the equations can be abbreviated as follows (except at the beginning of a sentence): Eq. (7). If possible, the typeface and type style of symbols placed in the text should match those of the equations (achieved by applying e.g., [Symbol] or [Emphasis-Italic] styles).

3.4 Citations

Citing other work is the standard method of authenticating data, crediting other workers in the field, and guiding the reader to supplementary information. Authors are strongly encouraged to recognize and cite relevant publications outside of their own work and institutions to create more comprehensive manuscripts with greater long-term reference value. Authors should avoid referencing material posted on the internet, unless the material is truly archival, as is the case for most online journals.

In the body of the report, citations are numerically identified using square brackets inserted in the text, as in [1, 2] or [1,2,3]. They are numbered sequentially in the order of first appearance. The citations are resolved as literature references in the References section of the paper, as described in Style Guide Section 2, Table 1.

3.5 Page Numbers

Insertion of temporary page numbers in the footer is helpful during the review process. Please remove page numbers before submitting your final manuscript.

3.6 Supplementary Electronic Content

SAE recognizes the opportunity to include alternative electronic content to support and enhance SAE online technical publications. The list of acceptable content types is evolving, but initially SAE will accept audio/video files in MPG format and Microsoft Excel spreadsheets in native format. For future consideration of other multimedia file types, please send suggestions to techpaper@sae.org.

Note that binary computer programs are not currently acceptable as supplementary content. Note however that text versions of such programs can be included as an attachment. Apply the [Monotype] style to control spacing and character alignment.

All supplementary content should be submitted as an attachment using Microsoft Word's Insert Object tool to insert supplementary files at the end of the technical paper. Be sure to select the *Display as Icon* checkbox. Supplementary attachments require the same peer review as the paper contents. Be sensitive to the file size of the attachment—attach *compressed* files whenever possible.

Supplementary electronic content will not be available in SAE print products and will not exist as independent objects with their own DOI (Digital Object Identifiers). Supplementary electronic content should be chosen only when the material cannot be represented in the paper.

4 Styles of the SAE Technical Paper Template

Table 2 presents all the preset styles of the SAE Template and offers instructions for their application when creating an SAE technical paper.

Table 2: SAE Template Styles	
Template Styles	Instructions
[Clear All]	Apply style to selected text to remove formatting and revert back to [Normal] style.
[Affiliation]	Apply style to the author affiliation text.
[Author]	Apply style to the author list.
[Center]	Apply style to center content.
[Definition Term]	Apply style to the definition terms in the Definitions/Abbreviations section of the paper. See also: [Definition] style.
[Definition]	Apply style to the definitions in the Definitions/Abbreviations section. See also: [Definition Term] style.
[Emphasis-Bold]	Apply style to make text bold.
[Emphasis-Bold-Italic]	Apply style to make text bold and italicized
[Emphasis-Italic]	Apply style to make text italicized.
[Emphasis-Underline]	Apply style to underline text.
[Equation]	Apply style to each equation line (including the equation number). See also: Equations in Style Guide Section 3.3.
[Figure]	Apply style to each figure to center and align it with the figure caption. See also: [Figure Caption] style.
[Figure Caption]	Apply style to center (and tag) each figure caption. As stated in Style Guide Section 3.1, figure captions must be separate from the figures (not combined) and must not be inserted using Word's Insert Text Box or Insert Caption tools.

Table 2: SAE Template Styles

Template Styles	Instructions
[Footnote Reference]	Apply style to the footnote reference <i>numbers</i> , both in the paper body and in the actual footnote. Footnotes may be inserted using Word's Insert Footnote tool which takes care of sequential numbering as well as automatic application of the two footnote styles, [Footnote Reference] and [Footnote Text].
[Footnote Text]	Apply style to the footnote <i>text</i> (but not to the footnote reference number to the left of the text). Footnotes may be inserted using Word's Insert Footnote tool which takes care of sequential numbering as well as automatic application of the two footnote styles, [Footnote Reference] and [Footnote Text].
[Head1]	Apply style to all first level headings (as specified in Style Guide Section 2). Head 1 is 12 pt., initial Caps, Bold
[Head2]	Apply style to all second level headings. Head 2 is 11 pt., Initial Caps, Bold Italic
[Head3]	Apply style to all third level headings. Head 3 is 10 pt., Initial Caps, Bold
[Head4]	Apply style to all fourth level headings. Head 4 is 9 pt., Initial Caps, Bold, Italic
[List-Ordered-Numeric]	Apply style to text to create a numbered list. This style is also applied to the Reference section. Please avoid nested (multilevel) lists as they are not currently supported by the electronic publishing standards SAE is using.
[List-Unordered]	Apply style to create a bulleted list.
[Monotype]	Apply style to make text monospaced. This style is commonly used to display computer programs or their output.
[Normal]	The default font, used by the [Normal] style, is 9 point Regular. Apply [Normal] style to any text not assigned another style. When text is pasted into the paper from another document, apply the [Normal] style. Once all text is in [Normal] style, apply appropriate heading, emphasis, list styles, etc.
[Normal Table Text]	Apply style to format text in a table. This will apply the required font size to the text.
[Paper Number]	Apply style to the SAE Paper Number.
[Subscript-Italic]	Apply style to make text subscripted and italicized.
[Subscript]	Apply style to make text subscripted.
[Superscript-Italic]	Apply style to make text superscripted and italicized.
[Superscript]	Apply style to make text superscripted.
[Symbol]	Apply style to convert text to the Symbol font. A selection of symbols is available in the TimesNewRoman character set—use that font preferentially if it contains the desired symbol. Note also that Word's Insert Symbol tool can be used to place symbol characters, but be sure to select only Symbol or TimesNewRoman font in the process. Therefore, this style tag only needs to be applied if the symbol you want is not available within the TimesNewRoman font.
[Table Title]	Apply style to the table title text. See also: Style Guide Section 3.2.

