<Title of the Project Report >

Project Report Submitted in Partial Fulfilment of the Requirements for the Degree of

**Bachelor of Technology (Hons.)**

***in***

**<Computer Science and Engineering>**

*Submitted by*

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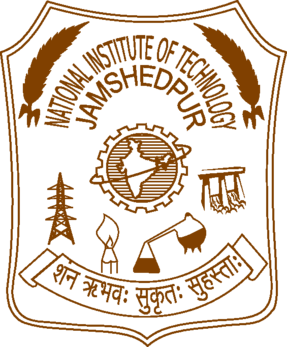
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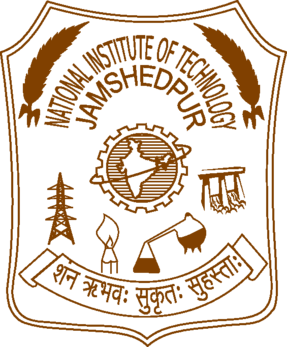
Department of Computer Science and Engineering

National Institute of Technology Jamshedpur

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CERTIFICATE

This is to certify that the report entitled “TITLE OF THE PROJECT” is a bonafide record of the Project done by ABCD (Roll No.: 20XXUGCSXXX), EFGH (Roll No.: 20XXUGCSXXX) and KLMN (Roll No.: 20XXUGCSXXX) under my supervision, in partial fulfillment of the requirements for the award of the degree of Bachelor of Technology (Hons.) in Computer Science and Engineering from National Institute of Technology Jamshedpur.

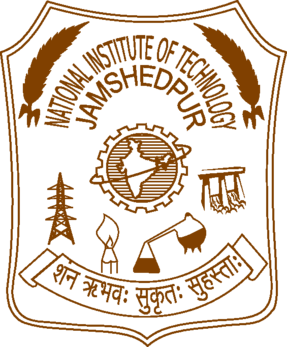


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I certify that the work contained in this report is original and has been done by us under the guidance of my supervisor(s). The work has not been submitted to any other Institute for any degree. I have followed the guidelines provided by the Institute in preparing the report. I have conformed to the norms and guidelines given in the Ethical Code of Conduct of the Institute. whenever I have used materials (data, theoretical analysis, figures, and text) from other sources, I have given due credit to them by citing them in the text of the report and giving their details in the references. Further, I have taken permission from the copyright owners of the sources, whenever necessary.

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Signature of the Students

ACKNOWLEDGEMENT

t gives me a great sense of pleasure to present the report of the Project Work undertaken

during B. Tech. Final Year. I owe special debt of gratitude to my Project Coordinator

Ms/Mr. <Name of Project Coordinator>, <Designation>, Department of Information

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Anmol rishiket(2022UGCS091)

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## ABSTRACT

The official website for the **Industry-Academia Conclave (IAC) 2024** at **NIT Jamshedpur** serves as a dynamic platform to facilitate collaboration between academia and industry. Designed with a focus on user experience and functionality, the site provides comprehensive details about the event's theme, "Viksit Bharat – Viksit Jharkhand: 2047," emphasizing innovation, sustainability, and industrial growth.

Key features of the website include sections on event highlights, keynote speakers, competitions, and workshops. Users can easily access registration portals for participants, delegates, and stall exhibitors. The platform showcases the involvement of esteemed partners, including **IITs**, **NITs**, and industry leaders like **Tata Steel** and **NTPC**, alongside details of technical committees and advisory panels.

A responsive design ensures seamless navigation across devices, catering to a diverse audience of students, researchers, and industry professionals. The inclusion of multimedia content and regular updates enhances engagement, keeping visitors informed about schedules, deadlines, and announcements.

This website exemplifies the integration of technical expertise and creative design, reflecting the ethos of **IAC-2024** as a milestone in bridging the gap between academia and industry, paving the way for sustainable development and innovation.

