

M. TECH CYBER SECURITY

CURRICULUM & SYLLABUS

2025
REGULATION



M.Tech

CYBER SECURITY

2025 REGULATION

CURRICULUM & SYLLABUS

SEMESTER III

CURRICULUM

Semester III

SLOT	COURSE CATEGORY	COURSE CODE	COURSE NAME	L	T	J	P	S	C
A		M250902/CN300A	MOOC	-	-	-	-	-	2
B		M250902/CN300B	Audit Course	3	0	0	0	2	-
C		M250902/CN340C	Internship	-	-	-	-	-	3
D	PS	M250902/CN340D	Dissertation Phase 1	0	0	17	0	2	11
(L- Lecture, T-Tutorial, J-Project, P-Practical, S-Self-learning & Team Work, C- Credit)									

*MOOC Course to be successfully completed before the commencement of fourth semester

M250902/CN300A MOOC COURSES

The MOOC course shall be considered only if it is conducted by the agencies namely AICTE/NPTEL/SWAYAM or NITTTR. The MOOC course should have a minimum duration of 8 weeks and the content of the syllabus shall be enough for at least 40 hours of teaching. The course should have a proctored/offline end semester examination. The students can do the MOOC according to their convenience, but

shall complete it by third semester. The list of MOOC courses will be provided by the concerned BoS if at least 70% of the course content match with the area/stream of study. The course shall not be considered if its content has more than 50% of overlap with a core/elective course in the concerned discipline or with an open elective.

MOOC Course to be successfully completed before the commencement of fourth semester (starting from semester 1). A credit of 2 will be awarded to all students whoever successfully completes the MOOC course as per the evaluation pattern of the respective agency conducting the MOOC.

AUDIT COURSE

SLOT	SL NO	COURE CODE	COURSE NAME	L-T-P	HOURS	CREDIT
B	1		DESIGN THINKING	3-0-0	3	-
	2		ACADEMIC WRITING	3-0-0	3	-

COURSE DESCRIPTION							
REGULATION	2025	L-T-J-P-S	3-0-0-0-2	VERSION	26/0	CREDITS	0
(L- Lecture, T-Tutorial, J-Project, P-Practical, S-Self-learning & Team Work)							

COURSE CODE	COURSE NAME	COURSE CATEGORY
	DESIGN THINKING	AUDIT COURSE
PRE-REQUISITE		
Nil		

PREAMBLE
This course offers an introductory exploration of fundamental engineering concepts and techniques, the design process, analytical thinking and creativity, as well as the fundamentals and development of engineering drawings, along with their application in engineering problems.

RATIONALE
This course provides a foundation in engineering principles, problem-solving, and design thinking essential for engineering practice. It develops analytical and creative skills while introducing engineering drawing as a tool for visualizing and communicating technical ideas. The course prepares students for higher-level engineering studies and real-world engineering applications.

COMPETENCY STATEMENT/s
1. Apply fundamental engineering concepts, design thinking, and problem-solving techniques to address basic engineering challenges.
2. Interpret and prepare engineering drawings using standard conventions for effective technical communication and visualization.

CO	CO Statement	Competency Mapping	Cognitive (C)	Psychomotor (P)	Affective (A)
1	Apply fundamental engineering concepts, analytical thinking, and problem-solving techniques to solve basic engineering problems.	CC1	A	M	Rs
2	Apply the engineering design process and creative thinking approaches to develop solutions for simple engineering problems.	CC1	A	M	V
3	Interpret engineering drawings using standard engineering conventions and graphical communication techniques.	CC2	A	P	V
4	Analyze engineering problems and communicate technical ideas effectively through engineering graphics and visualization techniques.	CC1, CC2	An	Ar	O

TEACHING AND ASSESSMENT SCHEME													
Teaching Scheme / Week					Hours / Semester	Credit	Examination Scheme						
							Theory			Practical			Total
L	T	J	P	S	(30+20)	C	CIA	ESE	Total	CIA	ESE	Total	
3	0	0	0	2		-	40	60	100				100
L: Lecture (One unit is of one-hour duration), T: Tutorial (One unit is of one-hour duration), P: Practical (One unit is of one-hour duration), J: Project (One unit is of one-hour duration), S: Self-Learning & Team Work (One unit is of one-hour duration), CIA: Continuous Internal Assessment, ESE: End Semester Examination													