Table 2: SAE Template Styles	
Template Styles	Instructions
[Table Note Reference]	Apply style to the reference <i>number</i> of any reference note associated with a table. As with the [Footnote Reference] style, the [Table Note Reference] style is applied to the reference number positioned in the table body as well as to the reference number to the left of the reference text positioned below the table. See also: Style Guide, Section 4.
[Table Note Text]	Apply style to any reference <i>note</i> associated with a table. See also: Style Guide, Section 3.4.
[Title]	Apply style to the paper title.

Appendix A: Sample References

SAE's publications team is committed to listening to and acting upon the concerns of our contributors. Over the past few years, we've received feedback from technical paper authors who have expressed a need and desire of being cited in recognized impactful journals— this has led to SAE's publication of scholarly journals. One important aspect of our journals' evaluation for indexing and impact factor is to have proper and consistent citations. We continue to improve the consistency and proper citation of SAE publications, and we provide author tools for ease of downloading these citations for inclusion in future works.

It is our intent to publish quality, impactful, highly cited technical research; to that end, we encourage you to review and follow the rules and guidelines set forth in the reference listing.

Table A1 provides samples to illustrate the proper presentation of references for a variety of sources. If available, please include the DOI (Digital Object Identifier) for **all** online references—they will enable readers of online publications to locate reference material efficiently. To find the DOI associated with a reference, use the free search feature at <http://www.crossref.org/guestquery/> (All SAE published papers are assigned a DOI – doi:10.4271/20xx-01-xxxx).

Properly formatted citations for SAE Technical papers can be found and copied from the SAE website at www.sae.org. Enter the paper number in the Search field to locate the paper, then click on title to be directed to the page with the citation.

Table A1 - Reference formatting samples	
Reference type	Sample
SAE Technical Paper	Otsuki, S., Oie, T., and Ishida, K., "Hydrocarbons Speciation of Automotive Emissions Using High Speed Gas Chromatography," SAE Technical Paper 950513, 1995, doi: 10.4271/950513 .
Non-SAE Conference paper with no paper number or DOI	Saha, P., Pan, J., and Veen, J., "Thoughts Behind Developing a Small Reverberation Room-Based Sound Absorption Test Method for the Automotive Industry," presented at NOISE-CON 2008, USA, July 28-31, 2008.
SAE Journal article with DOI	Antanaitis, D., Monsere, P., and Riefe, M., "Brake System and Subsystem Design Considerations for Race Track and High Energy Usage Based on Fade Limits," <i>SAE Int. J. Passeng. Cars - Mech. Sys.</i> 1(1):689-708, 2008, doi: 10.4271/2008-01-0817 .
Non-SAE Journal article with DOI	Miles, P., Collin, R., Hildingsson, L., Hultqvist, A. et al., "Combined Measurements of Flow Structure, Partially Oxidized Fuel, and Soot in a High-Speed, Direct-Injection Diesel Engine," <i>Proceedings of the Combustion Institute</i> 31(2):2963-2970, 2007, doi: 10.1016/j.proci.2006.07.231 .
Presentation	Alger, T., "SwRI's HEDGE™ Concept – High-Efficiency Dilute Gasoline Engines for Automotive, Medium Duty, and Off-Road Applications," Panel Presentation at SAE International 2009 Powertrains, Fuels, and Lubricants Meeting, Nov. 2009.
Magazine articles	Veen, J., Pan, J., and Saha, P., "Standardized Test Procedures for Small Reverberation Room," <i>Sound and Vibration</i> : 18-20, Dec. 2005.