## LIST OF CONTENTS

**ABSTRACT I**

**LIST OF CONTENTS II**

[**LIST OF ABBREVIATIONS** **III**](#_Toc18800)

[**LIST OF SYMBOLS** **IV**](#_Toc18801)

[**LIST OF FIGURES** **V**](#_Toc18802)

**[LIST OF TABLES IV](#_Toc18803)**

1. **Introduction 1**
   1. Introduction 1
   2. Problem Definition 1
   3. Outline of the Report 2
2. **Literature Review 4** 
   1. History 5
   2. Existing work 5

2.1.1 Art of Modelling 5

1. **Proposed Methods**  **6**
   1. Architecture of proposed method 6

|  |  |
| --- | --- |
| 1. **Results and Discussion** | **60** |
| 4.1 Results | 61 |
| 4.2 Analysis | 65 |
| **5 Conclusions and Scope for Future Work** | **68** |
| 5.1 Conclusions | 68 |
| 5.2 Scope for Future work | 69 |
| **Appendix I: Title of Appendix** | **70** |
| **Appendix II: Title of Appendix** | **72** |
| **References** | **74** |

**LIST OF ABBREVIATIONS**

|  |  |
| --- | --- |
| COP | Coefficient of Performance |
| EDM | Electric Discharge Machining |
| FEA | Finite Element Analysis |
| FMS | Flexible Manufacturing System |
| PV | Photovoltaic |
| WJM | Water Jet Machining |
|  |  |

Abbreviations shall be given in the alphabetical order. Give sufficient spacing between the abbreviation and its expanded form.

List of Abbreviations shall be included only if there are more than 3 abbreviations used in the report.

When it appears for the first time in the text of the report, the expanded form shall be given with the abbreviation in the parenthesis. *For example*: “Flexible Manufacturing Systems (FMS) are extensively used …”

**LIST OF SYMBOLS**

|  |  |
| --- | --- |
|  |  |
| *n* | Hardening exponent |
| *q* | Charge of an electron (1.6 × 10-19 C) |
| *t* | Time (s) |
| *A* | Diode idealist factor (1 to 5) |
| *Io* | Output current (A) |
| *K* | Boltzmann constant (1.38 × 10-23 J/K) |
| *T* | Absolute temperature (K) |
| *Vo* | Output voltage (V) |

**Subscripts and Superscripts** *t X* Quantity *X* evaluated at time *t* *t**t X* Quantity *X* evaluated at time *t**t*

*Aij* Row *i* and column *j* element of matrix/tensor *A*

Use the following order for listing: lower case Greek symbols, upper case Greek symbols, lower case English letters and upper case English letters. Each group should be arranged in alphabetic order.

Subscripts and Superscripts may be mentioned separately, if required, after giving a subheading: **Subscripts and Superscripts** (12 point, Bold, Title case)

Mention the numerical values (if any) and units (if any) in parenthesis as shown above.

The symbols here shall be modified as per requirement, even though some of them are shown in black colour.

**LIST OF FIGURES**

1.2 Block Diagram 12

2.7 Comparison Results 15

**LIST OF TABLES**

3.2 Dataset 12

5.7 Result Summary 15

## 

## CHAPTER 1

### **INTRODUCTION**

The Industrial Conclave is a prominent platform designed to foster collaboration between academia and industry, creating opportunities for knowledge exchange, networking, and innovation. This event brings together leading academic institutions, including IITs (e.g., IIT ISM Dhanbad) and NITs (e.g., NIT Raipur, NIT Patna), as well as industrial giants from various sectors.

To support the conclave’s objectives, an official website serves as a vital tool for disseminating information, managing participant engagement, and showcasing the event’s highlights. The earlier version of the website, developed using Google Sites, was instrumental in managing initial activities. However, as the conclave expanded, limitations in scalability, interactivity, and advanced data management became evident. To address these challenges, the website is being upgraded using the MERN stack, offering a robust and scalable platform aligned with modern web development standards.

This chapter provides an overview of the project, the problems addressed, and the structure of this report.

#### **1.1 INTRODUCTION**

The Industrial Conclave’s purpose is to bridge the gap between academic research and industrial practices. Over the years, it has emerged as a hub for technological advancements and innovative ideas. The event not only facilitates networking among students, researchers, and industry leaders but also provides a platform for showcasing groundbreaking projects and partnerships.

The website plays a crucial role in enabling the conclave’s success. It acts as a centralized system for event management, participant registrations, sponsor interactions, and information dissemination. With the shift to the MERN stack, the upgraded website aims to offer enhanced interactivity, efficient data management, and scalability to support future editions of the conclave.

