



IT - ITeS SSC
NASSCOM

Program Detail

Sector
IT-ITES

Sub-Sector
ENGINEERING AND R&D

Occupation
PRODUCT DESIGN ENGINEER

Reference ID: **SSC/Q4201**
NSQF Level **7**



Product Design Engineer
(Mechanical)

Product Design Engineer (Mechanical)

SSC/Q4201

Powered by



Background

The Indian IT-BPM industry has built its reputation in the global arena on several differentiators, chief among them being the availability of quality manpower. Organizations across the world recognize the value India brings to every engagement with its vast and readily available pool of IT professionals. Global entities have found it extremely effective to leverage this critical resource as a way to realize competitive edge.

In tandem with an evolving global manufacturing space, the Indian Engineering R&D sub-sector has adopted dynamic ways to respond to a new generation of customer needs across the full spectrum of product life-cycle. Organizations now need to demonstrate increasing adaptability in order to stay ahead of global competition.

The next wave in technological advances has disrupted the ways in which Designers and Engineers are at once empowered and challenged. Product development processes now exhibit increased agility, allowing for personalization and collaboration. Intuitive manufacturing capability enables industries to step into the world of connected services, where their product becomes the basis of meaningful service.

Given this trajectory, it is critical to develop and enable a pool of skilled talent with strong design fundamentals with an exposure to leading technology that surpasses global standards. It is to this end that the IT-ITeS Sector Skills Council NASSCOM (SSC NASSCOM) has been mandated with the objective of facilitating the creation of such a workforce, by building employment related standards for the IT-BPM industry as well as to keep track of changing scenario of talent demand and supply in the industry.

Courseware development is one of several efforts by which SSC NASSCOM aims to develop ready-to-deploy talent for IT-BPM Industry. The courseware (Facilitator Guide and a Student Handbook) set to support training in Product Design Engineer – Mechanical programs. Its development is aimed at empowering students with the required competencies at the entry level within the larger occupation of Product Engineering Design in the Engineering Research & Development (ERD) sub-sector of the industry.

To ensure the creation of an academic course that is both relevant and viable, SSC NASSCOM partnered with key industry stakeholders, namely, ANSYS, Autodesk, Geometric, Imaginarium, JCB, L&T Technology Services, SQS, Tata Technologies and TCS. Their inputs have significantly enhanced the design of the curriculum and courseware, and also addresses the need for faculty support, and achieves this by acquainting trainers with the latest advancements in pedagogy.

Introduction to the Qualification Pack

Qualifications Pack-Associate –Product Design Engineer (Mechanical) SSC/Q4201

SECTOR: IT-ITeS

SUB-SECTOR: Engineering and R&D

OCCUPATION: Product Engineering Design

REFERENCE ID: SSC/Q4201

ALIGNED TO NCO CODE: TBD

Brief Job Description: Individuals at this job are responsible for carrying out design, testing and assessment of mechanical systems. Digital Design tools supporting in developing prototypes for testing and visualization. It provides support in assessment and testing of advanced technology systems, subsystems and components in Product Engineering Design.

Personal Attributes: This job requires the individual to follow detailed instructions and procedures with an eye for detail. The individual should be analytical and result oriented and should demonstrate logical thinking.

Eligibility: Bachelor's Degree in Mechanical Engg. / Automobile / Electrical & Electronics Engg. / Production Engg. or any other course.

Work Experience: 0-2 years of work experience/internship in Product Engineering Design roles.