SYLLABUS (Major Topics)

Module	Title	Major Topics	Hrs
1	Design process	Traditional design, Design Thinking Approach, Introduction to Design Thinking, History and evolution of Design Thinking, Role of design thinking in the human-centred design process. Design space, Design Thinking in a Team Environment, Team formation.	7
2	Design Thinking Stages	Empathize, Define, Ideate, Prototype and Test. The importance of empathy, Building a user-centred mindset. Problem statement formulation, User needs and pain points, establishing target specifications, Setting the final specifications.	7
3	Ideation	Generating Ideas, Brainstorming techniques, Application of Aesthetics and Ergonomics in Design. Bio-mimicry, Conceptualization, Visual thinking, Drawing/Sketching, Presenting ideas.	7
4	Prototyping and testing	Use of prototyping, Types of prototypes, Rapid prototyping techniques, User testing and feedback collection, Iterative prototyping, testing to gauge risk and market interest	5
5	IPR in design	Entrepreneurship/business ideas, Patents and Intellectual Property, Agility in design, Ethical considerations in design. Overcoming common implementation challenges	4

Sl. No	Self-learning / Team Work Description
1	Study and summarize a successful product or service developed using the Design Thinking approach.
2	Explore engineering solutions inspired by nature and present their applications.
3	Investigate recent advancements in 3D printing and rapid prototyping techniques.
4	Study a patent related to an engineering innovation and analyze its key features.
5	Examine the role of ethics and sustainability in modern engineering design through real-world examples.

SUGGESTED LEARNING RESOURCES

Text Book			
Sl. No.	Title of Book	Author	Publication
1	Design Thinking: Understand – Improve – Apply	Christoph Meinel, Larry Leifer and Hasso Plattner	Springer Berlin, Heidelberg, 2011 Edition
2	Design Thinking: Integrating Innovation, Customer Experience, and Brand Value	Thomas Lockwood and Edgar Papke	Allworth Press, 2009 Edition

Reference			
Sl. No.	Title of Book	Author	Publication
1	Design Your Thinking	Pavan Soni	Penguin Random House India Private Limited, 2020 Edition
2	Design Thinking : A Guide to Creative Problem Solving for Everyone	Andrew Pressman	Taylor & Francis, 2018 Edition
3	Design Thinking Techniques and Approaches	N Siva Prasad	Ane Books Pvt. Ltd., 2023 Edition

Web Resource	
1	https://onlinecourses.nptel.ac.in/e-learning/preview/noc22_mg32
2	https://onlinecourses.nptel.ac.in/e-learning/preview/noc21_mg63

DETAILED SYLLABUS								
Module	Title	Topic	Mode of Delivery	CO	Learning Domain			Hrs
					C	P	A	
1	Design process	Design process: Traditional design, Design Thinking Approach. Introduction to	Lecture	2	U	M	Rs	3

		Design Thinking, History and evolution of Design Thinking.						
		Role of design thinking in the human-centred design process. Design space	Lecture, Discussion	2	U	M	V	2
		Design Thinking formation.	Activity Based Learning	2	A	M	V	2
2	Design Thinking Stages	Design Thinking Stages: Empathize, Define, Ideate, Prototype and Test.	Lecture	2	U	M	V	2
		The importance of empathy, Building a user-centred mindset.	Discussion, Case Study	2	A	M	V	2
		Problem statement formulation User needs and pain points, establishing target specifications, Setting the final specifications.	Activity Based Learning	1,2	A	P	V	3
3	Ideation	Generating Ideas, Brainstorming techniques.	Activity Based Learning	2	A	M	V	2
		Application of Aesthetics and Ergonomics in Design. Biomimicry.	Lecture, Case Study	2	U	M	V	3
		Conceptualization, Visual thinking, Drawing/Sketching, Presenting ideas	Workshop	3,4	A	P	O	2
4	Prototyping and testing	Use of prototyping, Types of prototypes, Rapid prototyping techniques.	Lecture, Demonstration	3	A	P	V	3
		User testing and feedback collection, Iterative prototyping, testing to gauge risk and market interest	Activity Based Learning	4	An	Ar	O	2
5	IPR in design	Entrepreneurship/business ideas, Patents and Intellectual Property.	Lecture	1	U	M	V	2
		Agility in design, Ethical considerations in design. Overcoming common implementation challenges	Discussion, Case Study	4	An	M	O	2