**1.2 Problem Definition**

**The earlier version of the Industrial Conclave website, while functional, faced several critical challenges that hindered its effectiveness:**

1. **Lack of Timely Updates: The website often contained outdated content, reducing its relevance and utility for participants and stakeholders.**
2. **Limited Visual Appeal: The design of the website was not engaging or visually attractive, failing to capture the attention of users effectively.**
3. **Lack of Interactivity: Static pages and minimal user interaction features limited the website's ability to engage participants actively.**
4. **No Connection Between Sponsors and Administration: The platform did not provide dedicated channels or features to facilitate direct communication and collaboration between sponsors and event administrators.**
5. **Absence of Upcoming Event Information: Crucial updates about upcoming conclave events were not prominently displayed, leading to reduced user awareness and participation.**
6. **No Details on Registration and Participants: There was no structured system for displaying information about registrations, including participating individuals and organizations, which reduced transparency and accessibility for stakeholders.**

**These limitations highlighted the need for a modernized website capable of addressing these challenges. By leveraging the MERN stack, the upgraded platform aims to create a scalable, interactive, and user-friendly solution that aligns with the conclave’s growing scope and objectives.**

**1.3 Outline of the Report**

The report is structured as follows:

* **Chapter 2: Literature Review**  
  Provides an overview of existing solutions and technologies in web application development, along with related works that inspired this project.
* **Chapter 3: Proposed Methods**  
  Discusses the architecture and methodologies employed in designing and developing the upgraded website, including the use of the MERN stack.
* **Chapter 4: Results and Discussion**  
  Presents the results achieved through the project, showcasing improvements in functionality and user experience, followed by an analysis of the outcomes.
* **Chapter 5: Conclusions and Scope for Future Work**  
  Summarizes the key findings of the project and discusses potential areas for further development and enhancements in future iterations.
* **Appendices and References**  
  Provides supplementary materials, figures, and references to literature cited throughout the report.

**. 2.Literature Review**

The Industry-Academia Conclave (IAC) at NIT Jamshedpur began as a platform to bridge the gap between academic research and industrial practices. Its primary aim is to foster collaboration, innovation, and entrepreneurship while addressing regional and national challenges.

The first edition of IAC, launched with support from industrial and academic partners, focused on enhancing industry-academia relationships through discussions, competitions, and workshops. This tradition continues in the 2024 edition, themed "Viksit Bharat – Viksit Jharkhand: 2047," aligning with India's vision of sustainable development by its centennial anniversary.

The conclave brings together prominent organizations such as Tata Steel, ONGC, NTPC, and academic institutions like IITs and NITs, featuring keynote sessions, panel discussions, and competitions that attract students, researchers, and professionals from diverse domains. Over time, it has evolved into a hub for innovation, particularly in areas like IoT, robotics, renewable energy, and sustainable practices

**2.1 History**

The Art of Modelling, as emphasized in the context of IAC NIT Jamshedpur 2024, highlights the importance of creating innovative and functional representations of ideas, technologies, and solutions. This skill is showcased in various events like model-making competitions and hackathons, which form integral parts of the conclave.

At IAC 2024, the model-making competition allows participants to demonstrate their understanding and creativity by designing prototypes or representations that align with the conclave's themes, such as sustainable development, IoT applications, renewable energy solutions, and industrial innovation. These models serve as tangible expressions of theoretical concepts, bridging the gap between academic learning and practical applications.

The event encourages collaboration, creativity, and problem-solving, inviting over 300 students and professionals to participate. The competition is structured to foster a spirit of innovation, offering participants opportunities to refine their ideas and present them to experts from academia and industry​.

**2.2 Existing work**

The Industry-Academia Conclave (IAC) is a recurring event organized at NIT Jamshedpur, with a focus on fostering collaboration between academia and industry. Over the years, it has evolved into a significant platform for bridging gaps and promoting innovation.

Past editions of IAC have included a variety of activities such as panel discussions, workshops, technical sessions, and competitions. These events have addressed themes like renewable energy, IoT, robotics, and sustainable mining. Notable collaborations with organizations such as Tata Steel, NTPC, and academic institutions like IITs and NITs have provided diverse perspectives. The conclave has also emphasized creating actionable outcomes by addressing regional challenges and aligning with national goals like "Atmanirbhar Bharat"​

Competitions such as model-making and hackathons have been central features, encouraging students to apply theoretical concepts to real-world problems. The integration of industry leaders and academic experts in advisory roles ensures the relevance and impact of the initiatives undertaken during the conclave​.

