

निर्माण प्रबंधन (Construction Management) के सिद्धांत
[Nirman prabandhan (Construction Management) ke Siddhant]

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Lecture – 2
Vishay suchi – I



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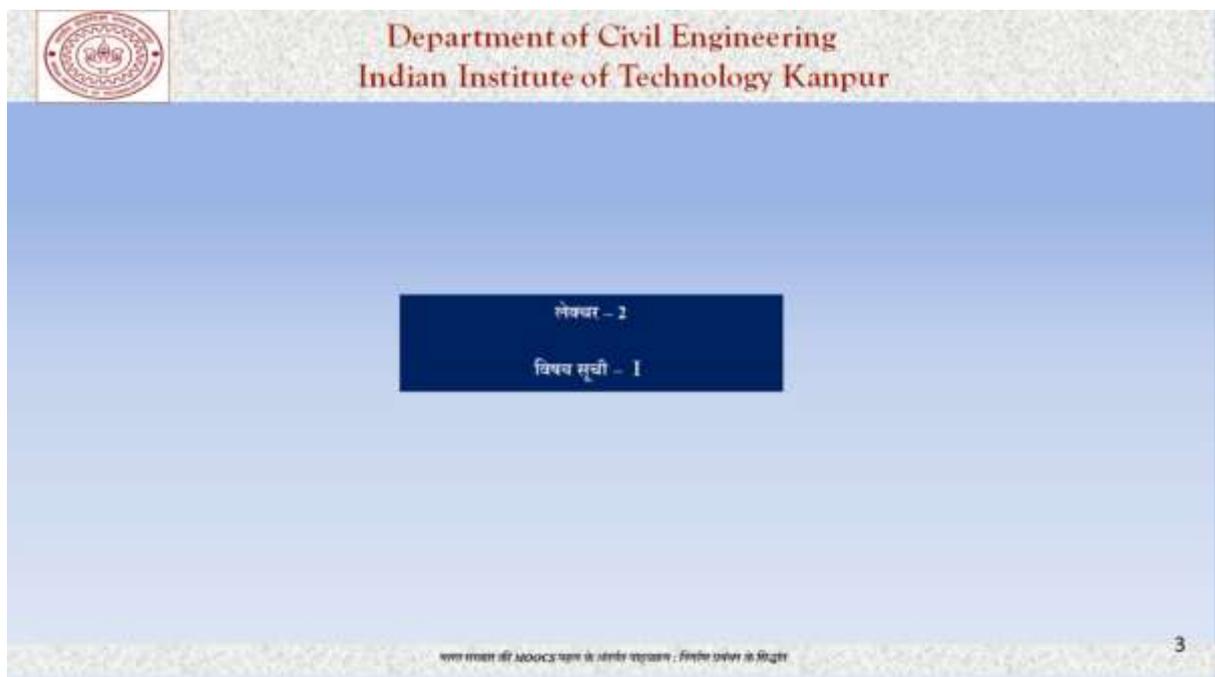
भारत सरकार की MOOCs पहल के अंतर्गत पाठ्यक्रम
निर्माण प्रबंधन के सिद्धांत
Principles of Construction Management

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भारत सरकार की MOOCs पहल के अंतर्गत पाठ्यक्रम : निर्माण प्रबंधन के सिद्धांत 1

Namaskaar aapaka phir se svaagat hai bhaarat sarakaar kee Moocs pahal ke antargat paathyakram Nirmaan Prabandhan ke Siddhaant ke is 2 lecture mein.

(Reference Time 00:23)



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लेक्चर – 2
विषय सूची – I

भारत सरकार की MOOCs पहल के अंतर्गत पाठ्यक्रम : निर्माण प्रबंधन के सिद्धांत 3

Aaj ke lecture mein vistrt charcha karane se pahale main aapake saath yah saajha karana chaahata hoon yah paathyakram design karate vakt, usako sochate vakt maine kya dhyaan mein rakha.

(Reference Time 00:40)

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यह पाठ्यक्रम

- कॉलेज के तृतीय या अंतिम वर्ष के इंजिनियरिंग के विद्यार्थी
- देश के जिज्ञासु युवा लोग जो कि अपने आस-पास इफ्रास्ट्रक्चर का निर्माण देखने हैं
- इफ्रास्ट्रक्चर निर्माण से जुड़े लोग

