NASSCOM®

Foundation Skills in IT (FSIT)

Guideline Document for the Facilitator

in the Outcomes Based Format (OBF)

Powered by:
Infosys, Cognizant, Accenture, HCL, TCS, IBM, and Wipro

Supported by:
Excelsoft Technologies Pvt. Ltd.

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NASSCOM appreciates its partnering companies for believing in NASSCOMs vision to increase the industry readiness of the available student pool, by developing and facilitating the implementation of programs of educational relevance, with aim to address the generic industry–academia skill gaps in the IT sector.

The Foundation Skills in IT (FSIT) training program is aimed to empower students with IT related skills at the entry level. NASSCOM recognizes that this is an initiative of great importance for all the stakeholders concerned; the industry, academia, and students. The tremendous work as ceaseless support, offered by members of the working group and our partnering companies, in strategizing and designing the training material for the FSIT program is commendable.

NASSCOM would also like to thank the senior leadership of these partner companies for sharing their thoughts and invaluable inputs in the planning of the FSIT program.

Introduction to the Program

The Foundation Skills in IT (FSIT) program will increase the industry readiness of students who want to start a career in IT/engineering companies. This program has been developed by experts from member companies—Infosys, Cognizant, Accenture, HCL, TCS, and IBM—with a vision to develop the skills of students graduating from colleges to match the industry requirement.

The program has been developed using the Outcomes Based Format (OBF) keeping the focus on the key skills required to perform a given job role. The program has two tracks—one that focused on training and guide for the facilitator and the other for the student.

Objective of the Program

The FSIT program has been developed to facilitate the acquisition of the foundation skills required in the IT industry today. The program aims to improve student's understanding of the basic concepts involved in software development. This program provides the requisite awareness and knowledge to understand key concepts that can be applied to IT projects.

In addition, the student will develop skills related to the business dynamics and project implementation that will enable one to work in high performance teams.

About the Program

To Increase the funnel of available quality students at 'entry' level, NASSCOM suggests the Basic Skills/Foundation Skills termed as Foundation Skills in IT (FSIT) program to be run as an add-on program in various education institutions. One of the purposes of this initiative is that going forward; universities/colleges will consider making these programs compulsory for students or integrate the development of these skills into the teaching-learning program by allocating credits to these programs.

Eligibility

The program is targeted towards students perusing graduate courses in the engineering or any other stream.

Program Duration

The program offers a blended learning solution comprising of a mix of guided learning or instructor-led training, tutorials, and practical exercises. It is designed to be conducted over 140 hours. The recommended delivery is divided into 75 hours of guided learning, and 65 hours of tutorials and practical exercises. The classes for this program can be held for 20 weeks—3 days a week, 2 hours per day.

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How to Use this Program?

In order to make the teaching-learning process effective, this program has been developed based on the OBF for curricula design.

The curricula framework highlights an integrated output that encompasses the following for the program:

- Outcomes
- Processes
- Inputs

The curricula framework enables every parameter to be detailed to maximize impact and empower the learner with the requisite skills and competencies toward lifelong learning and gainful employment.

For the expected learning outcomes, the facilitator must refer to the FSIT OBF detailed in the following pages.

The module content identified is followed by a suggested lesson plan and the associated assessments with assessment keys.

Outcomes Based Format for Curricula Design

Foundation Skills in IT

(FSIT)

Curricula Framework

NASSCOM®

IT-ITeS Sector Skill Council

An Industry Initiative

Framework for "Employment" oriented curricula

The "Curricula Framework" highlights an integrated output that encompasses "Outcomes", "Processes" and "Inputs". The frame will enable stakeholders develop and customize programs of learning using different media to empower candidates with the desired foundation skills necessary for entry level employment for the IT industry.

Outcomes	Processes	Inputs
Part-I *Specifies the direct and indirect outcomes of the curriculum w.r.t. the: 1. Course/program: i. Generic ii. Domain/s iii. Employment 2. Student learning 3. Classroom design/layout 4. Learning experiences 5. Summative assessment 6. Continuous assessment 7. Processes instituted 8. Inputs provided (quantify and qualify): i. Infrastructure and facilities ii. Faculty iii. Support staff iv. Governance v. Land and buildings 9. Institution	Part-II *Indicates development and implementation of processes as applicable toward: 1. Empowering personals 2. Attributes and soft skills 3. Employment skills 4. Domain skills and competencies 5. Generic transferable skills and competencies 6. Course/program delivery methods using i. Blended learning ii. ICT iii. E-learning 7. Pedagogy-appropriate usage 8. Learning experiences to be provided 9. Higher Order Thinking Skills (HOTS) 10. Assessments and evaluation: continuous and summative 11. Classroom design/layout and impact. 12. Accreditation of the curriculum 13. Institutional efficiency 14. Publications, report writing 15. IPR, R&D, innovation 16. Entrepreneurship	Part III *Identifies the required inputs toward: 1. Curriculum structure 2. Syllabus 3. Infrastructure 4. Classroom layout 5. Faculty and support staff 6. ICT 7. Content (text books and labs, internship programs etc.) 8. E-learning program–content and facilities 9. Administrative processes 10. Lesson plans 11. Blended teaching–learning methodologies 12. Assessment and evaluation practice 13. Certification 14. Approvals for standardization and parity national and international 15. Placement process (if applicable) 16. Industry standards and acceptance

Metrics and Evaluation Support System:

- Identifies Key Performance Indicators (KPIs) and Performance Ensuring Measures (PEMs).
- Enables analysis and reconciles the same as feedback.
- Aims at greater impact and efficiency, while achieving the set outcomes.

We propose the course assessments, formative and summative, to be based on the learning styles, as explained in the adaptation of the Bloom's taxonomy. Please refer to the illustration below.

Current Practice (anecdotal evidence)		Proposed System (Subject to module requirement)
80	Remembering	10
15	Understanding	15
5	Applying	15
	Analyzing	15
	Evaluating	15
	Creating	15
	Effective Communication	15

Part-I: Outcomes
Name of the Program: Foundation Skills in IT This program can be offered with all UG or equivalent programs/courses for all engineering streams. This program is also applicable for PG graduates who aspire to join the industry at the entry level.
The FSIT program aims to improve student's understanding of the basic concepts involved in software development. This program provides the requisite awareness and knowledge to understand key concepts that can be applied to IT projects. In addition, the student will develop skills related to the business dynamics and project implementation that will enable one to work in high performance teams. Students, who undergo this program, will stand a better chance to be considered for jobs in the IT industry.