TABLE OF SPECIFICATIONS (ToS) (ESE Question Paper Design)

Module	Module Title	Distribution of Marks (RBL)						Total Marks
		R	U	A	An	E	C	
1	Design Process		X	X				12
2	Design Thinking Stages		X	X				12
3	Ideation			X	X			12
4	Prototyping and Testing			X	X			12
5	IPR in Design		X		X			12
This ToS shall be treated as a general guideline for students and teachers for distribution of marks.								

ASSESSMENT PATTERN

Assessment		Marks
Continuous Internal Assessment		40
1	Internal Examination	10
2	Learning Activity	15
3	Course Project	15
End Semester Examination – Theory		60
Total		100

Total Pages:	
Register No.:	Name:

(AN AUTONOMOUS COLLEGE AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANATHAPURAM)

THIRD SEMESTER M. TECH DEGREE (REGULAR) EXAMINATION, DEC 2026 (2025 SCHEME)			
Course Code:			
Course Name:	DESIGN THINKING		
Max. Marks	60	Duration:	2 hours 30 minutes
Specify if the question paper is common to different programmes			
Use of Data Book / IS codes, etc to be specified by the question paper setter			

Answer any five full questions, each carries 12 marks.			
No.	Question	CO	Marks
1 a.	How can a multidisciplinary team collaborate effectively to implement design principles?	2	7
1 b.	What are the key differences between human-centred design and other design methodologies?	2	5
2 a.	How do you measure the success of a design project in terms of user satisfaction and impact?	4	7
2 b.	How does the iterative nature of the design process contribute to better outcomes?	2	5
3 a.	What are the fundamental principles of effective brainstorming, and how do they differ from traditional problem-solving approaches?	2	7
3 b.	What are some key principles of ergonomic design, and how do they contribute to the usability and comfort of products?	1	5
4 a.	Enumerate some examples of successful and unsuccessful market testing scenarios, and what lessons can be learned from these experiences to improve future product or service launches?	4	7
4 b.	What is the primary purpose of creating prototypes in the design and development process?	2	5
5	What strategies and methodologies can designers use to embrace agility and respond quickly to changing user needs and market dynamics?	4	12
6	Illustrate any four examples of successful bio-mimicry applications in various industries	2	12
7	What ethical considerations should designers keep in mind when designing for diverse user groups?	4	12

COURSE DESCRIPTION							
Regulation	2025	L-T-J-P-S	3-0-0-0-2	Version	25/0	Credits	0
(L- Lecture, T-Tutorial, J-Project, P-Practical, S-Self-learning & Team Work)							
Course Code	Course Name					Course Category	
	ACADEMIC WRITING					AUDIT COURSE	
PRE-REQUISITE							
Basic proficiency in English language and communication.							

PREAMBLE	
- Introduces the principles of reader-centric writing, scholarly communication, scientific documentation, and technical reporting. - Develops the ability to prepare research papers, project proposals, review articles, and technical reports that meet academic and professional standards.	

RATIONALE	
This course equips the students with - The ability to communicate research findings effectively through academic and technical documents using accepted scholarly conventions. - Competence in preparing research papers, project proposals, and technical reports that meet academic and professional standards. - Knowledge of citation practices, academic ethics, and publication standards, along with the critical thinking and communication skills required for research careers.	

COMPETENCY STATEMENT/s	
CC1	Develop scholarly documents using principles of academic and scientific writing.
CC2	Prepare research manuscripts, project proposals and technical reports conforming to academic standards.