भारत सरकार की MOOCs पहल के अंतर्गत पाठ्यक्रम : निर्माण प्रबंधन के सिद्धांत 4

Yah paathyakram college kee trteey aur antim varsh ke engineering ke vidyaarthee upayogee paenge. Engineering mein vo chaahе civil engineering ke hon, chaahе electrical ke hon, mechanical ke usase koeе antar nahin padata hai bahut jyaada, chaahе vah kisee bhee vibhaag ke hon unako yah paathyakram agar ruchi hai to rochak lagega ho sakata upayogee bhee lage. Ek aur constituency hai jisako ki main is paathyakram ke maadhyam se pahunchaana chaahata hoon vo hai desh ke jigyaasu yuvak log, jo ki apane aas-paas infrastructure ka nirmaan dekhate hain aur unako lagata hai ya unako pata hona chaahie ki us nirmaan ko karane ke pahale ya us nirmaan ko karane ke lie kis tareeke kee taiyaaree kee jaatee hai, jo nirmaan prabandhak hote hain unako kya baaten dhyaan mein rakhaneе hotee hain. Aur of course infrastructure se jude log bhee is paathyakram se kuchh laabhaanvit ho sakate hain yadyapi unako yah paathyakram bahut hee besik lagega. Vo apane anubhav se bahut saaree baaton ko adhik jaanate hain lekin phir bhee kabhee-kabhee aisa hota hai ki ham anubhav se jin baaton ko jaanate hain unaka theoretical basis yah samajh mein aana ki achchha ham jo karate aa rahe hain vah kyon karate hain, kaise karate hain ek naya drshtikon saamane aana usase bhee laabhaanvit ho sakate hain. To in logon ke lie yah paathyakram banaaya gaya hai aur yadi unako achchha lagata hai to hamaara yah effort poora maana jaega.

(Reference Time 02:16)

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पाठ्यक्रम के मॉड्यूल

परियोजना प्रबंधन और निर्माण प्रबंधन में क्या अंतर है

भारत सरकार की MOOCs पहल के अंतर्गत पाठ्यक्रम : निर्माण प्रबंधन के सिद्धांत

Jab pichhalee baar ham logon ne charcha kee thee to pariyojana prabandhan aur nirmaan prabandhan ke antar par baat huee thee. Is baat ko aaj ham log ek udaaharan ke saath spasht karenge.

(Reference Time 02:28)

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निर्माण परियोजना के हितधारक (STAKEHOLDERS)

ग्राहक

डिजाइनर

उपभोक्ता

उपयोगकर्ता

उपभोक्ता

परियोजना

अन्य महत्वपूर्ण हितधारक

- सुरक्षा ऑडिटर्स
- गुणवत्ता ऑडिटर्स
- तीसरे पक्ष के सलाहकार
-

भारत सरकार की MOOCs पहल के अंतर्गत पाठ्यक्रम : निर्माण प्रबंधन के सिद्धांत

6

Yah slide bhee pichhale lecture se lee gae hai jisamen ki ham logon ne nirmaan pariyojana ke hitadhaarak unake stakeholders ke baare mein likha hua hai graahak, designer, thekedaar, upabhokta, niveshak, regulator tatha any auditors aur teesare paksh ke salaahakaar.

(Reference Time 02:47)



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पाठ्यक्रम के मॉड्यूल

- परिचय एवं विहंगम छवि/दृश्य
- परियोजना की लागत का अनुमान
- निर्माण अर्थशास्त्र
- प्लानिंग एवं शेड्यूलिंग
- गुणवत्ता प्रबंधन
- सुरक्षा प्रबंधन
- अनुबंध प्रबंधन

Aage badhate hue ham logo ne pichhale lecture mein hamane is paathyakram ke sabhee modules dekhe the parichay evan vihangam chhavi, pariyojana kee laagat ka anumaan, nirmaan arthashaastr, Planning and Scheduling, gunavatta prabandhan, suraksha prabandhan evan anubandh prabandhan. Aaj ham inamen se chaar modules arthaat parichay, laagat, nirmaan arthashaastr aur Planning and Scheduling in chaar modules par thodee baareeke se thodee gaharaee se charcha karenge. Baakee ke teen modules kee charcha ham agale lecture mein karenge. To aaiye ham log chalate hain pahale module par.