1. Program Outcomes	Course Objectives
i. Generic	After completing this program, the student will be able to: • Describe the fundamental concepts of computer hardware and software and how the hardware and software elements function together. • Apply a logical approach to problem solving, algorithms, and data structures. • Develop and test programs which involve file handling, string handling, searching, and sorting. • Process data using SQL queries in an RDBMS. • Resolve issues faced while working with file systems catering to a large data and users. • Design databases for real world software applications. • Write simple queries to extract/update information from databases. • Analyze the importance of SDLC in projects. • Identify different computer networks, network services, and network topology. • Apply the concepts of networking to arrive at the appropriate solution for business requirements. • Browse and search for information on the Internet. • Apply concepts to solve problems and adhere to the industry standards and business needs. • Define the process and aspects of effective communication. • Appreciate the skills required to develop language competency, and eliminate the barriers of communication. • Explain the mother-tongue influences on the English language and the significance of good pronunciation • Apply appropriate stress patterns and intonation in speech and exhibit the elements of voice modulation in speech. • Apply the "Writing Process" and use tips provided on "Email Etiquette". • Identify the need for nonverbal communication. • Identify the types of nonverbal communication and interpret nonverbal cues. • Communicate effectively with peers. • Identify the current state of the Indian IT industry, and how the IT industry has evolved. • Develop a creative thinking capability to find solutions to problems and roadblocks and make effective decision. • Nurture traits vital to creating and fostering healthy relationships with people in the workplace. • Develop goals, set measures, and achieve them. • Prioritize tasks and manage time effectively by using tools to plan work. • Understand the basic principles of project management in IT projects.

ii. Domain/s	• Information Technology • Business Dynamics • Project Management
iii. Employment	Increase the level of industry readiness of students for entry level jobs in the IT industry. Students will develop skills relevant to: ○ Business, service, and leadership areas of all industries ○ IT Industry ○ Helping all entrepreneurs, as well as developing life skills
iv. Any other outcome	NA

2. Student Learning Outcomes	Student Learning Objectives	Key Performance Indicators (KPI)	Performance Ensuring Measures (PEM)
Knowledge: i. Foundation ii. Specialized Domain	At the end of the program, the students will be able to:	The student is able to:	
	• Define key terms related to systems software: assemblers, linkers, loaders, compilers • Identify the definition of some basic concepts of Operating Systems: Process, Memory, Devices, File Management, Networking Principles • Define terms related to basic data types, variables, operators	• State, identify, or match the definitions of the key terms related to the systems software, operating system, and programming	• Quiz • Assignments • Simple hands-on exercises on programming, labeling, sequencing, and matching. • Role-plays • Class discussion
	• Identify the steps in the logical and algorithmic approach for solving a problem	• Sequence or list the steps to solve a given problem	
	• State the names of the basic programming constructs—Control structures such as Selection, Iteration, Recursion, and Looping constructs to their use. • Identify the use of data structures algorithms, flowcharts, and programming	• Explain the implementation of basic programming constructs	

	• Identify the need for testing, process of generating test-cases, and types of testing • Sequence the steps to generate test cases and state the types of testing	• Describe how test cases are developed.	
	• Identify the need for Databases and RDBMS • Identify the elements in database design and SQL	• Explain the need for databases and key elements of database design and SQL	
	• State the phases of the software development life cycle (SDLC) • Enumerate the activities involved in each phase of SDLC • Identify the SDLC models followed by the IT industry • State the advantages and disadvantages of each SDLC model	• Chart the steps/phases in the SDLC • Build a comparison of the SDLC models identifying the advantages and disadvantages of each model	
	• Identify networks, network types and network services, and their implementation	• Describe a network and enumerate the different types of networks and network services	
	• Identify different network topologies and their uses • Identify the layers in the OSI and TCP/IP protocol stacks and their purpose	• List types of network topologies and identify the various layers in the OSI and TCP/IP stacks	
	• Define a business and an industry and state their objectives • Outline globalization and its impact on the business • Recap the evolution of the Indian IT industry • Examine what employability means and what opportunities are available in the Indian IT industry	• Examine and describe the growing trend of Indian IT industry and identify available employment opportunities	
	• Define the process	• Identify the elements	

	and aspects of communication • Distinguish between good and bad pronunciation • Identify, recall, and reproduces correct English speech sounds • State acceptable norms for telephone conversation	of clear, effective business communication at the workplace, and outline the acceptable conduct in a business environment	
	• State the characteristics of effective writing • Outline the process of writing • Recognize and show appropriate non verbal communication	• Describe to email protocols and identify key aspects to be covered in an email message	
	• State how to set goals and prioritize tasks • Identify the benefits of team work and the key attributes of a team player. • Identify the key elements of goal setting, business etiquette, and time management • Given a situation, identify steps to resolve conflict • Differentiate assertive behavior from dominating behavior	• Exhibit healthy attitudes that contribute to team work	
	• Define project, program, project management, and project manager • Describe the roles and responsibilities of a project manager	• Determine project manager's role in different organization types.	
	• Describe the project life cycle model • List project processes and their interrelationships • Differentiate between types of organizational structures • Identify the different	• Determine the role and correct sequence of project management processes in an organization.	

	project management life cycle stages.		
Understanding/Comprehension	At the end of the program, the students will be able to:	The student is able to:	
	• Describe the parameters in the system configuration • Provide an high level view of the implementation of key system software elements	• Describe the working of key system software elements and the system configuration	• Classroom discussion, • Simple assignments • Algorithm identification assignments • Data structure implementation assignments • System configuration description exercises • Exercise on compiler errors, Comparison of features of two or more OS (Unix, Windows) • Exercises on reading and understanding test plan, study of ER diagrams, normalization, analyzing SQL query • Software Development Life Cycle models • Software project management phases assignments • Identify and map project management principles through project management / life cycles management tools • Quiz
	• Describe the different types of algorithms and implementation of basic data structures. • Identify the appropriate type of a given algorithm based on the problem statement • Explain the implementation of data structures using basic programming constructs in programming	• Examine the concept and constructs of programming, and concepts of database and database design	
	• Identify the use of SQL commands • Examine ER diagrams for a given scenario	• Understand the use of databases	
	• Explain the key aspects of the test plan	• Describe the process and need for developing a test plan	
	• Examine basic concepts, phases, models of the Software Development Life Cycle • Explain the advantages & disadvantages of SDLC	• Examine advantages and disadvantages of each SDLC models	
	• Explain what a network is • Distinguish between various types of network topologies • Describe the benefits and drawbacks of various types of network topologies	• Define a network, and classify the various types of networks and network protocols	