For detailed description of QP, please visit: <http://www.sscnasscom.com/qualification-pack/SSC/Q4201/>

About This content

The courseware will be based on a Qualification Pack which contains National Occupational Standards (NOSs). Each NOS will be taken up as a 'UNIT' which will cover all the Performance Criteria and relevant knowledge and skills with respect to the performance criteria covered. There are two books for every module, one for Teachers/Facilitators and other one for Students/participants

The UNITS will further be divided into 'TOPICS' which will further be divided into SUB TOPICS as follows:

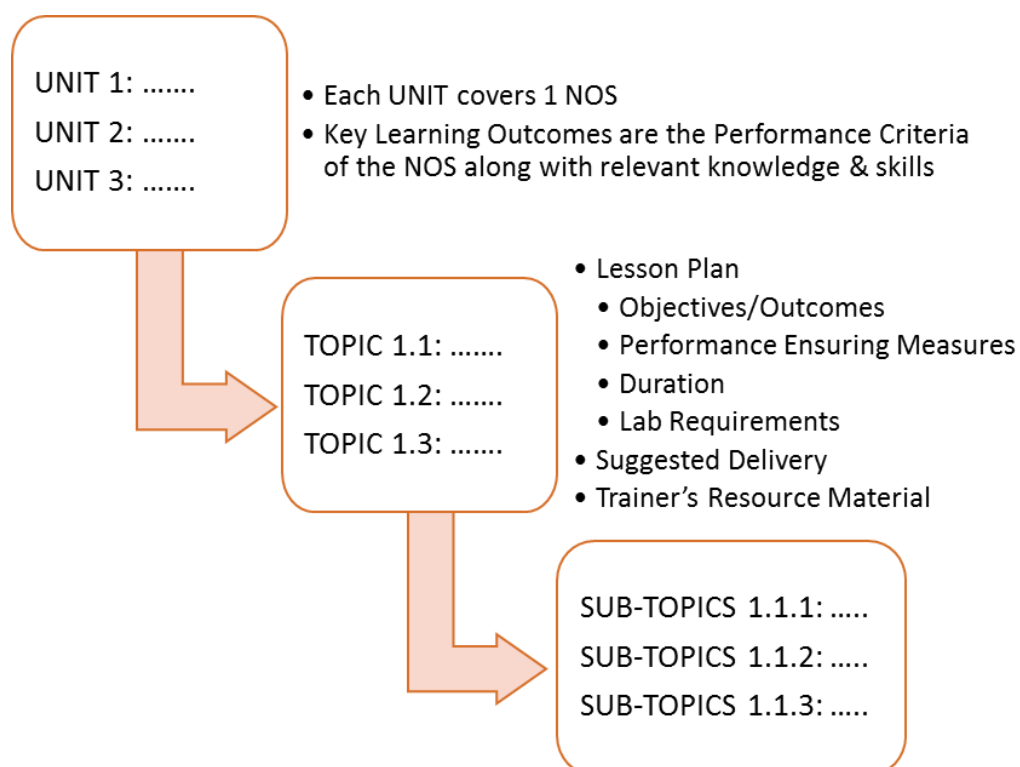


Table of Contents: (Facilitators Guide)

Module 1

S. No	Units and Topics	Page No
1	Guidelines for the Facilitator	11
	Key Learning Outcomes	12
	Introduction to the Qualification Pack	13
	Glossary of terms	14
	Nomenclature for QP & NOS UNITS	16
	Facilitator Preparation	18
	Principles of Facilitating	19
2	Introduction to the Industry, Sub-sector, Occupation and Job Role	21
	Key Learning Outcomes of the Unit	22
	Topic Plan	23
	IT-ITES Industry – An Introduction	24
	Relevance of IT BPM Industry Sector and its Sub-Sectors	26
	Sub-Sectors within the IT-BPM Industry	27
	Engineering and R&D Sub-Sector	28
3	Introduction to the NOS	33
	The Qualification Pack	34
	SSC/N4201: Create Simple Mechanical Designs	35
	SSC/N0703: Create Documents for Knowledge Sharing	36
	SSC/N9001: Manage Your Work to Meet Requirement	37
	SSC/N9002: Work Effectively With Colleagues	38
	SSC/N9003: Maintain a Healthy, Safe and Secure working Environment	39
	SSC/N9004: Provide data/information in standard formats)	40