(Reference Time 03:34)



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मॉड्यूल 1 : परिचय एवं विहंगम छवि

हितधारक, निर्माण परियोजना की विशेषताएं और चरण, परियोजना प्रबंधक की भूमिका, निर्माण परियोजनाओं की मल्टी-डिसिप्लिनरी प्रकृति, समाधान

Material
Machine
Money
Manpower

Pahale module mein ham log baat karenge aur balki baat kar rahe hain hitadhaarak, nirmaan pariyojana ke visheshataen aur charan, pariyojana prabandhak ke bhoomika, nirmaan pariyojanaon ke multidisciplinary prakrti aur sansaadhan. Hitadhaarakon ke baare mein ham charcha kar chuke hain. Hamane dekha ki hitadhaarak owner se lekar ke user, jo niveshak hain vo, jo thekedaar hain vo, sabhee log apane-apanee bhoomika nibhaate hain. Nirmaan pariyojana ke visheshataon aur unake charanon par bhee pichhalee baar charcha huee thee. Ek pariyojana ke kalpana karate hain usako concept lete hain usake baad usaka deign karate hain phir usaka construction karate hain (nirmaan karate hain) aur antatah decommission kar dete hain rakharakhaav ke avadhi ke baad. Is par ham log baad mein phir charcha karenge. Pariyojana prabandhak ke bhoomika - is baare mein bhee ham log lagaataar is course mein charcha karenge. Balki yoon kahen ki yah course hee is prakaar se deigned hai ki pariyojana prabandhak ko kya-kya pata hona chaahie, kya-kya nirnay usako lene padate hain, kis paripekshy mein nirnay lene padate hain yahee is course ka uddeshy hai. Multidisciplinary prakrti is par ham log ek metro ka udaaharan lekar sambhavat: agale lecture mein charcha karenge. Jahaan tak sansaadhan ka savaal hai kisee bhee nirmaan prakriya mein bahut saare sansaadhan upayog mein aate hain jaise ki saamagree arthaat material, saath-saath hamako equipment ke aavashyakata hotee hai, hamako paise ke aavashyakata hotee hai, dhan ke aavashyakata hotee hai, saath-saath hamako menpower ke aavashyakata hotee hai, jan sansaadhan ke aavashyakata hotee hai. To in sansaadhanon ka prabandhan material management se lekar machine ka management, funds ka management, menpower ka management yah sab nirmaan prabandhan ke ansh hain.

(Reference Time 05:42)

Agala module rakha gaya hai project kee laagat ka anumaan - yah bahut aavashyak hai ki ham kisee bhee project ko kisee bhee pariyojana ke baare mein sochen, to yah bhee dhyaan mein rakhen ki is pariyojana ko poora karane mein hamen kitane paise lagenge, hamaaree kitane dhan ke requirement hai 5 crore hai, 10 crore hai, 100 crore hai. To isalie laagat ka anumaan yah bahut hee mahatvapoorhota hai. Jab laagat kee baat hotee hai ya usake anumaan kee baat hotee hai to praarambhik aur vistrt anumaan, vastu vivaran, nirmaan

upakaran, depreciation, overheads, anubandhon ka parichay evan bolee prakriya, markup yah sab keywords hamaare dimaag mein aate hain in par charcha hona aavashyak hai.

Praarambhik aur vistrt anumaan - isaka kya arth hai? Praarambhik anumaan maatr ek anumaan hota hai lekin usakee bhee besis hotee hain. Kal ko agar hamase kaha jae ki ham yahaan se lekar ke yahaan tak A se lekar ke B tak ek sadak banaenge yah dooree 100 kilomeetar hai. To yah to pata hona chaahie ki is 100 kilomeetar kee sadak banaane ke lie hamen 10 crore rupe lagenge ki 100 crore rupe lagenge. Yah anumaan lagaane ke lie bhee hamen kuchh basic information (soochana), sthaaneey jaanakaaree aavashyak hai. Ham kis tareeke kee sadak banaana chaahate hain concrete kee sadak hogee ya bitumen kee sadak hogee, pahaadon mein sadak hogee ki maidaanee ilaake mein sadak hogee to in sab baaton ko dhyaan mein rakhate hue ham ek praarambhik anumaan banaate hain. Theek hai hamaare anubhav ke anusaar agar ham normal sadak ek sadak ham apane anubhav ke anusaar yah kahate hain ki ek normal sadak maan leejie har kilomeetar ek crore kee banatee hai, yah figure hamako apane anubhav se maaloom hai. To baat aatee hai normal kya hua? Kya is par sirph cycle chalegee, car chalegee ki truck bhee challengee ya is par bahut hee bhaaree tanks challenge. To tanks vaalee sadak shaayad normal mein na aae. Isalie hamako dekhana hota hai ki jab ham sadak kee baat karate hain to kis tareeke kee sadak baneege, yah cheej cover hotee hai ek prakaar se vastu vivaran mein. Ki jo specification hai vah kya hai ham kis tareeke kee sadak banaana chaahate hain. Normal sadak jo ki ek particular ek tareeke ke load ke lie hai usake lie ham IRC bhaarat mein Indian Road Congress's ke maanak hain unakee guidelines hain unake anusaar ham yah tay karate hain ki theek hai is tareeke kee sadak agar ham banaenge to 100 kilomeetar kee sadak itane paise mein ban jaegee. Nirmaan upakaran-nirmaan kaaryon mein masheenon ka bahut bada haath ho gaya hai. Bahut saare upakaranon ka prayog hota hai, unako vahaan laaye jaane ka cost hai unako operate karane ka cost hai ityaadi. To upakaranon kee cost ke baare mein bhee hamen jaanakaaree hona aavashyak hai taaki ham project kee laagat ka anumaan laga saken. Depreciation upakaran se sambandhit hai usakee charcha ham baad mein karenge.