	Describe the layers in the TCP/IP protocol stack		
	• Compare a globalized business environment and a localized business environment • Illustrate challenges that need to be met in a globalized economy • Examine the challenges posed by globalization and the need to develop employable skills	• Explain what skills are necessary to capitalize on employment opportunities	
	• Define the process and aspects of communication • Describe the importance of the skills required to develop language competency • Identify barriers of communication • Explain how mother-tongue influences English • Explain the significance of good pronunciation and demonstrate the Speech sounds • Explain the significance of writing • Identify the importance and types of nonverbal communication • Identify and interpret nonverbal cues • Explain how to write mails adhering to email protocols • Explain acceptable norms for phone conversations	• Explain the importance of clear, effective communication (speaking and writing) at work place. (Clear, concise speaking and writing, appropriate body language, etc)	
	• Examine the importance of personal attitude, conflict management and assertiveness • Reflect upon yourself	• Explain what factors influence attitude, and describe healthy attitudes that contribute to team work	

	and identify your strengths and weakness with respect to the qualities of a good team player is about • Distinguish between a group and a team • Recognize conflicts and steps to resolve them • Distinguish between assertiveness and domination • Distinguish between acceptable and unacceptable conduct in a business environment		
	• Illustrate the importance of goal setting and time management • Illustrate how to prioritize tasks	• Explain how to set goals	
	• Define basic concepts of project management • Relations between project and product management • Analyze the project management processes and their implementation • Indentify a project activity and sequence the phases of project management • Understanding the importance of communication in project management	• Define various project management concepts • Define project activity with their details and understanding through the use of tool	
Application	At the end of the program, the students will be able to:	The student is able to:	
	• Detect the system configuration of a simple computer • Troubleshoot simple OS related problems • Solve problems by applying the concepts of algorithms and data	• Configure and troubleshoot system failure and recovery options	• Algorithm development system configuration identification—Hands on exercises • OS troubleshooting exercises • Assignments for

	structures		searching and sorting • Hands on exercises on integrated development environments (IDE) • Small projects involving file and string operations (Telephone Directory Application, for example) • Test plan creation exercises • ER modeling case studies • normalization exercises • Case studies involving queries implementation • Assignment and Quiz on SDLC • Assignment and Quiz on networking. • Assignments and activities included in every sub topic of each module—Role play, GD, mock interviews, written exercises, reading aloud, etc • Based on activities mentioned above, feedback (generic/individual) needs to be shared and noted. • Practical application assignment using tools
	• Write string and file handling programs • Implement appropriate algorithms and data structures for problems of searching and sorting	• Develop programs involving file and string handling	
	• Create a test plan	• Create a test plans for a small application program	
	• Model the relationship between entities for a given scenario • Normalize a given table to different normal forms • Arrive at 1NF, 2NF and 3NF for a given scenario	• Develop with ER models for a given real world scenario	
	• Write queries with Joins and sub-queries	• Write queries for a given problem statement relating to a set of tables	
	• Determine appropriate solution for the business requirements by applying the concepts of SDLC	• Apply the appropriate model of the SDLC	
	• Create a networking solution based on business requirements	• Work on an office network and use the Internet	
	• Apply appropriate stress patterns and Intonation in speech. • Exhibit the elements of voice modulation in speech. • Practice aspects of nonverbal communication. • Use tips provided on email etiquette • Interpret nonverbal cues • Distinguishes between effective and ineffective verbal and	• Communicate effectively—clear and to the point—using appropriate tone	

	non verbal communication • Interpret and summarize information in a clear, concise, unambiguous manner		
	• Exhibit qualities that make for a good team player • Demonstrate positive attitudinal traits • Use conflict resolution approaches to resolve conflicts • Demonstrate ability to be assertive • Use appropriate etiquette (business, email and telephone) and manage time efficiently • Demonstrate acceptable norms for telephone conversation • Display acceptable conduct in a business environment • Write mails adhering to email protocols	• Work in teams	
	• Write a personal goal statement • Prioritizes tasks	• Set goals with appropriate targets and mechanism to meet the goals	
	• Apply project management principles in different scenarios	• Identify the correct processes for a given project phase.	
Analysis (HOTS)	At the end of the program, the students will be able to:	The student is able to:	
	• Check and review the performance of algorithms • Review time/space requirements and constraints of using a particular data structure	• Review code and improve performance of algorithms and data structures	• Algorithm analysis assignments • Code review assignments • Code optimization assignments • Test plan review assignments • ER diagram analysis assignments • Query review
	• Verify program from the point of view of correctness of implementation,	• Review test plans	

	optimality, and understandability • Validate test plan from the point of view of code coverage and scope for automating the test cases		assignments • Situational analysis.
	• Create a database design by implementing the appropriate data model.	• Ability to analyze an ER diagram and come up with database design	
	• Validate a query with regards to of optimality and understandability	• Review queries	
	• Apply different aspects of communication in speech, writing as well as in body language	• Identify common errors in speaking and writing.	
	• Analyze different project situations and come up with correct approach to the problem.	• Implement different tools and techniques for different project management phases	
Synthesis(HOTS)	At the end of the program, the students will be able to:	The student is able to:	• Simple real life application development project • Peer review of the project • Real-life application development project • Practical application using tools
	• Make design decisions based on concepts and techniques learnt • Port an application based on files to databases	• Make design decisions	
	• Build checklists and review mechanisms for code and test plans • Develop good writing skills • Document the requirements, design and test plans, be able to present the same for evaluation	• Develop review mechanisms for code and test plans	
	• Uses of various aspects of communication, clarity of expression, correct pronunciation, stress	• Communicates with clarity and conciseness and appropriate accent • Ability to	

	patterns of English, intonation and elements of voice modulation, body language • Write emails effectively and follow appropriate non verbal cues	communicate effectively (spoken and written)	
	• Develop and plan different project management deliverables. E.g. creating requirement docs, Schedule, creation of basic work breakdown structure planning for defect management, and approval processes, etc	• Identify the correct process and methodology for project management deliverables and creating solution to different situations.	
Evaluation (HOTS)	At the end of the program, the students will be able to:	The student is able to:	
	• Document/establish the requirements, design, and test plans, and be able to present the same for evaluation • Make design decisions based on concepts and techniques learnt • Makes design decisions • Develop checklists	• Reviews project	• Simple real life application development project • Simple real life application development project • Peer review of the project • Learning through situational analysis.
	• Evaluate their own barriers to communication • Evaluate how Mother Tongue Influence (MTI) affects their English • Evaluate the effectiveness of their writing	• Communicate effectively (spoken and written) • Evaluate and comment on appropriateness of communication in a given context	
	• Make and identify the right tools based on technique learned.	Make right decisions in different scenarios of project lifecycle.	

