CAD/CAM COURSE
7th TERM

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COURSE CONTENTS: INTRODUCTION TO CAD/CAM, COMPUTER METHODS IN CAD/CAM, GEOMETRIC MODELING, TRANSFORMATIONS, PROJECTIONS, CAD/CAM DATABASES, AUTOMATED MACHINE TOOLS & CUTTING TOOLS, NUMERIC CONTROL, MOTION CONTROL, APT PROGRAMMING, CNC MACHINE TOOLS PROGRAMMING, ROBOTICS, CONFIGURATIONS & MOTIONS

MARKS DISTRIBUTION

- Assignments & Attendance = 20 Marks (sessional)
- Examination = 80 Marks
- Practical = 30 Marks
- Project & Seminar = 20 Marks (Group Work)

LECTURE # 1

CAD/ CAM

TOPICS

- Introduction to CAD/CAM
- understanding of Product Design Cycles with CAD/CAM
- Benefits of CAD/CAM

INTRODUCTION TO CAD/CAM

- CAD stands for Computer Aided Designing while CAM is the abbreviation of Computer Aided Manufacturing
- Computer is helping to Design, Analyze & Manufacture the Product with in short span of time
- CAD/CAM is playing a major role in reducing the time to market
- Precision & Accuracy is achieved in product design & development

TIME REDUCTION TO MARKET

- The use of computers has reduced the time to market with the following applications

(a) Generating Product Concept

Product concept is generated precisely along with different alternatives

(b) Product Variation

- Computer generated models can be easily modified
- Save time by avoiding multiple prototypes

TIME REDUCTION TO MARKET- CONTD.

(c) Analysis

Analysis of Geometric Models on a computer *can prevent testing of prototypes*

(d) Production Drawings

Much faster than conventional drawings

(e) Fast Communication

Communication of any type at any stage of the product development and marketing can be enhanced by a large factor using computers

TIME REDUCTION TO MARKET- CONTD.

(f) Control

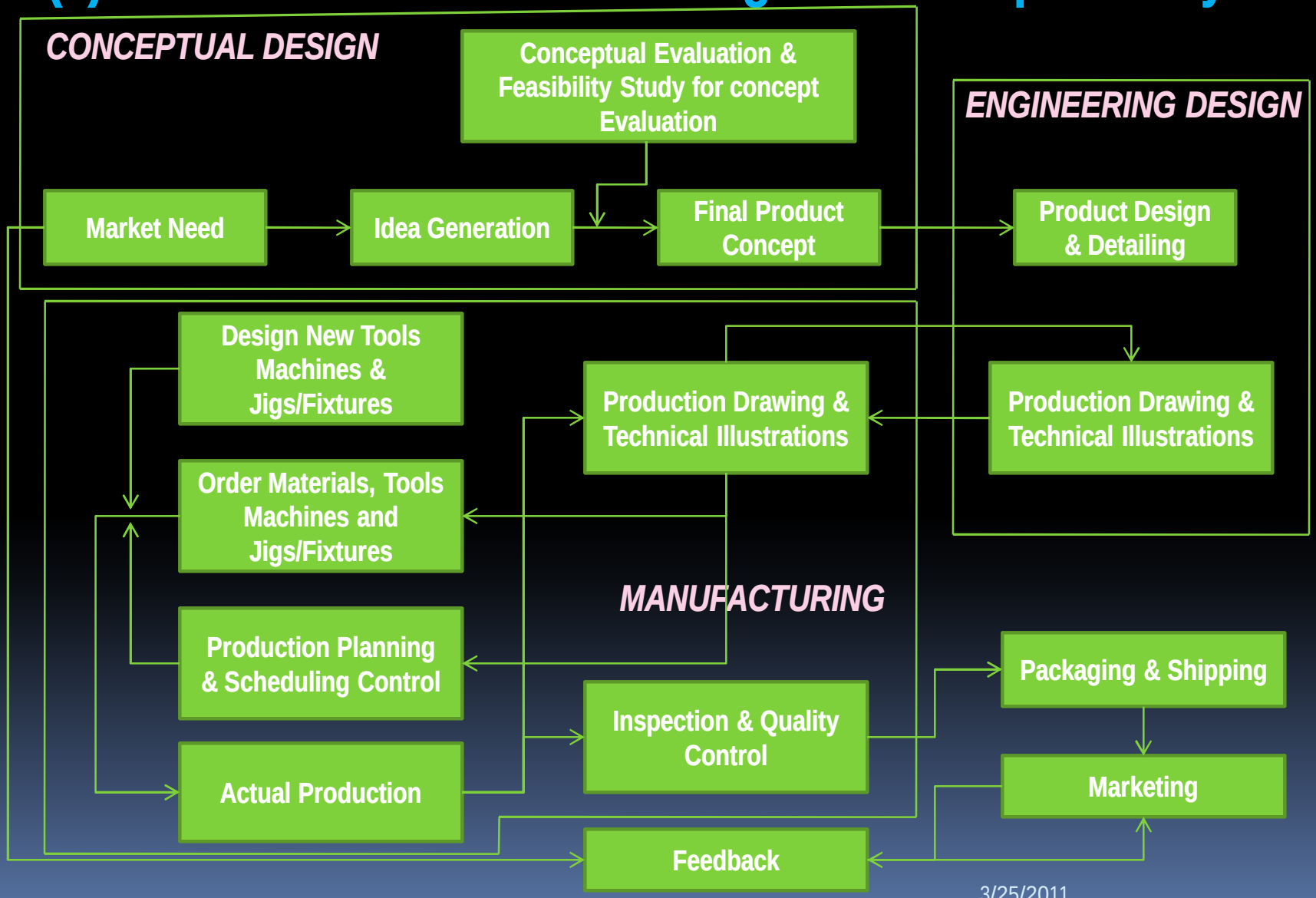
- Better Control over manufacturing
- Accurate Process Planning
- Less defects