These improvements contributed to healthier interactions between the event's stakeholders, providing a more organized, engaging, and interactive platform for all involved. Although the updates addressed many of the website’s shortcomings, they still represent only the first step toward a more dynamic and scalable solution that will fully cater to the event’s growing needs through the implementation of the MERN stack.

**3. Proposed Methods**

**To address the limitations of the previous versions of the website, we focused on improving existing pages while preparing for future enhancements. The goal was to create a dynamic, interactive, and user-friendly platform capable of resolving challenges such as outdated content, lack of interactivity, and insufficient connectivity among stakeholders like sponsors, participants, and administrators.**

**Improvements Made**

1. **Timely Updates**
   * **Developed a workflow to ensure that event schedules, announcements, and critical information were updated consistently.**
2. **Enhanced Visual Appeal**
   * **Improved the site’s visual appeal by customizing themes, layouts, and multimedia integrations.**
3. **Improved Interactivity**
   * **Added basic interactive features like clickable buttons, navigation menus, and embedded forms to enhance the user experience.**
4. **Sponsor-Administrator Connection**
   * **Created dedicated sections for sponsors and administrators to showcase information and facilitate communication.**
5. **Upcoming Event Information**
   * **Highlighted event schedules and details in a dedicated section, ensuring visibility for users.**
6. **Registration and Participation Details**
   * **Integrated registration forms and displayed participant details directly on the site.**

**Skeleton Framework and Schema Development**

**As part of transitioning to the MERN stack, we laid the foundation for a scalable and dynamic website by developing a skeleton framework and database schemas:**

1. **Skeleton Framework:**
   * **Built using React, the skeleton provides a modular and reusable component-based architecture that ensures scalability and flexibility.**
   * **The framework includes a responsive layout to ensure compatibility across devices and screen sizes, providing users with a seamless experience.**
2. **Database Schema Development:**
   * **MongoDB was used to define schemas for managing data related to sponsors, participants, administrators, and event details.**
   * **These schemas define relationships between entities, optimizing data management and retrieval for complex queries.**
3. **API Development:**
   * **RESTful APIs were developed using Express.js and Node.js to enable secure and efficient communication between the frontend and backend.**
   * **These APIs support critical functionalities, such as fetching event schedules, registering participants, and managing sponsor data.**

**By integrating the skeleton and schema into the proposed methods, we have established a robust foundation for a fully interactive, dynamic, and user-friendly platform that addresses the limitations of the earlier versions of the website while preparing for future enhancements.**

**Why We Used Google Sites for Earlier Versions**

Google Sites was chosen as the platform for the initial versions of the website due to its practicality and ease of use. Its user-friendly interface allowed for quick and efficient creation and updates of web pages without requiring advanced technical expertise. As part of the free Google Workspace suite, it was a cost-effective solution that eliminated additional expenses for hosting or development. The platform facilitated real-time collaboration, enabling multiple team members to work simultaneously on updates and content management. Seamless integration with Google Workspace tools such as Forms, Calendar, Drive, and Sheets streamlined workflows for data collection, event scheduling, and document sharing. Additionally, changes made to the website were instantly reflected, which was essential for managing real-time updates during the event. Although limited in comparison to custom-coded platforms, Google Sites provided sufficient flexibility to meet basic design and functionality requirements, making it an ideal choice for the initial stages of the project.

**Transition to MERN: Skeleton and Schema Development**

To address the limitations of Google Sites and prepare for future scalability, we began transitioning to the MERN stack, which comprises MongoDB, Express.js, React, and Node.js. The initial phase involved creating a robust skeleton and schema structure for the upgraded website.

1. **Skeleton Framework:**
   * The website’s skeleton was designed using **React**, leveraging its component-based architecture to build reusable and dynamic UI elements. This modular design ensures flexibility and simplifies future enhancements.
   * The framework also includes a responsive layout, ensuring compatibility across different devices and screen sizes.
2. **Database Schema Development:**
   * **MongoDB** was used to design schemas for key entities such as sponsors, participants, administrators, and event details.
   * These schemas define the structure of data stored in the database, including attributes like names, roles, event contributions, registration details, and schedules.
   * Relationships between entities were carefully planned to optimize data retrieval and ensure efficient handling of complex queries.
3. **API Development:**
   * RESTful APIs were developed using **Express.js** and **Node.js** to facilitate secure and efficient communication between the frontend (React) and the backend (MongoDB).
   * These APIs enable functionalities like fetching event details, registering participants, and managing sponsor profiles.