3. Skill Development	Skills	Key Performance Indicators (KPI)	Performance Ensuring Measures (PEM)
Learning Ability &Technology Skills	At the end of the program the student will have the skills required to: • Take up a job in the sector • Develop/build the aptitude required to succeed in a basic IT job • Be equipped with techniques to improve his/her skills to perform a IT-project related task efficiently	Demonstrates: • Programming skills • Interpersonal skills • Internet and browsing/information searching skills • Ability to work on IT projects	• Assessment and grading by instructor at the end of the training • Attain the desired range scores/grades necessary as cut-offs for employment For training the facilitators: • Train the Trainer (T3) practice sessions and grading by T3 (All student and faculty assessment packages are available)
Communication Skills	At the end of the program, the student should be able to: • Understand the importance of effective communication and communicate with clarity, conciseness, coherence, and the correct tone at the work place • Communicate with clarity and conciseness • Develop good listening skills • Develop good comprehension skills • Understand the importance of appropriate body language Email communication: • Ability to communicate effectively with customers using grammatically correct English	Demonstrate appropriate: • Ability to communicate effectively • Clarity of thoughts • Clarity of expression • Ability to respond to the need of the situation • Ability to adapt to the listener • Writing skills and emails etiquette	• Written and verbal assessments • Grading by instructor at the end of the training • Attaining the desired range scores/grades; necessary as cut-offs for employment For training the facilitators: • T3 practice sessions and grading by T3 (All student and faculty assessment packages are available)
Behavioral Skills	Interpersonal Skills and Winning Behavior:	Demonstrates:	• Quiz • Mock trial

	• Team work • Attitude • Ethics • Aptitude • Discipline • Values-led behavior • Change management • Hunger to succeed • Respect for others • Thriving on change • Sense of urgency • Conflict resolution At the end of the program the student must be able to: • Work successfully in teams • Understand, relate with, and display ethics and values common to most corporate. They must also display: • Discipline • An ability to learn and work to instructions • Willingness to put in hard work as required	• Team work • Attitude • Ethics • Aptitude • Discipline • Values-led behavior • Change management • Hunger to succeed • Respect for others • Thriving on change • Sense of urgency • Conflict resolution • Attain the desired range scores/grades; necessary as cut-offs for employment	sessions • Questions on situations asked during the training session • Assessment and grading by instructor and peers at the end of the training For training the facilitators: • T3 practice sessions and grading by T3 (All student and faculty assessment packages are available
Employment Skills • Project management skills • Verbal ability • Numerical ability • Attention to detail • Abstract reasoning	The student must be able to: • Develop an attention to detail • Reason and take logical steps/decisions in any given situation • Provide and manage the end–to-end solution for a given project, in requisite situation • Demonstrate leadership skills • Manage time efficiently and effectively • Develop an effective project report	Demonstrate • Attention to detail • Abstract reasoning • Project report writing skills • Successfully achieve the given project outcomes • Attain the desired range scores/grades necessary as cut-offs for employment	• Written Assessments, Questions on situations asked during the training session. • Presentation assessment • Peer evaluation • Appropriate and effective project report For training the facilitators: • T3 practice sessions and grading by T3 (All student and faculty assessment packages are available)
R&D skills	The students must be able	Demonstrate appropriate:	• Assessment and

• Data management and searching /organizing skills	to: • Work with large amounts of data on computer systems • Organize data effectively • Identify and use relevant information effectively. • Research required information and data from either the given documents or from common search engines on the Internet	• Data management and searching/organizing skills	grading by instructor at the end of the training/project. • Appropriate and effective project report For training the facilitators: • T3 practice sessions and grading by T3 (All student and faculty assessment packages are available)
Innovation Skills	_	_	_

Part-II: Processes		
Processes required for conducting the Program	Process developed to attain the 'Course Outcome'	Process Implementation
1. Processes for **Empowering Soft Skills & Personal Attributes**	• Pre, interim, and post assessments • Interactive instructor-led classroom sessions with a proper feedback mechanism, • Self study tutorials • Practice sessions—2 types: instructor monitored and peer practice sessions	1. Conduct assessments and provide timely feedback at regular intervals using the provided assessment sheets 2. Monitor and keep track of students' progress during self study tutorials 3. Conduct practice session and provide immediate feedback 4. Encourage and track peer practice sessions during the tutorial hours
2. Processes for empowering **Employment Skills** (Team work, project management skills, attitudinal, ethics, etc.)	• Speaking activities • Writing activities • Listening and reading comprehension	1. Assign topic and explain the activity 2. Facilitate activity 3. Provide feedback
3. Processes to develop **Domain Skills & Competencies**	Lectures, assignments, doubt clearing sessions, hands-on exercises, role-plays, assignments and projects	1. Lectures that communicate ideas with practical examples. Lectures are interactive in nature, where students to be challenged with problems and assisted to discover the solution 2. Assignments to be solved by groups of students so that interpersonal skills are developed 3. Detailed lab guides for hands-on exercises to enable students to work on their own with little intervention from the faculty members 4. Exercises to be worked out by students on their own with constructive evaluation done by the teacher; Interactive dialogue between teacher and students, and among students 5. Role-plays involving two or more students demonstrating concepts/ideas 6. Projects to be supplemented with detailed specifications, templates, and checklists to give a real life feel
4. Processes to develop **Generic Transferable skills & Competencies**	• Interactive instructor-led classroom sessions	1. Encourage students to share their opinions and ideas during the session