	SSC/N9005: (Develop your knowledge, skills and competence)	41
4	Unit 1 : Conceptual Designing and Manage and Collaborate	43
	Key Learning Outcomes of the Unit	44
	Topic Plan	47
	1.1 Conceptual Design	49
	1.2 Manage and Collaborate	203
	Suggested Formative Assessment	222
5	Unit 2 : Manage your work to meet requirements	223
	Key Learning Outcomes of the Unit	224
	Topic Plan	226
	2.1 Time Management	231
	2.2 Work Management and Prioritization	239
	2.3 Quality and Standards Adherence	244
	Suggested Formative Assessment	247
6	Unit 3 : Work effectively with Colleagues	249
	Key Learning Outcomes of the Unit	250
	Topic Plan	252
	3.1 Team Work	256
	3.2 Professionalism	260
	3.3 Effective Communication	266
	Suggested Formative Assessment	281

Module 2

S. No	Units and Topics	Page No
1	Guidelines for the Facilitator	11
	Key Learning Outcomes	12
	Introduction to the Qualification Pack	13
	Glossary of terms	14
	Nomenclature for QP & NOS UNITS	16
	Facilitator Preparation	18
	Principles of Facilitating	19
2	Introduction to the Industry, Sub-sector, Occupation and Job Role	21
	Key Learning Outcomes of the Unit	22
	Topic Plan	23
	IT-ITES Industry – An Introduction	24
	Relevance of IT BPM Industry Sector and its Sub-Sectors	26
	Sub-Sectors within the IT-BPM Industry	27
	Engineering and R&D Sub-Sector	28
3	Introduction to the NOS	33
	The Qualification Pack	34
	SSC/N4201: Create Simple Mechanical Designs	35
	SSC/N0703: Create Documents for Knowledge Sharing	36
	SSC/N9001: Manage Your Work to Meet Requirement	37
	SSC/N9002: Work Effectively With Colleagues	38
	SSC/N9003: Maintain a Healthy, Safe and Secure working Environment	39
	SSC/N9004: Provide data/information in standard formats)	40
	SSC/N9005: (Develop your knowledge, skills and competence)	41

4	Unit 1 : Designing Parts, Managing Assemblies and Design Automation	43
	Key Learning Outcomes of the Unit	44
	Topic Plan	47
	1.3 Designing parts	49
	1.4 Managing assemblies	163
	1.5 Design Automation	237
	Suggested Formative Assessment	323
5	Unit 2 : Maintain healthy, safe & secure working environment	325
	Key Learning Outcomes of the Unit	326
	Topic Plan	328
	2.1 Workplace Safety	333
	2.2 Report Accidents and Emergencies	339
	2.3 Protect health and safety as you work	349
	Suggested Formative Assessment	358
6	Unit 3 : Provide data/information in standard formats	359
	Key Learning Outcomes of the Unit	360
	Topic Plan	362
	3.1 Knowledge Management	365
	3.2 Standardized Reporting and Compliance	375
	3.3 Decision Models	381
	Suggested Formative Assessment	389

Module 3

S. No	Units and Topics	Page No
1	Guidelines for the Facilitator	11
	Key Learning Outcomes	12
	Introduction to the Qualification Pack	13
	Glossary of terms	14
	Nomenclature for QP & NOS UNITS	16
	Facilitator Preparation	18
	Principles of Facilitating	19
2	Introduction to the Industry, Sub-sector, Occupation and Job Role	21
	Key Learning Outcomes of the Unit	22
	Topic Plan	23
	IT-ITES Industry – An Introduction	24
	Relevance of IT BPM Industry Sector and its Sub-Sectors	26
	Sub-Sectors within the IT-BPM Industry	27
	Engineering and R&D Sub-Sector	28
3	Introduction to the NOS	33
	The Qualification Pack	34
	SSC/N4201: Create Simple Mechanical Designs	35
	SSC/N0703: Create Documents for Knowledge Sharing	36
	SSC/N9001: Manage Your Work to Meet Requirement	37
	SSC/N9002: Work Effectively With Colleagues	38
	SSC/N9003: Maintain a Healthy, Safe and Secure working Environment	39
	SSC/N9004: Provide data/information in standard formats)	40
	SSC/N9005: (Develop your knowledge, skills and competence)	41