By implementing the skeleton and schema using the MERN stack, we have laid the groundwork for a fully dynamic, interactive, and scalable platform that will cater to the diverse needs of all stakeholders. This transition represents a significant improvement over the static capabilities of the earlier Google Sites implementation.

**4. Results and Discussion**

The **Results and Discussion** section focuses on the improvements made to the previous version of the Industrial Conclave website, built on Google Sites, and the expected outcomes of transitioning to the MERN stack for the upgraded website.

**4.1 Results**

In the earlier versions of the website, which were built using Google Sites, several key limitations were identified. These included outdated content, limited interactivity, and insufficient connectivity between stakeholders. Although the initial platform provided basic functionalities, it lacked scalability and flexibility for future growth. To address these issues, we made a series of improvements through enhancements in Google Sites, while planning for a future transition to a more dynamic system with MERN.

1. **Timely Updates:**
   * To ensure that content remained current, we utilized the HTML embedding feature in Google Sites to integrate external services and update content dynamically. This allowed us to embed real-time data, such as event schedules or registration lists, from external sources, which was not possible with static pages.
2. **Enhanced Visual Appeal:**

Although Google Sites provided basic templates, we customized the website's design using the platform's built-in design tools and layout options. This allowed us to modify the theme and design elements to create a more visually appealing and user-friendly interface. These enhancements improved the overall user experience by providing a more modern and attractive appearance. However, the design flexibility was still limited compared to what could be achieved with a fully custom-coded solution using a more robust platform.

1. **Improved Interactivity:**

Interactivity was a significant issue with the old version of the site. We used Google Sites' HTML embedding feature to enhance the interactivity, particularly on the sponsorship and panel pages. By embedding custom HTML and CSS, we introduced dynamic elements like clickable cards for sponsor profiles and panel details, making the content more engaging and visually appealing. These interactive cards allowed users to easily navigate through key information about sponsors and panels. While this approach improved user engagement, it still lacked more advanced features like real-time updates, dynamic content, and complex user interactions that a custom solution using the MERN stack could offer in the future.

1. **Sponsor-Administrator Connection:**
   * The previous site had minimal connectivity between sponsors and event administrators. To improve this, we created embedded forms and contact sections to allow sponsors to submit inquiries or share event-related information directly on the site. However, this solution was basic and lacked the depth and scalability required for efficient management and communication.
2. **Upcoming Event Information:**
   * We introduced a more prominent display of event schedules and updates by embedding external calendars and announcement feeds, making it easier for users to find important event details. This helped address the lack of visibility in the earlier version, but it was not an integrated, dynamic solution.
3. **Registration and Participation Details:**
   * The previous website had no automated system for managing registrations. We embedded registration forms and linked them to Google Forms, which allowed users to sign up for the event. While this provided basic registration functionality, it lacked features like tracking participant data in real time or showing dynamic updates on registration status.

**4.2 Analysis**

While the improvements made using Google Sites enhanced the website's functionality, the platform still had limitations in terms of scalability, interactivity, and advanced data management. The embedding feature allowed us to make important updates and improvements but didn’t offer the flexibility and customization that a full MERN stack solution would provide. Here’s an analysis of how the changes made via Google Sites compare to the future plans with MERN:

1. **Performance and Scalability:**
   * Google Sites was adequate for managing a small-scale website, but it is not built to handle large amounts of dynamic content or complex interactions. As the number of event participants and sponsors grows, we expect the MERN stack to provide better scalability and performance, particularly with MongoDB handling large data sets and React ensuring a fast, dynamic user interface.
2. **Data Management and Real-Time Updates:**
   * The Google Sites improvements, such as embedding Google Forms and external calendars, were useful for basic updates, but they did not provide an integrated system for managing data. The MERN stack will allow for more efficient data management through MongoDB, where real-time data can be updated, retrieved, and displayed in a seamless manner.
3. **Interactivity and User Engagement:**
   * Google Sites allowed us to embed interactive elements, but these were limited to basic forms and static content. With React, the new website will be able to provide a much more dynamic user experience, with interactive features like dropdowns, modals, and live notifications.
4. **Future Flexibility:**
   * While Google Sites served as a useful starting point, it didn’t offer the flexibility needed for future enhancements. The MERN stack will allow for a fully customized and scalable platform where new features, such as role-based access control, real-time notifications, and dynamic dashboards for sponsors and administrators, can be easily integrated.