	• Activities during the sessions • Assignments given by the faculty • Feedback and debriefing on the assignments done by the students	2. Conduct activities like brainstorming to encourage participation and sharing of their ideas 3. Conduct assessments through assignments and provide feedback	
5. Processes to develop **Course/Program Delivery Methods** Using i. Blended learning ii. ICT iii. E-Learning	• Slides for concepts • Activities to practice concepts • Faculty guidelines/manuals on how to evaluate and provide feedback • URLs that would help self/peer study	1. Conduct sessions, activities as per session plan and provide feedback for activities	
6. Process for delivering the appropriate pedagogy-appropriate usage to empower the requisite skills	• Blended approach with instructor-led training and technology-enabled learning • Teaching techniques made available as part of the FSIT package • Interactive Instructor-led sessions	1. Faculty to go through the pedagogy modules before handling sessions 2. Conduct sessions in a discussion mode	
7. Process to empower the Learning Experiences to be Provided		KPI	PEM
Entrepreneurship & Leadership Innovation approach R&D methods Assessments (Continuous & Summative) Industry Internship Internal Team Projects Tutorials Practical Face-to-Face Teaching	• Include activities for practice of concepts through relevant exercises suggested in session plan • Ensure feedback is shared as soon as possible • Encourage participation in class	• Student involvement, participation in class • Scores on the program level assessment	• Contribution of ideas and examples from students • Grades or scores in the assessments
8. Processes to empower Higher Order Thinking Skills (HOTS)		KPI	PEM
Applying	Application—Lab Guides, Student Workbook	• Submitted and presented the case findings • Submitted completed assignments, filled workbooks	• Grades given by faculty on the submissions and presentations
Analyzing	Analysis—Annotated Case Studies		
Evaluating	Evaluation—Review processes (code/document)		
Creating	Synthesis—Software Development Life Cycle processes		

9. (A) Processes to design and develop Assessments & Evaluation: Continuous		KPI	PEM
Knowledge: i. Foundation ii. Specialized Domain Understanding Application (HOTS) Analysis (HOTS) Synthesis(HOTS) Evaluation (HOTS) Behavioral Skills Effective Communication	• Design and conduct a pre test to assess level of students • Design and conduct interim assessment to track progress • Design and conduct a post test to assess level after completion of course • All speaking/written activities need to be evaluated and given feedback on • Knowledge—simple classroom quizzes • Understanding—concept description exercises • Application—case studies and hands on • Analysis—solved case studies for analysis • Synthesis—real life application development • Evaluation—review of real life applications	• Assessments scores • Students' progress evaluation done by faculty during self study tutorials • Faculty and peer feedback practice session	• Grades or scores in the assessment and track records
9. (B) Processes to develop Assessments and Evaluation: Summative		KPI	PEM
Knowledge: i. Foundation ii. Specialized Domain Understanding Application (HOTS) Analysis (HOTS) Synthesis(HOTS)	Same as 9 (A)		

Evaluation (HOTS) Effective Communication			
10. Classroom Design/layout		KPI	PEM
Infrastructure Tutorial rooms Internet LAN/WAN Labs Webinars	• Preferably online classrooms with projector will enhance the learning experience in the classroom • Lab guides will help the students to be on their own while doing hands-on assignments and reduce intervention from faculty • Class size: 20–25. • Classroom with required capacity, classrooms with movable chairs to facilitate speaking activities and with tables for written activities • Computer, projector • White board and marker pens • Language lab with facility to record	• Facilitator's effectiveness • Availability of resources to deliver the training • Student participation and learning	• Number of students employed in the industry
11. Process of Accreditation of the Curriculum		KPI	PEM
By an Industry Body/Sector Skills Council for IT & ITeS	As per recommendation from the IT council and approval process. IT council will be actively involved in the content development and deployment of the program. Members will review design and content inputs at various phases of development along with NASSCOM.	• Enrolments to the program • Student satisfaction from the courses • Facilitator satisfaction on completeness of the material	• No of enrolments • Satisfied scores given by the student to the training • Facilitator effectiveness
12. Processes to ensure Institutional Efficiency	Real time classrooms with appropriate, adequate seating arrangement that will: • encourage student		

	participation • facilitate group activities the classroom should have: 1. Adequate lighting 2. White board and pens 3. Projector Lab should have: 1. Infrastructure—20 computers, white board, white board markers, projector.		
13. Process to ensure Publications and Report Writing	• Appropriate faculty development for learner centric mode of teaching • Infrastructure (hardware & software) availability for conduct of the program • 100% Placements for students		
14. Process to ensure		Yes	No
IPR generation	IPR for the final materials will lie with NASSCOM. The individual member companies who have provided the content will hold the IPR for their individual topics.	√	
R&D	R&D in learning models more appropriate for the adult audience have led us to choose the Mission 10x learning pedagogy for this program.	√	
Innovation	The pedagogy used in this program promotes a learner centric approach and emphases on the use of Innovative and	√	

	collaborative learning methods such as group discussions, puzzles, demonstrations, model making, mnemonic instruction and impersonation.		
15. Process to ensure Entrepreneurship	NA	NA	NA

Part-III: Inputs			
Inputs for the Program	**Are the inputs in place?**		
	Yes	**No**	**Details**
1. Curriculum structure in place	√		- Program brief - Content outline - Session plans - Session inputs
2. Syllabus in place	√		
3. Infrastructure in place	√		• For TTT/TOT (batch of 25 trainers): ○ Classroom size—Min. 10 ft. x 15 ft. ○ U-Shaped table with a seating capacity of 25 ○ Computer/Laptop with speakers & CD ROM—1 (for master trainer) ○ Computer lab with 25 Computers (desktop) with following: ▪ CD Rom ▪ MS Office ▪ Typing Tutor (software) ▪ Speakers ▪ Headphones with microphone—25 ▪ Internet ○ LCD Projector & Screen—1 ○ Whiteboard—1 ○ Flip Charts—5 • For Student Training (batch of 30 candidates): ○ Classroom size—Min. 10 ft. x 15 ft. ○ Tables / chairs—30 ○ Computer/Laptop with speakers & CD ROM—1 (for trainer) ○ Computer lab with 25 Computers (desktop) with following: ▪ CD Rom ▪ MS Office ▪ Typing Tutor (software) ▪ Speakers ▪ Headphones with microphone—30 ▪ Internet ○ LCD Projector & Screen—1 ○ Whiteboard—1 ○ Flip Charts—5
4. Classroom Layout in place	√		
5. Faculty and Support Staff in place	√		Institution to provide the faculty and support staff as required.
6. ICT in place		√	ICT to be available at the training institute based on the stated requirements.
7. Content: text books and labs, internship programs, etc. as prescribed are available	√		List of reference books and lab guides provided. Institution to ensure availability of the same for the training program.
8. E-learning Program—Content & facilities in place		√	- Develop FSIT portal and host e-learning modules in the next phase