COURSE OUTCOMES			
Course Outcomes (CO): At the end of this course, learners will be able to:			
CO	CO Statement	Competency Mapping	Cognitive (C)
CO 1	Apply the principles of reader-centric academic writing to improve clarity and readability of scholarly documents.	CC1	A
CO 2	Analyse writing structures and progression techniques used in scientific literature.	CC1	An
CO 3	Develop titles, abstracts, introductions, conclusions, and visual elements for research publications.	CC1, CC2	A
CO 4	Evaluate and apply referencing, citation, and technical grammar standards in academic documents.	CC1	E
CO 5	Prepare project proposals, review papers, extended abstracts, and technical reports for research dissemination.	CC2	C
Cognitive (Revised blooms Level): - R: Remember; U: Understand; A: Apply; An: Analyse; E: Evaluate; C: Create			

TEACHING AND ASSESSMENT SCHEME												
Teaching Scheme / Week					Credit	Hours / Semester	Examination Scheme					
							Theory			Practical		
L	T	J	P	S	C		CIA	ESE	Total	CIA	ESE	Total

3	0	0	0	2	-	60	40	60	100				100
L: Lecture (One unit is of one-hour duration), T: Tutorial (One unit is of one-hour duration), P: Practical (One unit is of one-hour duration), J: Project (One unit is of one-hour duration), S: Self-Learning & Team Work (One unit is of one-hour duration), CIA: Continuous Internal Assessment, ESE: End Semester Examination													

SYLLABUS (Major Topics)			
Module	Title	Major Topics	Hrs
1	Fundamentals of Academic Writing	Reader-centric writing, memory load in reading, acronyms, pronouns, synonyms, disconnected phrases, background ghettos, abusive detailing, cryptic captions, long sentences, reader motivation and engagement.	10
2	Fluid Reading and Progression Techniques	Setting expectations, progression tracks, topic and non-topic progression, sentence fluidity, reading energy consumption, readability enhancement.	8
3	Structure of Research Articles	Writing titles, abstracts, introductions, headings, subheadings, organization of research papers, coherence and logical flow.	10
4	Visuals, References and Technical Grammar	Visual communication, conclusions, references, bibliography, citation styles, grammar in technical writing, active/passive voice, common writing errors.	8
5	Scholarly and Technical Documents	Extended abstracts, project proposals, review papers, research papers, technical reports.	9

SELF-LEARNING / TEAM WORK		
Sl. No	Self-learning / Team Work Description.	Hrs
1	Review and critique of a published journal paper.	4
2	Analysis of titles, abstracts and introductions from reputed journals.	4
3	Preparation of an extended abstract on a selected research topic.	4
4	Citation and referencing exercises using IEEE/APA styles.	3
5	Technical grammar and proofreading activities.	3
6	Preparation of visuals, tables and figures for a research article.	3

SUGGESTED LEARNING RESOURCES			
Text Book			
Sl. No.	Title of Book	Author	Publication
1	Scientific Writing 2.0: A Reader and Writer's Guide	Jean-Luc Lebrun	World Scientific Publishing, 2011
2	How to Write and Publish a Scientific Paper	Barbara Gastel & Robert A. Day	Greenwood Publishers, 2016
Reference			
Sl. No.	Title of Book	Author	Publication
1	The Craft of Research	Wayne C. Booth et al.	University of Chicago Press
2	Academic Writing for Graduate Students	John M. Swales & Christine B. Feak	University of Michigan Press
3	Writing for Peer Reviewed Journals	Pat Thomson & Barbara Kamler	Routledge
4	Publication Manual	American Psychological Association	Latest Edition
Web Resource			
1	https://owl.purdue.edu		
2	https://writingcenter.unc.edu		
3	https://authorservices.wiley.com		
4	https://www.springer.com/gp/authors-editors		

DETAILED SYLLABUS

Module	Major Topic & Sub Topic	Mode of Delivery	COs	Learning Domain Level	Hours
				C	
1	Reader-centric academic writing and reading toolkit	L	1	U	1
	Acronyms, pronouns, synonyms and memory burden	Activity	1	A	2
	Disconnected phrases, background ghettos and abusive detailing	L	1	A	1
	Cryptic captions and long sentences	L	1	A	1
	Sustaining reader attention and maintaining flow	L	1	A	1
	Creating reader motivation and reducing knowledge gaps	Activity	1	A	2
	Case studies and writing exercises	Activity	1	A	2
2	Setting expectations through grammar and themes	L	2	U	1
	Topic-based and non-topic-based progression tracks	L	2	A	1
	Detection of sentence fluidity problems	L	2	U	1
	Reading energy consumption and readability	L	2	A	1
	Abstract writing: structure, coherence and precision	L, Activity	3	A	2
	Exercises on progression and coherence	L, Activity	3	A	2
3	Title writing: qualities, purpose and metrics	L	3	A	2
	Abstract writing: structure, coherence and precision	L	3	A	2
	Headings and sub-headings: principles and syntax	L	3	A	2
	Introduction writing: scope, definitions and reader questions	L, Activity	3	A	2
	Analysis of published research papers	L, Activity	3	A	2
4	Visuals in research papers: principles and metrics	L	4	A	1
	Writing effective conclusions	L, Activity	4	A	2
	References and bibliography: citation styles and ethics	L, Activity	4	A	2
	Grammar in technical writing	L, Activity	4	A	2
	Active and passive voice, common mistakes	L	4	A	1
5	Extended abstract preparation	L, Activity	5	C	1
	Project proposal preparation	L, Activity	5	C	2
	Writing review papers and overview articles	L, Activity	5	C	2
	Research paper preparation	L, Activity	5	C	2
	Technical report writing	L, Activity	5	C	2