In conclusion, the improvements made to the Google Sites-based website served to address some immediate challenges, but the transition to the MERN stack is necessary to build a more robust, scalable, and interactive platform that can handle the evolving needs of the Industrial Conclave. The future version of the website, once fully implemented with MERN, will be more dynamic, flexible, and capable of meeting the demands of all stakeholders.

**5.1 Conclusions**

The project successfully enhanced the functionality and user experience of the Industrial Conclave website. Improvements included timely updates to event schedules and announcements, enhanced visual appeal, and added interactivity for better communication among sponsors, participants, and administrators. Despite these enhancements, the limitations of Google Sites, such as scalability and advanced functionality, highlighted the need for a more robust platform. This led to the decision to transition to the MERN stack, setting the stage for a dynamic, scalable, and interactive website in the future.

**5.2 Scope for Future Work**

The move to the MERN stack represents a significant advancement in the development of the Industrial Conclave website. The following key improvements are planned for the next phase of development:

1. **Full MERN Stack Integration**:
   * **Frontend with React**: The website’s frontend will be fully rebuilt using React, enabling dynamic, component-based development. This will allow for real-time updates, a responsive user interface, and seamless interaction with backend data.
   * **Backend with Node.js and Express.js**: The backend will be developed using Node.js and Express.js, providing a fast and secure server-side architecture to manage requests, data processing, and API integrations.
   * **Database with MongoDB**: MongoDB will be used to store and manage data related to sponsors, participants, events, and registrations, providing a flexible, scalable database solution.
2. **Real-Time Features**:
   * **Email and SMS Notifications**: To keep participants, sponsors, and administrators informed about event updates, registrations, and schedule changes, email and SMS notifications will be implemented. This will ensure that all stakeholders receive timely information and reminders about important events and actions.
3. **Role-Based Access Control**:
   * **User Authentication**: Role-based access control (RBAC) will be implemented to manage user roles such as participants, sponsors, and administrators. This will provide a secure, personalized experience, with each user group having access to relevant sections of the site.
   * **Admin Dashboard**: A dedicated dashboard for administrators will be created to manage event data, registrations, sponsor details, and other aspects of the website efficiently.
4. **Payment Integration**:
   * **Online Payments**: To streamline the registration process, we will integrate a payment gateway (e.g., Stripe or PayPal) for secure online payments. This will allow participants to pay registration fees directly through the website, ensuring a smooth transaction experience.
5. **Enhanced Security**:
   * **Data Protection**: With the transition to MERN, enhanced security measures will be implemented, including data encryption, secure user authentication, and protection against common web vulnerabilities like SQL injection and cross-site scripting (XSS).
   * **Secure Payment Gateway**: The payment system will use SSL encryption to ensure that financial transactions are safe and secure for all users.
   * **User Privacy**: Personal information, including participant details and payment data, will be securely stored and processed, complying with data protection regulations such as GDPR.
6. **Scalability and Performance Optimization**:
   * **Optimized Performance**: As the website grows, techniques such as caching, load balancing, and code splitting will be implemented to ensure the platform remains fast and responsive, even under heavy traffic.
   * **Mobile Optimization**: The website will be fully responsive, ensuring a seamless user experience across all devices, including smartphones and tablets.

## REFERENCES

1. Crisfield, M.A., “A Fast Incremental/Iterative Solution Procedure that Handles Snap Through,” *Computers and Structures*, Vol. 13, pp. 55-62, 1981.
2. Cook, R.D., Malkus, D.S., Plesha, M.E., and Witt, R.J., *Concepts and Applications of Finite Element Analysis*, 4th Edn., John Wiley & Sons (Asia) Pte. Ltd., Singapore, 2004.
3. Gresho, P.M., Lee, R.L., Chan, S.T., and Leone, J.M., Jr., “A Finite Element for

Incompressible or Boussinesq Fluids,” in *Third International Conference on Finite*

*Elements in Flow Problems* (D.H. Norrie, ed.), Banff, Alberta, Canada, pp. 204215, 1980.

1. http://www.doe.hov.org/FundamentalSeriesItemPowerQualityandHarmonics.htm (As on 23-3-07).
   * Indicate references by number(s) in square brackets.
   * All references cited in the text should be present in the list of references, and the list of references should contain those referred in the report only.
   * Number the references (numbers in square brackets) in the list in the order in which they appear in the report
   * In the reference list, the names of all authors shall be mentioned. Shortening the list of authors by using “et al.” shall not be done in the reference list.