			- Content developed for the instructor-led modules will be used as base for developing the e-content.
9. Administrative processes in place		√	The administrative process to be established in the MOUs with the institutions delivering this course.
10. Lesson plans in place	√		Session plan and facilitator handbooks will be made available in the e-book and print format for all the facilitators.
11. Blended teaching-learning methodologies in place	√		Included in the faculty handbook and lab guides.
12. Assessment and evaluation practice in place	√		Assessments and guidelines for conducting these assessments along with expected solution are provided in the facilitator handbook.
13. Certification in place		√	Certification framework to be worked. Currently this program along with NAC-Tech test score will be considered by the industry to gauge employability of the student.
14. Approvals for standardization and parity with national & International standards in place			Not Applicable
15. Placement process in place (if applicable)			Not Applicable
16. Industry standards & acceptance		√	The industry has participated in the development of this program; outcomes of the program are for entry level roles in the IT industry.

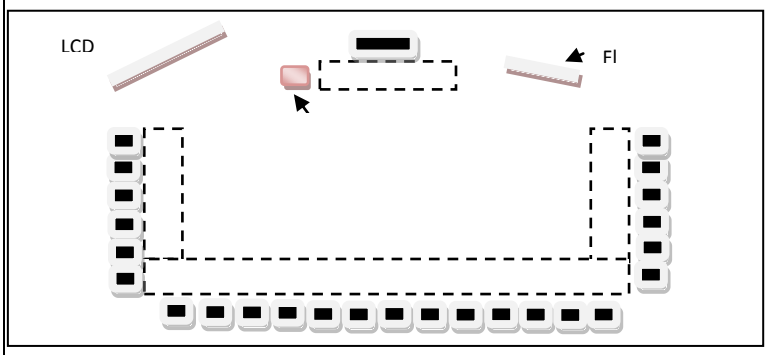
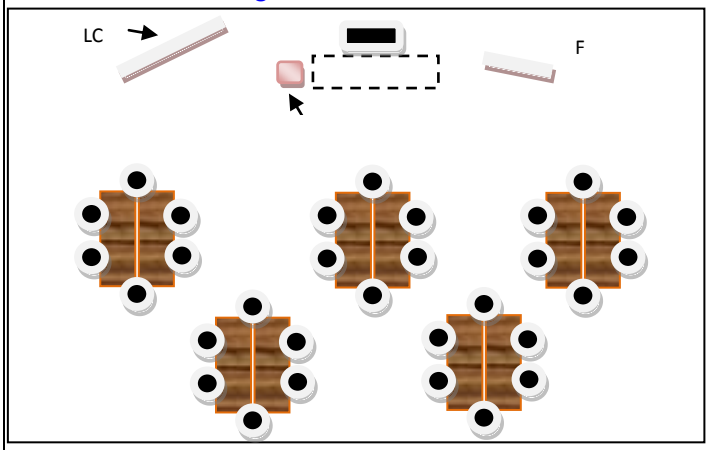
ANNEXURE-I

Curriculum Details

Curriculum Details	
Curriculum Structure	The following program to be run as an add-on program for students: • Basic skills/foundation skills termed as Foundation Skills in IT (FSIT) The program aims to build skills in the technology and the business area for students who are seeking jobs in the IT/Engineering industry. Foundation knowledge in the IT domain and basic skills to perform a job role are covered in this program. Students undertaking this program will be industry ready and will require less number of training days to become productive in their job roles. The idea behind the initiative is, that going forward, universities /colleges will consider making these programs compulsory for students or integrate the development of these skills into the teaching-learning program by allocating credits to these programs. Flow of the program: • The detailed facilitator guide and student handbook for the program can be sourced by the university/college from the NASSCOM identified publisher. • This will be followed by Train-the-Trainer (TTT) programs for select university faculty by NASSCOM/IT Skills Council members. • Post the TTT, the first batch of student training shall be launched in the university/affiliated colleges at identified centers. • Identified students, are pre-tested with the NAC-Tech Diagnostic, subsequently trained by the trained faculty and finally accessed via the NAC-Tech Final. • NAC-Tech Final scores will be forwarded to IT/Engineering companies for the first step toward employment. • An analysis of pre and post NAC-Tech scores will facilitate impact analysis with respect to skill transference, from the teacher to the taught. • Feedback to the university/college will aim to improve the teaching-learning methodology toward the development of these life skills and increased employability of the students concerned; it will also facilitate scaling faculty capacity.
Syllabus	**Technology—Fundamentals** • Introduction to Computer Systems, Operating Systems • Problem-solving Techniques • Basics of Programming **RDBMS** • Introduction to RDMS • Structured Query Language: DDL, DML, DCL • Advanced SQL Queries

	Software Development Life Cycle
	• Introduction to SDLC
	• Implementation Models
	• Unit and Integrate Testing
	• Integrated Project
	
	Networking
	• Network Protocols
	• Internetworking
	• Distributed Systems
	
	Campus to Corporate
	• Etiquette: Business, Email and Telephone
	• Goal Setting
	• Time Management
	• Industry Awareness
	  ○ Different types of Business Entities
	  ○ Structure, Conduct and Performance
	  ○ Vertical, Market differentiation
	
	Interpersonal Effectiveness
	• Business Communication
	  ○ Reading and comprehension
	  ○ Writing Skills
	  ○ Presentation Skills
	• Team Dynamics
	  ○ Interpersonal skills
	  ○ Team Work
	  ○ Managing Diversity
	• Problem Solving and Creativity
	  ○ Understand the problem solving lifecycle.
	  ○ Understand the typical process to solving problems
	  ○ Understand approaches to creative thinking
	  ○ Apply creative thinking to solving problems
	
	Project Management Approach
	• Principles of Project Management
	• Case Study 1
	• Case Study 2
	• Self Paced Learning
	• Final Project

Infrastructure Required	• For TTT/TOT (batch of 25 trainers):
	  ○ Classroom size—Min. 10 ft. x 15 ft.
	  ○ U-Shaped table with a seating capacity of 25
	  ○ Computer/Laptop with speakers & CD ROM—1 (for master trainer)
	  ○ Computer lab with 25 Computers (desktop) with following:
	  ▪ CD Rom
	  ▪ MS Office
	  ▪ Typing Tutor (software)
	  ▪ Speakers
	  ▪ Headphones with microphone—25