Ab aata hai overheads – overheads pe charcha karane se pahale ham is anumaan ke vishay par ek aur pahaloo se charcha karen. Jab ham anumaan lagaate hain to ek anumaan hota hai client kee or se, jo owner hai ham sadak banaana chaahate hain ya ham NHAI hain, ham raajy sarakaar hain ham chaahate hain ki yahaan par sadak bane to ham ek anumaan lagaate hain ki hamen kitane dhan kee aavashyakata hogee. Yah laagat yah jo value aatee hai 100 crores ho, 500 crores ho yah aavashyak nahee hai ki jo thekedaar hai jab ham usako tendar karate hain us proses ko to thekedaar bhee vo 100 crores mein banaane ko taiyaar ho jaaye. Vo apanee tareeke se usaka aakalan karata hai theek hai hamako yah sadak agar banaane kee baat agar hai, to ham usako kitane mein banaayenge yah baat huee notice inviting tender aur phir jo bid huee usaka evaluation hua to kae thekedaaron ne apane-apane bid submit kiye hamako bheje kisee ne kaha ham 110 crores mein sadak banaayenge, kisee ne kaha ham 105 crores mein banaayenge, kisee ne kaha ham 99 crores mein banaayenge to amooman ham 1-1 arthaat jo lovest bidar hota hai usase kahate hain ki tum sadak banao. To thekedaar kee taraph se arthaat contractor kee taraph se jo bid submit hotee hai vah bhee vastu vivaran aur thekedaar ke apane jo considerations hain un par nirbhar karata hai ki vah kitane mein vah sadak banaane ke lie taiyaar hoga. Hamaare estimate ka thoda bahut phark padata hai. Thekedaaron ko bhee pata hota hai ki UP sarakaar hai, Madhy Pradesh sarakaar hai, Delhi sarakaar hai, NHAI hai to yah log kin guidelines ke aadhaar par anumaan lagaate hain. To usako anumaanit laagat ka andaaja hota hai aur lagabhag yah jaanakaaree hamaare NIT mein publish bhee hotee hai ki ham samajhate hain ki is project mein itana laagat aaegee ya aa sakatee hai lekin thekedaar kee cost alag ho sakatee hai yah baat hamen dhyaan mein

rakhanee chaahie. To markup aur overhead ye donon thekedaar tay karate hain. Aakhir is tareeke se samajhie ki is sadak ko thekedaar A agar kahata hai ki ham 105 crores mein banaenge aur thekedaar B kahata hai ki ham usako 95 crores mein banaane ke lie taiyaar hain, to yah 10 crores ka phark ya antar kyon aa raha hai? Kyonki aakhirakaar sadak to ek hee hogee, ek hee tareeke kee saamagree ka prayog kiya jaega vastu vivaran mein spashit likha hua hai ki kis tareeke kee sadak hogee chaahye concrete ho, chaahie vah bitumen ho, kis width kee hogee. To yah phark jo hai yah kae karaanon se aa sakata hai is par ham log kabhee baad mein charcha karenge.

Anubandhon ka parichay evan bolee prakriya - aaj kee charcha mein abhee aapane dekha ki is poore laagat kee charcha tabhee kee ja sakatee hai jabaki ham anubandhon ke baare mein jaanakaaree rakhen. Anubandh kae prakaar ke hote hain. Ab aaj kal jab ham pariyojanaon kee baat karate hain, unake construction contract kee baat karate hain. To tarah-tarah ke contracts prachalit hain un par charcha ham log baad mein karenge. Aaiye aage badhate hain aur chalate hain nirmaan arthashaastr kee or.