TABLE OF SPECIFICATIONS (ToS) FOR QUESTION PAPER DESIGN

Module	Module Title	Teaching Hours	Distribution of Marks (Revised Bloom's Level)	Total Marks
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			R	U	A	An	E	C	
1	Fundamentals of Academic Writing	10		✓	✓				12
2	Fluid Reading and Progression Techniques	8			✓	✓			12
3	Structure of Research Articles	10			✓	✓			12
4	Visuals, References and Technical Grammar	8				✓	✓		12
5	Scholarly and Technical Documents	9					✓	✓	12
<i>This ToS shall be treated as a general guideline for students and teachers for distribution of marks.</i>									

ASSESSMENT PATTERN	
Assessment	Marks
Continuous Internal Assessment	40
Internal Examination	10
Learning Activity	15
Course based task	15
End Semester Examination	60
Total	100

M250902/CN340C **INTERNSHIP**

A student shall opt for carrying out the Internship at an Industry/Research Organization or at another institute of higher learning and repute (Academia). The organization for Internship shall be selected/decided by the students on their own with prior approval from the faculty advisor/respective PG Programme Coordinator/Guide/Supervisor. Every student shall be assigned an internship Supervisor/Guide at the beginning of the Internship. The training shall be related to their specialisation after the second semester for a minimum duration of six to eight weeks. On completion of the course, the student is expected to be able to develop skills in facing and solving the problems experiencing in the related field.

Objectives

- Exposure to the industrial environment, which cannot be simulated in the classroom and hence creating competent professionals for the industry.
- Provide possible opportunities to learn understand and sharpen the real time technical / managerial skills required at the job.
- Exposure to the current technological developments relevant to the subject area of training.
- Create conducive conditions with quest for knowledge and its applicability on the job.
- Understand the social, environmental, economic and administrative considerations that influence the working environment.
- Expose students to the engineer's responsibilities and ethics.

Benefits of Internship Benefits to Students

- An opportunity to get hired by the Industry/ organization.
- Practical experience in an organizational setting & Industry environment.
- Excellent opportunity to see how the theoretical aspects learned in classes are integrated into the practical world. On-floor experience provides much more professional experience which is often worth more than classroom teaching.
- Helps them decide if the industry and the profession is the best career option to pursue.
- Opportunity to learn new skills and supplement knowledge.
- Opportunity to practice communication and teamwork skills.
- Opportunity to learn strategies like time management, multi-tasking etc in an industrial setup.
- Makes a valuable addition to their resume.
- Enhances their candidacy for higher education/placement.
- Creating network and social circle and developing relationships with industry people.
- Provides opportunity to evaluate the organization before committing to a full time position.

Benefits to the Institute

- Build industry academia relations.
- Makes the placement process easier.
- Improve institutional credibility & branding.
- Helps in retention of the students.

- Curriculum revision can be made based on feedback from Industry/ students.
- Improvement in teaching learning process.

Benefits to the Industry

- Availability of ready to contribute candidates for employment.
- Year round source of highly motivated pre-professionals.
- Students bring new perspectives to problem solving.
- Visibility of the organization is increased on campus.
- Quality candidate's availability for temporary or seasonal positions and projects.
- Freedom for industrial staff to pursue more creative projects.
- Availability of flexible, cost-effective workforce not requiring a long-term employer commitment.
- Proven, cost-effective way to recruit and evaluate potential employees.
- Enhancement of employer's image in the community by contributing to the educational enterprise.