Table A1 - Reference formatting samples	
Reference type	Sample
Standards	SAE International Surface Vehicle Recommended Practice, "Laboratory Measurement of the Composite Vibration Damping Properties of Material on a Supporting Steel Bar," SAE Standard J1637, Rev. Aug. 2007.
Book	Richards, P., "Automotive Fuels Reference Book, Third Edition," (Warrendale, SAE International, 2014), 69-73, doi:10.4271/R-297. NOTE: If no doi is available insert ISBN number in its place.
Personal communication	Smith, R., General Motors Corporation, personal communication, Feb. 2007.
Patent	Wilkinson, J., "Nonlinear Resonant Circuit Devices," U.S. Patent 3,624,124, July 16, 1990.
Internet reference	SAE International, "UNS on the Web; Metals and Alloys in the Unified Numbering System," http://www.sae.org/uns , accessed Aug. 2009.
Thesis/Dissertation	Mathuria, P., "Transfer Path Analysis of Diesel Engine Noise Using Statistical Energy Analysis," Ph.D. thesis, Mechanical Engineering Department, Indian Institute of Technology, Bombay, 2000.
Software	Miller, M., The Interactive Tester (Version 4.0), Computer Software, Psytek Services, Westminster, CA, 1993.
CD-ROM	Acoustics Testing Laboratory of the NASA Glenn Research Center (Distributor), Auditory Demonstrations II: Challenges in Speech Communication and Music Listening, CD-ROM available from the NASA Glenn Research Center Acoustical Testing Laboratory 04 from http://acousticaltest.grc.nasa.gov , Dec. 2003.
Video	SAE International, "How Does SAE World Congress Enable Industry Networking and Relationship-Building?," SAE Video 10943, accessed Nov. 11, 2011.

Appendix B: Color Guidelines

COLOR

Color Palette

Our color palette is contemporary and vibrant, reflecting our energy and enthusiasm. It's a mix of warm and cool hues that work universally across our design system.

The palette consists of seven colors—two from our logo—supplemented by white, three grays and black.

These are the only colors used. Do not add colors to our palette.

Color-Pairing Strategy

Each color, whether warm or cool, has a dark variation and a lighter counterpart. They are generally paired together in this manner.

While our colors work harmoniously, pairings must be analogous, such as a yellow background used with an orange (or white) headline and subheads.

Non-analogous pairings should never be used, for instance, pairing a yellow background with green or blue text.

The lighter color is always used as the background color. This creates the correct staging color for the Supergraphic in its analogous color variation.

Color Palette



SAE Blue

SAE Dark Blue

SAE Light Green

SAE Dark Green



SAE Yellow

SAE Orange

SAE Red

White



SAE Light Gray

SAE Medium Gray

SAE Dark Gray

SAE Black

Color Pairings



SAE Blue

SAE Dark Blue

SAE Light Green

SAE Dark Green

SAE Yellow

SAE Orange

SAE Orange

SAE Red

SAE Light Gray

SAE Medium Gray

SAE Medium Gray SAE Dark Gray

ARAI ACADEMY













COLOR

Color Specifications

All colors in the SAE color palette have precise color references, shown in the specifications charts on this page.

Always use the exact color values listed, which correspond to the medium being employed. Don't use color references or values from files that have been converted automatically between color modes.

Some software programs don't always make color conversions that are equal to the specific color values listed in the palette specifications. Slight variances in color may occur when printed through different processes or reproduced in different media.

Color	Spot Color*	CMYK	RGB
 SAE Blue	Pantone 2925 C/U	86/8/0/0	1/160/233
 SAE Dark Blue	Pantone 301 C/U	100/60/4/19	0/81/149
 SAE Light Green	Pantone 361 C/U	69/0/97/0	46/177/53
 SAE Dark Green	Pantone 348 C/U	100/2/100/10	0/119/61
 SAE Yellow	Pantone 130 C/U	0/31/95/0	255/178/1
 SAE Orange	Pantone 158 C/U	0/62/95/0	234/113/37
 SAE Red	Pantone 485 C/U	0/95/100/0	220/41/30
 SAE Light Gray	Pantone Cool Gray 3 C/U	0/0/0/20	202/202/200
 SAE Medium Gray	Pantone Cool Gray 7 C/U	0/0/0/45	154/155/157
 SAE Dark Gray	Pantone Cool Gray 10 C/U	0/0/0/80	97/98/101
 White	NA	0/0/0/0	255/255/255
 SAE Black	Black C/U	0/0/0/100	0/0/0

*Pantone Colors

In lieu of the color(s) listed on this page, you may use the PANTONE® colors cited, the standards for which can be found in the current edition of the PANTONE® formula guide. The colors shown throughout these guidelines have not been evaluated by Pantone, Inc. for accuracy and may not match the PANTONE® Color Standards. Consult current PANTONE® Publications for accurate color. PANTONE® is the property of Pantone, Inc.

17. NOTES

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17. NOTES

A series of horizontal dashed lines for writing notes.