All the resources, from which information (like figures, equations, tables etc.) is obtained, shall be properly acknowledged by including in the reference list.

**General Notes for the Project Report**

*Cover pages*: The title of the report, author, department, month and year of submission along with the emblem of the Institute will be included on the first cover (*See sample – first page of this document - for details*). This may be made in special quality paper like plastic coated paper.

*Inner cover:* contents shall be same as that of the front cover, but on ordinary A4 size paper.

*Report Format*:

* Single column format, and print only on one side of the paper.
* Full justification of all texts, other than headings and titles.
* Ensure that each new paragraph is clearly indicated with an additional spacing (using tab button)
* Use a line spacing of 1.5 throughout, for texts.
* Ensure that each new section heading is separated by an additional spacing.

Chapter/section headings shall be as per the font size shown below. All chapters are to be started on a fresh page.

Table 1: Suggested Font sizes in Mini Project Report

|  |  |  |  |
| --- | --- | --- | --- |
| **Details** | **Font Type** | **Font size** | **Spacing** |
| *Facing page*  *(cover and first page)* | Times New Roman | Exactly follow the format given in the sample page (*First page of this document*) | |
| *Chapter headings with chapter number on top* | **TIMES NEW ROMAN** | 16pt bold  Upper Case | Cantered |
| *Section headings* | **TIMES NEW ROMAN** | 12pt bold  Upper Case | Left justified |
| *Subsection headings* | **Times New Roman** | 12pt. Bold  Title case | Left justified |
| *All other lower level headings* | ***Times New Roman*** | 12pt. Bold  Italics  Title case | Left justified |
| *Body of thesis* | Times New Roman | 12 pt | Adjusted on both left and right and with 1.5 spacing for text and double spacing for equations |
| *Margins* | Left Margin | 1.5 inch | To accommodate binding area |
| Right Margin | 1.25 inch |  |
| Top | 2.0 inch | Pages on which a chapter begins |
| 1.0 inch | Other pages |
| Bottom | 1.25 inch | |

The preliminary pages are numbered in *roman numerals* (i, ii, etc). The first page of the chapter 1 onwards shall be numbered in *Arabic* numerals (1, 2, 3, etc).

Follow internationally accepted symbols, rules and conventions: use the international system of units (SI). If other quantities are mentioned, give their equivalent in SI.

Number consecutively any equations that have to be displayed separately from the text. Use standard software like “Equation Editor” for writing the equations. Centralize the equations and right justify the equation numbers. For example, the first equation in chapter 3 shall be written as:

Eq*. 3.1*

It shall be referred in the text as Eq. (3.1). Tables shall be numbered consecutively in each chapter, and given suitable captions **above the table** (*Example*: Table 2.2: Comparison of Costs), and shall be referred in the text as Table 2.2.

Tables should not duplicate results presented elsewhere in the manuscript (for example, in graphs). Footnotes to tables should be typed below the table and should be referred to by superscript lowercase letters.

Graphs/plots shall be clear with axes information and number (*Example*: Fig. 2.2: Variation of Temperature in a Typical Day) consecutively, and given suitable captions **below** **the plot/graph**. Referred in the text as Fig. 2.2

Figure axis labels are often a source of confusion. Try to use words rather than symbols. As an example, write the quantity "Magnetization," or "Magnetization, *M*," not just "*M*." Put units in parentheses. Do not label axes only with units.

Copy paste or import from the simulated sheets of software packages will not produce clears graphs/plots, and shall not be produced in the thesis.

Colour illustrations and photos are allowed, only if clear and necessary for understanding. Same shall also be numbered and titled at the bottom. Photos shall be pasted on a separate page covered by a protection film.

All figures and tables must be in place in the text near, but not before, where they are first referenced. Figures and tables, including the title, shall be centralized.

If there are some appendices, these can be numbered as Appendix I, Appendix II, etc. The equations/figures/tables etc. in the appendices shall be numbered as serially in each appendix, by prefixing A-I, A-II etc. (*Example*: Fig. A-I 2, Table A-II 1, A-II 3 refered in the text as Eq. A-II 3).

Colour For cover: **SKY BLUE** RGB CODE **[176, 211, 243]**

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