4	Unit 1 : Product Documentation and Visualization	43
	Key Learning Outcomes of the Unit	44
	Topic Plan	47
	1.6 Product Documentation	49
	1.7 Product Visualization	197
	Suggested Formative Assessment	256
5	Unit 2 : Develop your knowledge, skills and competencies	257
	Key Learning Outcomes of the Unit	258
	Topic Plan	260
	2.1 Knowledge, skills and competence	261
	2.2 Training and development	270
	2.3 Learning and development policies and record keeping	276
	Suggested Formative Assessment	283
6	Unit 3 : Create documents for knowledge sharing	285
	Key Learning Outcomes of the Unit	286
	Topic Plan	289
	3.1 MS Visio	292
	3.2 MS Word	300
	3.3 MS Excel	311
	3.4 MS Powerpoint	316
	Suggested Formative Assessment	326

IT-ITES Industry – An Introduction



This topic presents the knowledge and conceptual understanding of the IT-ITES Industry. It will help explain the context of the role that this course is preparing the learner for, its positioning in the sector and relevance to society. The purpose of providing the learner with this information is to enhance the learner's motivation and interest in taking up this training and the role.

Relevance of IT-ITES Industry

General Overview

The Information Technology – Business Process Management (IT-BPM) industry has been fuelling India's growth story.

In addition to contributing to the country's Gross Domestic Product (GDP) and exports, the industry has played a big role in influencing the socio-economic parameters across the country.

The industry has helped provide employment and a good standard of living to millions. It has placed India on the world map with an image of a technologically advanced and a knowledge-based economy.

Growth of the IT-BPM industry has provided India with a wide range of economic and social benefits which includes creating employment, raising income levels, promoting exports and significantly contributing to the GDP of the country.

This sector attracts amongst the largest investments by venture capitalists and has been credited with enabling the entrepreneurial ventures of many, in the country.

The IT-BPM industry has almost doubled in terms of revenue and contribution to India's GDP over the last six years.

Relevance of IT BPM Industry Sector and its Sub-Sectors

Organizations within the IT-BPM Industry

The organisations within the IT-BPM Industry are categorised along the following parameters:

- Sector the organisation is serving
- Type as well as range of offering the organisation provides
- Geographic spread of operations and
- Revenues and size of operations

A broad structure of the Industry based on the parameters identified in the Indian context is represented below :

Multi-national Companies (MNCs):

MNC organisations have their headquarters outside India but operate in multiple locations worldwide, including those in India. They cater to external clients (both domestic and/or global).

Indian Service Providers (ISPs):

ISPs are organisations that have started with their operations in India. Most of these organisations would have their headquarters in India, while having offices at many international locations.

While most have a client base which is global as well as domestic, there are some that have focussed on serving only the Indian clients.

Global In-house Centres (GIC):

GIC organisations cater to the needs of their parent company only and do not serve external clients. This model allows the organisation the option to keep IT Operations in-house and at the same time, take advantage of expanding their global footprint and offering opportunities for innovation in a cost-effective manner.

Sub-Sectors within the IT-BPM Industry

The IT-BPM industry has four sub-sectors as listed in the subsequent figure.