	▪ Internet ○ LCD Projector & Screen—1 ○ Whiteboard—1 ○ Flip Charts—5 • For Student Training (batch of 30 candidates): ○ Classroom size—Min. 10 ft. x 15 ft. ○ Tables/chairs - 30 ○ Computer/Laptop with speakers & CD ROM—1 (for trainer) ○ Computer lab with 25 Computers (desktop) with following: ▪ CD Rom ▪ MS Office ▪ Typing Tutor (software) ▪ Speakers ▪ Headphones with microphone—30 ▪ Internet ○ LCD Projector & Screen—1 ○ Whiteboard—1 ○ Flip Charts—5
Classroom Layout	**For TTT/TOT:**  **For student training:** 

Faculty and Support Staff	Faculty to be evaluated based on classroom experience. The faculty should have skills in the subject area and should have presentation skills to be able to engage the student. Support staff for the lab and classroom is required with technological skills to be able to troubleshoot errors in codes, and other procedures.
ICT requirements	We will be building e-content for the FSIT program in the next phase of development.
Text books	NA
Labs infrastructure	• A lab with a minimum of five computers for every three students and peripherals required to set up a network • The lab should have licensed software available to build and install the operating systems, domains and email systems, and a facility to record • The lab should have internet facility available to students • Preferably online classrooms with projector will enhance the learning experience in the classroom • White board and marker pens • Lab guides will help the students to be on their own while doing hands-on assignments and reduce intervention from faculty
Internship programs	NA
E-learning Program -Content & Facilities	E-learning for the program will be developed post the roll out of launch of the Instructor-led version
Lesson Plans Template	Lesson plan in courseware
Blended Teaching-learning Methodology details	Blended methodology—classroom training, with hands on lab exercises, self-paced learning and evaluation through assignments and quiz.
Assessment & Evaluation Practice Details Sample question papers;	Assessments and evaluation exercises are provided as a part of the courseware and will be delivered during the training. In addition, the student will be assessed through the NAC-Tech test. Please log on to www.nac.nasscom.in/nactech for further details.
End of Elective Certification	NA
Employment Skill Assessment	A pre and a post assessment NASSCOM Assessment of Competence is linked with the training. Details of the assessments are provided in Annexure V.

ANNEXURE-II

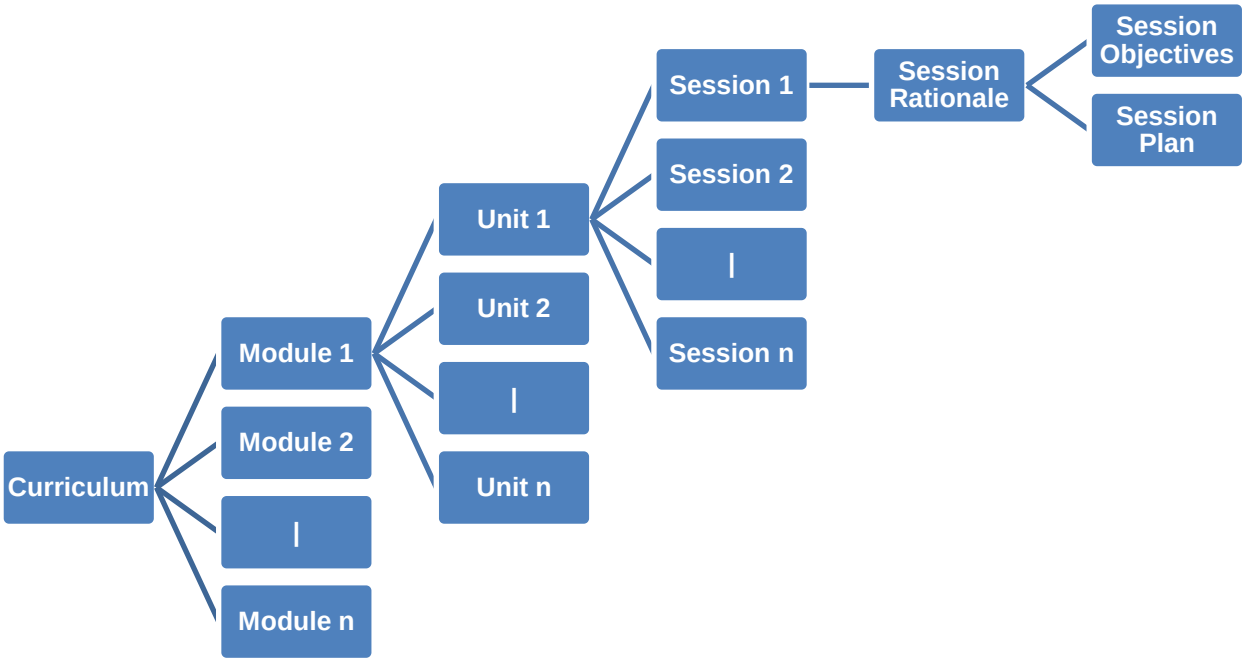
Content Outline—Guideline document for the Trainer: To be filled in by the trainer while customizing delivery

	Course Name: Foundation Skills in Information Technology	**Hours**							Lesson Plan for each activity in place Yes / No
		Face -to- Face	Team Work	individual project/ Internship + Feedback	Practical + Feedback	Practical+ Feedback	Assessments +Feedback		
							Continuous	Summative	
A	**Technology - Fundamentals** • Introduction to Computer Systems, Operating Systems • Problem solving Techniques • Basics of Programming								**Yes**
B	**RDBMS** • Introduction to RDMS • Structured Query Language: DDL, DML, DCL • Advanced SQL Queries								**Yes**
C	**Software Development Life Cycle** • Introduction to SDLC • Implementation Models • Unit and Integrate Testing • Integrated Project								**Yes**
D	**Networking** • Network Protocols • Internetworking • Distributed Systems								**Yes**
E	**Campus to Corporate** • Etiquette: Business, Email and Telephone • Goal Setting • Time Management • Industry Awareness								**Yes**

	○ Different types of Business Entities ○ Structure, Conduct and Performance ○ Vertical, Market differentiation								
F	**Interpersonal Effectiveness** • Business Communication ○ Reading and comprehension ○ Writing Skills ○ Presentation Skills • Team Dynamics ○ Interpersonal skills ○ Team Work ○ Managing Diversity • Problem Solving and Creativity ○ Understand the problem solving lifecycle. ○ Understand the typical process to solving problems ○ Understand approaches to creative thinking ○ Apply creative thinking to solving problems								**Yes**
G	**Project Management Approach** • Principles of Project Management • Case Study 1 • Case Study 2 • Self Paced Learning • Final Project								**Yes**

ANNEXURE-III

Directional Guideline Plan for Modules



ANNEXURE-IV

A. Lesson Plan Template:

***Day-wise Template**

Note: This table is to be filled by the facilitator for each session based on the schedule and class information.