(g) Distribution & Marketing

Computers used a control tool for distribution, marketing & sales to collect useful feedback from the customers

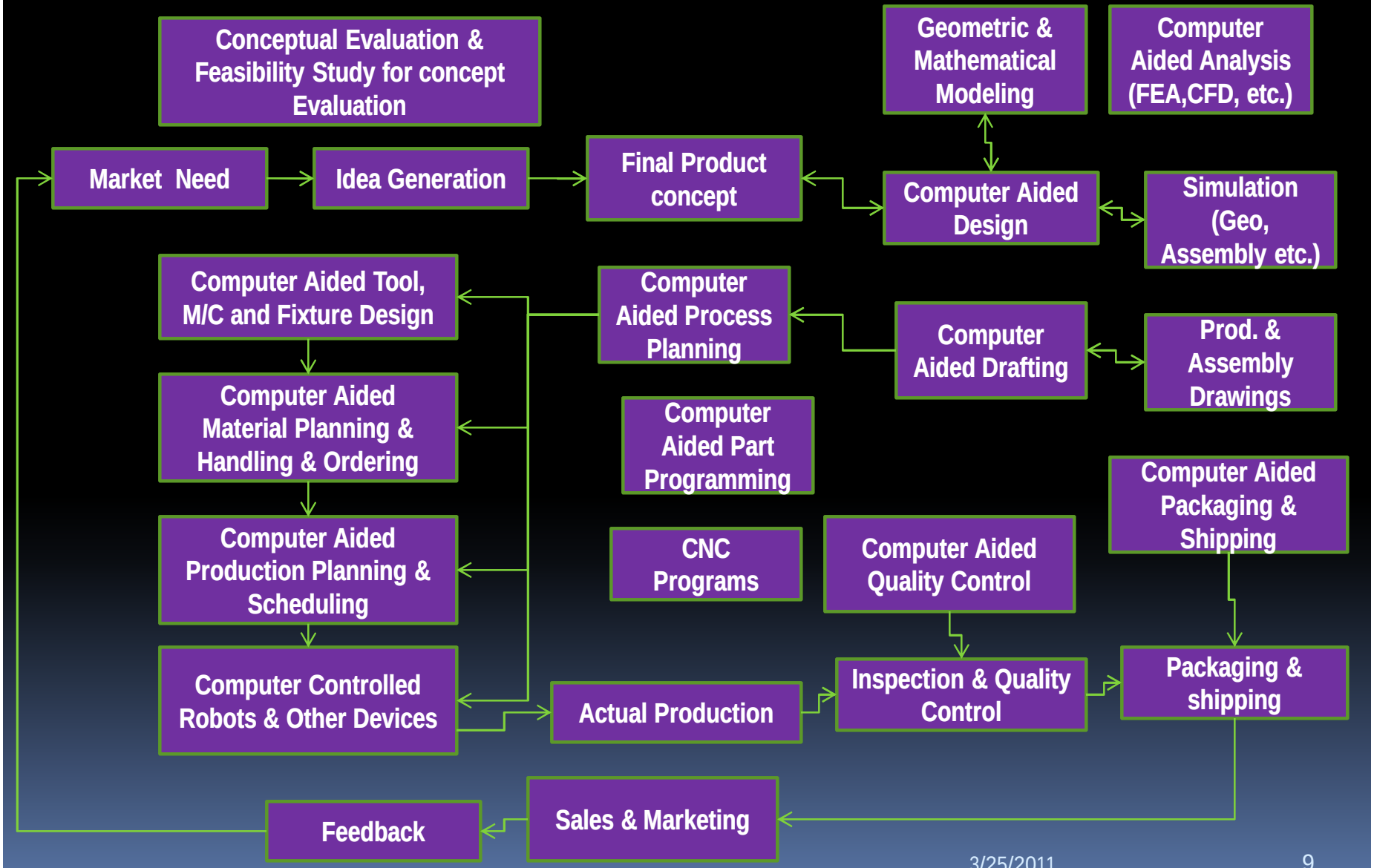
PRODUCT DESIGN CYCLE

(a) Conventional Product Design & Development Cycle



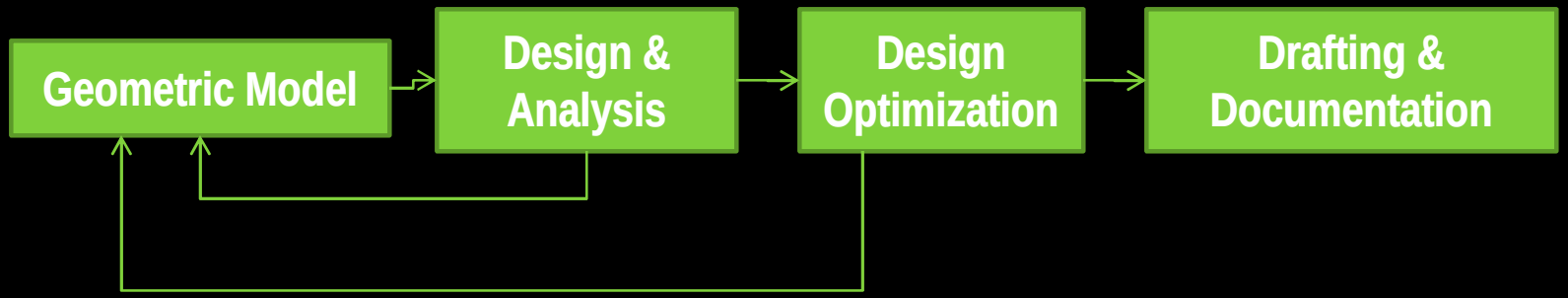
PRODUCT DESIGN CYCLE- CONTD

(b) Product Design & Development Cycle with Computers



COMPUTER AIDED DESIGN- CAD

The various phases of CAD section are as follows



- ***Geometric Modeling***

  Geometric modeling and computer graphic helps to generate and visualize models on which the analysis is done
- ***Design & Optimization Tool***

  Algorithms for exclusive applications are applied onto the virtual product already modeled
- ***Drafting & Documentation Tool***

  The model already created, analyzed and optimized guarantees a safe model under real conditions. The safe model's drawings are to be communicated to the production floor with technical illustrations