(Reference Time 13:02)

Isamen kis tareeke ke keywords hain cash flow, dhan ka samay mooly, payback avadhi, ROI, cash flow ke aadhaar par vikalpon ka moolyaankan, NPV, IRR, asamaan jeevan kaal, pariyojanaon ka moolyaankan, taxation, laabh laagat (cost benefit) ka anupaat ityaadi. Aaiye inamen se kuchh shabdon par thoda baareeke se vichaar karane ka prayaas karen. Nirmaan arthashaastr ka siddhaant is chitr mein dikhaaya gaya hai. Yah hai time axis (samay) yahaan par ham usako plan karate hain, yahaan par ham usako deign karate hain, yah construction ka samay hai, execution ka samay hai, yahaan par usako ham operate karate hain, kisee bhee pariyojana ko operation aur yahaan par ham usako decommission kar dete hain. Yah baat ham logon ne pichhalee baar kahee thee. Ab is time axis par agar ham yah dekhen ki kis samay hamako vyay karana hai aur kis samay hamako us pariyojana se kuchh aay hogee is baat ka adhyayan cash flow ka adhyayan kahalaega. To planning mein kuchh paise lagenge, kuchh laagat aaegee, deign karane mein kuchh laagat aaegee, construction karane mein kuchh laagat aaegee to aap yah dekh leejie ki expenditure ya vyay ham log is lain line ke neeche

plot kar rahe hain. Aur is arrow ke lambaee ek prakaar se us anupaat ke baat bhee ho sakatee hai ki jitana dhan usamen lagega ho sakata hai yah 5 crore hai, yahaan par 6 hai, yahaan 7 hai, yah 10 hai, 12 hai, 15 hai jo bhee nambar aaega. Jab yah operation mein aa jaega poora nirmaan kaary samaapt ho jaega tab ho sakata hai ki isase hamako kuchh aay hone lage arthaat yahaan par hamako kuchh aay ho sakatee hai. Aay ke saath-saath kya yahaan vyay nahin hoga? Aisa nahin hai, kyonki rakharakhaav mein bhee hamako kuchh na kuchh vyay karana hoga. Ab kya yah rakharakhaav mein aane vaala vyay constant hoga ya constant nahin hoga? Ho sakata hai do-teen saal kuchh vyay ho aur usake baad hamen thoda adhik repair karana pade usamen hamen adhik vyay karana ho sakata hai. To is prakaar se rakharakhaav ke dauraan bhee kuchh vyay hoga. Decommissioning ke samay phir se hamen kuchh na kuchh vyay karana hoga.

Is pooree prakriya ka adhyan hee cash flow ka adhyayan hai. Aur isakee jaanakaaree hona bahut hee aavashyak hai kyonki tabhee ham yah tay kar sakate hain ki aakhirakaar jo hamane vyay kiya aur jo hamen aay huee kya isaka anupaat theek hai hamen maany hai? Isee baat ko vibhinn tareeke se ROI, payback avadhi, ROI aadi mein samaaveshit hota hai. NPV ka jo siddhaant hai vo ye hai ki ham yahaan par 2 rupaye kharch karate hain, 1 rupaye yahaan kharch karate hain, 5, 6, 7 aadi jaise likhe hue hain to kyonki yah cheej kae varshon ke antaraal mein ho rahee hai jo operation hai vo bhee kae varshon ka antaraal hai to us samay hone vaalee anumaanit aay usakee aaj kitane value hai is baat ko ham log present value analysis mein lete hain. Jaise ki ham bank mein koe paisa jab rakhate hain to agar ham 100 rupaye bank mein rakhen aur 10% kee byaaj kee dar hai to 1 saal baad yah 110 rupaye ho jaayega. Ek tareeke se dekha jaay to 1 saal baad ke 110 rupaye kee value aaj 100 rupaye hai agar byaaj dar 10% hai aur byaaj annual lagaaya ja raha hai, to is saral ganit ko ek vaastavik samasya jo ki hamaaree cash flow analysis hai ek pariyojana mein prayog karana yah nirmaan arthashastr ke antargat aata hai.

Yahaan tak cash flow ke aadhaar par vikalpon ke moolyaankan ka prashn hai ham usako aise samajh sakate hain ki hamaare paas do vikalp hain ek vikalp hai sadak banaane ka. Maan leejie A, ek vikalp hai B. To vikalp A aur B ke lie ham alag-alag cash flow ke chitr banaen. Yah cash flow A ke lie hoga aur yah cash flow B ke lie hoga. In donon mein jo bhee shreyaskar hoga chaahe vo ham NPV ke aadhaar par dekhen ya kisee any aadhaar par. Us vikalp ko ham chunenge ki ham A se sadak banaenge ki B se sadak banaayenge. Is baat ka nirnay karana cash flow ke aadhaar par vikalpon ka moolyaankan isake antargat aaega. Asamaan jeevan kaal pariyojanaon ke moolyaankan isako ham ek udaaharan se samajhane kee koshish karate hain. Agar ham equipment A aur B kee baat karen aur yah kahen ki A kee vartamaan keemat 100 rupaye hai, B kee keemat 120 rupee hai lekin yah hamako 4 varsh kaam dega aur yah hamako 5 varsh kaam dega. Ab tay yah karana hai ki kya hamen equipment A lena chaahe ya B lena chaahe? To is baat ko tay karane ke lie kyonki yahaan par 4 varsh ka maamala hai aur yah 5 varsh ka maamala hai to ek model yah hai ki ham 20 varshon ke cash flow analysis karen.