Course Name	
Date, Day, Time	
Name of Faculty	
Name of Company/ College/University	
Number and Nature of Students	
Base Equipment	

***Course Lesson Plan templates**

Note: Lesson plans are provided as a part of the trainer material. The session breakup can be used from the trainer material.

Course Rationale, Objective & Plan

Course Rationale & Objective:

Course Rationale : The purpose of learning this course on _____, is to:
Course Objective: At the end of this module on_____, the learner will be able to:

Course Plan:

Title	
Duration (in hours)	
Session 1	
Session 2	
Session 3	
Session 4	
Session 5	
Session 6	
Session 7	
Session 8	
Session 9	
Session 10	
Session 11	
Session 12	
Session 13	
Session 14	
Session 15	
Session 16	
Session 17	
Session 18	
Session 19	

Session Rationale, Objective & Plan

Session Rationale : The purpose of learning this session on _____, is to:
Session Objective: At the end of this Session on _____, the learner will be able to:

Session Plan

Time	Content	Learning Aid / Methodology	Trainer Approach	Learner Activity	Learning Outcome (Skill, Competency)
	Recap/Introduction:				
	Sub-topic—1:				
	Sub-topic—2:				
	Sub-topic—3:				
	Conclusion & Summary				

ANNEXURE-V

Assessment Templates:

Any further assessments required by the trainer can be developed.

ANNEXURE-VI

Employment Assessment
NASSCOM Assessment of Competence—Tech (NAC)

AboutNAC-Tech

NAC-Tech has been conceived as an industry standard assessment and certification program to ensure the transformation of a "trainable" workforce into an "employable" workforce, hence creating a robust and continuous pipeline of talent for the IT/engineering industry. It is targeted at final year and pre-final year students, who will be seeking employment opportunities in the IT/engineering sector.

Conceptualization of NAC-Tech

In-depth meetings with the large recruiters in the industry were conducted to understand their recruitment practices, cause of attrition desired skills in a candidate, etc. Based on this, a job-skill matrix was developed which formed the basis for the design of this assessment program. Core and working committees from the industry were formed and constant interactions were made to make sure that the program was in line with the industry requirements. An evaluation committee was set up to finalize the vendors and decide on the approach to the pilot. Multi-tier evaluation of the vendors happened after the initial interaction. The identified vendors provided the content and technology to run the test. The companies that have helped develop the assessment program are—TCS, Wipro, Infosys, Accenture, Cognizant and HCL.

Key Features of NAC-Tech

Eligibility for NAC-Tech
- Any candidate appearing in “final year” of BE, B.Tech, MCA, MSc-IT is eligible to take the test
- Preferred scores of candidates: 60% aggregate in graduation, 12th standard & 10th standard

Advantages of NAC-Tech for various stakeholders

a. For Colleges/Universities
- Enable the college to generate a quantifiable picture of the knowledge and skill level of its students.
- Approach industry aggressively and in a more organized way for placement opportunities.

b. For Students
- Detailed feedback on their knowledge and skills help them decide career opportunities in different areas of IT.
- NAC-Tech score card enables them to leap-frog to the next level of selection to multiple companies endorsing the program.

c. For the Industry
- Industry gets a pool of pre-assessed candidates mapped against competencies required for entry level professionals.
- It helps them reach out to a wider geography and access talent from level 2 and 3 cities and institutions.

Test Matrix for NAC-Tech is illustrated below:

Part A (this must be attempted by all candidates)

Skill	Competencies Checked	Duration (in min)	Mode of delivery
Verbal Ability	To assess candidate's verbal building blocks by evaluating skills like grammar, spellings, punctuations, and vocabulary. To assess English usage by evaluating skills like structure, arguments, and verbal reasoning.	20	Online
Reading Comprehension	To assess candidate's comprehension of English passages and ability to make inferences from a large amount of information. Be able to connect the dots and make an assessment based on information and ideas spread across the passage.	10	Online
Analytical Reasoning	To assess problem-solving skills through questions on quantitative reasoning. To assess candidate's logical skills by evaluating skills like deduction, induction and visualization.	25	Online
Attention to Detail	To assess candidates eye for detail.	5	Online
	total duration	**60**	

Part B - Optional (can be attempted if the student desires so) (The candidate can choose any one of the domains)

Skill	Competencies Checked	Duration (in min)	Mode of delivery
IT	To assess candidate's technical skills in the core area of education.	30	Online
Electrical	-do-	30	Online
Electronics	-do-	30	Online
Mechanical	-do-	30	Online
Civil	-do-	30	Online
Chemical	-do-	30	Online
Textile	-do-	30	Online
Bio-Technology	-do-	30	Online
Telecommunications	-do-	30	Online
	total duration	**30**	

Minimum Configuration for NAC-Tech Tests	
Description	**Client PC (Test Taking PC) (with a Monitor, Mouse, & Keyboard)**
Operating System	Windows® XP SP3+, or 7
CPU	Pentium® IV and higher
RAM	1GB RAM and above
HDD	At least 500 MB free disk space
Web browser:	Internet Explorer 6.0, 7.0 or 8.0
Broadband Internet connection	E1 with a bandwidth of at least 1Mbps or Shared DSL or cable with a bandwidth of at least 2 Mbps for 25–30 users
Sound Card with necessary audio and video drivers	Yes (Should support recording & playback capabilities)—OPTIONAL
Headset with Microphone	Headset with a USB headset is strongly recommended -- OPTIONAL
Java Scripts	JRE 1.6 (Enabled in the browser)
Adobe Flash Player 10.0	Yes
UPS (assuming that generator will be used during power failure)	2 Hours Battery Backup
Generator (may be used for 8 hours or more if needed)	Yes
CD-ROM Drive	OPTIONAL
USB Ports	OPTIONAL
Antivirus	Yes
Screen resolution	1024 x 768 pixels
Network security access to allow http://202.138.124.234/Nactech2 (port 80)	
Disable pop-up blocker on all machines	

***