Types of Internships

- Industry Internship with/without Stipend
- Govt / PSU Internship (BARC/Railway/ISRO etc)
- Internship with prominent education/research Institutes
- Internship with Incubation centres /Start-ups

Guidelines

- All the students need to go for internship for minimum duration of 6 to 8 weeks.
- Students can take mini projects, assignments, case studies by discussing it with concerned authority from industry and can work on it during internship.
- All students should compulsorily follow the rules and regulations as laid by industry.
- Every student should take prior permissions from concerned industrial authority if they want to use any drawings, photographs or any other document from industry.
- Student should follow all ethical practices and SOP of industry.
- Students have to take necessary health and safety precautions as laid by the industry.
- Student should contact his /her Guide/Supervisor from college on weekly basis to communicate the progress.
- Each student has to maintain a diary/log book
- After completion of internship, students are required to submit
 - Report of work done
 - Internship certificate copy
 - Feedback from employer / internship mentor
 - Stipend proof (in case of paid internship).

Total Marks 100: The marks awarded for the Internship will be on the basis of (i) Evaluation done by the Industry (ii) Students diary (iii) Internship Report and (iv) Comprehensive Viva Voce.

Continuous Internal Evaluation: 50 marks

Student's diary - 25

Marks Evaluation done by the industry - 25 Marks

Student's Diary/ Daily Log: The main purpose of writing daily diary is to cultivate the habit of documenting and to encourage the students to search for details. It develops the students' thought process and reasoning abilities. The students should record in the daily training diary the day to day account of the observations, impressions, information gathered and suggestions given, if any. It should contain the sketches & drawings related to the observations made by the students. The daily training diary should be signed after every day by the supervisor/ in charge of the section where the student has been working. The diary should also be shown to the Faculty Mentor visiting the industry from time to time and got ratified on the day of his visit. Student's diary will be evaluated on the basis of the following criteria:

- Regularity in maintenance of the diary
- Adequacy & quality of information recorded
- Drawings, design, sketches and data recorded
- Thought process and recording techniques used
- Organization of the information.

The format of student's diary

Name of the Organization/Section:

Name and Address of the Section Head:

Name and Address of the Supervisor:

Name and address of the student:

Internship Duration: From To

Brief description about the nature of internship:

Day	Brief write up about the Activities carried out: Such as design, sketches, result observed, issues identified, data recorded, etc.
1	
2	
3	

Signature of Industry Supervisor

Signature of Section Head/HR Manager Office Seal

Attendance Sheet

Name of the Organization/Section:

Name and Address of the Section Head:

Name and Address of the Supervisor:

Name and address of the student:

Internship Duration: From To

Month & Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	...
Month & Year																					

End Semester Evaluation (External Evaluation): 50 Marks

Internship Report	-	25 Marks
Viva Voce	-	25 Marks

Internship Report: After completion of the internship, the student should prepare a comprehensive report to indicate what he has observed and learnt in the training period and should be submitted to the faculty Supervisor. The student may contact Industrial Supervisor/ Faculty Mentor for assigning special topics and problems and should prepare the final report on the assigned topics. Daily diary will also help to a great extent in writing the industrial report since much of the information has already been incorporated by the student into the daily diary. The training report should be signed by the Internship Supervisor, Programme Coordinator and Faculty Mentor.

The Internship report (25 Marks) will be evaluated on the basis of following criteria:

- Originality
- Adequacy and purposeful write-up
- Organization, format, drawings, sketches, style, language etc.
- Variety and relevance of learning experience
- Practical applications, relationships with basic theory and concepts taught in the course

Viva Voce (25 Marks) will be done by a committee comprising Faculty Supervisor, PG Programme Coordinator and an external expert (from Industry or research/academic Institute). This committee will be evaluating the internship report also.

M250902/CN340D Dissertation Phase 1

Dissertation: All categories of students in track 1 are to carry out the dissertation in the Institute they are studying or can work either in any CSIR/Industrial R&D organization/any other reputed Institute which have facilities for dissertation work in the area proposed.

Mark Distribution:

- **Phase 1: Total marks: 100, only CIA**