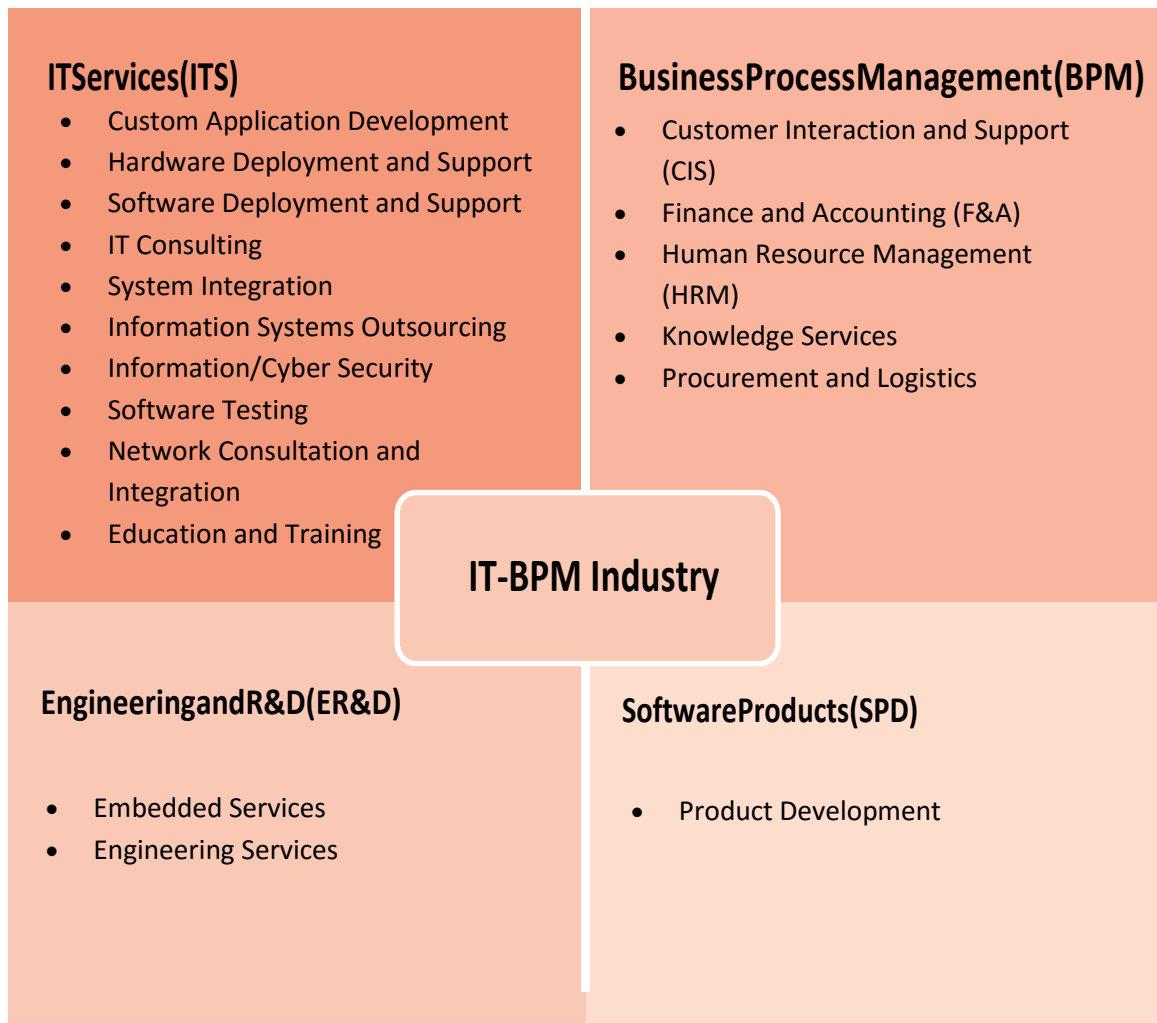