Ek tareeka yah hai ki ham 20 varshon kee cash flow analysis karen aur yah dekhen ki yahaan par hamako yah equipment paanch baar khareedana padega, yahaan hamako chaar baar khareedana padega aur is cheej ko ham cash flow diagram mein plot karen aur tab yah nirnay karen ki hamen A lena hai ya B lena hai. Jab jeevan kaal asamaan hota hai to cash flow analysis itanee aasaanee se nahin ho sakatee jaise ki hamane yahaan kiya tha. Hamako ek koman time par lekar aana padega yah ek tareeka hai aur tareeke bhee hain. Lekin yah ek aasaan tareeka hai samajh mein aasaanee se aata hai ki haan theek hai A aur B ko kaise ham

log tulana karen. Jahaan tak taxation ka savaal hai ham log isakee jab charcha karenge us module par jaenge tab ham adhik charcha karenge. Jahaan tak laabh laagat anupaat (cost benefit ratio) ka prashn hai, is chitr mein kee gae charcha se bahut kuchh spasht ho jaata hai ki vyay kitana hua aur aay kitanee huee lekin agar maamala itana hee aasaan hota to sabhee log bade aasaanee se kar lete aur koe vivaad nahin hota. Baat tab mushkil ho jaatee hai jabaki chaahe vo vyay ho, chaahe vo aay ho inamen indirect (paroksh) baaten aane lagatee hain. To jahaan tak vyay ka savaal hai vahaan par bhee paroksh baaten hain. Ham paryaavaran mein kuchh chenjjij karenge kuchh ped ho sakata hai kaatane pade, kuchh hamako nadee divert karanee pade, kuchh dam banaane mein kuchh gaanv paanee se bhar jaenge, vo vyay mein indirect roop se aate hain. Usee prakaar se jahaan tak aay ka prashn hai sadak pariyojanaon mein toll se hone vaalee aay to aasaanee se samajhee ja sakatee hai ki 2 crores hai ki 2.5 crores hai jo bhee hai. Kintu usase hone vaale paroksh benefits jaise ki logon ko A se B tak jaane mein huee aasaanee jo unaka samay bacha koee beemaar tha usako aspataal le jaane mein sahooriyat ho gae. Yahaan par sadak ban jaane se isake paas mein ek audyogik ikaee lag gae isase vikaas hua logon ko rojagaar mila. Is tareeke ke benefits ya laabh kis prakaar se kvaantiphaee kie jaen, kis parkaar se unako rupe mein laaya jae aur tab cost benefit analysis kee jae aur tab is cash flow diagram ko modify kiya jae usako badala jae vahaan par thoda bahut drshtikon vaala maamala bhee aa jaata hai. To ek tareeke se sochana aur doosaree tareeke se sochana usake kuchh maanak hain, kuchh maanak nahin hai kuchh, subjectivity hamesha rahatee hai.

(Reference Time 22:26)

Aage ham log chalate hain agale module par planning evan scheduling. Isako ham log do bhaagon mein dekhate hain. Bhaag 1 jisamen ki ham charcha karenge gatividhi, breakdown structure, network diagram, poorvata ke niyam, AOA, AON jinako angrejee mein kahenge activities on arrow aur activities on nodee, bar chart, CPM, Part. Yah to ek maamala hai jisamen ki ham log gatividhi se shuroo karate hain. Kisee bhee pariyojana mein tamaam gatividhiyaan hotee hain. Ab gatividhi kee paribhaasha yah hai ki gatividhi shuroo karane ka