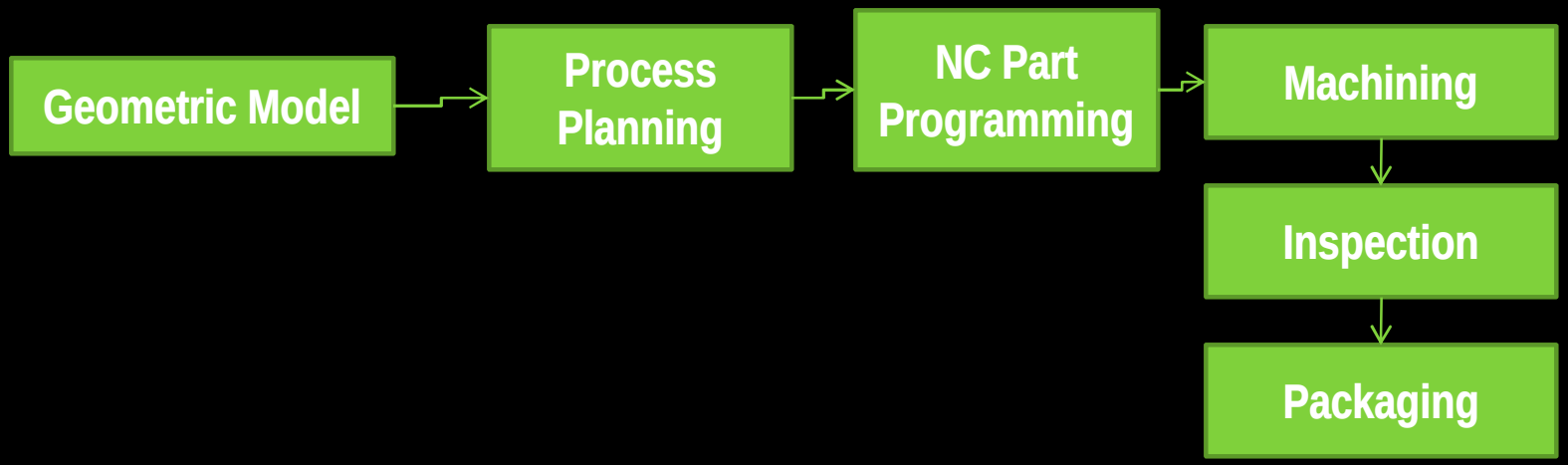
DEFINITION OF CAD

A Process of use of computers in creating, analyzing, modifying, optimizing and drafting /documenting a product data so as to achieve its design goal efficiently and effectively is called CAD

Computer Aided Drafting	Computer Aided Design/ Modeling
This is done after analysis is performed on the geometric model	This is done before analysis is performed on geometric model
The dimension shown in computer aided drafting are safe , since these are drawn after analysis	This provides the dimensions which may or may not be safe
This is generally a 2D drawing	This is a 2D or 3D model
These are made basically for conveying the production design	The model is used for design analysis
This is drawn with reference from the model already created	Model is developed from scratch

COMPUTER AIDED MANUFACTURING- CAM

Various phases of computer aided manufacturing are as follows



A Process of use of computers in planning, manufacturing, inspecting and controlling the manufacturing operation is called CAM

COMPUTER INTEGRATED MANUFACTURING- CIM

The process of integration of CAD, CAM and business aspects of a factory is called CIM

CIM attempts to describe complete automation with all processes, functioning under computer control

CIM Includes MIS (Management Information System), sales, marketing, finance, database management system, design, manufacturing, monitoring and control and bar code software etc. which helps to manage and control the overall factory environment

BENEFITS OF CAD/CAM

- Market needs and demands can be easily gathered
- CAD is faster and accurate method of designing components of products
- With CAD technologies, it is easy to change or manipulate the geometric shapes, sizes and other specifications to try out different variants without actually making prototypes
- CAD helps to reduce the engineering personal requirements

BENEFITS OF CAD/CAM- CONTD

- A component can be easily drafted after designing because of its associativity
- Several design and manufacturing factors can be considered simultaneously and therefore can be designed concurrently
- CAD utilizes the capability of advanced graphics and with this, models can be envisioned as real products
- CAM assures better organized machining and process planning and hence increase productivity

BENEFITS OF CAD/CAM- CONTD

- CAM tries to ensure least production halts because of organized planning of inventory
- Organizations are benefited from less rejection because of computer aided control and monitoring of process using CAM
- It helps to bring product in the market much faster than traditional design and development