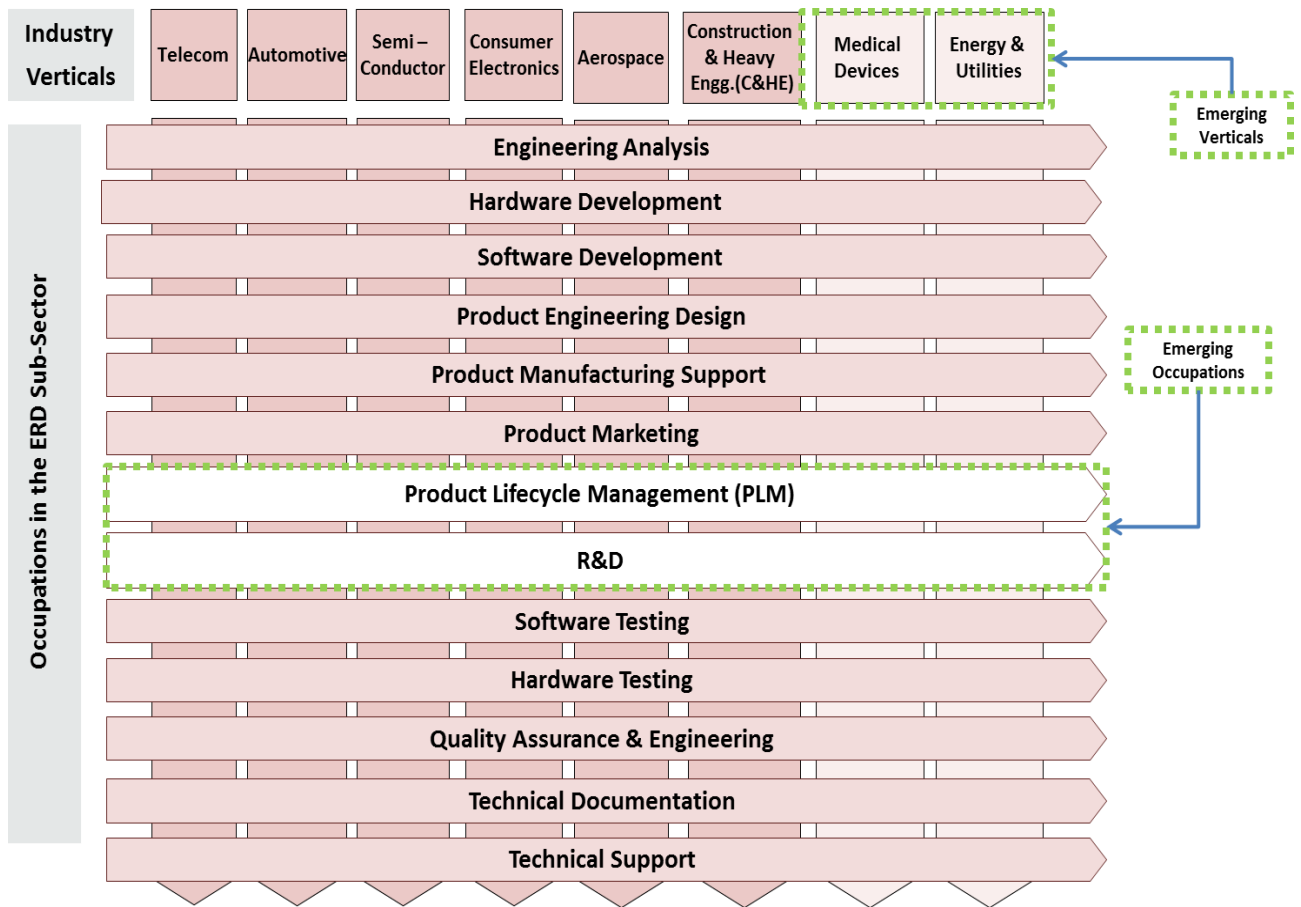