ek samay hota hai usake pahale vah gatavidhi nahin ho rahee hai aur isake baad vah shuroo ho gae aur hone lagee aur us gatavidhi ke samaapt hone ka bhee ek samay hota hai arthaat har gatavidhi kee avadhi hotee hai. Gatavidhi tabhee maanee jaatee hai jabaki usamen kisee na kisee sansaadhan kee aavashyakata ho chaahe vah samay ho, chaahe ho dhan ho, chaahe vo saamagree ho kuchh bhee ho. To janaralee planning and scheduling mein ham log samay par hee dhyaan kendrit rakhenge aur gatavidhi mein lagane vaale samay ko dhyaan mein rakhenge. Breakdown structure ka matalab yah hai ki ham kisee bhee project mein kaun see gatavidhiyaan hain un gatavidhiyon mein sub gatavidhiyaan hain un sub gatavidhiyon ke bhee kya parts hain un sabako agar ham ek baar list kar lete hain aur yah dekhate hain ki har part mein kya sansaadhan lagenge, kab lagenge ye agar ham pahale se taiyaaree karake rakhate hain to execution ke time mein project ko chalaane ke time mein aasaanee hotee hai. To usako kahate hain work breakdown structure banaana. Poorvata ke niyam - jab tak ham yah gatavidhi khatam nahin kar lete hain maan leejie A, tab tak ham activity B arthaat gatavidhi B ko shuroo nahin kar sakate hain jaise ki agar ham neenv jab tak nahin daalate hain makaan kee tab tak ham usake upar kee deevaar nahin bana sakate hain. To neenv banaane kee gatavidhi ek ho gae aur upar se deevaar banaane kee gatavidhi doosaree ho gae. Neenv banaana yahaan se shuroo hua yahaan par neenv ban gae. Usake baad yahaan par deevaar banana shuroo huee aur deevaar ban gae. Jab tak deevaar ban nahin jaatee tab tak ham usamen khidakee, daravaaje nahin laga sakate lekin khidakee aur daravaaje lagaane ke lie sabhee deevaaren ban jaen yah bhee jarooree nahin hai. To is baat kee charcha karana yah planning and scheduling mein aata hai ki kab kaun see activity hogee, kab kaun see gatavidhi hogee us gatavidhi mein kya saamagree chaahie hogee, kitana samay lagega, kis tareeke ke any sansaadhan lagenge.

Activity on arrow aur activity on nodee - yah baat is chitr se spasht ho jaatee hai kyonki hamane gatavidhi a ko ek arrow par rakha hai. Yah node ek, node do, node teen is pariyojana mein yah foundation thee (neenv) aur yah deevaar thee (walls). To foundation kee shuruuat node 1 par huee foundation ka ant node 2 par hua . Node 2 par hee foundation banate hee aur walls kee shuruuat ho gae aur walls (deevaar) node 3 par khatm ho gae. A jo ki gatavidhi thee foundation banaana vah arrow par aa gae. Yahaan par node 2 se lekar node 3 yah jo 2, 3 hamaara arrow hai is par activity B aa gae, to yah ho gaya activity on arrow. Isee cheej ko ham aise bhee dikha sakate the ki yah hamaaree activity A hai jab activity A khatm ho gae. To ham activity B karenge to yah ho gaya activity on node to isako kaise ham log use karate hain kaise ham log network banaate hain yah ham log charcha karenge jab ham log planning aur scheduling par vistrt charcha karenge. To bar chart, CPM, Part yah teenon ek aujaar hain jisase ki ham vibhinn gatavidhiyon ko ek chitr par dekhakar yah aakalan karane kee koshish karate hain ki aakhirakaar is project mein kitana samay lagega aur har gatavidhi ka shuroo hona kab anivaary hai ya kis gatavidhi mein hamaaree paas kitana samay hai ki ham thoda der se shuroo karen thoda pahale shuroo karanee padegee. Vishesh roop se bar chart yah bhee hamen bataata hai ki agar ham project kee monitoring kar rahe hain, to kya 3 maheene baad kya activity (kya gatavidhiyaan) us samay chal rahee honee chaahie taaki hamaara project delay na ho vah vilamb na ho? Usamen maatr in tools se ham project monitoring effectively tareeke se kar sakate hain.

Doosara bhaag aata hai sansaadhan aavantan, sansaadhan stareekaran, network crashing, crashing ka mooly, samay-laagat, trade-offs. Ab is charcha ko jo abhee tak huee bhaag 1 mein usako ham log thodee doosaree tareeke se dekhen. Agar hamaare paas do gatavidhiyaan hain jisamen ki ek hee tareeke ke sansaadhan chaahie. Hamaare paas cement hai jo ki ham chhat kee dhalae mein use kar sakate hain aur ham deevaaron ke plaster mein use kar sakate hain. Agar cement kee saplaee mein kamee hai to hamen yah tay karana hoga ki kya hamen

cement jo hamaare paas hai vah ham chhat kee dhalae mein prayog karen ya deevaaron ke plaster mein karen ya pharsh mein kar den. To yah samajhana hoga ki kis gatividhi mein karana anivaary hai. Is baat kee charcha hogee sansaadhan aavantan (allocation of resource). Ab chalen sansaadhan stareekaran - sansaadhan stareekaran ka matalab yah hai ki kisee bhee project mein jo yahaan shuroo hokar ke yahaan tak chal raha hai ham yah nahin chaahate hain ki agar maan leejie crane hai. To yahaan par ham crane ka istemaal karenge, phir ham yahaan par crane ka istemaal karenge, to is beech mein us crane ka kya hoga? Hamen usaka bhaada anaavashyak roop se vahan karana hoga. To kya ham yah kar sakate hain ki ham jis gatividhi mein crane chaahie vah yahaan kaheen kar len taaki crane ko ham chhod den ya is gatividhi ko ham yahaan par karen taaki crane hamen yaheen par chaahie ho. To yah kar paana kabhee sambhav hota hai kabhee nahin hota hai. To isako kahate hain stareekaran levelling of resource ki ham chaahate yah hain ki hamaaree pooree pariyojana mein poore project mein jo bhee sansaadhan hai vah akasmaat tareeke se unakee demand na ho aur hamaaree jo supply hai vah yathaasambhav ek samay mein hee ho. Chaahie equipment ho jaisa kee crane yah baat jan saadhaaran par bhee laagoo hotee hai, jaise welder agar hamen welding yahaan bhee karanee hai aur yahaan karanee hai to kya ham yah kar sakate hain ki jab ham welder apanee site par lekar aen to ham yah gatividhi pahale kar len. Vahee baat kabhee sambhav hoga kabhee nahin hoga lekin is baat kee jaanakaaree aur is baat ka yojanaabaddh tareeke se soch is baat ka poore project kee laagat par bahut phark padata hai yah baat dhyaan mein rakhane chaahie.

Network crashing aur crashing ka mooly- ham jab kahate hain ki yah gatividhi 4 din mein hogee. To ham jab 4 din ka ek anumaan lagaate hain to yah sochakar chalte hain ki is gatividhi mein kul itana kaam hai. To workload jo hai vah hamen pata hai aur hamaaree vah kaam karane kee kshamata kya hai vah bhee hamen pata hai to ham us kshamata aur us total workload ke aadhaar par yah 4 din anumaan lagaate hain. Crashing ka matalab yah hua ki ham kya any sansaadhan isamen agar jod den, to ham is 4 din ko 3 din kar sakate hain aur usake lie kitanee adhik laagat aaegee? Samay-laagat, trade-off bhee vahee baat hai ki kya samay ko kam karana agar ham project ko 26 haphte kee jagah 24 haphte mein kar sake to hamane poore project mein 2 haphte bachae, ab us 2 haphte bachaane ke lie agar hamen 10 lack rupe lagaane pade, to kya hamaare lie yah shreyaskar hai, yah hamen maany hai ya nahin maany hai? Agar ham maatr laagat par challenge to ham 26 haphte mein poora karenge lekin agar hamen ek incentive hai ek protsaahan hai ki har haphte hamako 10 laakh rupe milenge. Project kee avadhi 26 saptaah hai us 26 saptaah se pahale project khatam karane ke liye har saptaah par hamako 10 laakh rupe milenge. To hamako 24 haphte mein samaapt karane par 20 laakh ka bonus milega. Is 20 laakh ka bonus lene ke lie agar hamen 10 laakh rupe lagane bhee padhate hain to yah sauda bura nahin hai. Is 10 laakh kee jagah 40 laakh rupe lagaane padate hain. To ham is saude ko nahin lenge. Ham kahenge 26 haphte mein hee ham is project ko karenge. Is baat ka charcha calculation yah samay-laagat trade-off mein hota hai. Is par vistrt charcha ham udaahanon ke saath jab is module par pahunchenge tab phir se karenge.

(Reference Time 32:37)



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पाठ्यक्रम के माहौल

- परिचय एवं विहंगम छवि/दृश्य
- परिचोजना की लागत का अनुमान
- निर्माण अर्थशास्त्र
- प्लानिंग एवं शेड्यूलिंग
- गुणवत्ता प्रबंधन
- सुरक्षा प्रबंधन
- अनुबंध प्रबंधन

Aur isake saath hee ham aaj ka lecture yahaan samaapt karenge. Hamane pahale bhee kaha tha ki aaj ka lecture planning aur scheduling ke modules tak rahega aur agale class mein agale lecture mein ham log charcha karenge gunavatta prabandhan, suraksha prabandhan aur anubandh prabandhan par.

(Reference Time 32:57)



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Is slide mein ek baar phir se upayogee prakaashit pustakon ka ullekh hai aur isee ke saath main aapako phir se dhanyavaad deta hoon. Namaskaar. Jay hind.