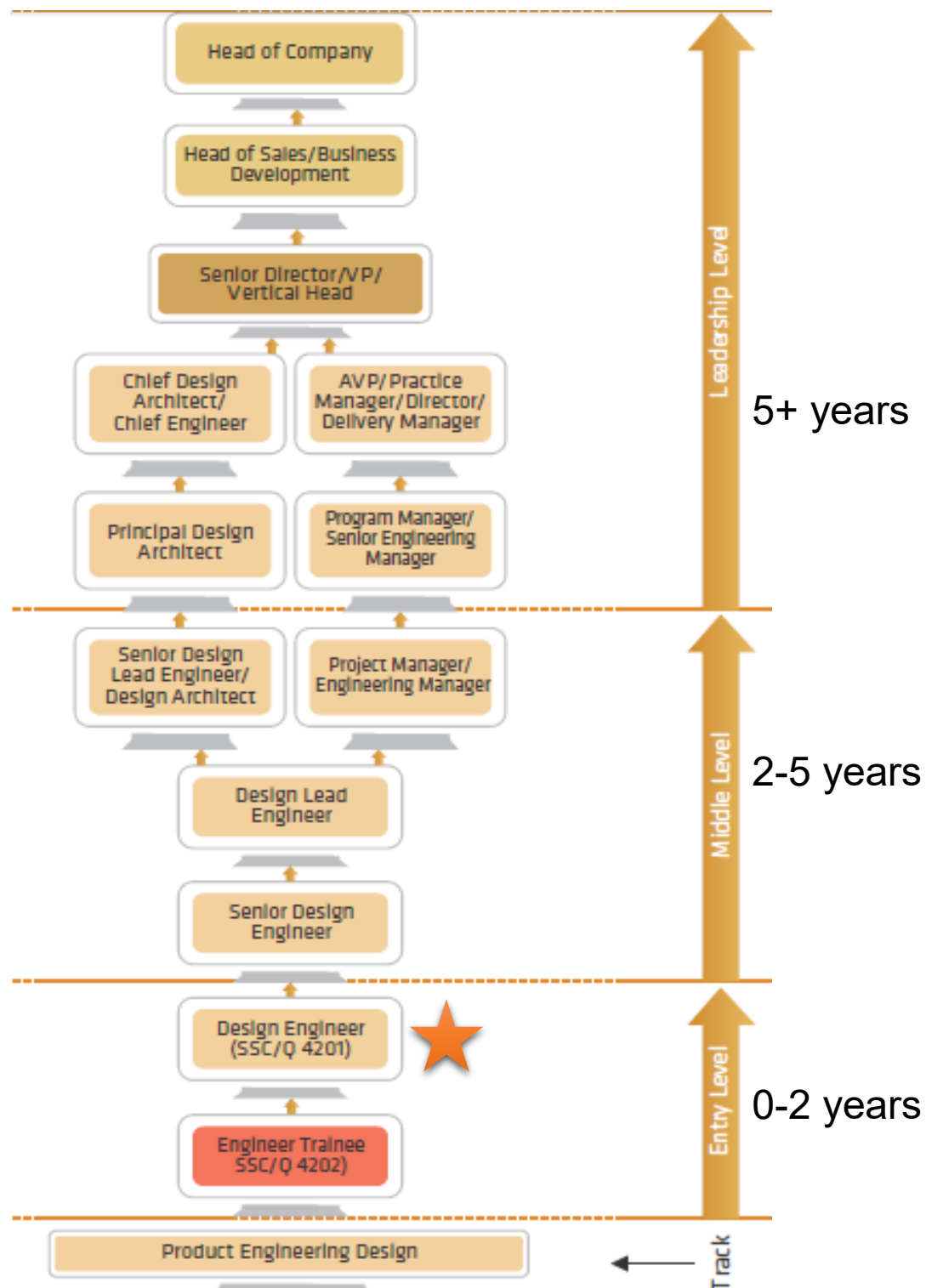


Figure: Sub-Sectors in the IT-BPM Industry, Source: IT-ITES Sector Skill Council NASSCOM

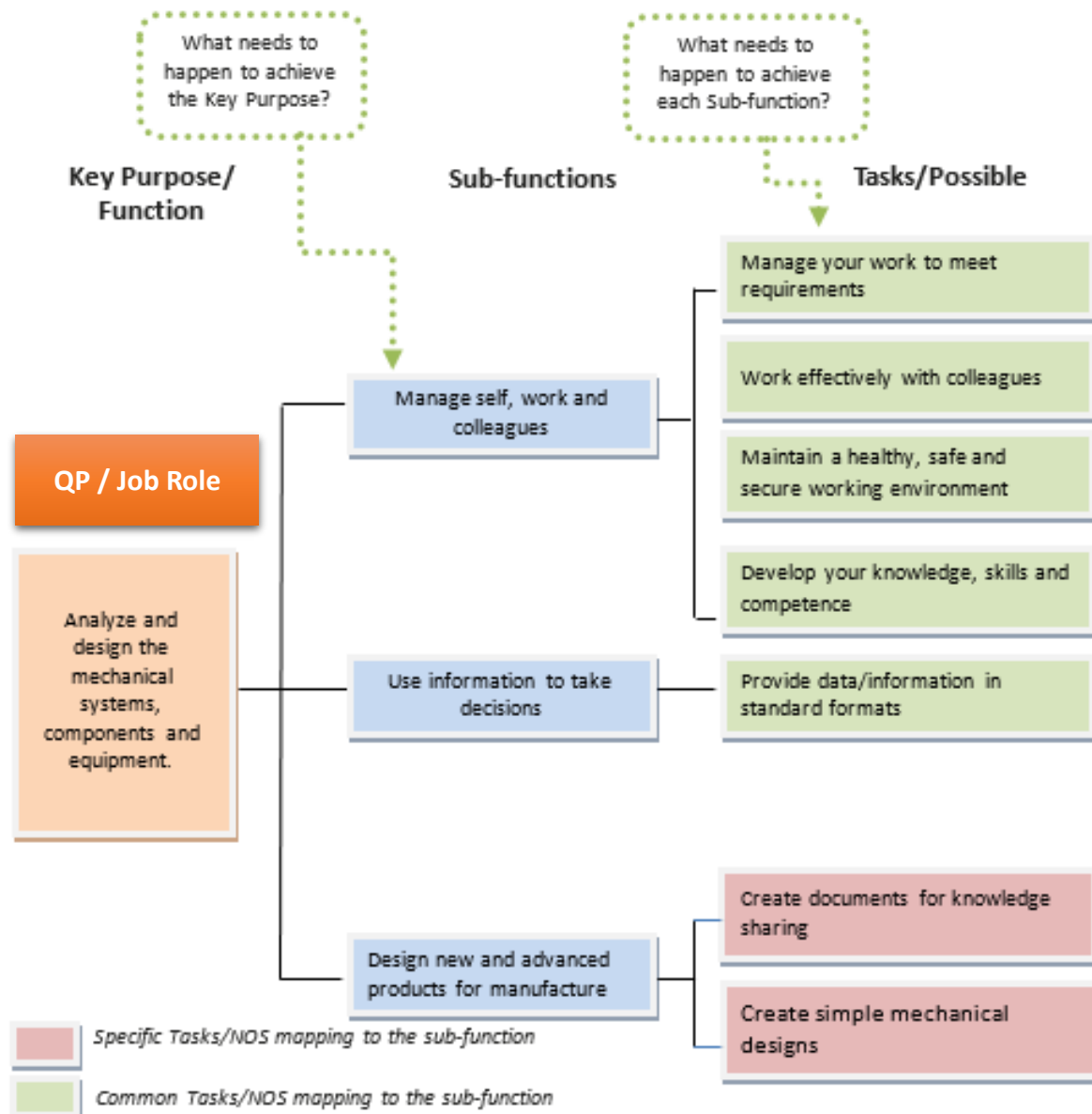
Engineering and R&D Sub-Sector – An introduction



Product Design Engineering Career Map



Functional Analysis – Product Design Engineer



Functional Mapping – Product Design Engineer

Functional Mapping for Product Design Engineer - Mechanical (SSC/Q4201), NSQF Level 7		
Key Purpose of the Job/ Function	Sub-functions	Tasks/National Occupational Standards (NOS)
Analyze and design the mechanical systems, components and equipment.	Manage self, work and colleagues	i. SSC/ N 9001: Manage your work to meet requirements
		ii. SSC/ N 9002: Work effectively with colleagues
		iii. SSC/ N 9003: Maintain a healthy, safe and secure working environment
		iv. SSC/ N 9005: Develop your knowledge, skills and competence
	Use information to take decisions	i. SSC/ N 9004: Provide data/information in standard formats
	Design new and advanced products for manufacture	i. SSC / N0703: Create documents for knowledge sharing
		ii. SSC / N4201: Create simple mechanical designs